Proliferation Fallout from the Iran Deal
The South Korean Case Study

Soo Kim

Foreword by Mark Dubowitz

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Foreword

The nuclear agreement with Iran, the Joint Comprehensive Plan of Action (JCPOA), fails to achieve the stated goal of the P5+1: blocking all pathways to an Iranian nuclear bomb. Iran has merely agreed to certain limitations on its nuclear activities—a departure from the original U.S. policy goal of dismantling Iran's illicit nuclear infrastructure. And even these modest restrictions are fatally flawed because they disappear over time. Iran, instead, will mothball certain equipment and reduce enriched uranium stockpiles for ten to fifteen years, after which Tehran can expand its nuclear activities and build an industrial-scale infrastructure powered by advanced, much more efficient centrifuges. As the United States and its partners dismantle the global sanctions regime, Iran can build greater economic resiliency against potential, future sanctions pressure.

The JCPOA will have long-ranging effects on the Middle East and on Iran’s ability to project power in an already unstable region. As the global arms embargo ends after five years and the ban on ballistic missile development disappears after eight, Iran’s military advancement will be unencumbered. Its terrorist proxies will likely benefit from greater access to Iranian cash and from Iran’s ability to legally purchase the best of Russian and Chinese heavy weaponry. A future U.S. president may find that sanctions are no longer available as an effective deterrent against Iranian nuclear weapons development or regional aggression, leaving U.S. military force as the only viable option.

Given the deeply-flawed nature of the JCPOA, it should come as no surprise that bipartisan majorities of both the House and Senate opposed the deal and that the American public overwhelming rejected it. Some members of Congress who ultimately decided not to vote against the deal did so after issuing lengthy—and anguished—statements outlining its shortcomings. Of these flaws, perhaps the most dramatic over the long term will be the impact of the Iran deal on the global nonproliferation regime.

The JCPOA reversed decades of U.S. and international policy of denying Iran the ability to enrich uranium domestically. Iran, in turn, claims that the JCPOA recognizes its “right” to enrich under the Nuclear Non-Proliferation Treaty (NPT)—despite U.S. claims to the contrary. Prior to the announcement of the JCPOA, 34 countries with civilian nuclear programs purchased nuclear fuel on the open market instead of engaging in domestic enrichment or repossessing. Only five countries (excluding Iran) with peaceful nuclear energy programs produced their own fuel. A decade from now, how many countries will have domestic enrichment or reprocessing capabilities? How will the proliferation of industrial-scale civilian nuclear programs—with many more countries on the threshold of nuclear weapons status—affect global security and stability?

In the following report, former CIA analyst and FDD National Security Fellow Soo Kim examines the South Korean nuclear program to assess how the Iran deal may have irreversibly undermined global nonproliferation standards. A strong U.S. ally, Seoul has nonetheless indicated its desire for enhanced nuclear capabilities, including the ability to produce nuclear fuel domestically. While South Korea’s primary motivations are related to domestic needs and regional security, the Iran nuclear deal—as well as other inconsistencies in U.S. nuclear policy—has provided Seoul with a predicate to push back against U.S. restrictions on expanded nuclear activity on the Korean peninsula. Indeed, as the report explains, the most recent round of

i. For example, see John Kerry, “Interview with Sir Harold Evans, Thomas Reuters Editor-At-Large,” New York, August 11, 2015. (http://www.state.gov/secretary/remarks/2015/08/245935.htm)
negotiations on the U.S.-South Korean civilian nuclear cooperation agreement has already opened this door.

In the wake of the Iran deal, policymakers in Congress and in the Executive Branch need to grapple with the impact of the JCPOA on the spread of nuclear weapons. While the Middle East remains of deep concern, Northeast Asia is a potential tinderbox of nuclear proliferation given Chinese and North Korean nuclear weapons programs, not to mention Japanese threshold nuclear capability. That’s certainly how policymakers in Seoul view their security needs. This timely report provides useful policy recommendations to tackle this challenge and a particularly insightful appendix on who’s who in South Korea’s nuclear decision-making hierarchy. The report is a must-read for members of the arms control community, Congress, the Obama Administration, presidential campaigns, and anyone seeking to mitigate the impact of the Iran deal on global proliferation.

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Introduction

The Joint Comprehensive Plan of Action (JCPOA) reached in July 2015 between the P5+1 negotiating powers and Iran resulted in a structurally flawed nuclear deal. The JCPOA provides Tehran with patient pathways to nuclear weapons and intercontinental ballistic missiles, as well as a more powerful economy immunized against future sanctions. The dispute resolution mechanism effectively constrains America’s ability to re-impose sanctions to address Iranian noncompliance, except for the most egregious violations. Additionally, terms of the deal appear to limit Washington’s ability to address non-nuclear related illicit conduct by the Iranian regime. Most important, the JCPOA abandons decades of U.S. policy and contradicts multiple U.N. Security Council resolutions by giving Iran a domestic enrichment capability and permitting that enrichment capacity to expand over time to industrial size. The agreement also grants Iran a plutonium reprocessing capacity that is only constrained by a requirement that spent fuel be shipped out of the country.

In addition, the deal may weaken Washington’s position in future nuclear proliferation negotiations, unless steps are taken now to mitigate damage to global standards and to prevent the JCPOA from setting the new precedent. During a hearing on the U.S.-South Korean civil nuclear agreement, Senate Foreign Relations Committee Chair Bob Corker (R-TN) recently noted, in connection with the JCPOA, “We’re sending very mixed signals about what our commitment really is to nonproliferation by the type of agreements we are entering into.” The Iran agreement weakens the foundations of the nonproliferation regime and undermines the so-called “Gold Standard” of nuclear cooperation that requires countries to pledge to not enrich uranium or reprocess plutonium in exchange for civilian nuclear assistance. Indeed, the JCPOA has the potential to accelerate nuclear proliferation around the world. Few countries, whether in the Middle East or in other regions of the world, may be willing to accept greater constraints on their nuclear activities than were demanded of Iran.

In fact, we may already be witnessing this potential for nuclear proliferation in Northeast Asia. In June 2015, the U.S. and South Korea (the Republic of Korea) signed a revision to their “123 Agreement”—a bilateral agreement on nuclear cooperation that Washington has with some 25 countries (derived from Section 123 of the U.S. Atomic Energy Act of 1954). Whereas the previous nuclear agreement prohibited Seoul from enrichment and reprocessing, the new U.S.-South Korean 123 Agreement leaves open the possibility of granting Seoul access to sensitive technologies for making fissile material for nuclear weapons.

This paper examines the prospects of South Korea developing threshold nuclear capabilities in light of the U.S.-South Korean 123 Agreement revision. In essence, this is a case study of potential global nuclear proliferation in the wake of the Iran deal. The paper concludes by offering several policy recommendations to prevent further nuclear proliferation on the Korean Peninsula and beyond.

Background: An Overview of South Korea’s Nuclear Program

Since the construction of its first reactor in the 1970s, South Korea has made strides in its nuclear


capabilities. Today, South Korea has the world's fifth-largest nuclear energy program and is an exporter of nuclear technology.

Lacking natural resources, South Korea depends heavily upon energy from abroad, spending nearly $200 billion—one-third of all imports—on energy.\(^3\) With a fast-growing population and rising electricity consumption, Seoul has turned to cost-effective, zero-emission nuclear power as a viable source of electricity to reduce dependence on foreign energy resources. Seoul currently has 24 nuclear power reactors in operation, providing about 25 percent of the country’s electricity.\(^4\)

But even this is insufficient. Total electricity demand is expected to increase by 2.2 percent per year over the next 15 years.\(^5\) To accommodate this increase, South Korea plans to construct 10 additional plants by 2029, reaching a total of 34.6. However, given Seoul’s limited uranium resources, it remains dependent on imports from abroad.

Recognizing the profitability of the nuclear power industry, South Korea is aggressively promoting its nuclear technology as a major export business with the goal of becoming the world’s third-largest supplier of nuclear technology behind the U.S. and either France or Russia. The Ministry of Trade, Industry, and Energy (MOTIE) aims to export 80 nuclear power reactors worth more than $400 billion by 2030.\(^7\) In recent years, Seoul entered the Thai, Greek, Malaysian, and Dutch markets, to name a few.\(^8\) The country is also trying to win a bid to build power plants in the United Kingdom, which plans to build 10 reactors by 2025.\(^9\) In 2009, South Korea signed its first major nuclear cooperation agreement with the United Arab Emirates. Under this $20.4 billion contract, Seoul will provide four reactors to the Gulf state with the possibility of providing four additional reactors.\(^10\)

South Korea also anticipates increased global demand for nuclear power reactors, as many of the world’s nuclear power plants are due for replacement in the coming years. In 2013, a South Korean consortium received a license to build the first nuclear research reactor in Jordan. The $130 million reactor is a 5-thermal megawatt version of a Korea Atomic Energy Research Institute (KAERI)-designed reactor, expected to be completed and operational by 2016.\(^11\) South Korea’s Daewoo Engineering Construction is leading the project with the involvement of the Korea Nuclear


Energy Promotion Agency. The reactor will be used to produce isotopes and serve as a focal point and training ground for engineers running the country’s proposed nuclear program.12

**Nuclear Trade Expansion through Riyadh**

The South Korean nuclear establishment made another advance in its nuclear trade expansion earlier this year with the signing of a nuclear-cooperation agreement with Saudi Arabia. It should be noted that Saudi Arabia has stated that it would seek to develop a nuclear program as a response to the one granted to Iran through the JCPOA.13 In March, South Korean President Park Geun-hye and Saudi Arabia’s King Salman signed a memorandum of understanding to cooperate on building at least two System-integrated Modular Advanced Reactors (SMART)—developed with what Seoul bills as pure Korean technology—worth nearly $2 billion. Under the agreement, the two countries will conduct a three-year preliminary study to review the feasibility of building and operating SMART units in Saudi Arabia. South Korea has dispatched some of its nuclear experts to Saudi Arabia to support the establishment of nuclear energy departments at universities, and it also set up a joint center on manpower cultivation.14 The two sides will work together further on the commercialization and promotion of SMART units to third countries.

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of $3 billion. Saudi home appliance firm Al Hassan Ghazi Ibrahim Shaker Company has also signed a non-binding agreement with LG Electronics for cooling systems in nuclear reactors.\(^\text{18}\)

South Korea views the Saudi agreement as a way to enhance its image as a nuclear superpower. It opens opportunities for major involvement in the kingdom’s nascent nuclear-power program, as well as serving as a gateway to expand Seoul’s nuclear-export market in the Middle East and North Africa.

In 2010, a Saudi royal decree designated nuclear power as an essential energy source for electricity generation and water desalination, foreshadowing the trajectory of the country’s energy program. Over the next 20 years, Saudi Arabia plans to construct 16 nuclear power reactors. Underscoring the South Korea-Saudi Arabia nuclear deal’s objectives and Seoul’s role as Riyadh’s supplier of nuclear technology, Korea’s Minister of Science, ICT and Future Planning Choi Yang-hee described the nuclear pact as “more than an ordinary agreement” for which Riyadh had substantially high hopes.\(^\text{19}\) Choi also pointed to the SMART units as “an extremely suitable” form of reactors for Middle Eastern countries with small cities dispersed throughout the country, in the hopes of appealing to other would-be buyers in the region.\(^\text{20}\)

**Hurdles to an Expanded Nuclear Program**

As Seoul seeks to expand its own nuclear program, however, it faces some constraints to becoming a completely self-sufficient nuclear superpower. The most pressing concern is the management of spent nuclear fuel. By the end of 2014, South Korea’s overall accumulated spent fuel amounted to around 80 percent of the country’s total storage capacity.\(^\text{21}\)

Between 2016 and 2021, spent-fuel storage capacity at four of South Korea’s reactor sites will be exhausted.\(^\text{22}\) Additionally, 12 of South Korea’s nuclear power reactors will reach their expiration date between 2023 and 2029.\(^\text{23}\) South Korean government officials are pressed for time to find a solution to manage the spent fuel and are currently weighing several options, including off-site storage and dry casks. Plans to select a temporary storage site by 2020, and to establish a permanent storage facility by 2051, are now underway.\(^\text{24}\)

The issue of spent-fuel management stems from difficulties in securing the physical space and the strong domestic opposition of South Koreans to siting storage facilities. Public trust in nuclear energy

\(^\text{19}\) “최양희 사우디, 원자력 인력양성 한국지원 기대 커,” Yonhap News (South Korea), March 9, 2015. (http://www.yonhapnews.co.kr/bulletin/2015/03/09/0200000000A KR20150309145700017.HTML)
\(^\text{20}\) 이희진, “최양희 미래부 장관 ‘스마트원전 수출, 창조경제 성공모델,'” NoCut News (South Korea), March 9, 2015. (http://www.nocutnews.co.kr/news/4379473)
\(^\text{21}\) Sanghyun Hong, “A Sustainable South Korea Should Stick With Nuclear,” East Asia Forum, May 21, 2015. (http://www.eastasiaforum.org/2015/05/21/a-sustainable-south-korea-should-stick-with-nuclear/)
\(^\text{23}\) Sanghyun Hong, “A Sustainable South Korea Should Stick with Nuclear,” East Asia Forum, May 21, 2015. (http://www.eastasiaforum.org/2015/05/21/a-sustainable-south-korea-should-stick-with-nuclear/)
\(^\text{24}\) “사용후핵연료 처분시설, 2051까지 건설해 운영해야.” ChosunBiz (South Korea), June 29, 2015. (http://biz.chosun.com/site/data/html_dir/2015/06/28/2015062800774.html?main_hot4)
waned following Japan’s Fukushima nuclear crisis in 2011 and was compounded by local scandals the following year involving false security certificates. In an effort to earn residents’ buy-in to build storage facilities or new reactors, the government has launched a public-engagement campaign and is offering financial incentives to districts willing to host such facilities. For example, in November 2005 the South Korean government paid $300 million to the local government in the southeastern city of Gyeongju to secure a 2-square-kilometer site for low-level waste.

Last November, the government signed an agreement with Yeongdeok County, 100 kilometers north of the Wolsong reactor in the southeastern region of the country, to build a new plant. In exchange for hosting the plant, the county will receive $1.3 billion over 60 years.

South Korea has aggressively pushed for indigenous enrichment and reprocessing capabilities as viable solutions to these challenges. Until recently, one of the major constraints to securing these rights had been the U.S.-South Korean civil nuclear agreement, which barred Seoul from obtaining that technology due to proliferation risks. But after revising the agreement in June 2015, the possibility now exists for future uranium enrichment and pyroprocessing through consultations with the U.S.

South Korea’s Case for Expanded Domestic Nuclear Capabilities

Now that Washington has agreed to permit Iran to build an industrial-scale domestic enrichment capability, South Korea has a strong precedent to cite as it presses for its right to indigenous enrichment and reprocessing capabilities. After all, South Korea’s diplomatic credibility is in much better standing than Iran’s. Unlike Tehran, it is neither a state sponsor of terrorism nor hostile to U.S. interests and national security. South Korea is one of Washington’s strongest, most reliable allies, and it is a party to the Nuclear Non-Proliferation Treaty (NPT) in good standing with its safeguard obligations. South Korea has also insisted that as a nuclear technology exporter, it has a limited ability to provide a full-service nuclear package to exporting countries. To be on comparable standing with other nuclear countries in the region, including China, Russia and North Korea, Seoul has argued that it needs enrichment and reprocessing capabilities.

South Korea had dug in its heels for years on the issue of advanced consent on enrichment and reprocessing, which allows Seoul to reprocess nuclear material transferred under the 123 Agreement without obtaining Washington’s consent in each case. The possibility of Seoul acquiring these rights to domestic enrichment and reprocessing is significant progress for the administration of President Park Geun-hye.

The structural flaws in the Iran nuclear deal make it easier for Seoul to build its case for indigenous “spent fuel management” capabilities, and complicates the U.S. case for barring a key ally from obtaining what Iran achieved through the JCPOA. Senate Foreign Relations Committee member Ed Markey (D-MA) recently warned that Washington should not leave the door open for its partners to use U.S. technology to

process spent nuclear fuel in ways that could be used as building blocks for nuclear weapons.²⁸

While South Korea is one of Washington’s most trusted allies, even reliable partners could inadvertently misuse nuclear technology, with unintended consequences for an already unstable Northeast Asia. The region is fraught with rivalries, territorial claims, and security tensions. South Korea has had an armistice agreement with North Korea since the end of the Korean War (1950-1953), but lives in fear that its erratic neighbor, the Democratic People’s Republic of Korea (DPRK), can strike at any time, with nuclear or conventional weapons. It is also surrounded by other acknowledged nuclear weapons states (China and Russia), and countries like Japan that have the technological capacity to build nuclear weapons.

Weakening of the “Gold Standard” Bolsters Seoul’s Position

Between 2010 and 2015, the United States and South Korea negotiated revisions to their 40-year-old civil nuclear-cooperation pact. Seoul pushed for the new agreement to include provisions that correspond to its elevated status in the nuclear energy domain. South Korea is no longer a recipient of U.S. nuclear supply and technology, as it now operates a nearly full-fledged nuclear power program and exports its indigenous nuclear technology to other countries.

Iran nuclear negotiations from 2013 onwards overlapped with U.S.-South Korean talks about their nuclear-cooperation agreement. Seoul watched Washington and the P5+1 give Tehran substantial nuclear concessions in response to Iranian nuclear intransigence. As a result, Seoul was fairly confident that Washington would make similar concessions on South Korean enrichment and reprocessing.²⁹ The lack of a unified U.S. stance on the “Gold Standard” of nonproliferation further strengthened South Korea’s position.

In 2012, after carefully assessing Washington’s stance on easing restrictions on enrichment and reprocessing, Foreign Minister Kim Sung-hwan told the press that the U.S. “isn’t in a position of saying ‘never’” to allowing South Korea to reprocess nuclear fuel.³⁰ Seoul was clearly certain that its wishes on enrichment and reprocessing would be granted; otherwise its officials would have been more circumspect in publicly expressing this position on a controversial and sensitive issue.

One year later, Secretary of State John Kerry and his South Korean counterpart Yun Byung-se held talks in Washington to discuss revisions to the agreement. Comments during the press conference following the talks suggested that the U.S. and South Korea were operating under different timelines—Kerry expressed his hopes for completing the renegotiation in time for President Park’s visit to the United States in May 2013, whereas South Korea appeared more at ease with a slower timetable. Yun Byung-se expressed Seoul’s

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determination to work out an agreement that offered more flexibility in expanding its nuclear capabilities. 31

From South Korea’s perspective, Washington demonstrated flexibility in its negotiating position through its inconsistent application of the “Gold Standard.” The 123 Agreement between the U.S. and UAE set the “Gold Standard” in 2009 by including a binding commitment from Abu Dhabi not to engage in domestic enrichment or reprocessing. 32 But the agreement also guaranteed the UAE would receive any benefits afforded to any other non-nuclear-weapon state in the Middle East in a peaceful nuclear-cooperation agreement. 33 In other words, if other states are granted the right to domestic enrichment under a 123 Agreement, then the UAE has the option of requesting the possibility of amending its own. The P5+1 agreement with Iran, while not a nuclear-cooperation agreement, may provide the UAE with a case to lobby for an amendment if it so chooses. This “slippage” may impact Washington’s nuclear cooperation agreements with countries around the world, including South Korea.

The South Korean government and media also scrutinized the negotiations of the Vietnam nuclear deal, which was agreed upon in 2013, in hopes of finding loopholes to bolster its own case for domestic enrichment. In October 2013, nuclear experts and policymakers speculated that Washington would drop the “Gold Standard” from its nuclear-cooperation agreement with Hanoi. 34 South Korean observers were quick to pick up on this shift in U.S. nonproliferation standards. When Washington ultimately dropped the “Gold Standard” from the Vietnam agreement, the South Korean press called it the “Silver Standard” and criticized Washington’s case-by-case inconsistencies on nonproliferation. 35

South Korea further noted the “extremely flexible” U.S. stance towards Iran’s domestic enrichment program and was quick to add that if a country from the “Axis of Evil” obtained enrichment and reprocessing rights, then South Korea, an American ally, should receive similar if not better terms. 36 Shortly thereafter, an unnamed senior South Korean official told the press that Seoul cannot accept the Gold Standard “in light of its [international] status”—referring presumably to Seoul’s rise as one of the world’s largest economies and its increasing prominence in global affairs. 37

35. “원자력협상, 미 비확산정책과 한국 자율성확대 절충 >,” Yonhap News (South Korea), February 6, 2015. (http://www.yonhapnews.co.kr/bulletin/2015/02/06/0200000000AKR20150206163900043.HTML)
36. “미국, 턱밑에 칼 주고 우방국 사지 묶어.. 원자력협정, 우리에게 열린 포승줄 요구…북수 노린 일본은 관내,” Daum blog (South Korea), March 2, 2014. (http://m.blog.daum.net/dandakhan/16584700)
Revised 123 Agreement Removes “Shackles” to ENR Technology

For South Korea, the U.S.-South Korean 123 Agreement signed in June 2015 is a milestone achievement—a “long-cherished desire,” according to President Park—and an affirmation of Seoul’s status as Washington’s partner that shares an interest in a safe and secure growth of nuclear power. The creation of the High-Level Bilateral Commission, led by the U.S. deputy secretary of energy and South Korea’s vice foreign minister, underscores the seriousness of the commitment. The commission will oversee four working groups on spent-fuel management, assured fuel supply, export cooperation, and nuclear security.

But Washington yielded on some key issues. The duration of the pact was reduced from 30 years to 20 years, after Seoul’s policymaking and nuclear communities argued that a lengthy agreement was inappropriate given South Korea’s status as one of the world’s top nuclear countries, as it would “shackle” the country’s progress in the nuclear domain. A 20-year agreement would also take into account the rapid technological change in the nuclear industry, according to Assistant Secretary of State for International Security and Nonproliferation Thomas Countryman.

On reprocessing, the provisions of the 123 Agreement state:

The reprocessing or other alteration in form or content of source material or special fissionable material transferred pursuant to this Agreement or used in or produced through the use of any source material, special fissionable material, moderator material, or equipment so transferred may take place only if the Parties agree in writing, including with respect to the facilities in which such an activity may be performed.

On enrichment, Article 11 of the agreement states:

Uranium transferred pursuant to this Agreement, and uranium used in or produced through the
use of equipment transferred pursuant to this Agreement, may be enriched only if:

i. the Parties agree in writing on an arrangement to do so, following consultations undertaken bilaterally through the High Level Bilateral Commission to be established pursuant to paragraph 2 of Article 18 of this Agreement and consistent with the Parties’ applicable treaties, national laws, regulations and license requirements, and

ii. the enrichment is only up to less than twenty percent in the uranium isotope 235.43

Though the provision does not give South Korea explicit enrichment rights, it places Seoul closer to securing the capabilities than ever before. The country currently does not have enrichment capacity.

The new agreement also acknowledged South Korea's status as an advanced nuclear state. Park Robyug, Seoul’s former special representative for the 123 Agreement, said the deal granted his country “everything it needed,” giving him confidence that the skills of Korean nuclear scientists surpassed those of their U.S. counterparts.44 The elimination of the “Gold Standard” from the agreement alone was considered a major achievement.45

The 123 Agreement opens opportunities for Seoul to potentially become one of the world’s most advanced nuclear powers, but to attain this status, the country needs to further develop certain capabilities.46 Nuclear scientist and university president Chang Soon-hung says that if South Korea successfully develops its pyroprocessing capabilities, it could have one of world’s most advanced back ends of the fuel cycle.47 Kim Hak-ro of KAERI agrees, and he enumerates a list of tasks ahead for the South Korean nuclear industry, including the potential need for uranium enrichment facilities.48

Can South Korea Make A Bomb?

After securing the ability to expand its domestic nuclear capabilities, the question remains: Will South Korea develop a threshold nuclear-weapons capability? The JCPOA permits Iran to develop an industrial-size threshold nuclear capability after ten to 15 years once key restrictions lapse. This could have a profound impact on global norms.

In South Korea, nuclear scientists and journalists have assessed how close the country is from producing nuclear weapons. Seoul has, for example, conducted experiments in laser uranium enrichment, plutonium


46. “한미원자력협정 개정 협상 타결 긴급좌담회
41년만의 한미원자력협정 개정, 연구자율권, 원전 선진화 기반 전기 마련,” Dong-A Science (South Korea), June 30, 2015. (http://www.dongascience.com/ctech/view/840/special)

47. “한미원자력협정 개정 협상 타결 긴급좌담회
41년만의 한미원자력협정 개정, 연구자율권, 원전 선진화 기반 전기 마련,” Dong-A Science (South Korea), June 30, 2015. (http://www.dongascience.com/ctech/view/840/special)

48. “한미원자력협정 개정 협상 타결 긴급좌담회
41년만의 한미원자력협정 개정, 연구자율권, 원전 선진화 기반 전기 마련,” Dong-A Science (South Korea), June 30, 2015. (http://www.dongascience.com/ctech/view/840/special)
Nuclear engineering professor Seo Kyun-ryul estimates that even without plutonium, his country may be able to produce nuclear weapons within a short time frame using laser uranium-enrichment technology. While laser-uranium enrichment is still an unproven technology for making nuclear bombs, it would help South Korea enhance its plutonium production capability.

Lee Chun-geun of the Korea Institute for Maritime Strategy argues that South Korea’s nuclear weaponization potential is underestimated and predicts a five-year timeframe for the country to produce nuclear weapons. Charles Ferguson of the Federation of American Scientists reached a similar assessment, claiming that Seoul could produce dozens of nuclear warheads using weapons-grade plutonium produced from its four pressurized heavy water reactors. This route might actually be preferable for South Korea, as it already has some reprocessing technology and many tons of plutonium stored in spent fuel. Seoul is also equipped with advanced computers to conduct nuclear reactor simulations, as well as the expertise from a number of nuclear- and electronic-related research institutions to design and manufacture nuclear explosives, not to mention delivery vehicles.

**Seoul’s Record of Nuclear Cheating**

Since the construction of its first nuclear power plant in the 1970s, South Korea has carried out a handful of secret nuclear weapons-related experiments. Many were revealed only decades after they were conducted.

During the Park Chung-hee era (1961-1979), the country carried out research to develop a long-term nuclear-weapons program. This effort was halted only after intense U.S. pressure. Subsequently, in 1975, South Korea ratified the Nuclear Non-Proliferation Treaty, foreshadowing nuclear weapons. Yet, South Korean nuclear scientists subsequently experimented with uranium enrichment technology. Between 1979 and 1981, Seoul’s scientists enriched 700 grams of natural uranium powder to 0.72 percent to assess whether a chemical-exchange process could be used to produce low-enriched uranium. KAERI scientists did not even...


51. 이춘근, “[프리미엄] 한국, 5년내 핵 수십발 제조 가능” 이 보고서, 한 능력 과소평가,” Chosun Ilbo (South Korea), May 18, 2015. (http://news.chosun.com/site/data/html_dir/2015/05/18/2015051803191.html)


bother to keep this experiment secret; they published the research results in 1981, but the government did not report the activity to the International Atomic Energy Agency (IAEA) until 2004.\(^\text{58}\)

In connection with the IAEA’s inquiries following the 2004 Safeguards Implementation Report, Seoul also acknowledged that a laboratory experiment had been conducted in the early 1980s to irradiate a mini-fuel assembly and to study uranium and plutonium separation.\(^\text{59}\) These activities had not been previously reported to the IAEA, as required under the Comprehensive Safeguards Agreement.

In 1990, KAERI scientists used atomic vapor laser isotope separation (AVLIS) technology involving small, solid-state high-power lasers on non-fissile materials, but the technology was later used for uranium enrichment. South Korean scientists conducted at least 10 AVLIS-related experiments on natural or depleted uranium between 1993 and 2000. These experiments, however, were again not reported to the IAEA as required under its safeguards agreement until several years afterwards.\(^\text{60}\) In the tests conducted in 2000, KAERI scientists separated one-fifth of a gram of uranium enriched to an average of 10.2 percent of U-235.\(^\text{61}\)

South Korean nuclear experts have also pursued experiments in plutonium separation. In 1997, IAEA inspectors found traces of separated plutonium at former KAERI research sites. South Korean nuclear scientists had apparently separated small amounts of plutonium from uranium fission products extracted from a miniature fuel assembly. In addition to not declaring the activity, they also filed a false physical inventory report on the location of the assembly.\(^\text{62}\)

### South Korea’s Arguments for Nuclear Weapons

In 1992, energy expert Peter Hayes wrote an article for a South Korean current affairs journal assessing Seoul’s likelihood of building nuclear weapons.\(^\text{63}\) He concluded that while South Korea was likely decades away from becoming a threshold state, its calculations could change rapidly. Two decades later, South Korea has developed advanced nuclear capabilities and one of the world’s biggest civilian nuclear programs. With the revised 123 Agreement allowing for the possibility of Seoul to one day acquire domestic enrichment and reprocessing capabilities, not to mention the enormous investment in manpower, money, and political capital into its nuclear industry, Seoul may decide to push for a turnkey nuclear weapons capability to match Japan or even the development of a nuclear weapon to deter North Korea.

Nuclear weapons ambitions appear to be growing among South Korea’s elite. The most commonly cited justifications for a nuclear South Korea revolve around the North Korean challenge and a diminishing


Proliferation Fallout from the Iran Deal: The South Korean Case Study

The Paradox of Nukes for Denuclearization and Reunification

The threat of North Korea has long been an argument for South Korean nuclear weapons. South Korea has endured a volatile security environment for decades in the face of the North's brinkmanship through missile and nuclear tests, military provocations, and cyberattacks. The international community's approach to solving this problem has thus far proved ineffective. When threatened, Pyongyang engages in brinksmanship. When goodwill gestures are made, the regime tends to seize the opportunity to make more demands to lift sanctions, or carries out a provocation. South Koreans are weary of the merry-go-round of diplomacy, ineffective punishments, and living under the ever-present possibility of a North Korean attack.

Some conservative politicians and journalists have made the case for nuclear weapons on the grounds that a nuclear Seoul might paradoxically force the DPRK to denuclearize and put the two Koreas on the path to reunification. For example, Chung Mong-joon, a former conservative presidential candidate and businessman, proposed that South Korea withdraw from the NPT and follow the example of India or Israel in building its own nuclear program.

He suggested that South Korea needs to match the confidence in U.S. security assurances in the event of a nuclear attack or some other large-scale provocation from Pyongyang.

When North Korea sank the South's *Cheonan* warship in March 2010 and shelled Yeonpyeong Island in November of that year, the hypothetical scenario of a DPRK attack on South Korean soil turned into a plausible reality. In the aftermath of these attacks, many conservative voices in Seoul called for a harder stance towards Pyongyang, with some advocating for Seoul's own nuclear weapons program.

But even with pressing security challenges, Seoul's leadership acknowledges that crafting a sensible nuclear policy is a complex conundrum. Foreign Minister Yun Byung-se has compared the nuclear issue to the five Olympic rings—there are disarmament, nonproliferation, peaceful use, nuclear safety, and nuclear security aspects. The rings are interconnected, and only a fine balance of all leads to an effective and safe nuclear policy.

DPRK’s nuclear progress step-by-step, committing to stop only if Pyongyang does.

Chung has been one of the more extreme proponents for a nuclear-armed South Korea, but he is not alone in making the case. Prominent journalists are also calling for South Korea to leave the NPT. In an April 2015 article, investigative journalist Cho Gab-je outlined 10 steps for Seoul’s nuclear weaponization, including using Article X of the NPT to exercise its right to leave the treaty in 90 days. Under this scenario, South Korea would remove IAEA surveillance cameras from its nuclear facilities, signaling its intent to build nuclear weapons. As an alternative, Cho suggests a clandestine option, which he assesses would require two years to reach weapons capability.

Conservative journalist Kim Dae-jung has described nuclear negotiations with North Korea as “self-deception,” arguing that the DPRK will not abandon its nuclear weapons program under any circumstances. South Korea is the “outcast” among the Six-Party states, he notes. Most other members (North Korea, China, Russia, and United States) have nuclear weapons, and Japan has the latent capacity to produce them rapidly. As such, the North maintains the upper hand to make nuclear threats. According to this argument, a robust South Korean nuclear weapons program would at least put the country on equal footing. Similarly, military strategist Lee Chun-geun claims that there are no real strategic options for Seoul in dealing with the DPRK’s nuclear system, other than deterrence through nuclear weapons.

Kim Moo-sung, leader of the ruling party, has built a case for advanced nuclear capabilities, but on the grounds that nuclear power is a cost-effective, safe source of energy. But he also has expressed the need for a nuclear weapons-based approach to dealing with the North, as talks and diplomacy have accomplished little in way of peace or security.

Anything Japan Can Do, We Can Do Better

Another argument for a South Korean indigenous nuclear weapons capability is based on Seoul’s rivalry with Tokyo, which has shut down its enrichment plants but still has in its possession highly enriched uranium.

If Japan were to seek nuclear weapons, South Korea may feel compelled to match that capability. Tokyo currently has more than 47 metric tons of weapons-useable plutonium, and the reprocessing facility at Rokkasho could add as many as eight tons of plutonium to the country’s stockpile each year. This “Japan pretext” has been widely discussed among the South Korean elite and plays into powerful nationalist currents.

During negotiations on the 123 Agreement in 2014, ruling party member Kang Chang-hee appealed to Foreign Minister Yun to promote Seoul’s right to reprocessing: “The Japanese obtained reprocessing..." KONAS.net (South Korea), June 25, 2015. (http://www.konas.net/article/article.asp?idx=42103)

75. 이영찬, “북핵과 동북아 핵도미노, 어떻게 대응할 것인가?” KONAS.net (South Korea), June 25, 2015. (http://www.konas.net/article/article.asp?idx=42103)
76. 김연정, “김무성 ‘원전 이익 더욱...정보 투명하게 공개해야,” Yonhap News (South Korea), November 28, 2014. (http://www.yonhapnews.co.kr/politics/2014/11/28/05050000000AKR20141128150900001.HTML)
rights through their stubbornness. It’s not too late for us, either.” Ruling party leader Kim Moo-sung, in an effort to increase public support for the atomic industry, noted South Korea’s superiority over Japan in the electricity and atomic energy industry.  

Others have pointed to the Fukushima nuclear disaster as a lesson in the importance of nuclear safety and implications for South Korean nuclear leadership. Kim Jong-kyung, the president of KAERI, noted that the disaster had encouraged a new beginning for KAERI. Had it not been for the Fukushima disaster, Kim said, Japan would have dominated the world’s nuclear market. But the tides turned in favor of South Korea’s atomic energy industry, and it was time for Seoul to globalize its nuclear power.  

A Torn U.S. Nuclear Umbrella  

Another rationale for Seoul’s nuclear armament centers on doubts about the reliability of the U.S. security commitment in deterring a North Korean provocation or nuclear attack. Despite public gestures of bilateral solidarity, some politicians and pundits have expressed skepticism. Rather than leaving their fate in the hands of another country, they advocate Seoul’s independent nuclear weapons program as the most effective deterrent.  

The U.S. nuclear umbrella, which long has been the most credible safeguard of South Korean security, is no longer sufficient for some. When Washington urged Seoul’s restraint following the Cheonan and Yeonpyeongdo incidents, some South Korean politicians began to doubt U.S. commitment to Seoul’s security and called for South Korea to develop its own nuclear weapons program.  

Military strategist Lee Chun-geun, for example, recently discussed a hypothetical scenario in which the U.S. nuclear umbrella would disappear once China’s regional hegemony is no longer a viable threat to Washington’s interests. In such a scenario, the U.S. would feel less of a need to maintain military presence and provide extended deterrence on the peninsula. “In this case, we do have to think about nuclear armament for ourselves,” Lee argued.  

Ruling party lawmaker Won Yoo-cheol and Kim Jong-ha of Hannam University have also cast doubts that Washington would sacrifice its own men for another war in the event of a DPRK-induced conflict on the peninsula. Kim noted that Washington’s definition and rationale for a nuclear umbrella has shifted over the years, which is inevitable given the constantly evolving global security challenges. Similarly, research scholar Lee Sang-hyun advocates Seoul’s independent strategic armament rights through their stubbornness. It’s not too late for us, either.” Ruling party leader Kim Moo-sung, in an effort to increase public support for the atomic industry, noted South Korea’s superiority over Japan in the electricity and atomic energy industry.  

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options to handle security dilemmas so as to avoid relying upon other countries to solve its problems.\textsuperscript{87}

**Cautious Voices Against Going Nuclear**

There are still those concerned that the nuclear option would only hurt Seoul's international reputation. In 2014, Peter Hayes and Moon Chung-in warned of the potential for Seoul to face an energy crisis more severe than Japan's energy shortage in 2011.\textsuperscript{88} To be sure, the risk of an energy crisis can be cited as grounds for developing an industrial-sized civilian nuclear program with domestic enrichment or reprocessing capabilities. But the probable political, economic, and reputational costs incurred against a country whose nuclear power program is a clear breach against nuclear safety norms would outweigh the benefits to securing an advanced nuclear program.

There would be economic fallout, too. Nuclear weaponization would deal a severe blow to South Korea's nuclear export industry. The U.S., France, Russia, and other Nuclear Suppliers Group countries would be expected to suspend the provision of uranium, fuel, enrichment services, and nuclear technology to Seoul if it left the NPT. While this would hurt American, French, and Japanese suppliers of technologies to South Korea's nuclear program, the loss of access to these key technologies would amount to serious hardship for Seoul.

Seoul would also fear economic sanctions, the preferred go-to coercive tool to punish bad nuclear behavior. To be sure, U.S.-led economic sanctions against South Korea would be difficult to impose. Still, Seoul remains concerned. In 2013, the Ministry of Unification posted a blog entry to its website in which the writer expressed concerns about the “inevitable economic isolation”—including “an all-out blockade” on South Korean exports—should the country decide to go nuclear.\textsuperscript{89}

Even if sanctions were to be imposed on Seoul, earlier cases of U.S. allies developing nuclear weapons suggest that the economic effects may not endure. When India conducted its nuclear explosive tests in 1998, the country faced sanctions, but they were short-lived and had a relatively minimal impact on India's economy (compared to sanctions on Iran, for example) since countries like France, the U.K., and Russia refused to join the American effort. In 2001, the United States also lifted nuclear-related sanctions on Pakistan after Islamabad offered support for Washington’s pursuit of Osama bin Laden.\textsuperscript{90}

**Policy Recommendations**

While South Korea has pursued low-level nuclear weapons technology in the past, its motivations for pursuing a robust nuclear power program are primarily for peaceful, economic purposes. Yet a loosened or inconsistent U.S. stance on its “Gold Standard” could encourage South Korea to push for domestic enrichment or reprocessing and develop industrial-size capabilities to match Japan’s nuclear-weapons threshold status.

\textsuperscript{87} 양승식, “’한반도 핵우산은 ‘_CID’…” 北核 도발에 취약,” Chosun Ilbo (South Korea), July 16, 2015. (http://news.chosun.com/site/data/html_dir/2015/07/16/2015071600344.html?Dep0=twitter&d=2015071600344)


\textsuperscript{89} 구희상, “한국의 원자력 정책을 알아보자,” Ministry of Unification Official Blog (South Korea), May 1, 2013. (http://blog.unikorea.go.kr/3343)

U.S. policymakers need to take immediate steps to mitigate the damage that the UAE’s 123 Agreement and the Iran deal may have on global nonproliferation standards.

1. Mend the torn nuclear umbrella: As noted above, one of Seoul’s justifications for pursuing a threshold nuclear weapons capability is North Korea’s periodic provocations and military threats. Coupled with the enhanced defense capabilities of South Korea’s regional neighbors, Seoul perceives a weakening of its security position. Perceived shifting U.S. alliances in the Middle East away from traditional allies and towards Tehran may have additional ripple effects in Northeast Asia.

Washington needs to mitigate South Korea’s security concerns through a firm and enduring commitment of U.S. support, particularly with respect to the threat from North Korea. An indigenous nuclear weapons program may seem less appealing to Seoul if Washington demonstrates continued and constructive efforts vis-à-vis North Korea. The DPRK’s provocations and bad behavior, such as missile tests, and military and cyber attacks, should be met with punitive responses. This should include economic sanctions, increased political isolation, and coordinated efforts with our allies to target North Korean illicit financial and procurement networks. While North Korea is less economically integrated with the global community than Iran, for example, the U.S. Treasury has developed innovative tools to leverage key vulnerabilities. For example, Washington’s use in 2005 of the PATRIOT Act’s Section 311 authorities against the Macau-based Banco Delta Asia froze North Korea’s access to the global financial system, including banks in China, to a dramatic economic effect.91

Furthermore, because of the long-standing relationship between North Korea and Iran, there is cause for concern that this relationship may involve a nuclear element.92 North Korean scientists who played central roles in this relationship should be considered for designation under counter-proliferation sanctions. Strict enforcement of the nuclear procurement channel provided for in the Iran nuclear deal, and enhanced interdiction of illicit trade between Tehran and Pyongyang, are necessary to block the two rogue regimes from exploiting flaws in the Iran deal. Robust prosecution of violations will demonstrate to Seoul—and to other U.S. allies—that America’s nuclear and defense umbrella is intact.

2. Demonstrate renewed commitment to global nonproliferation norms: The nuclear deal with Iran raises questions about the new standards in the global nonproliferation regime. Allowing an adversary to possess nuclear weapons capabilities while denying this capability to allies sends a mixed message about U.S. nonproliferation policy and sullies its credibility. Even beyond the Iran deal, Washington’s track record has not been reliable or consistent, having walked back from the Gold Standard in several nuclear cooperation agreements.

The Iran deal makes this situation even more acute. To prevent the Iran deal from setting a dangerous precedent, Washington needs to demonstrate the “unattractiveness” of Iran’s nuclear path. Consistent messages from administration officials and members of Congress that investment in Iran poses risks for international business will likely have a cooling effect on market enthusiasm, even as sanctions are suspended. Anemic Iranian economic performance may help demonstrate the long-term effects of becoming a nuclear outlaw, even with a deal in place.


If the U.S. is serious in about its commitment to nonproliferation, it needs to demonstrate to both allies and adversaries the consequences of developing nuclear weapons. The United States therefore needs to articulate—privately, publicly, and potentially in law—the steps it is prepared to take to defend its understanding of the rules of the global nonproliferation regime. A consistent U.S. policy on nonproliferation, along with airtight, enforceable, punitive measures would send a clear message to states mulling the acquisition of nuclear weapons capabilities.

3. Assess the impact of warming Seoul-Beijing ties: The U.S.-South Korea alliance remains Seoul’s strongest security and political guarantee, but the “China factor” in Seoul’s economic and strategic calculus should not be dismissed. South Korea has shown signs of opening up to its regional neighbor, with President Park attending China’s World War II commemoration in September 2015.93 Seoul and Beijing also jointly warned North Korea against future provocations on the peninsula in an effort to reduce regional tensions.94 Growing South Korea-China ties may provide South Korea with the leverage to express greater independence from the United States on key issues, including its nuclear program.

Of course, the U.S.-South Korea alliance is built upon decades of unique trust incomparable to any prospective conditional benefits of stronger South Korean cooperation with China. But this evolving alliance should not be ignored. The U.S. government should engage in strategic assessment and in-depth policy planning across multiple agencies to assess the impact that this bilateral relationship may have not only on Washington’s ties with Seoul, but also on U.S. global standing and leadership over the long term. Congress should similarly be engaged in this assessment, holding public and private briefings with administration officials. To this end, Congress can task the U.S.-China Economic and Security Review Commission with preparing a report on South Korea-China relations. The Commission’s work already includes assessments of China’s relationships with other countries in the region.

Policymakers may decide that Beijing is a challenge to U.S. leadership in the region, and prompt Washington to strengthen its alliances against China. Alternatively, the U.S. may assess that there are strategic advantages to greater South Korean-Chinese cooperation and could work to forge a closer trilateral relationship. Indeed, enhanced cooperation with China could potentially deter Seoul from seeking nuclear weapons, or it could have the opposite effect. At this stage, more research is needed.

94. “China’s Xi Calls for Restart of Nuclear Talks with N. Korea,” Yonhap News (South Korea), September 2, 2015. (http://english.yonhapnews.co.kr/national/2015/09/02/9/030100000AEN20150902009300315E.html)
Appendix: Who’s Who in South Korea’s Nuclear Decision-Making

This report analyzed prospects of South Korea acquiring the technologies to build nuclear weapons and becoming a threshold nuclear state. It examined the ROK’s nuclear capabilities as well as any intent, active or dormant, to steer the country’s atomic energy industry towards nuclear armament at the appropriate time.

Knowing the individuals who work on the issue and implement policies is key to understanding the decision-making of any country. A president or leader selects candidates of specific backgrounds, skills, and strengths to implement his or her policies. In the case of South Korea, the nuclear program is one of its national priorities, an all-out effort across the government, academia, and civilian organizations.

As the South Korean nuclear program is expansive— with many stakeholders and overlapping purviews—we have limited the list to those at the top levels of the government and nuclear power industry. We include policymakers from the presidential administration, Foreign Ministry, Science, and Economic ministries as well as research organizations and regulatory agencies. Some have explicitly stated their views on the nuclear issue, while others have generally maintained the official ROK stance on the topic. Through these nine profiles, we aim to provide a sketch of the contours and vision of South Korea’s nuclear program.

YunByung-se
Minister of Foreign Affairs (since March 2013)

A career bureaucrat, Foreign Minister Yun Byung-se has earned recognition as a foreign policy and national security expert across conservative and liberal lines. He has worked primarily on U.S.-related assignments, including as Minister of the South Korean Embassy in Washington (2002-2004), Deputy Director-General of the Foreign Ministry’s North American Affairs Bureau (1999-2000), and Director of the North America Division (1994-1995).¹

However, he is also well-versed in other matters, including Japanese affairs, the United Nations, and international organizations. President Park most likely selected Yun to underscore the importance of Seoul’s alliance with Washington, its most important ally, and to signal Korea’s intent to continue to prioritize U.S. relations over other bilaterals.

Yun, 62, earned a B.A. in Law (1976) and an LL.M. (1978) from Seoul National University, as well as an M.A. in International Relations (1983) from the Johns Hopkins University School of Advanced International Studies in Washington.²

He was previously a member of the Foreign Affairs, National Defense, and Unification Subcommittee

on Park’s presidential transition team. He and Park became acquainted around 2009, when Yun was serving as a visiting professor at the Graduate School of International Studies at Sogang University, Park’s alma mater. Park consulted Yun on a handful of policy matters, and in 2010, she asked for Yun’s support as a member of her policy think tank, the National Future Research Center. Here, he worked on Park’s foreign policy platform and became one of the primary architects of her “Trustpolitik” process on the Korean Peninsula.

Nicknamed Park’s “foreign policy wonk,” Yun is widely known to be the brains and chief architect of the President’s foreign policy strategies. He has gained the President’s confidence and acknowledgement despite having served in top positions of the liberal Roh Moo-hyun administration (2002-2007), including as Deputy Foreign Minister (2006) and Senior Presidential Secretary for Foreign, Security, and Unification Policy (2006-2007). When asked whether she had reservations about working with Yun due to his previous position in a liberal administration, Park replied, “Is there ideology in policy? That doesn’t matter to me.”

Befitting his position as South Korea’s highest-ranking diplomat, Yun has remained noncommittal on the issue of Seoul’s nuclear program, treading carefully so as not to make comments veering from the presidency’s official stance on this sensitive topic. But Yun has made some remarks on the nuclear issue that reveal South Korea’s commitment to making nuclear power a long-term strategic priority.

Yun sees the Iran nuclear issue as having a ripple effect on North Korea’s nuclear weapons program and has been closely following the debate and negotiations surrounding Tehran’s nuclear program. In June, he urged the DPRK to take a lesson from Iran’s example and return to the dialogue table on Pyongyang’s own nuclear program.

Hwang Kyo-ahn
Prime Minister (since June 2015)

Hwang assumed the prime ministership in June. The 58-year-old holds an LL.B. (1981) and LL.M. (2006) from Sungkyunkwan University. He is the Park Geun-hye administration’s sixth prime ministerial nominee; three of Hwang’s predecessors withdrew their nominations even before confirmation hearings in the National Assembly, and one stepped down to take responsibility for the Blue House’s handling of the 2014 Sewol Ferry incident.
The prime minister role is largely an executive administrative role, with limited responsibilities such as leading the Cabinet and supervising ministries. Nevertheless, the Nuclear Safety and Security Commission (NSSC), which regulates the country’s nuclear industry, reports to the prime minister. Thus, decisions involving nuclear safety inspections and the enforcement of emergency safeguards will likely pass through Hwang for approval.

Hwang was most recently South Korea’s Minister of Justice (2013-2015). Previously, he served as Chairman of the Election Broadcast Deliberation Committee for the 19th General Elections. His career as a prosecutor spans several decades and various districts, including Busan (2011), Daegu (2009), and Seoul (2005).

Lee Un-chul
Chairman/Chief Regulating Officer, Nuclear Safety and Security Commission (since April 2013)

An “expert among experts” in atomic engineering, Lee Un-chul assumed the chairmanship of the Nuclear Safety and Security Commission (NSSC) when nuclear power was one of the most controversial issues in South Korea. Lee became chair just two months after North Korea conducted its third nuclear test and while the U.S. and South Korea were locked in tense discussions on the 123 Agreement. Domestically, the industry was embroiled in allegations of bribery and issuing fake safety certifications for nuclear reactor parts. Lee was therefore tasked with redeeming the nuclear establishment’s tarnished image and restoring public confidence in nuclear power. Lee claims that meeting the South Korean public’s standards for safety—which is “the highest in the world”—is one of NSSC’s greatest challenges.

The NSSC, which was formerly at the ministerial level, was subsumed under the prime minister when Park came into office. Lee says that this new status brought new challenges for the NSSC, including the absence of an authority to guarantee the organization’s independence and the lack of monetary and manpower resources to handle all of its responsibilities.

Chairman Lee’s nuanced understanding of nuclear technology and safety affords him the ability to break down complex concepts for the general South Korean public’s comprehension, which is of great utility as public engagement holds sway in Seoul’s nuclear policy. Lee has authored several books to educate the South Korean public on nuclear safety and energy, including a children’s trilogy on energy, future energy, nuclear energy. In 2012, he wrote a research paper for the layman titled “Is Nuclear Power Safe?” The paper aimed to mitigate some of the South Korean population’s biggest concerns about nuclear power.

9. “[프로필] 이은철 신임 원자력안전위원장,” News1 (South Korea), April 12, 2013. (http://news1.kr/articles/?id=1088178)
12. “이은철,” Naver.com People Profile, accessed July 2, 2015. (http://people.search.naver.com/search.naver?where=nexsearch&query=%EC%9D%B4%EC%9D%80%EC%B2%A0&sm=t_ab_etc&ie=utf8&key=PeopleService&os=152767)
nuclear technology, including safe levels of radiation, the need for nuclear power in small countries, and nuclear energy as a viable resource.

Lee, 58, earned a B.A. (1969) and M.A. (1971) in nuclear engineering from Seoul National University, as well as a Ph.D. in nuclear engineering (1976) from the University of Maryland. He served as professor in Seoul National University’s nuclear engineering department for 35 years. \(^{14}\)

**Yoon Sang-jick**  
Minister of Trade, Industry, and Energy (since March 2013)

Yoon spent most of his career in the Ministry of Trade, Industry, and Energy developing expertise in trade, energy resources, foreign investment, and electronics. He previously served as the First Vice Minister of Knowledge Economy (MKE) (2011-2013) and Standing Commissioner for the Korea Trade Commission (2009-2010). \(^{15}\) Yoon was also MKE’s Director-General for Energy Resources Development (2008-2009) and Secretary-General for the Korean Electricity Commission (2006).

As Minister of Trade, Industry, and Energy, Yoon is focused on developing programs to increase South Korea's energy supply from both domestic and foreign sources and to turn the ROK into a global business hub. He is also a major proponent of nuclear energy.

In March, he accompanied Park on her nine-day trip to the Middle East, visiting Kuwait, the UAE, Saudi Arabia, and Qatar. In 2014, Yoon and the MKE signed a Memorandum of Understanding with the UAE’s Ministry of Energy to promote the exchange of information, know-how, and manpower in the energy sector. \(^{16}\) The two countries also agreed to explore joint business opportunities and university-level research cooperation.

Yoon appears to be invested in Seoul’s spent nuclear fuel issue. In 2014, when asked about the ROK’s plans to construct spent fuel storage facilities, Yoon cautioned that there was very little time left to spend on the issue, and expressed his determination to resolve the spent nuclear fuel issue during his term. \(^{17}\)

Yoon’s bias toward nuclear energy—and presumably some pressure from the presidency to make strides in the country’s nuclear program—may have gotten the better of his judgment earlier this year. In April, he was accused of pressuring the Yeongdeok council chair to support the government’s plans to construct a new nuclear power plant in the region. According to the council chair, Yoon tried to coerce him in a telephone call to remove a survey question concerning the health effects of living near a nuclear power plant. \(^{18}\) MOTIE’s spokesman denied the allegations, saying Yoon merely made the call to improve cooperation with Yeongdeok’s residents and never even saw the survey questions.


Yoon Sang-jick was born in 1956 in North Kyongsang Province. He earned a B.A. in International Economics (1981) and M.A. in Political Science (1984) from Seoul National University, and an M.A. in Law (1996) from Korea University’s Graduate School. He also has an LL.M. (1998) and S.J.D. (2007) from the University of Wisconsin-Madison. Yoon is a member of the New York State Bar and holds a CPA license in Delaware.  

Moon Jae-do 
Second Vice Minister of Trade, Industry and Energy (since July 2014)  

As Second Vice Minister of Trade, Industry, and Energy (MOTIE), Moon Jae-do works closely with Minister Yoon Sang-jick to manage South Korea’s nuclear program, particularly with respect to energy and fuel supply. The Office of Energy and Resources—which includes divisions in nuclear industry policy and management, nuclear export promotion, and the environmental effects of atomic energy—falls under Moon’s purview.

Moon’s policy priorities include nuclear safety and spent fuel management. He asserts the importance of the South Korean public’s opinion on atomic energy, and called for the need to “transform the paradigm” of the nuclear industry to pursue a safety-first nuclear policy. In June, Moon spoke at a Public Engagement Commission on Spent Nuclear Fuel Management (PECOS) event, where he vowed to come up with a solution for the spent fuel issue “as soon as possible” so that the issue would not be passed on to South Korea’s future generations. Moon also regularly tours nuclear power plants to monitor safety standards and improve communication with residents of host districts.

Moon Jae-do, 56, holds a B.A. in Economics (1982) and M.A. in Public Administration (1985) from Seoul National University, as well as a Master’s in Management Science (1986) from the Korea Institute of Technology.

Choi Yang-hee  
Minister of Science, ICT, and Future Planning (since July 2014)  

As South Korea’s Minister of Science, ICT, and Future Planning (MSIP), Choi Yang-hee is commissioned to implement policies and programs in support of Park’s “creative economy” platform. Choi, unlike many of the officials who have a hand in Seoul’s nuclear policy, does not have nuclear-engineering or policy credentials. However, Choi’s science background gives him a sense of the importance of nuclear power to South Korea’s longer-term security and economic vision, enabling him to serve as an authoritative voice in promoting nuclear safety, research, and development.

23. President Park Geun-hye describes creative economy as the idea of creating new engines of growth and employment through “the convergence of science and technology with industry, the fusion of culture and industry, and the blossoming of creativity in the very borders that were once permeated by barriers.”
Choi is first and foremost an academic, having spent the majority of his career in universities and research institutions. He asserts that nuclear power is “more economically feasible than other forms of energy” and forecasts its importance to only increase with time.24 To that end, he advocates research and development in small- and medium-sized nuclear reactors, future nuclear systems, sodium fast reactors, and radiation technology. He praises South Korea’s comprehensive nuclear industry as having the potential to “pioneer the overseas [nuclear] markets.”25

Choi has been an authoritative proponent of South Korea’s nuclear cooperation with Saudi Arabia, being judicious as to tie these ventures to Park’s “creative economy” vision. He has promoted South Korean nuclear reactors as an example of successful economic growth, has stated that the Korean-developed SMART units are ideal for Middle Eastern countries, and cited the South Korean government’s plans to expand its nuclear export industry into other Middle Eastern and North African countries.26

Choi Yang-hee was born in 1955 in Kangwon Province. He earned a B.S. (1975) and M.S. (1977) in Electronics Engineering from Seoul National University and the Korea Advanced Institute of Science, respectively. He also holds a D.Eng. in Computer Science (1984) from the Ecole Nationale Superieure des Telecommunications (ENST) in France.

Lee Suk-joon
First Vice Minister of Science, ICT, and Future Planning (since July 2014)

A 30-year veteran in the Ministry of Science, ICT, and Future Planning, First Vice Minister Lee oversees the ministry’s budget coordination, “creative economy” planning and research and development. The ministry’s Nuclear Policy Division and Space, Nuclear, and Big Science Cooperation Division are also under Lee’s purview. Lee stresses the importance of earning the South Korean public’s trust to gain traction on the nation’s nuclear power development plans. Speaking at the Korea Atomic Power Annual Conference in April, Lee emphasized the need for the nuclear industry to “share everything” with the constituents and view the nuclear power issue from the public’s optic.27

Described as an “authentic bureaucrat in finance and economics,” Lee has worked mostly in policy and administrative positions, focusing on budget, finance, and real estate.28 Prior to assuming his current role, Lee was Second Vice Minister (2013-2014). He served as the Director-General of the Policy Coordination Bureau (2010-2011), Deputy Director-General of the Economic Affairs Budget Bureau (2009-2010), and Policy Advisor to the

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Minister (2005-2006).29 Earlier in his career, he was First Secretary of South Korea’s Permanent Mission to the U.N. Secretariat and International Organizations in Geneva (1996-2001).

Lee Suk-joon was born in 1959 in Busan. He earned a B.A. in Economics (1982) from Seoul National University, an M.A. in Economics (1984) from Chung-Ang University, and an M.S.M.S. from the Massachusetts Institute of Technology’s School of Management (1992).

Cho Seok
CEO, Korea Hydro & Nuclear Power Company, Ltd. (since September 2013)

Cho Seok spent the majority of his civil service career in the Ministry of Knowledge Economy, where he gained expertise in industry economy, natural resources, growth engines, commerce and trade, and the atomic energy industry. He was named CEO of Korea Hydro & Nuclear Power Company following a three-month leadership vacuum after his predecessor resigned.30 Prior to that, Cho was the CEO of the Korea Industrial Complex Corporation and served as the Second Vice Minister of Knowledge Economy (2011-2013). Cho’s appointment as Vice Minister followed a public uproar over the Lee Myung-bak administration’s series of unannounced, planned blackouts as a mechanism to deal with energy shortages. Lee appointed Cho as Vice Minister to spearhead the country’s efforts to develop resources overseas and stabilize the energy supply.31

Cho has been credited with restoring public trust in nuclear energy safety following the 2011 Fukushima nuclear disaster. He played a major role in solving the controversial issue of finding a site for a low- and intermediate-level radioactive waste disposal center in Gyeongju. In 2014, he led the negotiations for the constructions of Ulchin and New Hanul nuclear power plants.32

Cho and KHNP support the South Korean government’s strategic vision of becoming an energy-independent country through the development of nuclear technology. In his greetings to KHNP employees, Cho underscored the importance of developing atomic energy to handle “the instability of the economy,” which is a “risky factor” that should not be overlooked. Per Cho, South Korea needs to develop its nuclear energy program because “competition for green growth among nations” is becoming “more severe.” Cho is also a major proponent of improving communication between the nuclear industry and the public.

Cho was born in 1957 in North Jeolla Province. He earned a B.A. in International Relations (1981) from Seoul National University, an M.A. in Economics (1997) from Missouri State University, and a Ph.D. in Economics (2007) from Kyunghee University.

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Kim Jong-kyung
President, Korea Atomic Energy Research Institute (since January 2014)

As President of the Korea Atomic Energy Research Institute (KAERI), Kim Jong-kyung is responsible for steering South Korea’s research and development efforts on nuclear energy. He was appointed to KAERI’s presidency in January 2014, a position he will hold until January 2017. Since assuming his post, Kim has focused his energies on developing new domestic- and export-oriented nuclear technology as well as mitigating the public’s concerns about the safety of nuclear energy.

Prior to assuming his current role, Kim was a nuclear engineering professor at Hanyang University. He is credited with building the university’s radiological sciences field to one of the nation’s top programs alongside Seoul National University and KAIST. He has served in numerous leadership positions in nuclear safety- and radiation-related organizations, most recently as the President of the Korean Nuclear Society (2013-2014). Kim was also the Vice Chairman of the Korean Peninsula Energy Development Organization (KEDO, 2003-2006) and a board member of the Korea Atomic Industrial Forum (1999-2008) and the Korea Institute of Nuclear Safety (2002-2008). He served as a member of the Nuclear Safety Review Board of UAE’s Emirates Nuclear Energy Corporation.

Kim holds the South Korean nuclear establishment in high esteem, evaluating the industry’s design, construction, and research capabilities to be comparable to the technology of developed countries. However, he noted that Seoul’s aim is to go from being a “top-ranked” nuclear country to becoming “the world’s best.” To this end, Kim pledged to improve the atomic energy establishment, budget and infrastructure to support a more “innovative and challenging” nuclear research program during his term. Kim endorses KAERI’s research efforts—specifically, SMART unit technology, nuclear research reactors and radiation technology—as supporting Park’s “creative economy.”

Kim was born in 1953 in North Chungcheong Province. He attended Hanyang University and later transferred to the State University of New York at Buffalo, graduating in 1980 with a B.A. in nuclear engineering. He also holds an M.A. (1982) and Ph.D. (1986) in nuclear engineering from the University of Michigan.

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36. 구본혁, “[POWER INTERVIEW] 김종경
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Soo Kim is a 2015 FDD National Security Fellow and former CIA analyst and linguist. Her specialty is in authoritarian regimes, leadership and decision-making, and propaganda analysis. As an intelligence officer, Soo served on several interagency task forces to respond to emergent events around the world. She has interned for *NBC Nightly News with Tom Brokaw* and CNN International, focusing on foreign policy and investigative stories.

Soo holds an M.A. in International Relations from the Johns Hopkins University SAIS and B.A. in French from Yale University. She speaks Korean, French, Russian, and Japanese.

Photo Sources

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