ASAN 2013 NUCLEAR FORUM

Proceedings

February 19-20, 2013

The Asan Institute for Policy Studies

THE ASAN INSTITUTE for POLICY STUDIES

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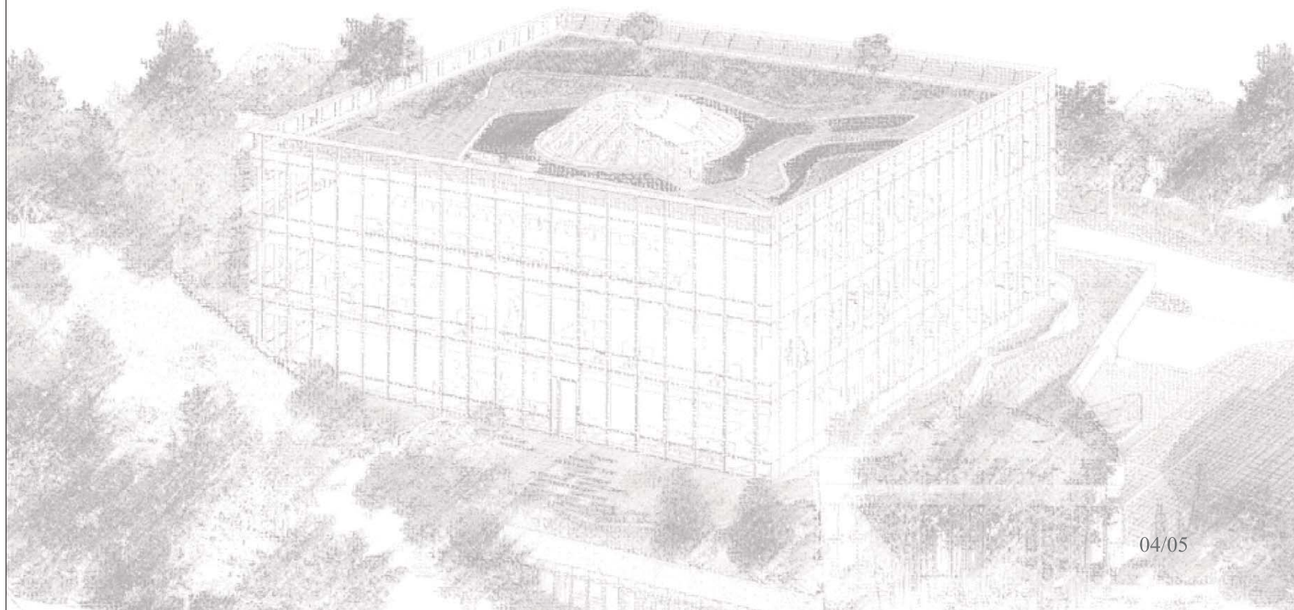
Greetings from the President

It is my great pleasure to welcome you to the *Asan Nuclear Forum 2013*.

This year's Forum brings together more than 200 leading nuclear policy and technology experts from around the world to analyze, discuss, and debate three major nuclear policy topics of 1) nonproliferation, 2) peaceful use of nuclear energy, and 3) nuclear security.

The threat from a nuclear North Korea has become even more urgent since its successful rocket launch and its provocative plans for a third nuclear test in 2013. A series of accidents in South Korean nuclear power plants has eroded public trust in their safety. Since successfully hosting the 2012 Seoul Nuclear Security Summit, South Korea has continued to play a major role in strengthening global nuclear security architecture.

I hope that our discussions over the next few days will contribute to a clearer assessment of the current state of global nuclear issues and provide policymakers with feasible and effective solutions for dealing with the challenges to our peace and security.



About the Asan Nuclear Forum

The *Asan Nuclear Forum* is an annual gathering of some 200 leading nuclear scientists, engineers, policy analysts and public intellectuals from around the world as well as the institutions they represent. The Forum will feature four plenary sessions and eighteen panels over two days.

Asan Nuclear Forum 2013

In terms of both timing and location the *Asan Nuclear Forum 2013* is designed to maximize its impact on the unfolding conversation on global nuclear problems and challenges. The agenda of this Forum holds particular significance for Northeast Asia. In the aftermath of the Fukushima Daiichi accident, the region faces decreasing public confidence in the safety of nuclear facilities yet there is increasing support for nuclear disarmament and for the strengthening of the nonproliferation regime because of the nuclear crisis on the Korean Peninsula.

Considering the problems that remain and the new challenges that are now emerging this forum will address whether nuclear energy will continue to be a viable energy source in the future and whether we can truly achieve a “world free of nuclear weapons.” What are the challenges that global leaders must confront in terms of nuclear policy and technological developments? What choices will they make? These are some of the questions that will inform the discussions, debates and analyses during the Forum.

About the Asan Institute

The Asan Institute for Policy Studies was founded with a mission to become an independent think tank that provides effective policy solutions to issues which are critical to Korea, East Asia, and the rest of the world.

The Institute aims to foster wide-ranging and in-depth public discussions which are essential for a healthy society. By focusing on areas including foreign affairs, national security, public governance, energy, and the environment, it strives to address some of the major challenges that our society faces today.

The Institute addresses these challenges not only by supplying in-depth policy analysis but also by endeavoring to promote a global and regional environment favorable to peace, stability, and prosperity on the Korean Peninsula.

In addition to policy analysis and research, the Institute undertakes the training of specialists in public diplomacy and related areas in an effort to contribute to Korea’s ability to creatively shape its own future.

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February 19, 2013

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Opening Ceremony

Date: February 19, 2013
Time: 09:30-10:10
Place: Regency Room

Opening Remarks
by Dr. Hahm Chaibong, President of the Asan Institute

Welcome to the first Asan Nuclear Forum, especially a warm word of welcome to all our guests from overseas. We have participants from 23 different countries, numbering about 120. If we include the Koreans, we are estimating roughly about 300 guests at any given time over the next two days. First, my apology for the lack of enough seats in this arena, especially for those standing in the back.

The enthusiasm that is apparent here is testimony to just how important the issues are that we will be discussing over these two days. As I like to say, when it comes to nuclear issues, South Korea is involved in every single aspect of it; you name it, in terms of proliferation issues, energy, security, commercial use. South Korea is deeply involved. And there are many issues that are sometimes mutually conflicting, but all of them are essential to our national interests and also to the interest of this region and globally. I appreciate all of you being here and I ask you to give us solutions. Give us answers to so many questions and issues that plague us.

Now I would like to introduce to you the first speaker, Dr. Chung Mong Joon, who is a seventh-term National Assembly member. He is the senior most member of the National Assembly, not in terms of age as he likes me to say. Until last term, he used to be the president of the Korea-US Inter-parliamentary Council and now, starting with this term, he is the president of the Korea-China Inter-parliamentary Council. One thing he did ask me to emphasize when I introduce him today is that he received his Ph.D. from Johns Hopkins University SAIS in American foreign policy, which is a very important topic. He tells me that during his comprehensive examination he had to take the comprehensive exam on that subject for a whole day and it involved topics such as American nuclear policy and strategy. And his mentors were Robert Osgood and Rob Tucker. So, what I'm trying to say is that he is eminently qualified to speak on this very important topic. Now I would like to ask all of you to join me in welcoming Dr. Chung Mong Joon.

Welcoming Remarks
by Dr. Chung Mong Joon, Honorary Chairman of the Asan Institute

Good morning. Welcome to the *Asan Nuclear Forum*.

The *Asan Nuclear Forum* is a gathering of the world's foremost experts on all aspects of the nuclear issues confronting us. This morning, allow me to focus my remarks on the most immediate and serious nuclear issue my country faces today, North Korea's nuclear armament.

Nuclear proliferation has become a major challenge for the global community. A newspaper headline after North Korea's recent nuclear test was, "Testing a weapon, and the World." Indeed, the world is being tested.

Four years ago in Seoul, Rupert Murdoch asked me "Do you know what the biggest news in the world is today?" The answer he said was "Iran's nuclear program." Even back then the Iranian nuclear program was two to three years behind North Korea's.

Exactly a week ago, North Korea tested a nuclear device for a third time. North Korea has already declared in the preamble to its constitution that it is a nuclear state. Last month, it announced the "Declaration on the Denuclearization of the Korean Peninsula" of 1992 to be "completely null and void." Most recently, it declared that it will not engage in any denuclearization negotiations. It did add, however, that it is interested in negotiating a "peace treaty" with the US. This shows that North Korea has yet to give up its dream of reunifying the Korean Peninsula under its own terms.

In South Korea, we still lack a consensus on how to deal with North Korea. This is because we do not agree on the nature of the regime.

The nature of Communism was revealed in the famous "Long Telegram" by George Kennan. In this pivotal document, Kennan argued that there was nothing the outside world could do to change the Soviet Union's behavior. Soviet leaders had to treat the outside world as hostile because this provided the only excuse "for the dictatorship without which they did not know how to rule."

He warned that we should not assume hospitality that would accumulate in dealing with Communism. It is naïve to expect that concessions would be reciprocated.

There is one thing, however, that Communists respond to, said Kennan, and that is power. "Impervious to logic of reason, it is highly sensitive to logic of force."

Some in the South still say that the time is on South Korea's side. However, North Korea most likely thinks that time is on its side.

In fact, we have already had a foretaste of what is to come with the sinking of the *Cheonan* and shelling of the Yeonpyeong Island in 2010.

Now, let' talk about China. Here, the question is why China is not willing to help. And the answer is China still thinks that North Korean regime stability is more important than nuclear armament.

Already surrounded by nuclear powers such as Russia, India, and Pakistan on its border, China does not

think North Korean nuclear weapons to be a serious threat to its security. In private conversations, Chinese experts admit that North Korea will never abandon its nuclear arsenal.

China does not seem to be worried about East Asian nuclear dominos either because it thinks that the US will never allow South Korea and Japan to go nuclear.

Knowing all this, North Korea is convinced that China will never abandon it no matter what it does.

What about the US? It used to mention CVID, "complete, verifiable, irreversible dismantlement" of nuclear weapons in North Korea. However, after the first North Korean nuclear test, it has stopped calling for CVID. It now seems concerned only with nonproliferation.

The ROK-US alliance has been one of the most successful military alliances in history. However, when it comes to North Korea's nuclear ambitions, it has been an abject failure.

US military commanders say that if North Korea launches an attack on South Korea, US can wipe-out North Korea just with conventional weapons. That is probably true from a military point-of-view. However, if such views lull Washington into a false sense of security and to think that all is quiet on the Korean front, this is a serious problem.

In an age of a nuclear-armed North Korea, we need to think the unthinkable.

Two years ago, in a speech at the National Assembly, I proposed the re-introduction of tactical nuclear weapons to South Korea. The weapons were voluntarily withdrawn in 1991, shortly before the "Declaration on the Denuclearization of the Korean Peninsula" in 1992.

I did so because the threat of a counter-nuclear force can be the only thing that will discourage North Korea from developing its nuclear arsenal.

A day after my speech, China's *Global Times* reported the story. Four days later, it carried an editorial in which it called my proposal a "dangerous gamble." It was the first time that we were able to elicit proper concern and response from the Chinese.

The advantage of this option is that these are US weapons and therefore, South Korea will not be in violation of the NPT. We would simply be restoring the pre-1992 condition, pending North Korea's denuclearization. Some say that the US "nuclear umbrella" is a "torn umbrella." If so, we need to repair it.

Some even say that the only way to solve the North Korean nuclear problem is for South Korea to follow the India-Pakistan example, or the case of Israel, a country that is most close to the US politically, but acknowledged to have nuclear weapons. Having our own nuclear arsenal may be the only way to negotiate a "grand bargain" with North Korea.

Now, allow me to tell you my personal experience. Both of my parents are from northern Korea. My father started the Mount Geumgang Tourism project as well as the Gaesong Industrial Complex.

Many people ask me why I do not follow in my father's footsteps. I, too, wish to help the North Korean people. I, too, wish to invest in North Korea. As a member of the South Korean delegation to the 2000 Pyongyang Summit, I too had hoped the Sunshine Policy would succeed.

As you may know, the "Sunshine Policy" derived its rationale from an Aesop's fable. Unfortunately, a more appropriate analogy for the two Koreas is another Aesop's fable, that of the Frog and the Scorpion.

The story is this. A scorpion was trying to cross a stream. Not able to swim, he asked a frog to carry him on his back. But the frog refused, saying "If I carry you, you will sting me and I will die." The scorpion replied, "Why would I do that? If I sting you, I will drown, too!" Convinced, the frog began swimming across the stream with the scorpion on his back. However, in mid-stream, the scorpion stung the frog. As they were both drowning, the frog cried out, "Why did you do it? Now you have killed both of us!" The scorpion replied, "I can't help it. It is my nature."

Now, I would like to conclude my remarks.

Sustaining peace and prosperity on the Korean Peninsula is first and foremost the responsibility of the Korean people. We will not surrender this responsibility.

In the early 1990s after the Seoul Olympics, as the Soviet Union disintegrated and Eastern European communist regimes collapsed, North Korea fell into a deep crisis. At the time, Kim Il-sung said in an interview with the Japanese press, "Even if the sky falls, there is always a hole through which one can emerge." North Korea was clearly feeling as if the sky just fell on them. However, the table has turned. Now, the crisis is upon us.

Many of our former presidents have declared, "Peace has arrived on the Korean Peninsula." All during that time, North Korea continued to develop nuclear weapons, while our security readiness crumbled. It is time for us to renew our resolve to fight and win this long struggle to preserve peace in our land.

To do this we need the full support of our neighbors, friends, and allies. Nuclear nonproliferation is a global agenda and our common goal. On it will depend, not only the future of the Korean people, but also of the region and the world as a whole.

I hope that the dialogues during the *Asan Nuclear Forum* can bring us to a peaceful East Asia.

Thank you very much for your kind attention.

Keynote Speech (Summary)
by Dr. Robert Gallucci, President of the John D. and Catherine T. MacArthur Foundation

In 1993, the IAEA found North Korea in violation of its safeguard commitments, sparking a North Korean nuclear crisis. The UN Security Council took action and North Korea announced its intention to withdraw from the NPT. Since then, there have been 20 years of recurring threats of death and destruction from the North, followed by nuclear weapons and ballistic missile tests, and sometimes by dangerous and provocative military and naval actions. The international community has responded to these instances by intensifying the sanctions regime. Political engagement in between periods of crisis, followed by commitments from North Korea to eventually give up its nuclear weapons program, have not prevented North Korea from accumulating an estimated 20kgs to 40kgs of plutonium, enough for up to eight nuclear weapons, conducting three nuclear tests, increasing its fissile material stocks daily with a modern gas centrifuge enrichment program, and heading for a robust nuclear weapons program mated to a ballistic missile capability of intermediate and eventually intercontinental range.

The threat to the region is that some incident or provocation from the North will result in a significant military or naval engagement on or near the Korean Peninsula and, exacerbated by the presence of nuclear weapons in the North, it will lead to a larger conflict and the tragic loss of life on all sides. The threat is also that, at any moment, North Korea will transfer some sensitive bit of nuclear weapons material or technology to a terrorist group or to a country known to sponsor terrorists. This has already happened as in the case of the plutonium separation plant that North Korea built in Syria and which Israel destroyed by bombing before its completion six years ago. This is the main concern of the United States. Some experts have argued that North Korea's third nuclear test may be an announcement that "the store is open for business."

Under the circumstances, careful tests of the North Korean intentions, engaging diplomatically to see if tensions can genuinely be reduced and a political settlement found is the best way to proceed. All, of course, while maintaining military readiness. An exclusive focus in diplomacy on the one thing that is most troubling, the North's nuclear weapons program, is not a productive way to proceed. In order to stop the North Korean nuclear weapons program, engagement must be broad with the aim to also address a range of political, economic, and security issues.

The ROK-US alliance is the foundation for any successful policy to deal with the North Korean nuclear problem. Also, China has a legitimate interest in how matters are resolved with North Korea, can play a role in shaping outcomes, and should be consulted, along with other interested countries such as Japan and Russia. Protracted engagement with North Korea requires sufficient domestic political support in democracies such as the United States and South Korea. Finally, restraint must be part of a negotiating process. Provocations from the North of the kind that we have seen in the past must be understood as incompatible with negotiations because they undercut the domestic support essential to sustained diplomatic engagement.

Gala Dinner

Date: February 19, 2013
Time: 19:00-21:00
Place: Grand Ballroom II

Gala Dinner Speech (Summary)
by Dr. Lee Hong Koo, Former Prime Minister of the Republic of Korea and Chairman of the Seoul Forum for International Affairs

The atomic bomb dropped on Hiroshima in August 1945 caused over a quarter of a million casualties, including 20,000 Koreans. Because Japanese and Koreans experienced the bomb, both are fundamentally opposed to it.

There were a few years of reasonably good relations between South and North Korea, where each accepted the other as a state and agreed to work toward eventual unification. In 1991, both were accepted to the United Nations and signed the “Joint Declaration on the Denuclearization of the Korean Peninsula,” pledging to keep the peninsula free of nuclear weapons. Given what had happened in Hiroshima, the two Koreas at the time agreed that the best way to keep Koreans safe is to have a nuclear weapons free Korean Peninsula. The North pointed out that American tactical nuclear weapons were in South Korea and asked for them to be withdrawn. The United States and South Korea agreed. Twenty years later, the Kim Jong-un regime has declared the Joint Declaration null and void, but the safety of the Korean people is more important than the security of any regime.

While some experts argue that North Korea insists on having nuclear weapons to deter aggression and blackmail form the outside, but the United States and other countries do not want to invade North Korea for many reasons. Others have argued that the threat to the global community is not North Korea’s nuclear weapons, but its regime, where North Koreans are prisoners of the system. While it is the regime that is the cause of the nuclear threat, there has been also a failure in international politics among the great powers, including the United States and China, to be more precise in their policies and not make empty threats.

The problem is the United States not having a well thought out Korea policy for the last hundred years. Not paying attention to Japan’s invasion of Korea and subsequent march into China resulted in the Second World War and Pearl Harbor. Since 1945, US East Asia policy has been based on US perceptions of Japan and China. Throughout history, countries in East Asia have understood that how things unfold on the Korean Peninsula changes the power balance in East Asia. Korea has been divided now for 68 years. And unless the problems on the Korean Peninsula are resolved first, it may be very difficult to find a permanent peace in East Asia. Though the United States has been distracted by other regions in the world for the past 20 years, Korea policy must be made the highest priority for problems in the region to be resolved.

The biggest reason why good solutions have not been found is the failure of diplomacy among China, Japan, Russia, and particularly the United States. Little has changed since the establishment of diplomatic ties between China and the United States forty years ago. Nurturing a good working relationship with Mr. Xi Jinping could be President Obama’s legacy in his second term. Deciding to resolve the Korea problem together would be a tremendous contribution to the global community. The agreement to hold talks between China, Japan, and Korea for the creation of an FTA is a sign that there is a great future in East Asia, and that much could be achieved through statesmanship and diplomacy.

Plenary Session I

Date: February 19, 2013
Time: 10:15-11:30
Place: Regency Room

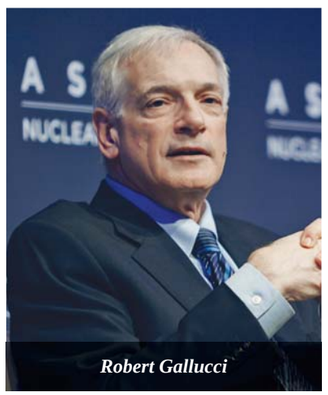
Dealing with a Nuclear North Korea

Moderator: Hahm Chaibong, The Asan Institute for Policy Studies
Speakers: Choi Kang, Korea National Diplomatic Academy
Endo Tetsuya, Japan Institute of International Affairs
Robert Gallucci, John D. and Catherine T. MacArthur Foundation
Vasily Mikheev, Institute for World Economy and International Relations
Yang Yi, National Defense University
Rapporteurs: David Santoro, Pacific Forum CSIS
Mira Rapp-Hooper, Columbia University

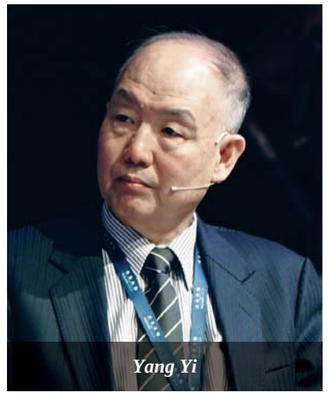

Hahm Chaibong


Choi Kang


Endo Tetsuya


Robert Gallucci


Vasily Mikheev


Yang Yi

The first plenary session of the *Asan Nuclear Forum*, titled "Dealing with a Nuclear North Korea," saw some consensus from all of the panelists, who agreed that North Korea's recent provocative actions continue to threaten regional peace and security and the viability of the nonproliferation regime. There were, however, significant differences among the five speakers from South Korea, Japan, the United States, Russia, and China over what the ultimate goal of North Korea's nuclear and missile programs might be. In addition, the five powers continue to disagree over how to address the problem. At issue is whether the international community should recognize that North Korea has become a de facto Nuclear Weapon State (NWS), and thus focus on managing the problem, or if it should continue to demand denuclearization.

Hahm Chaibong, president of the Asan Institute for Policy Studies, began the panel by asking participants what they believed North Korea's nuclear intentions were, and how the five powers should move forward in dealing with them. Choi Kang, director of Policy Planning at the Korea National Diplomatic Academy, argued that North Korea wanted to be accepted as a nuclear weapon state, much like Pakistan. Dr. Choi argued that the five powers could not recognize North Korea as such, but must realize that it is a de facto nuclear weapon state that is not going to relinquish this capability. As such, the region had to consider how to live with a nuclear North Korea, and this required a robust deterrence posture. Comprehensive, tailored deterrence should include political, military, and economic measures, as well as a more thorough implementation of the Proliferation Security Initiative around the peninsula.

Endo Tetsuya, former ambassador and senior adjunct fellow at the Japan Institute of International Affairs, agreed that it would be very difficult to convince North Korea to give up its nuclear arsenal, and argued that the capability served to shore up military support for the government. Ambassador Endo argued that the international community would have to provide North Korea with a number of extensive incentives, impose severe penalties, or undertake some combination of the two if a freeze on its nuclear and missile developments is to be achieved. Incentives could include a US guarantee of regime survival, and a peace treaty to end the Korean War. Harsher penalties would require strong international consensus and coordination, and that all five powers (especially the United States and South Korea) enforce these penalties rather than getting sidetracked by domestic politics. Ambassador Endo advised that it will be important to keep lines of communication with the North open at all times.

Robert Gallucci, president of the John D. and Catherine T. MacArthur Foundation, observed that we often assume that North Korea is a monolithic state, but argued that, in fact, the North may not have a grand strategy. Engagement with North Korea would be desirable, Dr. Gallucci argued, because it would give us the opportunity to ascertain whether the country would be willing, at some point, to place its nuclear arsenal on the negotiating table. If the North is unwilling to do so, we would need to commit to a robust containment policy. If it expressed some willingness to negotiate over its weapons, however, we could move forward with talks. Dr. Gallucci insisted that to be successful, any form of engagement of Pyongyang would have to be broad and transcend the sole nuclear and missile questions.

Vasily Mikheev, vice president of the Institute for World Economy and International Relations, argued that a nuclear North Korea is completely unacceptable, stating that we should speak not of how to "deal" with the North, but only how to disarm it. North Korea's third nuclear test is a sign of technical progress, Dr. Mikheev argued, and is also a sign that the regime is likely to continue its policy of nuclear blackmail. The United States and South Korea have recently stopped engaging with the North following provocations, and the third test was likely intended to catalyze some response from them. It was also intended for North Korea's domestic population, as the regime needs to justify its vast military expenditures. Dr. Mikheev argued that Pyongyang is confident that the five parties will be unable to resolve the contradictions among themselves and formulate the type of coherent policy that would be needed to enforce biting sanctions. Dr. Mikheev argued that the only real solution to the North Korean nuclear problem is regime change, but that the five powers should at least attempt to formulate coherent policy positions in the meantime.

Yang Yi, former director of the Institute for Strategic Studies at the National Defense University, contended that the international community should focus on engagement and dialogue with North Korea, rather than trying to define intentions from afar. While arguing that the Six-Party Talks remain the best forum to do so, Admiral Yang stressed that the United States is the best positioned to influence the North and offer a package deal that could address its security concerns and solve the problem. Admiral Yang also insisted that despite criticisms to the contrary, China has been very active (mainly behind the scenes) to prevent North Korea from conducting its recent nuclear test, and it failed. Admiral Yang argued that any military actions against the North would have serious regional consequences and should not be pursued. While the Six-Party Talks may not be a perfect solution to the standoff, they are the best mechanism available, and should be revived.

Dr. Hahm noted that the panelists differed in their tone and basic opinion on whether or not we should be "dealing" with a nuclear North Korea. Are the five interested powers simply trying to manage the situation, he asked, or is there something more proactive to be done? Dr. Choi argued that North Korea's siege mentality is ingrained, and unless they overcome this worldview there is little to be done. Dr. Mikheev argued that the United States had previously erred in its failure to take action against emerging nuclear powers, such as India. On the North Korean question, the United States and Russia bore responsibility as nuclear superpowers to uphold the nonproliferation regime. Despite their differences, the United States and Russia manage to cooperate on issues of strategic stability, Dr. Mikheev maintained, and they can do so in the North Korean case as well.

Dr. Hahm then asked whether there still exists a possible deal that might convince the North to abandon its nuclear program. Admiral Yang suggested that such a deal did exist, and that the international community should not make the error of recognizing North Korea as a nuclear weapon state as the United States did with India and Pakistan. Ambassador Endo argued that time is on North Korea's side as it continues nuclear and missile developments. A deal may be possible, however, on the way to broader nuclear abolition.

Dr. Gallucci concurred that the US-India civil nuclear cooperation agreement was a mistake. He also suggested that military options against North Korea had to be considered with great reservation. An important consideration for the United States, Dr. Gallucci noted, was the possible transfer of nuclear weapons or materials by North Korea. If the North were found to have transferred significant materials, he argued, this could be a casus belli for the United States. Dr. Gallucci expressed agnosticism on the question of whether or not a deal with North Korea might still be possible. He disagreed with Ambassador Endo, arguing that time was not necessarily on North Korea's side, and that the accumulation of nuclear weapons in the country did not make much of a difference strategically. The North's nuclear weapon program was unlikely to make major breakthroughs in the near-term, Dr. Gallucci argued, and the state's political-economic model is no more promising.

Admiral Yang suggested that the key players in any deal with the North would be the United States, South Korea, and China. South Korea should return to the Sunshine Policy, he argued, and the United States should offer the North a big package of incentives. Dr. Choi suggested that military strike options were not desirable. Instead, the five powers should start by managing the North Korean standoff to reverse a deteriorating situation, and then start to contemplate how it may be fixed.

Dr. Hahm then opened the panel for questions and answers. One audience member asked whether we were capable of "taking yes for an answer." In other words, could we deliver on engagement given that we had dragged our feet on previous deals with the North because we believed regime collapse was imminent and thought we could get away with it? Dr. Gallucci responded that past efforts had not been terrible, but that the United States had not done enough to cultivate its political relationship with North Korea. If we are to deliver on engagement, Dr. Gallucci argued, it cannot be on the nuclear issue exclusively. Rather, we will need a robust settlement. Ambassador Endo concurred, suggesting that the US-China relationship was absolutely central to any such arrangement.

Another audience member commented that it appeared that we had very few options for dealing with North Korea, and that this sent an unfortunate message to the world. Plainly, this suggests that: "If you make a mad dash for nuclear weapons you can succeed." The lack of serious options appeared to make the nonproliferation regime seem rather toothless. Dr. Gallucci replied that the interested powers had made a decision that more dire action was undesirable. North Korea had not dashed for nuclear weapons, he added, but rather had taken a long, slow road.

Dr. Hahm then solicited three questions from the audience. The first asked whether Track II efforts would be helpful in dealing with the North Korean nuclear problem. The second question noted that North Korea still imports a lot of the materials and technologies that go toward their nuclear weapon program and asked for China's response to this issue. The last question suggested that there may be a non-linear relationship between the North Korean nuclear and missile developments and our perceived threat, because of a lack of international understanding of North Korean motivations and intentions.

Admiral Yang replied that tougher sanctions against Pyongyang would only do damage to its people. Dr. Mikheev argued that the only hope for a solution was regime change. Dr. Gallucci noted that the American position had changed from one that called a nuclear North Korea "unacceptable" to one that hoped to avoid legitimizing its nuclear-armed status. If any package deal were to be made, Dr. Gallucci argued, it would need to address North Korean security concerns. Ambassador Endo argued that heavier sanctions and more political pressure should be imposed, but for these to succeed, positive incentives would also be needed. Dr. Choi maintained that the Proliferation Security Initiative should be strengthened, and that more concrete action was needed.

Wrapping up the discussions, Dr. Hahm concluded by stressing that it is essential for South Korea, Japan, Russia, the United States, and China to first begin to agree on how the North Korean problem has developed. Indeed, there is no consensus among the five powers on this issue. Yet agreement on history is crucial, Dr. Hahm argued. We need to understand how we got to where we are today to be able to produce consistent policies moving forward. Consensus on the past is needed to build a realistic policy approach for the future.

Session I

Date: February 19, 2013
Time: 12:30-13:45
Place: Regency Room

Reassessing North Korea's Nuclear Threat after the Third Nuclear Test

Moderator:	Joshua Pollack, Science Applications International Corporation
Speakers:	Kim Yongho, Yonsei University
	Markus Schiller, Schmucker Technologie
	Joel Wit, U.S.-Korea Institute at SAIS
Rapporteurs:	Kristine Bergstrom, Carnegie Endowment for International Peace

Against the backdrop of North Korea's third nuclear test conducted on February 12, 2013, analysts are assessing the current threat in order to better understand the North Korean leadership's intentions and future actions. The panel sought to assess the North Korean threat after its latest nuclear test and offer policymakers recommendations for future policies toward Pyongyang. In essence, more and more analysts suggest that the international community should shift its focus from denuclearizing North Korea to making sure it does not engage in nonproliferation. And without officially accepting North Korea as a de facto Nuclear Weapon State (NWS), the United States and its allies will need to re-examine its policies and consider new approaches to dealing with the North Korean regime, including within the Six-Party Talks.

Kim Yongho, professor of political science and director of the Yonsei Institute for North Korean Studies at Yonsei University, opened the discussion by declaring that he takes a pessimistic view of the North Korean nuclear issue and that, in his opinion, North Korea will never abandon its nuclear weapons. According to Professor Kim, North Korea's possession of nuclear weapons and the closed nature of the state are the two main tools for maintaining the Kim dynasty's political power. Although there is little North Korea could earn by conducting nuclear tests, argued Professor Kim, Pyongyang's leadership would go on if there is little to lose. He asserted that economic sanctions will not work because nothing is more important to the North Korean regime than its political survival, so the only solution is to convince the leadership that they have something to lose. And the way to do this is by sending the message that North Korean leader Kim Jong-un could face the same fate as Al Qaeda leader Osama bin Laden.

Shifting his focus to the connection between North Korea and Iran, Professor Kim pointed out that the recent Iranian declared success in sending and bringing back a monkey into the atmosphere signifies that the Islamic Republic has acquired the technique and materials to protect a nuclear warhead when it

re-enters the atmosphere from the stratosphere. If this technique is transferred to North Korea, Pyongyang could possess three core techniques to manufacture ICBMs with nuclear warheads, he warned. In order to better analyze the North Korean nuclear threat, Professor Kim pointed to the denuclearization of South Africa, Sweden and Pakistan, which all suggest several scenarios. In Sweden, for example, the calculation was that nuclearization was cheaper than strengthening the air force capabilities, but the Swedish government soon realized that several Swedish cities could easily be targeted by Russia, so what was supposed to protect the country became a source of threat to Swedish security.

In conclusion, Professor Kim stressed that South Korea needs to send a firm warning to North Korea in order to convince the regime that if they continue on this path, they have something to lose, and it should focus on the leader, Kim Jong-un. But there are still barriers to solving the problem and we have to ask ourselves the questions, “How many years and how many resolutions do we need to change North Korean behavior?”

Making the point that the latest North Korean rocket launch in December, 2012 was “not a big deal”—despite a public debate focused on the missile role and range issues—Marcus Schiller, senior analyst at Schmucker Technologie, noted that the launch of the Unha-3 long-range rocket does not have to result in an immediate change of the North Korean threat assessment. Equating the level of threat with “Intention x Capability,” Dr. Schiller argued that while it is difficult to guess the intentions of the North Korean leadership, it is possible to look at its nuclear capabilities in order to assess the nature of the threat and formulate possible responses.

Looking at the launch of the Unha-3 rocket, Dr. Schiller pointed to very few surprises and many predicted components of the launch, such as the aluminum airframe, Scud technology, propellants, stage operation

times, as well as trajectories. Some of the important findings after the launch include a low thrust in the second and third stage, that the rocket is only sensible for small satellites, the rocket was designed as a satellite launcher, and finally bad production quality of the first stage airframe. The imported parts indicated prototyping rather than serial production. The main consequence of this knowledge is that the previous threat assessments do not need to be changed because North Korea has a long road ahead before it can pose any serious threat. In fact, concluded Dr. Schiller, the Unha-3 rocket launch was more of a political signal, both foreign and domestic, and aimed to show the people of North Korea that their nation is prosperous. The rocket launch is therefore more of a political tool, and North Korea does not pose a direct threat at the moment.

Joshua Pollack, senior analyst at the Science Applications International Corporation, noted that between August 1998 and April 2012 North Korea had always labeled rocket launch tests “a success,” even though they were deemed partial or complete failures. Finally, in December 2012, North Korea successfully launched a rocket. “Why, after years of failures and partial failures, are we now seeing successes?” asked Mr. Pollack. He suggested that North Korea has over the last 15 years undertaken what he calls a “stepping-stone approach;” in attempting to achieve technical development, the North Korean regime is not building a bridge, but is trying to skip from one small stone to the next, all the while using as few resources as possible.

Mr. Pollack outlined two reasons for this pattern. First, the program is gradually maturing. Similar to other countries, North Korea has been at this for a very long time, although at different timetables. Second, there has been a change in leadership. Kim Jong-il’s son, North Korea’s current leader Kim Jong-un has expressed a different attitude toward technology in that he has broken the pattern of constantly claiming success. For example, the launch of the Unha-3 rocket in April 2012 was declared a failure by North Korean state media.

But why the admission of failure? Mr. Pollack suggested that Kim Jong-un, as opposed to his father, understands the potential of failure and does not desire to mislead the public in this matter. It thus seems as if North Korea is moving toward more realistic expectations, said Mr. Pollack, who furthermore pointed out that we have overlooked the influence of China on the North Korean development model. In fact, said Mr. Pollack, the model by which Pyongyang is developing its rocket technology is similar to what was practiced in the past by the Chinese, only they have taken it to the furthest, most possible extreme.

Mr. Pollack concluded that North Korea, just like China in the 1960s, proceeds by building a single prototype of a missile, tests it, then moves on to the next step without fixing the bugs of the first one. Mr. Pollack called this the “North Korean-style stepping-stone approach” and described it as low-resource and high-risk. Mr. Pollack concluded that the nature of this “North Korean-style stepping-stone approach” does not stop the North Korean regime from believing that their missiles can cross the Pacific Ocean and

reach the United States.

Taking the standpoint of a policymaker, Joel Wit, senior research scholar at the U.S.-Korea Institute at the Johns Hopkins School of Advanced International Studies, ended the presentation part of the panel by saying that he, along with others, have been saying for years that North Korea is on its way to becoming a small nuclear power. And although it has been transitioning very slowly, Mr. Wit noted that more analysts are now acknowledging that with the most recent rocket launch, North Korea is becoming a nuclear power.

Mr. Wit continued by saying that he believes that there is momentum behind the North Korean nuclear weapons program, that North Korea is serious about developing nuclear weapons and that that is a problem. Looking to the future, Mr. Wit argued that there is enough information to start making projections. He cited one American study that said that in a worst-case analysis, North Korea could have 50 nuclear weapons by 2016. Mr. Wit added that the North Korean regime will also conduct more nuclear tests, and the Unha-3 missile is just the tip of the iceberg, which gives us an idea of Pyongyang's intentions for the future.

Mr. Wit supported his argument by pointing to the evidence of activities at test sites for a much larger missile. However, Mr. Wit said, nothing shows that these missile tests will proceed smoothly, but it gives us an idea of future intentions. There are also a lot of uncertainties, Mr. Wit noted, but as a policymaker thinking about where you want to go in the future, it is important to listen to everyone's views, but at the same time warned, "where there is smoke there is fire."

Another point to think about as a policymaker, said Mr. Wit, is the implications for the United States, for the region, and for the international community. These include the direct threat to US allies and the region as well as the long-term threat to the United States; the growing technical capability and confidence to sell weapons and technology abroad without fear of reprisal; the ability to threaten and coerce neighbors such as South Korea, and an increasing danger of conflict; the future of the US-South Korean defense plan for defending the peninsula against a North Korean attack with, for example, tactical nuclear weapons; the future of the US defense budget, which is under serious threat of being cut—what will be the consequences for our alliance on the peninsula, including with Japan—and, finally, the danger of instability in North Korea; for example what happens if in 50 years the regime has 50 nuclear weapons and it is unstable?

Mr. Wit also suggested that we need to think about what measures bolster deterrence and what measures create instability. Instead of thinking in extremes about North Korean intentions—oscillating between absolute uncertainty and complete certainty—Mr. Wit suggested that while it is hard to predict the future, as a realist it is more important to focus on empirical data upon which to base policy decisions. He concluded that the United States needs to seriously think about its policy toward North Korea and re-examine the current approach that he dubbed "weak sanctions and weak diplomacy."

Mr. Pollack next asked how far policymakers should go in making assumptions about potential risks from North Korea based on what has been observed—to which Dr. Schiller echoed his previous remarks that while it is important to plan for worst-case scenarios, it is crucial to remain realistic and base policies on reliable data rather than assumptions. While one audience member claimed that the Agreed Framework signed by the United States and North Korea in October 1994 allowed North Korea seven years to relocate its plutonium program and begin cooperating with Pakistan and Iran, Mr. Wit disagreed. He responded that the North Korean plutonium program was not relocated, that the Agreed Framework did work, but that after 10 years North Korea claimed it did not work, and shifted to highly enriched uranium, ruining a perfectly good program and substituting it for uncertainty. Another audience member pointed out that everything in a rocket system has to work, otherwise it is useless. If all components of a missile and stages of a missile launch only have 50 percent chance to work, added up it would take North Korea about 120 missiles to manage to hit a target. North Korea is thus improvising, planning to fail and recover, and that it is not a reliable way of fighting a war.

In conclusion, while a majority of the panelists agreed that North Korea is moving closer to becoming a nuclear threat to the region, at least one panelist suggested that Pyongyang does not pose an immediate threat to its neighbors or to the United States for the time being. There was however broad consensus among the panelists about the importance of basing policies on reliable data rather than mere assumptions.

Session I

Date: February 19, 2013
Time: 12:30-13:45
Place: Grand Ballroom I

ROK, China and Japan as Responsible Nuclear Suppliers

Moderator: Hussein Khalil, Argonne National Laboratory
Speakers: Lee Hee-Yong, Korean Electric Power Corporation
Jane Nakano, Center for Strategic and International Studies
Jasper Pandza, King's College London
Rapporteurs: Seukhoon Paul Choi, Council on Foreign Relations

As a sustainable energy source for economic development, nuclear power garners strong interest from many countries. The Fukushima accident however has transformed the global nuclear market. This panel evaluated these changes, as well as the safety and security concerns associated with the nuclear supply ambitions and programs of Northeast Asian countries. Hussein Khalil, director of the Nuclear Engineering Division at the Argonne National Laboratory, commenced the discussion by describing the nuclear power industry landscape. He highlighted a weakened confidence in regard to safety as a significant challenge, especially in light of the Fukushima accident. Dr. Khalil also noted the rise of South Korea as a major supplier of nuclear power plants, new countries embarking on the use of nuclear technology, and the United States leveling off in its nuclear power use and projects.

Lee Hee-Yong, senior vice president of the Overseas Nuclear Project Development Department at the Korean Electric Power Company (KEPCO), introduced the operations of his organization. Explaining that KEPCO is responsible for generating, transmitting, and distributing South Korea's electricity, he also highlighted that it is actively pursuing nuclear power projects overseas. Nuclear energy plays an important role in Northeast Asia as it provides China, Japan, and South Korea with energy security. In this regard, the three countries share a common interest of advancing the nuclear industry and face common challenges. Mr. Lee explained that the Fukushima accident aggravated concerns about the safety of nuclear energy. North Korean nuclear tests are also increasing international anxiety. Collectively, this has had another significant impact on South Korea in that it has unfavorably affected current ROK-US negotiations regarding their 123 agreement.

In South Korea there is concern that the country is vulnerable to an earthquake and tsunami like those that led to the Fukushima disaster. Furthermore, as most of China's nuclear power plants are located on the country's eastern coast, a radiation leak at one of these plants would have a severe impact on South Korea and Japan. Despite these worries China, Japan, and South Korea are three of the world's most active countries in the nuclear industry. The latter two are developing third generation nuclear plants, and although Japan is facing difficulties in garnering domestic public support, it is still striving to get new international contracts, such as a project in the United Kingdom. Meanwhile, China is adopting French and American plants and growing not only as one of the largest nuclear markets but also trying to become a supplier.

Mr. Lee explained that only if these three countries exert collective action in reinforcing the safety of nuclear power plants will global anxiety over such plants be eradicated. He also recommended that this should be done in cooperation with intergovernmental organizations such as the IAEA. Since all three countries possess a strong supply chain, they should adopt stricter quality requirements. They should also equip themselves with systems that allow for information sharing. Finally, while the three countries are unique in their cultures, their safety practices should be strictly implemented with transparency and in accordance with international regulations since the impact of a nuclear accident extends beyond their respective borders.

Jane Nakano, fellow in the Energy and National Security Program at the Center for Strategic and International Studies, focused her statements on what is happening in Japan, challenges that this country faces following the Fukushima accident, and general thoughts on what it means to be a responsible exporter. Ms. Nakano noted that of the three countries, Japan has the longest history and is most established as a supplier of nuclear power plants. Furthermore, Japan is unique in being a non-nuclear weapons state and party to the Nonproliferation Treaty with major fuel cycle facilities. However, the Fukushima accident dramatically changed the environment in Japan regarding nuclear energy. Currently, only two nuclear power plants are in operation. This is a direct result of public anxiety about government, industry, and regulator ability to manage accidents. The Japanese government has made efforts to establish the independence of its regulatory body. However, the Japanese government faces the challenge of convincing the public that the nuclear regulatory commission functions will be effective. Ms. Nakano explained that garnering such confidence takes time.

When and to what extent Japan's remaining reactors will be reactivated is unclear. Furthermore, it is unlikely that Japan will be as proactive and aggressive in pursuing a nuclear expansion plan as it once was before the Fukushima accident. In the past, nuclear energy was considered a means for the country to achieve energy independence. It had expressed the target of increasing nuclear energy's proportion of the country's energy supply to 30 percent by 2008 and to 50 percent by 2030. It also planned to build nine nuclear reactors by 2020 and an additional five by 2030. However these targets are no longer politically sustainable. Other challenges that Japan faces is an industry landscape that is increasingly crowded with strong vendors and post-Fukushima utilities lacking clarity regarding the extent to which they can be a part of export deals.

Despite these challenges, Japan continues to demonstrate a strong commitment to operating as a responsible nuclear supplier, a condition of which is having robust regulatory and legal frameworks. Japan was the first country to ratify the Additional Protocol (AP) and has made AP adoption a required condition for Japanese supply to other countries. Ms. Nakano also highlighted that Japan has gained decommissioning experience and practice in accident management. Japan can share these lessons with the world, particularly with Germany which will be decommissioning many of its reactors.

Jasper Pandza, Ph.D. candidate at the Centre for Science and Security Studies at King's College London, focused on China's nuclear program, which ambitiously operates 16 nuclear power reactors, has 26 under construction, and seeks to introduce fast nuclear reactors. Mr. Pandza noted that the Fukushima accident has affected China's leadership, which understands that an accident in China would have significant repercussions for the country's domestic program. Consequently, following the accident, the Chinese leadership paused reactor construction and decided that, moving forward, only generation three designs would be approved. Mr. Pandza argued that despite China's long-term industry goals, the country lacked a roadmap. It also faces technical challenges to meet its goals, particularly its objective of introducing fast reactors—an ambition other countries have pursued with little success. Mr. Pandza blamed this failure on fast-breeding reactors being unreliable, unsafe, and expensive. However despite these challenges, China enjoys unique qualities that may enable it to overcome them. Whereas high capital costs may deter investors in other countries, the Chinese central government's control over research and investment enables it to support the country's program.

Mr. Pandza noted that ensuring nuclear safety is becoming more complex and difficult. A country has to protect itself against nuclear sabotage. Also, while China has not yet had a serious accident, there is always room for improvement. Mr. Pandza argued that this is important to consider given China's fuel cycle vision and role as a supplier. He noted that China suffers from a chronic shortage of experience and qualified safety staff. China also lacks a fully independent regulator. Furthermore, an additional challenge with a closed nuclear fuel cycle is how to prevent proliferation. Fast reactors using mixed oxide or plutonium metal fuels increase the accessibility of nuclear weapons. There is concern that China's nuclear energy program will support its strategic weapons program. Mr. Pandza noted that China is the only P5 country that has not declared a moratorium on pursuing nuclear programs for military purposes and is likely to increase its stockpile of weapons.

Finally, Mr. Pandza stated that it is unfortunate that China has in the case of deals with Pakistan prioritized strategic and commercial interests over safety. China's track record as a responsible suppler did improve since it joined the Nuclear Supplier Group (NSG) in 2004, but Mr. Pandza noted that the country exported reactors that undermined NSG requirements for recipient countries. He then expressed his uncertainty about whether China's future role in giving precedence to nuclear safety.

Dr. Khalil commented that Mr. Pandza's evaluation of fast reactors could be debated as they have had a mixed record. Dr. Khalil explained that fast neutron facilities have been built and operated in countries around the world to demonstrate technology for testing and experiments. While a number of these reactors had problems, others have been successful. Dr. Khalil stated that this technology has never been commercialized, and that this remains a goal for countries operating it. He then asked what needed to be in place in user countries and what the responsibilities of suppliers were to ensure that recipient countries were prepared to deal with safety, security, and environmental issues of nuclear power.

Mr. Lee replied that operators should be responsible for operation, maintenance, and accident response. Countries that seek to introduce nuclear power plants as a source of power for the first time should prepare appropriate industry infrastructure—manpower, regulations, legislation, and an independent regulatory body. For this to occur, Mr. Lee emphasized that countries planning to introduce nuclear power plants should ensure that they have plenty of time to build their programs. Mr. Lee also argued that the responsibility of nuclear plant providers is the strict application of standards for manufacturing and supply. Furthermore, suppliers must complete construction on time and in budget. Suppliers must also meet all the requirements of the recipient country's regulatory body and meet its high-level expectations for safety.

Using South Korea's experience in securing its contract with the UAE, Mr. Lee explained that before the latter accepted bids from potential suppliers it announced prerequisite conditions. Based on these requirements, South Korea, before making a bid, created a roadmap with consultation with other countries including the United States, and invited many foreign observers to promote transparency. During the bidding process, South Korea then hired an international consultation company to get advice and obtain a transparency evaluation. Finally, Mr. Lee noted that the world is closely observing South Korea's progress.

Ms. Nakano added that South Korea's decision to have an independent oversight commission in the UAE case was a good model. This effort to guarantee transparency raised public confidence. She also emphasized the importance of human resources. Utilities can provide training to operators, but that there should also be regulatory training for inspectors. Dr. Khalil stated that the UAE's capacity to regulate

and practice indigenous oversight of reactors was developing. Ms. Nakano noted however that while South Korea was engaging the UAE to build the latter's ability to conduct such activities, uncertainty remained regarding how much of this the UAE was successfully processing.

Dr. Khalil highlighted concerns about closing the fuel cycle through recycling and reprocessing, as well as issues with long-term storage of spent nuclear fuel as the accumulation of plutonium and spent fuel also poses risks. He asked what the terms of responsibilities were for suppliers regarding safe long-term management of spent fuel. It was noted that in addition to safeguards, it would be helpful if user countries had spent fuel management policies when they first launched nuclear programs or have take-back agreements. Also, while there may be problems with countries having a plutonium mine, the alternative of reprocessing is potentially worse and the former at least protects against proliferation for a hundred years.

The discussion concluded with a final discussion on the intensification of industry competition and that there was a diminishing number of contracts for which suppliers could compete. Dr. Khalil stated that because countries seeking nuclear power plants may have certain problems or may pose nuclear risks, suppliers must go beyond recipient regime requirements to ensure nuclear safety. In response, Mr. Lee noted that this issue was related to reprocessing. He argued that governments might consider Russia's strategy of taking back spent fuel from nations that cannot enrich and reprocess. In particular, the United States should take in international fuel.

Session I

Date: February 19, 2013
Time: 12:30-13:45
Place: Grand Ballroom III

Building Public Confidence in Nuclear Safety

Moderator:	Dae Chung, US Department of Energy
Speakers:	Ahn Joonhong, University of California, Berkeley
	Kim Myung Ja, Korea Federation of Women's Science and Technology Associations
	Lee Un Chul, Seoul National University
	Suzuki Tatsujiro, Japan Atomic Energy Commission
Rapporteurs:	Robert Kim, Center for Strategic and International Studies

In light of the recent accident at the Fukushima Daichii nuclear power plant, this panel discussed the role of public trust in the future of the nuclear power industry. Panelists stressed that a rigorous safety culture, and perhaps new forms of risk analysis such as "resilience engineering," are necessary for ensuring public confidence. The ensuing discussion emphasized that close relationships between the nuclear community and all stakeholders, including the general public, are integral for continued growth in nuclear power. In light of these objectives, the panelists recommended that the nuclear industry and regulators should become more transparent and communicate risk issues with stakeholders in a clear and neutral manner.

Dae Chung, principal deputy chief for Nuclear Safety and Technical Matters at the US Department of Energy, opened the panel discussion by underlining the role of safety culture in preparing for and precluding natural and man-made accidents. He highlighted three past accidents as examples. These accidents were the April 20, 2010 Deepwater Horizon explosion, the February 1, 2003, Challenger accident, and the March 7, 2002, David-Besse Nuclear power plant safety incident. The main underlying factor for all of these accidents was a lack of safety culture. In addition, he stated that a rigorous safety culture is necessary for securing public confidence in the safe operation of complex systems. He identified several foundational principles for a strong safety culture, including personal responsibility, a permeating concept of trust, a questioning attitude, and demonstrated leadership. Finally, he claimed that an effective safety culture should promote trust not only with the general public, but also in the organization itself. Safety culture should be present at all levels; he characterized it as both an individual and organizational responsibility.

Furthermore, Mr. Chung cited The World Energy Council's recent survey on the Fukushima accident and highlighted its conclusion that the most pressing barrier to adoption of nuclear power is public

perception. Given this barrier, he argued that effective risk communication is necessary for the future of the nuclear industry. He defined effective risk communication as gaining all stakeholders' points of view and reconciling different perspectives of risk. One condition for effective communication was clearly communicating, in plain language, the issues regarding nuclear power and technology to the public. He argued that providing wrong information is worse than providing no information, but ideally information should be both accurate and quick.

Finally, he noted that the realities of social media and new venues for communication must be acknowledged, especially as forums for establishing public trust. Public perceptions of government capabilities do not always match reality. For this reason, he emphasized that trust must be understood as a relationship, and should not be conceived only as an information exchange. The central pillars of this public trust were transparency and accountability. He also argued that messages to the public should be expanded to include what actions will be taken in the event of an accident. Finally, he stressed that the organization must be a *learning* organization that embraces best practices.

Ahn Joonhong, professor and vice chair of the Department of Nuclear Engineering at the University of California, Berkeley, continued this discussion by proposing to adopt an emerging framework for safety analysis, called "resilience engineering." While the traditional "error counting" paradigm for accident analysis assumes that humans and organizational behavior degrades otherwise safe systems in times of accident, "resilience engineering" contends that human behavior is not static and can adapt to circumstance. In the case of Fukushima, it was already clear that the accident came from a station blackout, the loss of the heat sink, failures in containment venting, and delays in seawater injection. The power plant was designed and equipped with multiple independent measures based on the "defense in depth" concept. Most analysis on these common mode failures focused on erratic human behaviors that degrade the safety system. Safety—once established—was maintained by human performance staying within prescribed boundaries and norms. Once an accident occurs, humans were regarded as unreliable system components that degrade flawless system performance. However, in reality, humans provided positive contributions to safety from their ability to adapt to gaps in system design and unplanned scenarios. Thus, Dr. Ahn argued that conventional ways of thinking about safety that regard humans and systems in a static manner are obsolete.

Dr. Ahn continued to elaborate on the "resilience engineering" concept. Complex systems like nuclear power are dynamic, and a state of dynamic stability could change into dynamic instability. Proactive resilient tendencies are needed in a world of uncertainty and conflicting goals, rather than reactive barriers and defenses. Safety is an emergent, not resultant property. Furthermore, safety and risk cannot be modeled purely on constitutive components and reactions. For a complex system, he argued that a high resilience to accidents must be founded in anticipation rather than in hindsight of accidents. Dr. Ahn defined resilience as the intrinsic ability of a system to adjust its functioning prior to, during, and following changes

and disturbances so that it can sustain required operations under both expected and unexpected conditions by detecting the drift into failure. He later likened this framework to martial arts; one should be prepared, but not be so overly prepared that one is "stiff" and inflexible in times of instability.

For this framework of "resilience engineering," he emphasized the necessity of developing a comprehensive set of measures for each stakeholder group when analyzing stakeholders. An incomplete set of measures for monitoring system performance leads to poor resilience. He argued that Japan did not take a risk-informed approach and instead relied on barriers and defenses in an incomplete manner. In essence, Japan kept the same policies for more than 40 years without backup plans.

Following this, Kim Myung Ja, president of the Korea Federation of Women's Science and Technology Association, focused on the necessity of public trust. She argued that a small number of vocal groups, both pro and con, tend to dominate the debate while the majority remains passive, which results in an environment where a genuine and forward-looking discourse is difficult.

Dr. Kim focused on three main points. The first was that risk is a strong factor undergirding public perceptions of nuclear energy. This perception of risk, she claimed, is informed by coverage of high profile and sensationalized incidents, which tends to cloud perceptions and make the public ignore evidence that contradict their beliefs. Second, given this gap between public perceptions and the scientific community, she stressed that facts need to be presented in a way that is clear and detached from external interests and biased sources. She also noted that attitudes towards nuclear power have a tendency to vary across the ideological spectrum and gender lines. Finally, she argued that that the anti-nuclear movement in Korea is powerful and can generate fear and anxiety in the mind of the general public. She suggested that the tendency of political circles to play to the overly sensationalistic media in order to gain popularity with their constituents only further contributes to this anxiety. Yet, she noted that there are no alternatives to nuclear power in South Korea.

For these reasons, Dr. Kim emphasized that effective and meaningful communication is key, although she admitted that what this approach would look like remains to be seen. Nonetheless, she stressed that information needs to be presented by a trusted source using clear and accessible language, and that policymakers should identify stakeholders and take note of their interests in a transparent and accountable manner. Additionally, she argued that stakeholder involvement should not be viewed as a convenient public relations tool. Rather, it should be viewed as an integral part of a holistic decision-making process. However, she warned that a one-size-fits-all will not likely work. Finally, she claimed that trust is the key element to conflict resolution efforts, especially given the gap in understanding between the general public and the nuclear industry. Competency, integrity, benevolence, and a commitment to high standards are all means to gain trust.

Lee Un Chul, professor in the Department of Nuclear Engineering at Seoul National University, continued this discussion by bringing up a broad range of questions that need to be considered by the public in the particular situation of South Korea. Professor Lee mentioned that South Korea has to import most of its energy from abroad and is very poor in natural resources. He reiterated that there are no expected substitutions for nuclear power, although he stressed that more efforts are needed to improve the safety consciousness of operators. Additionally, he argued that the long-term energy mix should be brought up for public discussion, since fossil fuels will inevitably need to be reduced.

For Professor Lee, the topic of spent fuel was one outstanding question to resolve in Korea. On-site spent fuel pools are reaching saturation. For him, there were essentially three options: direct disposal, reprocessing, and recycling with pyroprocessing (which he noted has not been proven in practice yet). Another related question was whether spent fuel is trash or a valuable resource that can be used again. When answering these questions, he emphasized that the discussion on how to deal with these problems needs public debate, especially in regards to siting temporary and permanent disposal sites.

Finally, Professor Lee warned that while the public wants both quick and accurate communication, achieving both at the same time is difficult. The government is in a very difficult position, because they can be accused of cheating the public and hiding information if they do not respond quickly, but can also be accused of misleading the public if the information provided is poor. He noted that the solution to this dilemma remains unclear.

Finally, Suzuki Tatsujiro, vice chairman of the Japan Atomic Energy Commission, recollected on several personal experiences while working at the Japan Atomic Energy Commission and the struggle to gain public trust there. He stressed that transparency is a continual objective at the JAEC, and spoke about closed meetings that later turned out to be scandals because they were not known to the public. Even if the substance of the discussion was not controversial, public perceptions of transparency and accountability were hurt. He noted that now, if any of the three out of the five commissioners meet, they keep a record of the discussion. If they meet outside of the government, they keep a record. Even during the drafting stage of documents, records are now kept of whoever makes comments and alterations, so that the public understands that the drafts are not manipulated.

However, he argued that these measures are not enough, and are only initial steps. He emphasized four principles for public trust. The first was accountability in policy decisions. The second was the disclosure of accurate information. The third was that the whole process of information dissemination should be transparent and fair to stakeholders, and that public participation should be enhanced. Finally, he argued that face-to-face communication with the local public is crucial and needs to be institutionalized. He claimed that face-to-face interactions allow for a better expression of public sentiments and create common values. Finally, he noted that this idea of “public trust” should not be only domestic, but also international.

He finally stated that how communication takes place is just as important as whether it takes place. During the question-and-answer time, he proposed that government regulators should not hesitate to become the “audience” and directly hear the concerns of citizens on the podium. These very minor changes in set-up were instrumental in changing the psychological setting.

One audience member stated that there is not just an information disconnect between industry and the public, but an emotional disconnect as well. The public is not merely concerned about the “message”; another dilemma concerns *who* is communicating that message, as the nuclear industry does not carry credibility at the moment. In response, Dr. Suzuki stated that, historically, the utilities were responsible for carrying the message. However, he argued that regulators need to start speaking up more. Finally, he mentioned that there should be an independent and trusted information source. Dr. Ahn highlighted the National Academy’s role in the US in providing neutral and well-balanced advice to the government, Congress, and the people.

Another question was on the topic of safety culture. One audience member asked whether there was some value in providing uniformity in defense to safety incidents since the operator is always the first line of defense to accidents. Mr. Chung replied that regulators can try and standardize practices, but they will be unable to standardize culture. He also re-emphasized that while it is easy to talk, it is much harder to implement the results of those discussions. Dr. Ahn also noted that the term “safety culture” should be used carefully, given that “culture” has its own definition and meaning in academic disciplines outside of the nuclear industry.

Session 2

Date: February 19, 2013
Time: 14:00-15:15
Place: Regency Room

A Nuclear North Korea: Nonproliferation Issues and Beyond

Moderator: Lee Jung-hoon, Yonsei University
Speakers: Bruce Bennett, RAND Corporation
Michishita Narushige, National Graduate Institute for Policy Studies
Alexander Vorontsov, Russian Academy of Sciences
Rapporteurs: Duyeon Kim, Center for Arms Control and Non-Proliferation

North Korea poses not only a threat to the United States and the region, but it also challenges the grand bargain of the Nuclear Nonproliferation Treaty (NPT). Pyongyang is a manifestation of two out of three interrelated challenges to the nuclear nonproliferation regime: 1) latent proliferation, 2) first-tier proliferation, and 3) second-tier proliferation. North Korea remained within the NPT while maintaining the latent capability for rapid development of nuclear weapons as a hedge against future threats and eventually withdrew from the NPT. Pyongyang's second tier proliferation centered on Pakistan has further exacerbated the threat of latent proliferation. The North's failure to fulfill its end of the NPT bargain has thereby undermined confidence in the nonproliferation regime and opened a door for other states to potentially follow suit. This session addresses the critical issues surrounding North Korea's nuclear ambitions and implications for the global nonproliferation regime.

Session moderator Lee Jung-hoon, professor at Yonsei University, began the discussion by portraying the failures of the nonproliferation regime manifested through repeated North Korean provocations. Professor Lee argued that the international community's inability to contain North Korea has compelled South Korea to discuss military options to offset North Korea's asymmetric capabilities. The range of such discussion includes nuclear deterrence and the full participation in the US missile defense network. Professor Lee further explained that such discussions are unavoidable for South Korea with its national survival at stake.

Bruce Bennett, senior defense analyst at the RAND Corporation, stressed that the nature of the North Korean nuclear threat depends on how the regime uses its weapons. This contradicts the current conventional wisdom that the mere existence and possession of nuclear weapons in it of themselves is a grave threat. Dr. Bennett argued that while Pyongyang has not yet launched nuclear weapons, it uses them regularly by choosing from a "rich" menu that helps the regime achieve its objectives even in the absence of a published doctrine.

He identifies seven kinds of possible uses based on official statements coming out of the reclusive country. They are: 1) deterring coercion and military action, 2) providing a "nuclear shadow" that reduces escalation risks from provocations, 3) demonstrating the empowerment of a failing regime, 4) affecting regional perceptions of the Korean military balance, 5) stimulating interest in purchase of North Korean nuclear weapon capabilities, 6) "leveling the playing field" in a conflict, and 7) providing a means for exacting to overcome US/ROK technology advantages.

Dr. Bennett also raised the question of whether the US president would use roughly 100 nuclear weapons in response to North Korea's use and kill roughly 10 million North Korean civilians, thus challenging some expert beliefs that the US would "turn North Korea into a parking lot" should the regime use a nuclear weapon against it. He believed denuclearization will not work, and that the focus should be on counter-proliferation instead. Dr. Bennett called for political actions that focus on the regime since military force is not an option, and since the options for economic sanctions have run out. In other words, he argued that striking against a battalion of soldiers would only embolden the North Korean military about the US threat. Instead, Dr. Bennett called for focusing on Kim Jong-un.

When asked by Professor Lee on how close North Korea is to miniaturizing a nuclear warhead, Dr. Bennett acknowledged the limits to an accurate assessment but claimed the real question ought to be "When did North Korea start testing miniaturized warheads?"

Michishita Narushige, professor at the National Graduate Institute for Policy Studies (GRIPS), began his remarks by stating his preference not to discuss nonproliferation, but rather, counter-proliferation, which he claimed is a more important topic. Professor Michishita estimated North Korea's nuclear weapons

stockpiles at about 10 nuclear bombs, and said 2009 estimates suggested Pyongyang might have succeeded in miniaturizing nuclear devices to mount on missiles, although he prefaced the lack of absolute certainty. Professor Michishita purported that Pyongyang's third nuclear test seemed to have been conducted with a miniaturized nuclear device.

As for missile capabilities, Professor Michishita pointed to what he claimed to be the international community's "diverted" attention to North Korea's successful Unha-3 long-range rocket test while noting the North's growing potential capability to strike the US mainland. However, he placed an importance on Pyongyang's basic capabilities of 500 Scud missiles capable of reaching most of South Korean territory and 300 Nodong missiles capable of reaching the Japanese mainland as well as Nodong missiles tested by Iran and Pakistan.

Professor Michishita explained three scenarios envisioned by Japan in which North Korea might use missiles against it in the future. The first scenario is military diplomatic use of missile force should Pyongyang deem Tokyo to be uninterested in talks to normalize bilateral relations. In this scenario, the North desires the normalization of relations but Tokyo's refusal to reward bad behavior leads to missile launches in the vicinity of Japanese territorial waters and in the direction of the Japanese mainland. Pyongyang would further threaten to escalate if Tokyo continues to refuse talks, and eventually hurt Japanese lives. The second scenario is another Korean War in which the US would use Japanese bases to fight against North Korea but Pyongyang would try to persuade Tokyo not to allow Washington to use its bases. Professor Michishita explained the likelihood of this scenario is not high since it is a war scenario in which the North would use a limited number of conventionally-equipped weapons to scare Japanese people into a diplomatic solution. The final scenario is a suicide scenario in which the regime is destabilized and Kim Jong-un would feel his days are numbered, which would compel him to leave behind his legacy along with his father's and grandfather's legacies. Since this scenario is suicidal, Professor Michishita explains that Pyongyang would be able to use as many nuclear weapons available, but noted that it is a highly unlikely scenario since dictators tend to believe their days are never numbered.

Professor Michishita concluded by outlining steps Japan has taken in terms of a military and diplomatic response to North Korea. He explained that Tokyo has procured ballistic missile defense in 2003, which was acquired in 2007, and deployed last year with two systems: 1) an Aegis destroyer base capable of taking on missiles with a range of 1,500 km, and 2) ground-based Patriot PAC-3s that are cheaper and easy to handle. Professor Michishita noted Japan's heavy expenditures on missile defense of US$10 billion. He said the second step was in civil defense, or "national protection" in which parliament enacted the law in 2004, and various municipal governments have devised action plans that also include establishing warning systems activated during past North Korean provocations. In light of North Korea's third nuclear test, he posited the question as to whether sanctions would escalate or whether Seoul and Washington would "change minds" and hold talks with North Korea. Professor Michishita said the third step was in maintaining and bolstering the credibility of US extended deterrence, which continues to be an issue of concern for Japan. Finally, on the diplomatic front, Professor Michishita explained unilateral sanctions have been used against North Korea after failed efforts to properly address the abduction issue coupled with deteriorated relations in the aftermath of Pyongyang's first nuclear test.

When asked by Professor Lee about Japan's nuclear option, Professor Michishita explained that Tokyo already possesses conventional strike capabilities that include the F-2 attack aircraft, Joint Direct Attack Ammunition, and a procured aerial refueling aircraft.

As for the implications of North Korea's third nuclear test, Alexander Vorontsov, professor at the Russian Academy of Sciences claimed it showed the relevant parties continuing to move in a vicious circle as well as in a new circle. He attributed the vicious circle to misperception and miscalculation on both sides of each other's intentions and concerns. Professor Vorontsov stressed that Pyongyang should understand that it "will lose something" upon provocations. He reminded the audience that new UN sanctions will be adopted, but North Korea's reaction will be just as predictable by rejecting the resolution, rejecting what it calls "double standards," and continuing to develop its missile and nuclear capabilities. Thus, Professor Vorontsov called for persuasion to conduct safer and less provocative behavior.

Pointing to the failure to prevent North Korea from developing its military nuclear program, Professor Vorontsov drew several conclusions. He stated that "strong-arm tactics" and sanctions alone have failed to bring positive results, and Washington's "strategic patience" policy has also failed to reach its goals. Professor Vorontsov further denounced Washington's firm position of isolating and weakening North Korea, even at the cost of resolving the nuclear issue, pointing to the "policy of economic blockade."

On the other hand, referring to the Six-Party Talks process, Professor Vorontsov argued that a policy of engagement and strategic compromise has proven successful, pointing to talks—described as a mechanism that placed the parties on an equal footing and taking into account their legitimate mutual concerns—which he claims have succeeded in delaying or freezing the situation or resulting in a cessation of nuclear activities. At the same time, Professor Vorontsov blamed the Six-Party Talks process for placing too many preconditions, which led to the failure of those talks.

Professor Vorontsov said he met senior North Korean officials days prior to the third nuclear test and asked them the chances of following through with another test, and what would persuade them against it. In response, the North Korean officials told him they will continue to test because "negative US policy toward us won't change, we have nothing to lose."

Before engaging in a broader discussion with the audience, Professor Lee countered Professor Vorontsov's argument on the preconditions attached to the Six-Party Talks, saying all six members shared a clear

understanding that full dismantlement came with it a package of "goodies." Thus, Professor Lee claimed Pyongyang did not abandon the talks due to feelings of abandonment and threats because the multilateral forum was designed to have the opposite effect. Instead, Professor Lee stressed that the North abandoned the Six-Party Talks because it was unwilling to surrender its nuclear weapons.

When asked whether disarmament or nonproliferation is more important in the event of resumed Six-Party Talks, Dr. Bennett claimed North Korea would never be denuclearized so the focus must be on counter-proliferation although he acknowledged the challenges to finding the path forward.

When asked what types of nuclear weapons could be introduced to South Korea, Dr. Bennett instead said he would use bombers against North Korea over inter-continental ballistic missiles (ICBM) or submarine-launched ballistic missiles (SLBM). He noted the difficulties in moving tactical nuclear weapons from Europe.

When asked what institutional frameworks Moscow put on the table as the chair of the Six-Party Talks Northeast Asia and Security Mechanism Working Group for a post-dismantlement process, Professor Vorontsov noted it deals with the establishment of a peace regime. When asked about the political utility of nuclear weapons rather than the military utility of them, Dr. Bennett questioned the absence of a military utility for them.

As the final word, Professor Michishita corrected a previous comment by saying Japan's precondition on the abduction issue was linked to its financing of energy assistance and not the return to multilateral talks.

Session 2

Date: February 19, 2013
Time: 14:00-15:15
Place: Grand Ballroom I

Nuclear Spent Fuel and Waste Management

Moderator:	Thomas Isaacs, Lawrence Livermore National Laboratory
Speakers:	Ferenc Dalnoki-Veress, James Martin Center for Nonproliferation Studies
	Philippe Gillet, AREVA
	Song Myung Jae, Korea Radioactive Management Corporation
	Jack Spencer, The Heritage Foundation
Rapporteurs:	Robert Kim, Center for Strategic and International Studies

This panel explored the issues and hurdles to resolving the spent nuclear fuel problem of South Korea. This issue bears particular importance for South Korea, given the impending saturation of spent fuel ponds. Panelists mentioned several recycling technologies, such as AREVA's MOX fuels and pyroprocessing, as possible avenues for waste reduction. However, it was noted that there is no replacement for the final repository as a permanent solution, even with recycling. The spent fuel experiences of other countries, in particular the United States, also provided lessons for waste management.

Tom Isaacs, director for the Office of Planning and Special Studies at Lawrence Livermore National Laboratory, started the discussion by pointing out the argument that spent fuel needs to be resolved in order to ensure the future of nuclear energy. He argued that there is an ethical obligation to store and provide a permanent solution to the waste problem. For him, this solution should be timely and an interim solution may be needed. In the past, nuclear waste management was viewed as an isolated problem after the fact. However, he stated that there is now a general understanding that waste must be addressed earlier and issues of waste management, nonproliferation, and safety should all be dealt with together. Finally, while there may be a scientific consensus on how to geologically store spent fuel, the challenge lies in gaining social, political, and institutional acceptance. He noted that the successes and failures of numerous countries, such as Finland, Sweden, Canada, and the UK, provide many pertinent lessons and examples for what governments should do and how they should behave.

Following this, Ferenc Dalnoki-Veress, scientist-in-residence at the James Martin Center for Nonproliferation Studies, stated that South Korea is well positioned as a nuclear exporter, but it faces the problem of saturation of pool ponds before the end of the decade and no siting of a geological repository. He elaborated on the nature of spent fuel, describing how it has to be cooled immediately after use because it is

hot and radioactive, and that this is different from coal because it is inherent heat. After 5-10 years in cooling ponds, it needs to be put in wet or dry cask storage. Finally, it needs to be put in a repository. He underlined that Korea will still need to have a repository even with pyroprocessing.

Dr. Dalnoki-Veress summed up South Korea's spent fuel situation as facing two basic problems. The first problem was the saturation of cooling ponds by the end of the decade. The second was the lack of siting for a geological repository. All of the efforts for a repository have failed despite the lack of seismic activity in South Korea. On the first problem, there are potential temporary solutions, such as transferring spent fuel from old pools to new pools, but such efforts will only go so far. There is also the option of creating a centralized interim storage facility, but he stressed that the key will be emphasizing to the public that such a facility will not be *permanent*, and that there will always be another stage.

Additionally, Dr. Dalnoki-Veress agreed that it is a social problem, not a technical problem. For him, community outreach and inclusion of all stakeholders is necessary for a solution. Authenticity and public trust are crucial. He recommended a multi-attribute, quantitative analysis for analyzing the interests of stakeholders and determining the best solution. He also stated that two important principles must guide these efforts. The first is that the community should not find itself worse off after the repository. Second, the community should understand that the compensation is not for the community accepting greater risk, but for them providing a service to a wider group of users. Ultimately, he argued that the entire issue of spent fuel should be reframed in order to be resolved.

Finally, he recommended the deep borehole repository as another possible solution to explore, although he admitted that it has yet to be proven in practice. He mentioned that research by Sandia National Laboratories

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showed that the highest mobility isotope, Iodine-129, was predicted to release to the environment at a very low level one million years from now if the packing of the deep borehole disposal worked. Even if fine sand were used as packing, it would be take ten thousand years for release. He noted that South Korea already has experience in digging deep boreholes.

Following this, Philippe Gillet, Asia senior vice president of the Back End Business Group-AREVA, started out by citing an opinion poll of the European Union which predicted that the popularity of nuclear power would rise if a country found a solution for waste. He proposed that a solution for waste resides in recycling, which consists of recovering 96 percent of the uranium and plutonium into MOX fuel and safely conditioning the remaining 4 percent of the fission product for geologic disposal.

He argued that this recycling could even strengthen nonproliferation. If the numbers of regional recycling centers were limited, any customers would be able to send to such centers and the number of sites with spent fuel would decrease. AREVA would return the waste, which he claimed has presented no issues according to IAEA safeguards. He emphasized that after 40 years of experience, this program has a perfect track record in terms of EURATOM and IAEA safeguards.

Furthermore, Mr. Gillet described MOX fuel as a reliable and safe solution to nuclear waste, while reiterating that there is no solution for final disposal yet. He contrasted used fuel, which he characterized as designed to create energy, and the final product of recycling, which is exhausted and should go to the final disposal. For this reason, he argued that MOX fuel is progress in terms of sustainability and stability. He also noted that the Netherlands is still recycling, and that its storage for the final product after recycling was licensed for 100 years. Later, he stated that while MOX fuel should not prevent work on a permanent solution, it is nonetheless a solution that is safe, stable, and smaller in quantity. He argued that open and closed fuel cycles are about the same cost and are competitive options, and that only about 5 percent of total nuclear costs are dedicated towards the back end. In sum, while countries may be tempted to research other recycling technology like pyroprocessing, he emphasized that AREVA already provides a solution.

Song Myung Jae, president and CEO of the Korea Radioactive Waste Management Corporation, discussed the current status of the spent nuclear fuel problem in South Korea. Initially, Korea's nuclear program postponed dealing with waste, and decided to store the waste at the reactor sites. The first radioactive waste management program was established in the mid-1980s, and its initial objective was to secure one site for low and intermediate level waste disposal and interim fuel disposal. These sites were later split. Eventually, the program identified the Gyeongju site for low level and intermediate waste.

However, the issues of interim storage and final disposal of spent nuclear fuel still remain. The Korea Radioactive Waste Management Corporation (KRWM) was created in 2009 to focus on these issues.

After an amendment of the Radioactive Waste Management Act provided the legal basis for waste man agement, the government opened a policy forum for spent fuel management. A final report was submitted to the government in September 2012, and a stakeholder engagement process ensued in order to determine the spent fuel management policy. He stated that the final disposal will be possible at 2050 or later, and that this timeline makes an interim storage absolutely necessary since the current spent nuclear fuel storage will be saturated by the end of the decade. He also noted that the interim facility would likely not be around before 2024.

With regards to management, he stated that there are basically three options. The first was direct disposal of spent nuclear fuel and highly radioactive waste. The second is volume reduction through reprocessing, which will reduce the amount needed for storage. The third option is partition and transmutation of radioactive waste into low-level radioactive waste using innovative technologies.

Finally, Jack Spencer, senior research fellow at the Heritage Foundation, drew primarily upon United States experiences in the back end of the fuel cycle. He first noted that while the front end is well situated in the US, the back end of the fuel cycle is a complete mess. Mr. Spencer argued that the primary problem in dealing with nuclear waste is too much government involvement and that a market-based approach is a better approach. For him, the splitting of responsibility between waste producers and the government is problematic, especially given the bureaucratic nature of the Department of Energy. He characterized the status quo as a fee system that is not attached to any actual service rendered by the government, which leads to inaccurate pricing. Finally, the Blue Ribbon Commission was created but it looked at everything except the current law for the Yucca Mountain repository.

He argued for three main principles when dealing with waste. The first was that waste producers need to be responsible for waste management, and that the market should determine the pricing for waste options. Business models should be based around the full fuel cycle, not 2/3rds of the fuel cycle. The second principle was market-based pricing, which he argued is necessary for determining the best options. Payments should be attached to the cost of the service. The final principle is competition. He argued that privatization would encourage innovation and growth in nuclear power, although he admitted that the US still has its subsidy problems. When responding to proliferation concerns during the question and answer session, he stressed that he is not arguing for a laissez-faire approach and that the government should still have a role in regulation. He also mentioned that while he thinks privatization is necessary for the best solution, it is not necessary for a solution.

One question raised by Dr. Isaacs during discussion centered on the production of cesium and strontium during the reprocessing of spent fuel. Mr. Gillet stated that while MOX fuel does not separate any actinides and does not answer questions regarding final disposal, the point of recycling is that it would condition the 4 percent of fission product in a stable and safe solution with reduced volume. Dr. Isaacs also questioned Mr. Gillet's wording that recycling technology has a perfect record with safeguards, and that his phrasing might overlook some of the strains on safeguards that might arise with the expansion of recycling technology. Mr. Gillet responded that these concerns were certainly valid, but that the facts of Areva's recycling program demonstrate a strong history with safeguards. He also argued that the US currently has accepted the possibility of recipient countries pursuing reprocessing services outside of their state during renegotiations of nuclear cooperation agreements. An audience member responded, though, that these reprocessing services are acceptable only with countries that are already nuclear weapons states.

Another audience member raised the question of whether deep borehole storage was merely another "paper storage facility," much like "paper reactors" that look great on paper before they are actually built. Dr. Dalnoki-Veress responded by highlighting various advantages for deep borehole disposal. He stated that there's less dependence on geological siting and that it's a much more simple idea, which makes it easier to explain to the public. He also noted that fuel conditioning arguably might be easier. However, he noted that these concerns were certainly valid and that deep borehole disposal currently sounds like a "religion," given that it has not yet actually been implemented.

Session 2

Date: February 19, 2013
Time: 14:00-15:15
Place: Grand Ballroom III

Nuclear Safety and Terrorism

Moderator:	William S. Charlton, Nuclear Security Science & Policy Institute
Speakers:	Jonathan Herbach, Utrecht University
	Hwang Il Soon, Seoul National University
	Naoi Yosuke, Japan Atomic Energy Agency
Rapporteurs:	Shawn Fitzgerald, Massachusetts Institute of Technology

Nuclear safety has always been a top priority for the industry in order to guard against both human failure and natural disaster. In recent years, the possibility of terrorist attacks against nuclear facilities has led to a renewed interest in nuclear security. This panel discussed risk analysis in both safety and security in terms of nuclear systems, as well as measures that the industry might implement in order to bolster both nuclear safety and nuclear security regimes.

William Charlton, director of the Nuclear Security Science and Policy Institute at Texas A&M University, led the panel discussion by introducing the topic of nuclear safety and terrorism by introducing two separate, yet linked, concepts of nuclear safety and nuclear security. He noted that risk permeates all complex systems, and we normally approach risk management by both lowering the likelihood of an incident as well as mitigating the consequences in the event of an incident. He explained that by assuming the probability of an incident is low, we underestimate the risk associated with both safety and security incidents.

Given the potential energy that exists in nuclear fuel, the possibility for far-reaching consequences is much higher when compared to traditional energy sources. Accidents such as those at Chernobyl and Fukushima are clear examples of this idea. We have experienced multiple core incidents when traditional models predict that the probability of any one event is extremely low. When dealing with low-probability, high-consequence events, we should not assume that there is a linear relationship between probability and risk. This leads to undervaluing the impact of such events, and thus, we do not invest enough in systems to mitigate these events.

The dimension of nuclear terrorism also adds a new variable to the calculus. Terrorist organizations are highly organized, may not be hampered by our own ideas of self-protection and rational choice, and meticulously plan attacks. Therefore, terrorism does not fit into traditional risk analysis models, because they might not be considered a low probability event. Dr. Charlton proposed five steps to improve risk analysis: 1) integrate safety and security in system design and operation. These two concepts are fundamentally aligned, and not separate. Systems that provide safety might also provide security; 2) enhance safety and security culture at all levels. If employees genuinely believe that a safety or security event might happen at any time, they will be vigilant; 3) understand flaws in traditional risk analysis; 4) engineer increasingly resilient systems. This allows the "defender" to adapt in the face of crisis instead of relying on traditionally rigid design and implementation; and 5) improve crisis management globally. When a nuclear safety or security event occurs, all nations are affected. An attack on one facility can be considered an attack on all facilities.

Jonathan Herbach, researcher at the Center for Conflict and Security Law at Utrecht University, highlighted the efforts of the international community to codify nuclear security issues within international law. International legal aspects of nuclear safety and security highlight the fundamental notion that the international community views cooperation as an important tool in both safety and security regimes. He noted that risk and threat perception associated with safety is reflected in the international legal regime that took shape after the Three Mile Island and Chernobyl incidents. Specifically, instruments were adopted in order to facilitate communication and information sharing regarding nuclear accidents.

After 9/11, there has been greater focus on the issue of nuclear security within the international legal sphere. Instead of relying on extremely specific provisions within different instruments of the law, the international community has moved toward a holistic approach. The Convention for the Suppression of Acts of Nuclear Terrorism of 2005 defined nuclear terrorism as a crime for the first time. Possession of radioactive material and/or devices, sabotage of nuclear facilities, and threats against those facilities with the intent to harm are acts of nuclear terrorism as defined by the Convention.

Dr. Herbach highlighted three points regarding nuclear safety and security within the international legal context. First, states are responsible for the physical security of their own nuclear facilities, but the international community recognizes that harmonizing efforts across states could provide added benefit. Physical security should prevent material from unauthorized removal, locate and recover stolen or missing material, and prevent sabotage. Additionally, there remains some overlap between safety and security in mitigating radiological consequences. Second, certain acts should be made crimes within domestic legislation, and the international community should continue to work to standardize definitions of criminal acts, nuclear facilities, and physical protection. Lastly, cooperation is of paramount importance. States are required to comply with their own national laws, but are expected to provide assistance if asked or if they wish to do so. Dr. Herbach concluded his remarks by noting that states will only take measures to which they have subscribed to, which creates gaps in the international system. Looking ahead to the Nuclear Security Summit of 2014, states should look for ways to make these international legal instruments more universal.

Hwang Il Soon, professor at the School of Energy Systems Engineering at Seoul National University, first highlighted the threat of indiscriminate terrorism facing the world today. Where there is a conflict between religion, ideology, or culture, the threat of terrorism remains high. Dr. Soon noted that during the Cold War, it was easy to identify ideology in terms of Western vs. Communist, but in the post-9/11 era, we must be creative in our view of terrorism. He suggested that given the technical difficulties associated with detecting terrorist activity, especially within densely populated urban areas, we should identify protocols to guard against such acts. Furthermore, he cautioned against sharing sensitive information with the public regarding nuclear facilities, even in the aftermath of disaster (such as Fukushima). Extremists could utilize this information in order to plan and execute other attacks.

Dr. Soon commented about concrete steps the nuclear community might take in order to improve both the nuclear safety and nuclear security regimes for power plants, spent nuclear fuel (SNF) storage, and research reactors. He also noted cyber terrorism as a growing threat to nuclear infrastructure, specifically highlighting the effectiveness of the Stuxnet virus. Dr. Soon suggested the following mechanisms to enhance safety and security posture: 1) development of sheltered interim storage of SNF. This interim storage might be built underground, which provides an additional geologic barrier to the terrorist threat; 2) ruggedized, self-sustaining underground control towers for power plants. In South Korea, for example, these control towers should be able to withstand conventional attack from an adversary. These control towers should also have no dependence on an external power supply in case of disruption; 3) early- warning defenses at nuclear sites; and 4) institutional measures such as legislation and international cooperation.

Dr. Soon specifically mentioned that there should be tangible action items for immediate implementation on the table. Education and outreach on the part of the nuclear industry could facilitate implementation of such measures. Dr. Soon concluded that the international community should worry about nuclear security, not just nuclear nonproliferation. The consequences of a nuclear security incident could be worse than the safety incident at Fukushima, and should be seen as unacceptable.

Naoi Yosuke, deputy director of the Integrated Support Center for Nuclear Nonproliferation and Nuclear Security of the Japan Atomic Energy Agency, began his remarks by noting that last year, the IAEA recorded about 200 cases of HEU transactions, which is of concern to the global nuclear security regime. He highlighted examples of infiltration at nuclear sites in France, Sweden, and the United States over the past year. He observed that this capability demonstrates a threat to nuclear infrastructure by potential terrorists that wish to gain access to protected sites with the intent to sabotage those facilities.

Mr. Naoi noted that the Fukushima incident reveals the vulnerability of nuclear infrastructure to both safety and security incidents. Specifically, Fukushima highlighted the vulnerability of some nuclear systems in the areas of cooling systems and spent fuel. As an alternative type of attack, a terrorist might choose to target some secondary component of the nuclear facility that affects the entire system, such as a seawater pump or final heat sink. Similarly, Fukushima brought to light some safety concerns associated with the prevention of accidents due to severe natural disasters, instrumentation, and training for severe accident management. He said that the countermeasures against safety and security incidents are similar, and systems must be engineered with both in mind.

Mr. Naoi concluded his remarks by highlighting several lessons learned from nuclear safety aspects of operations that impact nuclear security: 1) emergency preparedness; 2) the need to foster a joint safety and security culture, while recognizing there might be a contradiction in how to apply this culture. Security requires confidentiality regarding physical protection systems, while safety regimes require openness and transparency in order to provide public confidence; and 3) the need to gain synergy between safety and security considerations. In order to gain this synergy, the industry should look into both safety and security by design to consider both perspectives. Additionally, sustained communication between stakeholders in both the security and safety regimes should benefit both.

When asked what percentage of effort a country should devote to safety versus security, Dr. Charlton said that a country needs to think carefully about how to balance those two issues. With safety events, a country has to protect against human error or natural disaster, but with security events, there might be active measures that one might take in order to influence an adversary's decision. However, he noted that a country should look for where there is synergy and overlap between the two concepts and try to exploit them. A key point is that the nuclear industry should try to evolve along with the understanding of both safety and security threats.

When asked about the difficulties in enhancing both safety and security cultures, Dr. Charlton said that developing a culture is a long-term process. Training and education, in addition to an emphasis on the culture by facility management, are essential in changing culture. These programs must continually adapt and evolve. Dr. Herbach suggested that from the international law perspective, the instruments that have been ratified form a basis for international cooperation that could enhance the culture of cooperation between signatories. Dr. Soon suggested that the United States, with the experiences of 9/11 as well as security incidents with weapon recycling systems after World War II, might be in a good position to lead an effort in improving both safety and security culture.

Overall, the panel provided unique and interesting ways to think about the differences and similarities having to do with nuclear safety and security. There was agreement across the panel that both regimes must be strengthened and that states should try and exploit synergies in both regimes in order to provide more comprehensive protection against both safety and security incidents. International legal frameworks might provide an important framework for states to work within as they try to protect nuclear facilities from natural disaster, human error, and terrorism.

Session 3

Date: February 19, 2013
Time: 15:30-16:45
Place: Regency Room

US-China: North Korean Nuclear Dance Card

Moderator:	Simon Long, The Economist
Speakers:	Kim Sung-han, Ministry of Foreign Affairs and Trade
	Gary Samore, Harvard University
	Shi Yinhong, Renmin University of China
Rapporteurs:	Paolo Venneri, Korea Advanced Institute of Science and Technology

This session was one of particular relevance to the issues occurring on the Korean Peninsula at the time of the *Asan Nuclear Forum*. The recent successful nuclear and rocket tests had caused a seeming revaluation of the three-way relationship between North Korea, China, and the United States. This session examined how recent events had changed the three-way relationship, if they had in fact changed, and looked at the future of the complex dance that surrounds the interaction of these three countries.

The session began with Simon Long, The *Economist's* Asia columnist and editor, explaining the creative title of the session. He explained that the relationship surrounding North Korea occurred with a regularity and complexity that mirrored a dance. It consisted of a crescendo of rising aggression, seemingly timed with transitions of power in the world, the predictable and strident United Nation's response of various economic sanctions, the quick condemnations and mitigation of those sanctions through Chinese efforts, and the smooth return to the previous status quo. These relations, as presented, seemingly had the United States and China standing on opposite sides of the spectrum, each pulling in different directions. Yet Mr. Long pointed out that the two countries actually had very similar goals: preventing nuclear war and open conflict on the Korean Peninsula. Mr. Long proceeded to set the tone of the session by presenting the governing question: How will United States and Chinese cooperation relating North Korea happen, and how will South Korea behave in response to their actions?

The first issue that was addressed by all the speakers was what factors influenced the nuclear dance. Kim Sung-han, vice minister of Foreign Affairs and Trade of the Republic of Korea, provided a very apt analogy from the Korean perspective. The North hosted a dance party, symbolizing a request for cooperation, and had invited both China and the United States to attend. The question for the near future was to see who would be willing to dance and cooperate with North Korea. How would China, a long time dancing partner, and the United States, historically not a dance partner, dance with the North? Dr. Kim

explained that this had much to do with what each country sought to achieve by cooperating with Pyongyang. China seeks to maintain stability in the region, and to denuclearize North Korea. The United States, on the other hand, has the primary goal of denuclearization, placing it above the state's own stability.

The other two speakers, Gary Samore, executive director of the Belfer Center for Science and International Affairs at the John F. Kennedy School of Government at Harvard University, and Shi Yinhang, professor of international relations at Renmin University, added on to this analysis by connecting American and Chinese behavior to broader geopolitical issues. They both argued that how the United States and China reacted and behaved in relation to North Korea was largely dependent on other issues in the region and relating to the two countries. Dr. Samore argued that China was highly dependent on its aspirations for regional dominance, which helps explain the balancing of its two goals to both denuclearize the North and maintain stability in order to assure the survival of the current regime. With every nuclear test, the United States has increased justification for escalating its military presence, and Japan and South Korea are pushed towards nuclear weaponization, all of which would undermine China's regional dominance. However, if the regime were ever to collapse due to excessive pressure for disarmament, it would create the definite possibility of the reunification of Korea by a government that has had a history of being on friendly terms with the United States, also undermining Chinese regional dominance.

Dr. Shi offered a similar perspective in that the Chinese-DPRK relationship was related to broader issues, but drew attention to a different set of them. He argued that there were two related dances: a dance between China and North Korea, and a dance between China and the US. The first dance is dependent on the dance between the US and China, to a point. He argued that the China-DPRK relationship has always been a cycle between hot and cold, going from periods of close cooperation to periods of anything but. He explained that at the moment, especially after North Korea rocket and weapons tests after explicit Chinese requests to not do so, relations between the two countries were particularly frigid, and would allow harsh reprisals, for a while. This in turn allows China to use its relationship with North Korea to affect its dance with the US on other issues, using it as a bargaining chip of sorts. He cited the example of the recent condemnations and sanctions by the international community, including China as an example. He posited that with the current cold relations between China and North Korea, China was able to use this opportunity to offer support to US hopes of receiving similar concessions from the United States in other regional issues, such as China's recent conflicts with Japan.

A second major discussion point was the nature of the relationship between China and North Korea. Most of the speakers expressed the belief that China continues to have strong ties with North Korea, and as such, should play an important role in its denuclearization. Dr. Samore argued that despite China's balancing act between its two interests, it should cooperate more with the United States because it has the greatest ability to enforce the various sanctions because of the large borders it shares with North Korea and the special relationship between the two. Dr. Kim also expressed the view that China should change its

behavior and do more to support international action towards the denuclearization of North Korea. Dr. Shi responded to the positions made by Dr. Kim and Dr. Samore succinctly when he explained that, despite popular opinion, China was facing increasing difficulty in influencing North Korean actions, and that this deterioration was continuing to worsen. He continued to argue that it was because of this deterioration in relations that China refrained from taking part in the more drastic proposals made by the United States and its allies. He believed that if China were to actively support the sanctions proposed by the Untied States, China ran the risk of both losing what little influence it still had over North Korea and destabilizing the country to the point where it might collapse.

In conjunction with the last argument, it was also brought up that recently, as shown by Chinese responses to recent nuclear and rocket tests in North Korea, that perhaps, there is a growing opinion in China that North Korea is becoming a strategic liability. Dr. Kim argued that perhaps this was a sign that China would eventually come to cooperate with US and South Korea efforts in terms of how to act towards North Korea. Dr. Shi quickly pointed out at the end of his opening remarks that North Korea had always been a liability to China. It had thus far cost China lives and significant amounts of money in economic support with very little benefit. On top of that, North Korea continues to behave irresponsibly despite Chinese requests to the contrary.

Following up on this, Mr. Long asked whether the speakers thought the United States and China were ready to cooperate in terms of how to behave towards North Korea. Dr. Kim stated the strong position that China was not ready to cooperate with the United States. He followed with the strong statement that China didn't give enough credit to its public opinion (which had been mentioned to be leaning towards considering North Korea as a liability), and would continue to follow the course it had set so far. He

further encouraged China to leave its dichotic view of North Korea as being stable with nukes, or unstable without, and to move beyond that. Dr. Shi responded immediately that China had in fact been cooperating more with the United States in the latest events related to nuclear weapons testing and rocket launches in North Korea. It had, unlike previous occasions where it was not a viable option, supported international sanctions. He added that it was because of this stronger government action that the Chinese population had responded so strongly against North Korea, and was thus too variable to be of any consequence in determining Chinese policy. Dr. Samore was supported Dr. Shi in his belief that while China and the United States had their differences, they were already acting with a certain amount of coordination on issues regarding North Korea, recent events being a prime example.

A final recurring issue was the role South Korea would play in the dance. The issue would usually surface as a reaction to US or Chinese actions, and rarely as an independent player. The opinions circulated seemed to indicate a general trend of South Korea following a US lead in affairs relating to North Korea. It was generally agreed that South Korea on principle approved and supported US led sanctions of North Korea, and condemned the seeming reticence on the part of the Chinese to help carry out the sanctions. However, as the panel's representing Korean, Dr. Kim offered a different view and opinion of what South Korea should do. He maintained that South Korea must not, and should not have to choose between US and Chinese led actions when deciding how to interact with North Korea. He argued that South Korea should in fact take a leading role in formulating international policy regarding North Korea. Various policy paths that have been recently proposed in South Korea were brought up and discussed. The options included the reintroduction of US nuclear weapons into South Korea, initiating stronger trilateral sanctions against North Korea, and expanding the dialogue with North Korea to include issues beyond nuclear weapons.

It was generally agreed that reintroducing extended deterrence into South Korea was largely an ineffective tactic, and one that had been entertained due to worries regarding possible US defense budget cuts. The initiation of stronger trilateral sanctions by South Korea, China, and the United States drew more attention because of Chinese worries relating to the destabilizing effects on the region. Dr. Shi made the case that by engaging in stronger sanctions, the risk of North Korea becoming unstable became great enough to be unacceptable. Dr. Samore and Dr. Kim both expressed the opinion that this path was readily available, and that the destabilizing consequences were manageable.

The final possibility, that of expanding the dialogue to issues beyond nuclear weapons, was strongly proposed by Dr. Kim. He argued that the issues surrounding North Korea were not only nuclear in nature. He stated that the issue included human rights and the reunification of what has been a long divided country. He posited that a final solution to all the issues was the eventual reunification of the Korean Peninsula. In consequence of this, Dr. Kim believed that the possibility should be brought forward as an eventual goal for policy governing US and Chinese actions on the Korean Peninsula.

The session ended with the three panelists responding to a series of final questions. The question they all answered was about how each respective country saw the situation of North Korea giving up its nuclear armaments, but in exchange for a security guarantee against countries such as Japan, South Korea, or the United States. Dr. Shi answered first by explaining that Chinese positions are always highly complex with policy that is dictated by Chinese perspectives and interests. He reiterated that China seeks to continue to maintain and improve friendly relations with South Korea, but that even so, China could not guarantee everything. Dr. Samore followed by explaining that in order to receive security guarantees, North Korea must trust another country to provide them. The issue, as explained by Dr. Samore, is that North Korea does not trust anybody. Dr. Kim finished by stating that South Korea cannot assure the safety of North Korea. Instead, it must explore its own avenues to guarantee its security, despite its own systematic contradictions.

Session 3

Date: February 19, 2013
Time: 15:30-16:45
Place: Grand Ballroom I

Nuclear Fuel Cycle: Debates on Multilateral Approaches

Moderator:	Corey Hinderstein, Nuclear Threat Initiative
Speakers:	Tom Coppen, Utrecht University
	Caroline Jorant, SDRI Consulting
	Kang Jungmin, Korea Advanced Institute of Science and Technology
	William Tobey, Harvard University
Rapporteurs:	David Santoro, Pacific Forum CSIS
	Mira Rapp-Hooper, Columbia University

Corey Hinderstein, vice president of the international program at the Nuclear Threat Initiative, opened an informative discussion on multilateral approaches to the nuclear fuel cycle with an important point: in order to develop effective solutions to the spread of proliferation risk technology, a comprehensive approach is needed that brings together both technical and policy expertise. The diverse range of skilled panelists certainly bridged this gap, and provided key insights into the political, legal, and technical issues that stem from the nuclear fuel cycle. Although the panelists disagreed about the relative efficacy of multilateral tools, a unanimous consensus emerged that the spread of sensitive nuclear fuel cycle technology constitutes a major international security problem.

Several panelists pointed to the technical nature of the problem. Kang Jungmin, visiting professor in the Department of Nuclear and Quantum Engineering at the Korea Advanced Institute of Science and Technology, underscored that nuclear power provides energy security and environmental benefits. Nuclear reactors generate a stable source of electricity without releasing harmful quantities of carbon dioxide into the atmosphere. Despite these advantages, there are two major issues with nuclear energy that stem from the supply and disposal of nuclear fuel.

First, nuclear reactors need a continual supply of uranium fuel to produce energy. Some modern reactors require uranium to be enriched as well. Hence, the energy security benefits of nuclear power are dependent on an assured supply of uranium fuel and access to enrichment services. The problem is uranium enrichment provides the means to make highly enriched uranium (HEU). This fissile material can be fabricated into the core of a nuclear weapon. A country that has indigenous uranium enrichment technology therefore takes a major step down one pathway to the bomb. This is precisely why the international community is worried about Iran's uranium enrichment activities today.

Second, nuclear reactors produce highly radioactive spent fuel waste. Once the uranium fuel rods have been burned in a reactor, the waste product contains many other toxic and radioactive elements and isotopes. This waste must be disposed of properly to avoid deleterious environmental consequences. Spent fuel reprocessing technology provides one option to deal with the waste product. In essence, the burned fuel rods are broken down in their constitutive elements and isotopes. This allows some material to be recycled or further separated and stored more effectively and safely in waste repositories. The key problem is that reprocessing technology provides states with the ability to separate out nuclear weapons- usable plutonium from spent reactor fuel, and therefore acquire a second means to a nuclear weapon.

Dr. Kang put a sharp concluding point on the relationship between this nuclear fuel cycle technology and the risk of proliferation. Some states pursue domestic enrichment or reprocessing capabilities to ensure a supply of nuclear fuel and to deal with spent fuel waste. But since the ability to enrich uranium and reprocess plutonium provides two routes to acquire nuclear weapons, this sensitive nuclear fuel cycle technology carries an intrinsic technical risk of proliferation as well.

Ms. Hinderstein brought in a political dimension to this technical issue. She emphasized that while the pursuit of nuclear fuel cycle technology is a sovereign choice made by states, there is no global consensus on this agenda. The absence of consensus stands in contrast to the accepted global norm on nonproliferation. There is a sense that only 'bad' states use the nuclear fuel cycle for dangerous or risky purposes. Some countries believe the international community should address these nefarious actors and leave the general issue of sensitive technology alone. Other states seek to curtail the acquisition of this proliferation risk technology. Ms. Hinderstein emphasized that this division parallels the current gun control debate in the United States. The Second Amendment of the United States Constitution guarantees a right to firearms despite the risk these weapons pose to public safety. Similarly, Article 4 of the Nonproliferation Treaty (NPT) also guarantees states the right to peaceful nuclear energy, which many contend includes sensitive nuclear fuel cycle technology.

Multilateral approaches thus seek to provide access to these crucial nuclear fuel cycle services while mitigating the threat of proliferation that stems from the indigenous development of this technology. Ms. Hinderstein argued that the current international nuclear fuel cycle market has satisfied most demands for the supply of reactor fuel, but has critical gaps in back end waste disposal services. States are very interested in filling this gap. Furthermore, despite a long history of multilateral approaches to the fuel cycle, most proposals are minimalist and fail to gain significant political traction. Ms. Hinderstein pinpointed the weakness with these proposals as an attempt to apply market-based solutions to political problems. An effective multilateral approach must advance a system based on sound policy and technical principles that connect the front end of the fuel cycle to the back end, and implement solutions in a step-by-step process.

Caroline Jorant, president of SDRI Consulting, provided a detailed history of the multilateral policy concept and its implementation over the last few decades. The idea of having several nations provide nuclear fuel cycle services emerged during the last 'nuclear renaissance' as a means to prevent the spread of sensitive technology while also guaranteeing the supply of fuel. The International Atomic Energy Agency (IAEA) launched a working group to evaluate multilateral options in June 2004, with a particular emphasis on how to create strong nuclear fuel cycle assurances. Three types of assurances emerged: (1) suppliers provide additional assurances of supply; (2) national facilities are converted to multinational facilities; and (3) new joint nuclear fuel cycle facilities are constructed in the future. The IAEA explored a variety of options to translate these general assurances into actual policy.

The nuclear energy industry followed the lead of the IAEA and launched a working group to explore whether nuclear fuel cycle supply could be assured with the existing market. The basic concern was to make sure their contract obligations for fuel supply would continue to be filled well into the future. An increase in the number of backup suppliers—whether national or multinational—mitigates this risk. The approval to develop the IAEA global fuel bank is one such option to ensure supply. Although this project was launched with government support, Ms. Jorant underscored that the actual process of implementation is much more ambiguous.

However, she emphasized that the prospects for the future are bright. New joint partnerships similar to the global laser enrichment program based in the United States can be launched. At the moment, there is no new capacity or demand for civilian reprocessing services, though much will depend on the future of Japan's fuel cycle strategy. There is a critical gap in regional and international waste storage facilities and repositories. This is an area where a multinational approach can make a serious contribution to the nuclear energy industry. In sum, Ms. Jorant argued that the basic policy solution provided by a multinational approach to the fuel cycle still makes sense today.

William Tobey, senior fellow in the Belfer Center for Science and International Affairs at Harvard University, contended that the multilateral approach is not a "nonproliferation panacea." He argued that it is far more important to focus on stopping the spread of enrichment and reprocessing technology rather than simply placing it under international management. Furthermore, while enrichment and reprocessing technology is often lumped together, the two distinct technologies have quite different proliferation risks and characteristics.

Mr. Tobey supported his argument with three important observations. First, closed fuel cycle arguments—for both multilateral and unilateral approaches—are not compelling. Plutonium reprocessing activities significantly increase environmental, safety, and security risks. The economic cost of building and operating such facilities is likely much higher than medium-term dry cask storage of spent fuel waste, especially if new technologies such as pyro-processing are involved. In addition, there is little evidence

of a uranium shortage on the front end, with new ore discoveries and scaled-back plans for nuclear power plant use post-Fukushima. Furthermore, Mr. Tobey pointed out that producers of uranium are diverse, politically stable, and committed to free trade.

Second, Mr. Tobey noted that medium-term interim storage is a viable alternative to sensitive back end reprocessing technology. Foremost, the option is cost effective when stacked up against industrial scale waste reprocessing operations. The approach is also flexible and allows for implementation of advanced cutting edge technology. Medium-term storage is relatively safer than waste reprocessing, and provides a viable public policy that solves the problem of spent fuel for a reasonable period of time. Third, Mr. Tobey reemphasized that multilateral approaches do not automatically solve the problem of nuclear proliferation that stems from sensitive nuclear fuel cycle technology. Indeed, he pointed out that the greatest nonproliferation disaster in history resulted from a multilateral program—A. Q. Khan at URENCO.

Tom Coppen, researcher in the Center for Conflict and Security Law at Utrecht University, drew attention to the legal dilemma created by several articles in the Nuclear Nonproliferation Treaty. Under Articles 1 and 2 of the treaty, states have an absolute obligation to not manufacture nuclear weapons. But these articles do not specify exactly what activities constitute the production of a nuclear weapon. Given the right to peaceful nuclear energy stipulated under Article 4 of the treaty, the scope of such activities have been, and continue to be, hotly debated. Many states interpret the article as a fundamental right to develop enrichment and reprocessing technology. He emphasized that a multilateral approach does not automatically resolve this dilemma. States must still uphold their nonproliferation obligations, and participation in a multinational fuel bank, for example, does not require them to sign away their rights to peaceful nuclear technology.

The panel concluded with a spirited discussion of these political and technical issues, with particular emphasis on the potential spread of sensitive technology to countries in East Asia. Recent events in Iran and North Korea highlight that the threat is acute but limited, and Mr. Tobey argued that a small number of countries around North Korea—including South Korea—are at the greatest risk for significant change in the next few decades. Ms. Hinderstein asked each participant whether there is a problem with the current system regarding the pursuit of sensitive nuclear fuel cycle technology. All participants responded in the affirmative. So while there was a clear sense of a major international security and energy problem, how we should actually define and solve the problem remained contentious.

Session 3

Date: February 19, 2013
Time: 15:30-16:45
Place: Grand Ballroom III

Will Iran Go Nuclear?

Moderator:	Jang Ji-Hyang, The Asan Institute for Policy Studies
Speakers:	Ahmet Kasim Han, Kadir Has University in Istanbul
	Steven Miller, Harvard University
	Uzi Rubin, Rubicon Ltd.
	Nasser Saghafi-Ameri, Center for Strategic Research
Rapporteurs:	Gordon Wyn Jones, King's College London

Half a world away from the Korean Peninsula, Iran is the other vexing nuclear issue that confounds the international community. Despite several UN Security Council resolutions and multiple layers of accumulated sanctions, Iran continues to deny nuclear weapon aspirations and to defy external pressures to suspend its enrichment program or to fully explain its nuclear activities to the International Atomic Energy Agency (IAEA). If indeed the Iranian regime is determined to go nuclear, what are the global and regional implications, and what can be done to prevent, deter or contain a nuclear Iran?

Jang Ji-Hyang, director of the Middle East and North Africa (MENA) Center at the Asan Institute for Policy Studies, opened the session by contextualizing the parameters and debate over the Iranian nuclear issue: the perceived wisdom in the West, as well as differing country perspectives and threat assessments regarding Iran's nuclear capabilities and intentions, and the potential impact of either inaction or preventive action in terms of regional stability, proliferation containment, and possible cascade. Highlighting the importance of Turkey's regional influence, as well as the centrality of Iran, Israel, and the United States in the current issue, Dr. Jang welcomed the panel's depth, from all four countries, and posited two areas for consideration. Firstly, the fundamental question as to whether Iran will go nuclear, and, secondly the role and impact of so-called "smart" sanctions. Is Iran on a determined nuclear weapon path? Are the international sanctions serving to modify Iran's nuclear calculus and what, if any, other international approaches are appropriate toward helping to resolve the Iranian issue?

Steven Miller, director of the International Security Program at the Belfer Center for Science & International Affairs at Harvard University, outlined the current status of a largely failed "Western" policy objective of ensuring "zero enrichment," with Iran having effectively achieved a technical nuclear capability, regardless of the spectrum of debate regarding Iranian "weaponization" intentions. For Dr. Miller, the core issue now for the international community is whether it is possible to prevent Iranian weaponization and, whether yes or no, what strategies to pursue. Appropriate answers and responses to these questions depend on judgments of Iranian intentions. Despite persistent refutations regarding weapons intent by the Iranian leadership, emphasizing purely peaceful nuclear aspirations, others view Iranian rhetoric simply as a camouflage intended to hide their purposeful pursuit of nuclear weapons.

Suspicions of Iranian intent remain mixed but significant among the international community, with the spectrum of debate spanning deliberations about the efficacy of inducements and incentives versus the threat and potential use of force as effective or justifiable means to avoid any prospect of an Iranian bomb. The starkly differing narratives between the principal protagonists, Iran and the US, reflect the high level of mutual mistrust and incomprehension between the two countries, which will not likely be overcome in the near future. As regards Iran going nuclear, based on current conditions, Dr. Miller viewed it as unlikely that Iran will push for, or achieve, nuclear-weapon status in the near term, in part because of ongoing international and third country efforts to deter progress, as well as perceived political costs in terms of "transitional vulnerability" and Iran's standing and support among the Non-Aligned Movement (NAM). Rather than an outright weapon, test or NPT withdrawal, it is more likely that Iran will strive for a threshold nuclear capability.

Nasser Saghafi-Ameri, former Iranian diplomat and independent research scholar, prefaced his comments by countering the reported implicit linkage between Iran and the recent North Korean missile and nuclear tests and emphasized the Iranian government assertion that Iran is politically, morally and religiously opposed to nuclear weapons and WMD in general. Charting Iran's nuclear history from the 1960s to date clearly illustrates Iran's record of restraint (despite foreign pressures and having itself been a victim of WMD during the Iraq-Iran war) and the essentially defensive character of Iran's doctrine of asymmetric confrontation as a deterrent to foreign encroachment. Mr. Saghafi-Ameri emphasized the point that Iran has been pursuing a peaceful nuclear course for the past five decades, within the frame-

work of the NPT and under IAEA safeguards, and that the controversy created around its enrichment program is primary politically motivated and sustained.

Contesting the “utterly politicized” IAEA reports and the “debatable demand” to visit the military complex in Parchin (as being beyond the authority of the IAEA), Mr. Saghafi-Ameri emphasized Iran’s overall level of cooperation with the IAEA organization and inspectors in Iran, its stated readiness to “remove any ambiguity in its nuclear activities” under conditions of non-discrimination and respect for sovereign rights within the NPT framework, and stated desire for a peaceful solution for its peaceful-purpose nuclear program. In the view of Mr. Saghafi-Ameri, the political agenda and pressures of certain countries, headed by the US, in magnifying the Iranian nuclear case highlights and threatens to damage the credibility, trust and basic rights to nuclear technology, which are the core tenets of the Nonproliferation Treaty (NPT) for the designated non-nuclear weapon states (NNWS). In closing, Mr. Saghafi-Ameri re-emphasized the view that Iran neither wants nor seeks nuclear weapons and that there remains scope and hope for diplomacy to deliver a peaceful solution to the Iranian nuclear issue.

Ahmet Kasim Han, professor at Kadir Has University in Istanbul, prefaced his comments by highlighting prestige as a key currency of power, with nuclear weapons offering “hard power as a solid avenue” and Iran “definitely in the game” with regard to its nuclear status. Professor Han noted that Iran is an important regional actor, in terms of its history, statecraft and regional influence, which cannot be ignored nor contained. Iran is playing a double game of “denial” (in Afghanistan and Syria) and “nuisance” (in Lebanon), but is lacking “immunity” from external pressure and potential attack, which its nuclear program may facilitate, as a deterrent against regime change. From Professor Han’s perspective, Iran has not manifested a clear intention or domestic consensus to go for nuclear weapons, and will likely “stop a yard short of the bomb,” but he contended that a nuclear-capable Iran would essentially have the same consequences for the region in terms of facilitating Iran’s coercive capabilities and enhancing its influence, which is “certainly not good news for an aspiring power like Turkey.”

During recent years, Turkey attempted to help diffuse the nuclear confrontation through its tripartite diplomatic initiative with Brazil and Iran. However, Turkey faced the consequences in terms of geopolitical pressures and the thwarted prestige and credibility of its mediation efforts. Though Turkey has tended to downplay the Iranian threat, due in large measure to important bilateral energy relations (Iran being Turkey’s second largest supplier of hydrocarbons, with no practical alternative oil and gas supplier), there is growing anxiety about Iran’s direction. However, barring any drastic change in its NATO security environment and existing security assurances, he noted that it remained “very unlikely” that Turkey would go nuclear in response to a nuclear Iran, for reasons political, economic, and technological.

Uzi Rubin, CEO of Rubincon Ltd. and the founder and former director of the Israel Missile Defense Organization in the Israel Ministry of Defense, highlighted Iran’s combined nuclear, missile and space programs as clear indications of Iran’s progress towards developing a “viable nuclear strike force.” Together with revelations of secret facilities and convoluted, shifting rationales for its nuclear and missile-related activities, the Iranian regime’s explanations appear “de-linked” from the facts on the ground, which have prompted suspicions and raised many questions regarding Iranian intentions and whether Tehran’s rhetoric of restraint and denial represents “policy or ploy.”

From General Rubin’s perspective, Iran’s nuclear enrichment progress and considerable missile capabilities are clearly advanced and advancing beyond their respective civil application or deterrent justifications. Iranian comments regarding nuclear self-restraint and references to emulation of the “Japan model” belie the latter’s accumulated track record of international trust, cooperation and benign intent. In contrast, “Iran is not a satisfied power” and “has many axes to grind.” Though a nuclear Iran is not a foregone conclusion, the force of its military-industrial complex and the “irresistible temptation” of advancing nuclear ambitions are a serious concern for Israel, and should be for the wider international community. He concluded by noting that, although there remains scope to resolve the matter peacefully, much depends on the Iranian regime’s ability to mellow its stance and the fundamental question of whether “Iran can live with the world as it is, not as Iran wants it to be.”

On the matter of sanctions impact and international responses to date, Dr. Miller referred to the multiple layers of international and bilateral sanctions at the heart of US policy toward Iran since the early 1980s. Though there is no question that decades of accumulated sanctions have had an impact on the Iranian economy, the core objective of changing Iran’s nuclear behavior has not only not been achieved, but also possibly been counterproductive in terms of provoking and sustaining the resolute defiance of a proud nation. Though the noose has been tightening around Iran’s neck, including the grudging inclusion of Russia and China on key sanction actions, Dr. Miller pointed out that “Iran is not an inanimate object” and has been rather resourceful at evading the fuller impact of sanctions.

To date, Iran has shown considerable resilience in absorbing and evading the worst impact of sanctions. Despite a narrowing of official friends and trading partners, Iran was elected by the Non-Aligned Movement (NAM) as president for the important three-year term until 2015, and continues to garner sympathetic support among significant non-Western countries, as well as benefitting from higher oil export pricing, ironically caused by the tension between Iran and the West. How long Iran can continue the game of cat and mouse remains in doubt, especially with the combined intensification of US and EU sanctions now starting to bite. Coercive sanctions remain the preferred instrument for the United States to apply its continued “pressure-pain calculus” towards Iran, at the same time showing domestically and in key allied capitals that something is being done to confront and contain Iran, if not fundamentally changing regime rhetoric or behavior.

However, with Iran’s centrifuges spinning and the Israeli factor looming large, Dr. Miller observed that

the experience of dealing with the Iranian issue gives a strong sense of being on a somewhat perilous path of increasingly escalatory events and unpalatable alternatives. In this complicated mix of geopolitical considerations, there is the danger that, even if Iran was/is undecided (with two US National Intelligence Estimates having stated that Iran has not made a nuclear weapon decision), then continued external pressure, viewed by the Iranian regime in existential terms, may well have the unintended effect of actually pushing Iran toward a nuclear weapon.

Mr. Saghafi-Ameri commented that sanctions against Iran have been both counterproductive and not particularly "smart," having impacted more detrimentally on the Iranian people than the Iranian government or other targeted authorities. For average Iranians, sanctions are associated with Western coercion and have emboldened national sentiment. Additionally, the political agenda of certain powers has pressured numerous countries to forego long-standing and legitimate trade relations with Iran. He cited the example of Japan being pressured to withdraw from energy and other joint projects with Iran during the 1980s and more recently, only to be replaced by other Asian players. As such, Western countries and business opportunities are suffering because of political pressures to be part of the international coalition against Iran.

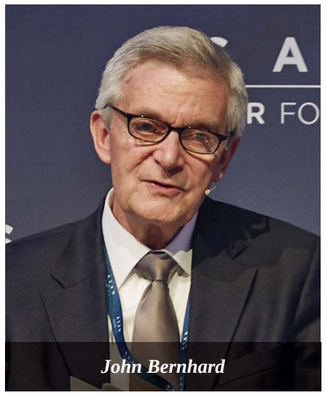
Despite differing perspectives on the motivations and intensity of Iran's nuclear program and international responses, the panel members largely concurred that there remains scope for resolving the Iranian issue short of conflict or weaponization. Iran exudes a posture as a defiant regional player, but its final position on nuclear matters remains to be seen. The centrality of the US-Iran relationship was highlighted as both the key obstacle and potential catalyst for addressing the nuclear standoff, and whether that long dysfunctional relationship can find a path to ease mutual mistrust and bring Iran closer to the international community.

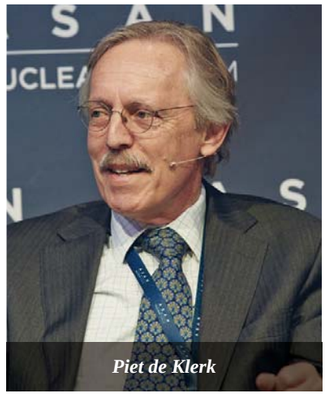
Plenary Session II

Date: February 19, 2013
Time: 17:00-18:15
Place: Regency Room

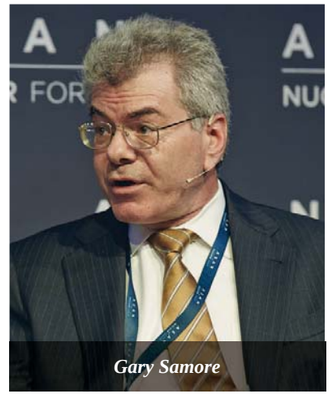
Nuclear Security Summit: Before & After Seoul

Moderator:	John Bernhard, Former Danish Ambassador to the IAEA and CTBTO
Speakers:	Piet de Klerk, Ministry of Foreign Affairs, Kingdom of the Netherlands
	Kim Bonghyun, Ministry of Foreign Affairs and Trade
	Gary Samore, Harvard University
Rapporteurs:	Jenny Town, U.S.-Korea Institute at SAIS
	Natalia Sharova, Hudson Institute


John Bernhard


Piet de Klerk


Kim Bonghyun


Gary Samore

One of the most disturbing global dangers today is the threat of nuclear terrorism. With about 2,000 tons of plutonium and highly enriched uranium (HEU) in various countries and with 18 documented cases of theft or loss of plutonium or HEU, the chances of a terrorist nuclear attack are unacceptably high. Thus, the goal of the Nuclear Security Summits (NSS) is to improve the safeguard of all nuclear material, technology and expertise, or other radioactive material. Additional problems addressed through the summit process include improving international cooperation on implementing international and domestic nonproliferation strategies, policies, and treaties to combat nuclear terrorism.

At the first NSS, representatives of 46 governments, along with three international organizations, cooperated to develop a common understanding of the threat posed by nuclear terrorism, to agree to effective measures to secure nuclear material, and to take measures to prevent nuclear smuggling and terrorism. In the second NSS, which was held in Seoul in 2012, 53 heads of state participated, along with representatives of the United Nations (UN), International Atomic Energy Agency (IAEA), European Union (EU), Interpol, and other international organizations.

The focus of the Washington and Seoul Communiqués was on 11 areas of priority and importance in nuclear security. These included: nuclear materials; radioactive sources; nuclear security and safety; the global nuclear security architecture; the role of the IAEA; transportation security; combating illicit trafficking; nuclear forensics; nuclear security culture; information security; and international cooperation. However, the Seoul Communiqué also set out the following specific actions: encouraging international efforts to develop high-density low-enriched uranium (LEU) fuel to replace HEU fuels; welcoming voluntary contributions to the IAEA Nuclear Security Fund; instigating ratification of the 2005 amended Convention on the Physical Protection of Nuclear Materials (CPPNM) and bringing it into effect by 2014, and so forth.

In the second plenary session of the *Asan Nuclear Forum* titled, "Nuclear Security Summit: Before & After Seoul," former and current NSS Sherpas from the Washington, Seoul, and upcoming Hague Summits gathered to discuss successes and lessons of the two previous summits, their expectations for the upcoming 2014 Hague NSS, and the pros and cons for sustaining the summit process beyond 2014. Panel moderator John Bernard, former Danish Ambassador to the IAEA and CTBTO, started the discussion by acknowledging the political value of the Nuclear Security Summits, which raise the profile of what needs to be done against nuclear terrorism and generates high-level impetus for improving nuclear security and nuclear security governance around the world. He noted that practical results have been achieved through the summit process, causing tangible and critical changes in national nuclear security practices. Namely, participating states have updated national laws, improved export controls, increased international cooperation on efforts such as highly enriched uranium minimization, and increased voluntary funding of the IAEA, which still "absolutely needs more funding." Ambassador Bernard invited the panelists to give an assessment of the previous two summits' successes, discuss their hopes and expectations for the upcoming Hague NSS in 2014, and to offer their advice for the next summit's communiqué.

Gary Samore, executive director of the Belfer Center for Science and International Affairs at Harvard University and former US Sherpa for the inaugural NSS in Washington, DC, started by offering four pieces of advice to the organizers of the Hague summit. His first recommendation was to "keep it simple." He reminded the audience how for the Washington Summit, the Sherpas produced a short communiqué of political principles that was supplemented by a work plan produced by experts. In Seoul two years later, the Sherpas worked to combine broader principles into a longer communiqué, where they included a list of specific actions in the 11 priority areas in nuclear security that were set out in the 2010 Washington Communiqué. Complex technological details were discussed in depth, and it took tremendous amounts of energy and effort from Sherpas to build consensus among all negotiators because not everyone was familiar with the technical side of the discussed issues.

For the Hague Summit, Dr. Samore suggested aiming for a short, general communiqué modeled after the Washington Communiqué, utilizing the Sherpas' time more effectively and leaving the more technical action plan to the experts. He emphasized that the great value of the NSS was to create a political umbrella for the technical experts to work under. Second, he urged, "keep it focused," stressing the importance of keeping a narrow agenda to avoid getting distracted by more controversial issues such as nuclear disarmament, which other international forums already address. He explained that at past summits, Sherpas had to fight off efforts to include such issues as nuclear disarmament and nuclear energy on the agenda and that it took a significant amount of their energy to keep the scope of the summit concentrated on its essential problem.

Third, he advised, "keep it practical," and pointed to the national commitments harvested at both summits to improve national practices and increase cooperation on nuclear security. Dr. Samore also noted that nuclear security is ultimately the responsibility of individual countries. For instance, states should voluntarily make a decision about whether or not to join certain instruments of the regime like the IAEA Convention on the Physical Protection of Nuclear Material (CPPNM). He suggested that it is impractical

to try to negotiate and adopt new global standards of nuclear security because it would only distract attention from practical measures, even though such a system of standards is desirable in theory. And his final advice was to "keep it going," explaining that although the NSS process was never intended to be permanent, 2014 might not be the right time to end the series. He recommended a fourth summit in 2016, since the Seoul Summit "harvested" many of the commitments made in Washington, and, presumably, the commitments made in Seoul will be harvested at the Hague. If additional commitments are made this third summit, then a fourth summit would be used to report on their progress.

Kim Bonghyun, deputy minister for Multilateral and Global Affairs at the Ministry of Foreign Affairs and Trade in the Republic of Korea and former ROK Sherpa to the Seoul NSS, stressed that there are 1,600 tons of highly enriched uranium (HEU) and about five tons of separated plutonium in the world today. Most of this formidable amount of fissile material rests in the form of nuclear weapons possessed by P5 states, mainly belonging to Russia and the United States. The Seoul Summit in 2012 was focused on the reduction of civilian use of HEU and separated plutonium. In Seoul, Sherpas chose a more scientific approach to limiting civil use of nuclear materials. Their goal was to initiate research on how to replace HEU with low-enriched uranium (LEU) for the production of, for instance, medical isotopes. Kim noted that successful achievement of this goal would be a breakthrough for nuclear security.

During the Seoul Summit, Ambassador Kim noted that 100 commitments from 53 participating countries were harvested, and that this was a practical success. However, he recalled how some negotiations, such as setting target dates for ratification of the CPPNM and for minimization of civil use of HEU, were extremely tedious. The reason for these difficulties, according to Kim, was the different perceptions of common problems, specifically among advanced countries, developing countries and the non-aligned movement (NAM) states. Although participants eventually agreed on target dates, Kim still suggested that a new, more inclusive communiqué should be elaborated for the Hague Summit. He recalled criticisms from NAM states that the states with the most nuclear material do not contribute proportionately to the nuclear security regime. He suggested that addressing criticisms from NAM states should be a high priority for the third summit.

Piet de Klerk, ambassador of the Kingdom of the Netherlands to Jordan and the Netherlands Sherpa to the Hague NSS in 2014, acknowledged the successes that have been achieved through high-level political attention on nuclear security since 2010, but also questioned how much more could be achieved at a third summit as much of the "low hanging fruit" has "already been picked." He announced that the Hague Summit will be held March 24-25, 2014, and will be accompanied by both an industry and academic summit on the side. He noted that government is not the only stakeholder in this process, and experts and industry should be allowed to play a greater role in building a stronger nuclear security regime.

Preparations for the summit are underway and drafting the summit agenda will begin in October 2013.

Ambassador de Klerk identified areas in which he felt progress could still be made, including improving the legal regime, addressing standards for military nuclear material, diminishing the use of weapons-usable material, increasing state-industry cooperation on nuclear security and so forth. He also stressed that countries such as the United States and Russia should be more active and should take a lead in the strengthening of the nuclear security regime, since they possess most of the nuclear weapons and fissile material in the world. Regarding legal changes, it would be an achievement to persuade as many countries as possible to join the CPPNM and set it into force. However, taking into account that 30 more countries need to ratify the convention, and due to the difficulty of the ratification process, he was skeptical this could be achieved in the short term.

He also made a strong argument for making the Hague NSS the last summit, insisting that at some point this kind of process needs to be inclusive and flow into regular multilateral channels, such as the IAEA, where technical expertise and the necessary instruments exist. He suggested that after three summits, the pressure of participant governments for national commitments "should have squeezed enough." He also mentioned that one of the practical outcomes of the last summit was a list of principles regarding the physical security of nuclear materials, to which non-participant countries will be able to adhere to. Such a measure will help to keep the process going and to expand it beyond the NSS.

The panelists agreed that the IAEA is the best institution to follow up the NSS, because it can provide training and it has the necessary mechanisms to facilitate the global process of improving the security of nuclear material. At the same time, aligned countries that are willing to share information about their security practices should cooperate more. That will help to build mutual trust between non-likeminded states and will unite them in their security practices. However, Dr. Samore stressed, and all panelists admitted, that funding is and will always be a difficult issue unless countries interested in nuclear security set up some funding mechanism.

While no consensus was reached on whether or not 2014 should be the final summit among the panelists, they did point to the importance of the IAEA's upcoming July ministerial level conference on nuclear security as a litmus test for whether or not political will to improve nuclear security will continue without high-level attention. However, Ambassador de Klerk did insist that it was important to make a decision soon as this will greatly affect the way the Hague Summit is structured.

Day 2

February 20, 2013

Session 4
Future of the ROK-US Nuclear Cooperation Agreement
Nuclear Dominos in Northeast Asia
Building Global Nuclear Security Architecture

Plenary Session III
Energy Security or National Security

Session 5
De Facto Nuclear Weapon States and the Non-proliferation Treaty Regime
How Viable Are Nuclear Weapons Free Zones?
How Safe Are Nuclear Power Plants in South Korea?

Session 6
Bolstering Counter-proliferation Regime
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Regional Cooperation in Nuclear Safety

Plenary Session IV
Challenges and Opportunities after the Fukushima Nuclear Disaster

Session 4

Date: February 20, 2013
Time: 9:00-10:15
Place: Regency Room

Future of the ROK-US Nuclear Cooperation Agreement

Moderator: Park Jiyoung, The Asan Institute for Policy Studies
Speakers: Mark Hibbs, Carnegie Endowment for International Peace
Sheen Seongho, Seoul National University
Scott Snyder, Council on Foreign Relations
Sharon Squassoni, Center for Strategic and International Studies
Yim Man-Sung, Korea Advanced Institute of Science and Technology
Rapporteurs: David Santoro, Pacific Forum CSIS

Park Jiyoung, director of the Science & Technology Policy Center at the Asan Institute for Policy Studies, opened the session "Future of the ROK-US Nuclear Cooperation Agreement" by explaining that negotiations for such an agreement are ongoing and will continue this year given that the current one is set to expire in March 2014. Significantly, Dr. Park stressed that the results of the negotiations will have both regional and international implications.

Mark Hibbs, senior associate in the Nuclear Policy Program at the Carnegie Endowment for International Peace, began the first presentation by noting that the most difficult issue regarding the future of the ROK-US nuclear cooperation agreement is linked to South Korea's willingness to get involved in commercial uranium enrichment and to introduce pyroprocessing in its nuclear activities. He explained that this was of concern to Washington, which has worked hard to limit the spread of enrichment and reprocessing technologies throughout the world since the terrorist attacks of September 11, 2001 against the United States and the discovery of the A. Q. Khan proliferation network a few years later.

Mr. Hibbs explained that it appeared that neither the United States nor South Korea was prepared to back down from their firm, mutually incompatible positions concerning South Korea's rights to "alter in form or content" irradiated nuclear material under a new nuclear cooperation agreement. Because time is running out for negotiations to proceed (and given the current regional security context characterized by Pyongyang's nuclear and missile developments and recent provocations), Mr. Hibbs argued that the most likely (and perhaps the most desirable) outcome would be for South Korea and the United States to extend the existing agreement for a few years and review its terms at a later stage, particularly on the basis of the conclusions of the joint study on pyroprocessing currently being conducted.

Mr. Hibbs pointed out that neither side would have a clear advantage in holding out for the existing agreement to expire without finding a solution because nuclear cooperation has been hugely beneficial to both countries. In the short term, an extension of the current agreement would benefit both parties because it would enhance the ROK-US alliance. In the long term, however, Mr. Hibbs suggested that problems may surface, particularly if Pyongyang continues to push forward with its nuclear and missile capabilities, because there would likely be pressures for South Korea to develop at least a nuclear weapon threshold capability in response.

Regardless, Mr. Hibbs insisted that it would be very difficult if not impossible for the United States to resist South Korea's willingness to develop enrichment and reprocessing technologies for three main reasons. First, South Korea can assert with confidence that its nuclear power program fully justifies searching for a long-term solution for the sustainable management of its ever-large volumes of spent fuel. Second, South Korea has solid nonproliferation credentials; Seoul is in full compliance with the Nuclear Nonproliferation Treaty (NPT), it is implementing an Additional Protocol with the International Atomic Energy Agency (IAEA), and it benefits from an annual "broader conclusion" from the IAEA Department of Safeguards that all nuclear activities in South Korea are declared and strictly dedicated to peaceful uses. Finally, a cornerstone of US policy against ROK reprocessing (the 1992 no-reprocessing/enrichment agreement between the ROK and North Korea) has been abrogated by Pyongyang.

Sheen Seongho, associate professor in the Graduate School of International Studies at Seoul National University, stressed that he was in general agreement with Mr. Hibbs' analysis and recommendations. In his presentation, Professor Sheen highlighted that the issue should not be portrayed as a test of the ROK-US alliance because this could very well impact negatively on the bilateral relationship, if not derail it significantly. He acknowledged that the issue had unfortunately already become highly politicized and portrayed as a "trust" problem, despite very good relations between the two countries.

Professor Sheen reminded the audience that time was running out for South Korea and the United States to come to an agreement, which needs to be found during the first half of the year. He also insisted that it was important to remember that the ROK-US Nuclear Cooperation Agreement was exclusively for peaceful purposes and that it should not be seen as an attempt by South Korea to develop an indigenous nuclear weapons capability. As he made clear, Seoul has no intention to develop nuclear weapons. This is despite the growing concerns about North Korea's nuclear and missile developments and its increasingly belligerent behavior. In fact, Professor Sheen insisted that negotiations for a new nuclear cooperation agreement should not be colored in any way by developments in North Korea or by discussions in the ROK as to how the North Korean threats should be addressed. The two issues are and should remain separate.

Professor Sheen also suggested that the United States should show more "respect" for South Korea's nuclear program and intentions (which are fully justified), just as South Korea needs to show "responsibility" in its nuclear activities. Significantly, he noted that South Korea's strong support for the nuclear nonproliferation regime and the Nuclear Security Summit process is evidence that it is already acting as a responsible actor; the decision of Seoul to host the second Nuclear Security Summit in March 2012, in particular, suggests that it is taking these considerations very seriously.

The third presentation was given by Scott Snyder, senior fellow for Korea Studies and the director of the Program on US-Korea Policy at the Council on Foreign Relations, who focused more specifically on the implications of the nuclear cooperation agreement for the ROK-US alliance. Mr. Snyder explained that he began to pay attention to this issue two or three years ago when he heard several observers suggesting that it could become a "train wreck" for the alliance. He noted that nuclear cooperation between South Korea and the United States has been extremely successful. Thanks to such cooperation, South Korea's industry has been developed considerably and, significantly, Seoul has since become a competitive nuclear exporter on the international market. That is why Mr. Snyder stressed that it was essential for bilateral nuclear cooperation between the two countries to continue. Plainly, both sides must find common ground on how to proceed because it is in their interests.

Noting that politicians have portrayed the matter as a "trust" issue, Mr. Snyder recommended that it be left to technical experts, who tend to focus strictly on technical cooperation in a way that policymakers cannot afford to do. However difficult it might be at this stage, depoliticizing the issue as much as possible would be most helpful. In the meantime, Mr. Snyder agreed with Mr. Hibbs that under current circumstances, the best option for South Korea and the United States would be to extend the current agreement.

Sharon Squassoni, director of the Proliferation Prevention Program at the Center for Strategic and International Studies, gave the fourth presentation of this session. She elaborated on the details of the nuclear cooperation agreement and signaled her agreement with Mr. Hibbs and Mr. Snyder that extension would be the best way forward in current circumstances. She noted, however, that such an extension would need

to be approved by the US Congress, which should not be taken for granted, particularly in the current environment.

Ms. Squassoni also insisted that it was important to keep in mind that the position of the United States was not to get Seoul to foreswear enrichment and reprocessing technologies, despite interest in the US Congress to restrict the transfers of such technologies as much as possible. Rather, the United States is concerned about applying nonproliferation principles fairly across the community of states. As she put it, "it is not about status, not about equity, it's about having in place a fair nonproliferation framework."

Yim Man-Sung, professor in the Department of Nuclear and Quantum Engineering at the Korea Advanced Institute of Science and Technology, gave the fifth and final presentation of this session, focusing on ROK perspectives on the nuclear cooperation agreement. Unlike the other presenters, Professor Yim took a different approach, stressing that the current ROK administration has proved favorable to the ROK nuclear program and insisted that a different administration may not have a similar perspective. That is why he raised deep concerns about postponing renegotiation of the current agreement. According to him, the sooner an agreement allowing the ROK to proceed with enrichment and reprocessing activities can be found, the better.

Professor Yim insisted that it was important to note that South Korea had no intention to develop an indigenous nuclear weapons capability. He explained that the time has passed when nuclear weapons were synonymous with prestige and status. He stressed that if South Korea developed nuclear weapons, it would break the ROK-US alliance. More importantly, nuclear weapons are useless, particularly on the Korean

Peninsula: they would not be able to effectively defend South Korea. Also significant is that it would be very unlikely that a nuclear-armed ROK would be allowed to engage in nuclear trade, which Seoul regards as a priority. That is why, according to Professor Yim, there is no doubt that South Korea would not elect to use its nuclear program as a cover to develop weapons.

Moreover, Professor Yim noted that unlike India—which has developed nuclear weapons—and Japan—which has suffered important nuclear safety issues—South Korea has very good nuclear nonproliferation and safety credentials. He stressed that renegotiation of the ROK-US Nuclear Cooperation Agreement, to include the right to engage in enrichment and reprocessing activities, is important for Seoul both for technical reasons (to deal with nuclear spent fuel) and economic considerations.

During the question-and-answer discussions, it was suggested that South Korea and the United States had four main options to deal with the nuclear cooperation agreement: renew it, let it expire, extend it, or simply delay the negotiations. Mr. Hibbs, Professor Sheen, Mr. Snyder, and Ms. Squassoni all reiterated that under current circumstances, the best option was to extend the agreement as is and delay the renegotiations of its terms, particularly those pertaining to enrichment and reprocessing technologies. Ms. Squassoni stressed that extension cannot be done by the executive branch because it requires Congressional approval and that passing a law is difficult and always requires a "champion" to be successful. Unlike the four other presenters, Professor Yim reiterated that extension of the current nuclear cooperation agreement may be a good option, but that it was not the best one: it is preferable to proceed now and negotiate a new agreement allowing South Korea to conduct enrichment and reprocessing activities.

Also discussed was how much South Korea really needed to conduct pyroprocessing activities to deal effectively with the problem of nuclear spent fuel. Some participants suggested that interim storage in dry casks may be sufficient. Others, including Professor Yim, pointed out that the Korean public is radically opposed to dry casks and, therefore, that pyroprocessing was a necessity.

Finally, a few participants mentioned the US-India Civil Nuclear Cooperation Agreement, suggesting that the United States has already negotiated nuclear cooperation agreements of the sort that ROK is seeking. Others also mentioned that Japan is already engaged in enrichment and reprocessing activities and wondered why the ROK should not be allowed to engage in similar activities. Mr. Hibbs responded that the US-India Civil Nuclear Cooperation Agreement was a mistake and was concluded because it fit US broader strategic goals. In closing his remarks, Mr. Hibbs wondered whether the Indian example could motivate South Korea to be firm and refuse to compromise with the United States.

Session 4

Date: February 20, 2013
Time: 09:00-10:15
Place: Grand Ballroom I

Nuclear Dominos in Northeast Asia

Moderator:	John Park, Massachusetts Institute of Technology
Speakers:	Jor-Shan Choi, Berkeley Nuclear Research Center
	Kim Young Ho, Korea National Defense University
	Li Hong, China Arms Control and Disarmament Association
	Miles Pomper, James Martin Center for Nonproliferation Studies
Rapporteurs:	Tristan Volpe, George Washington University

In the wake of North Korea's third nuclear test, will other states in East Asia decide to acquire nuclear weapons? If Japan or South Korea proliferate, will there be a nuclear domino effect in the region? The experts arrayed on this topical panel offered a simple and resounding answer. The nuclear dominos in East Asia will not fall. Regional proliferation is very unlikely in the near term. But significant changes to the political and security environment in the next ten to twenty years might catalyze a domino effect. Conflict between China and Japan could be a proliferation "game changer" that drives Japanese demand for nuclear weapons. Major realignments in alliance commitments from the United States might also interact with the rise to China to drive regional proliferation in East Asia. Yet barring these future worst-case conditions, the nonnuclear status quo will remain stable for Japan, South Korea, and Taiwan.

John Park, Stanton Nuclear Security Junior Faculty Fellow at the Massachusetts Institute of Technology, challenged the panelists to identify specific tipping points that might cause each country in East Asia to acquire nuclear weapons. Dr. Park focused on the impact of North Korea's third nuclear test on regional proliferation dynamics. If North Korea continues to build-up its nuclear capabilities, which states in East Asia will be next? Furthermore, Dr. Park also asked participants to consider possible nonproliferation measures that other states could pursue to mitigate the drivers of regional proliferation. In particular, alliance and security commitments from the United States have long played an important role in East Asian proliferation decisions. These questions provided the central analytic frame for the subsequent discussion of possible nuclear dominoes in East Asia.

Jor-Shan Choi, associate director at the Berkeley Nuclear Research Center at the University of California, Berkeley, strongly contended that the nuclear dominoes in East Asia would not fall in response to further North Korean nuclear developments. As long as the United States maintains its extended nuclear

deterrent umbrella over key dominoes—notably Japan and South Korea—North Korea will not trigger a domino effect in the near future. Dr. Choi argued that such a response to North Korea would have happened much earlier when they first tested a nuclear device in 2006, or in 2009 after the second underground nuclear test.

Miles Pomper, senior research associate at the James Martin Center for Nonproliferation Studies, also emphasized the critical role of the United States in the region. He agreed with Dr. Choi that the nuclear deterrent umbrella provided by the United States is a key inhibitor of the domino effect in East Asia. But as North Korea expands its nuclear capabilities, the United States faces a major challenge. America must keep its allies reassured while simultaneously reducing tension that can emerge during conventional military crises. If the United States can diffuse future crises and maintain a credible security commitment, nuclear weapons will continue to offer little strategic benefit for Japan or South Korea.

Mr. Pomper argued that the optimal future for these central East Asian states is one where the dominant global and regional powers continue to create and provide security for them. In the near term, the United States and China should work to provide diplomatic solutions to territorial issues in the region, specifically the South China Sea. The absence of diplomatic solutions and cooperation could have negative effects. Both South Korea and Japan may be willing to run higher risks at the conventional level. The United States may allow such risks in a gambit to pressure China. Escalation dynamics increase the risk of conflict in the regional, and can create long-term pressure for indigenous proliferation among non-nuclear weapon states in East Asia.

Li Hong, vice president and secretary-general of the China Arms Control and Disarmament Association, provided a slightly contrarian view. In contrast to Dr. Choi, Mr. Hong argued that North Korea could in

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fact be a catalyst for regional proliferation in East Asia. He pointed towards the complexity of the security situation between North Korea and South Korea, as well as the more diffuse pressure on Japan. Furthermore, the reaction to the third North Korean test among public citizens and elites in South Korea and Japan underscored a growing fear of proliferation. As North Korea expands its nuclear arsenal, the call to build nuclear weapons in South Korea and Japan may grow louder.

Yet Mr. Hong also agreed that security arrangements and alliances are critical barriers to proliferation in East Asia. The central alliances from the Cold War are still in effect, and show no signs of changing anytime soon. Although the means deployed by the United States in support of the South Korean alliance, for example, have changed over time, the alliance is still very firm. The key to future stability and nonproliferation in the region will be the maintenance of alliance commitments and credibility. Specifically, the United States and China have a special responsibility to stop proliferation and mitigate crises in the region. Mr. Hong contended that these two states should cooperate more on regional security arrangements. Finally, the United States and China should consider forms of joint competition against North Korea, such as costly counter-proliferation sanctions against the regime.

Dr. Choi and Kim Young Ho, professor in the Department of International Relations at Korea National Defense University, both focused on Japan as the key domino. Japan is the closest to going nuclear in East Asia right now because they have significant nuclear fuel cycle technology and stockpiles of fissile material. South Korea and Taiwan have the technology, but they need more time to produce a nuclear weapon than Japan. South Korea, Taiwan, and Japan are all committed to the Nonproliferation Treaty (NPT), and face numerous overlapping domestic and legal constraints on building nuclear weapons. Furthermore, all three of these potential proliferators face an interesting economic dilemma. Each of these states has enough economic capability to finance a nuclear weapons program. But since these countries are also highly dependent on international trade and continued integration into global financial markets, the trade embargos and sanctions imposed as penalties from breaking out of the NPT would severely hurt their economies. In sum, the economics of East Asia further reduce the demand for nuclear weapons.

Even though Japan is quite close to the bomb in a technological sense, the panelists argued that the extended deterrent protection of the United States nuclear umbrella prevents continued North Korean provocations from sparking a Japanese proliferation cascade. If, however, Japan and China found themselves in a military conflict, lack of support from the United States might cause Japan to rethink its nonproliferation bono fides. Since Japan has been trusted with sensitive nuclear fuel cycle technology, Dr. Choi argued that its decision to proliferate would render the NPT “useless.” This scenario is not farfetched. As China continues to rise, the possibility of conflict with regional contenders also grows more likely. Proliferation is unlikely to happen in the near term. But over the next few decades, Japan could indeed start a nuclear domino effect, especially if the United States fails to live up to its alliance commitments.

Mr. Hong and Mr. Pomper examined more closely the dynamics between the United States and its allies in East Asia. Japan has an equal need to balance North Korean and Chinese nuclear capabilities. South Korea primarily focuses on North Korea, but also wants to bridge the sensitive nuclear fuel cycle technological gap with Japan. As a major exporter of advanced nuclear reactor technology, Mr. Pomper aptly pointed out that there is no technical obstacle to South Korea developing indigenous uranium enrichment or plutonium reprocessing facilities. Rather, the main reason South Korea has not proceeded with the development of pyroprocessing plants, for example, is the strong opposition of the United States to the development of any such sensitive nuclear technology by Seoul. Mr. Hong argued that this fragile balance between South Korean and US preferences over nuclear technology has not been broken for two reasons: the strength of the global nonproliferation regime and the firm alliance commitment from the United States.

Mr. Pomper emphasized that the threat to Japan from North Korea presents a straightforward problem for the United States to counter. The rise of China is much harder. How much will the United States risk for the defense of Japan against a growing China with increasingly modern nuclear weapons capabilities? For South Korea, the challenge is more directly from North Korea. Would a nuclear deterrent help South Korea take Seoul out of hostage? Not likely. The basic deterrence calculus is not going to change. Since nuclear weapons offer little security benefit to these major East Asian players, the optimal situation will be for Japan and South Korea to make sure the United States maintains its security commitments, and to remain non-nuclear states under the United States nuclear umbrella.

Session 4

Date: February 20, 2013
Time: 09:00-10:15
Place: Grand Ballroom III

Building Global Nuclear Security Architecture

Moderator:	Shin Chang-Hoon, The Asan Institute for Policy Studies
Speakers:	John Bernhard, Former Danish Ambassador to the IAEA and CTBTO
	Kenneth Brill, Former US Ambassador to the IAEA
	Mona Dreicer, Lawrence Livermore National Laboratory
	Jun Bong-Geun, Korea National Diplomatic Academy
Rapporteurs:	Shawn Fitzgerald, Massachusetts Institute of Technology

Participants in the Seoul Nuclear Security Summit in 2012 agreed to support the objectives of existing international nuclear security instrument in order to bolster the global nuclear security regime. Measures such as the Convention on the Physical Protection of Nuclear Material (CPPNM), the International Convention for the Suppression of Acts of Nuclear Terrorism (ICSANT), as well as UN Security Council Resolutions 1540 and 1577 and IAEA INFCCIRC/225/Rev.5 were seen as vital to the overall effort. This panel was asked to comment on what other measures might be taken in order to promote the global nuclear security architecture moving forward. Shin Chang-Hoon, director of the Asan Nuclear Policy and Technology Center at the Asan Institute for Policy Studies, introduced the session by saying that building global nuclear security architecture is one of the most important topics within the conference.

Kenneth Brill, independent consultant and former US Ambassador to the IAEA, opened his discussion by observing that the threat of nuclear terrorism is so grave, it must be prevented. He listed four reasons why a global architecture is necessary: 1) nuclear energy will likely be more widely used in the future around the world, and thus the need for effective nuclear security in more places is growing; 2) terrorists have stated that they want nuclear material for malicious purposes and have demonstrated their ability to operate across borders, so we must look for collaboration across borders; 3) a nuclear event would disrupt the world economy, political system, and stability, and put disproportionate pressure on states that will be least able to handle such a disruption; and 4) states have obligations to their citizens as well as to the international community in order to ensure the security of their nuclear material and infrastructure.

Ambassador Brill noted that while there are many international agreements in place, a true global nuclear security regime does not exist. For example, the IAEA only operates on a voluntary, non-binding basis, the CPPNM only covers materials in transport and the ICSANT criminalizes security incidents

and does not address nuclear security operations. Ambassador Brill noted that there exists a mismatch between the nature of the nuclear security threat and the effort put forth toward the problem at the global level. The current nuclear security regime has no binding standards nor any assessment or transparency processes for evaluating whether states are meeting their responsibilities. Additionally, there exists no long-term mechanism for providing political oversight in the absence of the Nuclear Security Summit series. Ambassador Brill concluded his remarks by saying that the world should not wait until after a nuclear terrorism incident in order to strengthen the regime; we should strive to create a comprehensive system with accountability, binding standards, transparency, and long-term oversight.

John Bernhard, former Danish Ambassador to the IAEA and CTBTO, commented on the issues facing successful implementation of a global nuclear security regime. He supported Ambassador Brill's comment that the global security regime contains many gaps and that these gaps must be addressed in order to create a viable architecture. He observed that while global architecture may impact national sovereignty, states should recognize that these minor concessions on the issue of sovereignty would translate into increased nuclear security benefits for all states. Thus, states should look to enter into binding international agreements that strengthen the global security regime for all states. He asked the rhetorical question: What would governments wish they had done if a nuclear security event happens? Ambassador Bernhard suggested that states would wish they had worked harder to establish a balance between sovereignty and cooperation on the international scale. He cited Fukushima as a safety accident, where the international cooperation regime is much more developed.

However, the convention on nuclear security is not as developed, which does not match the potential threat of such an incident. He listed various characteristics that a successful nuclear security framework might exhibit: 1) a common set of nuclear security standards, including rules about transparency, cooperation, and assessment mechanisms at the national and international level; 2) the ability to measure the performance of states by domestic and international assessors while maintaining confidentiality of sensitive information; 3) the responsibility for implementation of any framework rests with the state, but should highlight the obligation of states to the international community as well as their citizens; and 4) continued and increased information exchange between party states. Ambassador Bernhard concluded by saying that the first concrete steps toward a stronger international security regime should be that support for the IAEA nuclear security conference in Summer 2013 and the Nuclear Security Summit in 2014 in order to continue dialogue and implement agreements.

Jun Bong-Geun, director-general of the Department of National Security and Unification Studies at the Korea National Diplomatic Academy, highlighted the concept of a unified "global governance" approach to building global nuclear security architecture. Currently, there exists a stopgap attitude, but states should aim to adopt a comprehensive, preventative approach. At the last Nuclear Security Summit, states agreed on the need for a national implementation kit, which would bring the many disparate nuclear security elements from different international instruments together. Dr. Jun suggested that the Nuclear Security Summit as well as other avenues like the Nuclear Suppliers Group could be an effective mechanism for implementing this simplified security kit.

This "global governance" concept is somewhat new to the nuclear security dialogue, but it is necessary in order to manage a global process without the existence of true global government. This approach should include a broad set of actors, norms, and both binding and non-binding measures. Dr. Jun argued that just as corporations exist to build profit, they also have social responsibility. In the same way, each state, regardless of size, bears responsibility for the global public goods of peace, stability, and nuclear security. Dr. Jun concluded his remarks by noting that efforts in this area should focus on balancing national sovereignty and the concept of shared international responsibility.

Mona Dreicer, acting program director for Nonproliferation at the Lawrence Livermore National Laboratory, remarked about practical aspects of implementing global nuclear security architecture. While legally binding requirements with transparency and assessment mechanisms would go a long way toward strengthening the global nuclear security architecture, since those mechanisms do not exist today, we must focus on those avenues that currently exist. In order to effectively implement existing requirements and recommendations, national programs seek to inform government officials and the workforce in order to create an educated "cadre" that is able to properly assess risk and implement effective nuclear security measures. She listed three elements needed to maintain such a global regime: 1) global governance; 2) capability at the state and regional level; and 3) security culture. She noted that a major challenge, besides the procurement of appropriate resources, is the maintenance of a security based culture after capacity has been built. Differences in this security culture are important because they contribute to different perceptions of both vulnerability and risk.

She also highlighted challenges to implementing current international agreements, namely, resources,

sustainability, and maintaining communication between and within governments. Dr. Dreicer spoke about the importance of the role of communication in any global security architecture. States must work to plug gaps within government agencies within a state, across states, and devise methods to demonstrate compliance with agreements as well as share information and provide assurances across the globe. Dr. Dreicer concluded her talk by highlighting the fact that defining success within the framework of existing international nuclear security agreements remains a challenge. For example, how do you know if or when you have established effective nuclear security? She argued that any established nuclear security regime would need to evolve with the changing nature of the threat.

Dr. Shin prompted the panel to think about the current definition of "nuclear security" in terms of its focus on only physical security. He asked whether the nuclear security definition needed to be expanded to include elements of nuclear terrorism. Ambassador Bernhard thought the nuclear security definition is sufficient; he observed that once the term terrorism comes up there exists the possibility for states to interpret that term differently, so a more technical definition is easier to abide by. Dr. Jun argued that sometimes it is better to have a relatively narrowly-defined term, seek agreement on that definition, and build upon that success. Ambassador Brill suggested that the definition of nuclear security as it stands now is sufficient for the framework convention that Ambassador Bernhard mentioned, as the framework would take elements from all aspects of the security regime and attempt to streamline them.

When asked by the audience about how to build new global instruments when the existing instruments are not fulfilled, the panel had some interesting thoughts. Ambassador Brill argued that we don't need a lot of new instruments. The question remains of how to unify what currently exists and fill existing gaps. An umbrella agreement in which states can identify gaps, understand their obligations, and submit to a peer review would have distinct advantages. He said that the upcoming Nuclear Security Summit could launch the negotiation process so that by 2020, a new, binding framework convention could enter into force. Ambassador Bernhard agreed, and highlighted the need for negotiation to happen at any major gathering of policymakers. He suggested that negotiations should be open to all interested parties, should start at the IAEA security conference and continue at the Nuclear Security Summit, and could start with a small group of signatory states and build from there. He did note that any agreement should be comprehensive and broad. Dr. Jun added that it is not really about strengthening the regime; it is more about consolidating existing instruments into a more simple, flexible, adaptable, and comprehensive convention. This convention should seek to streamline the process for states and not add new burdens.

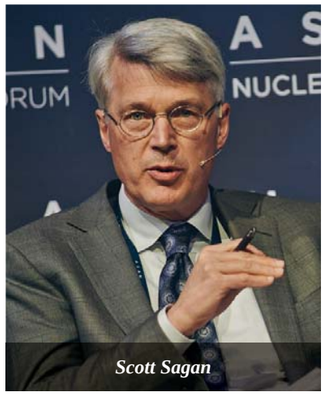
Overall, the panel provided interesting insights into both the overall issues that face the global nuclear security architecture as well as concrete steps that might be taken in order to strengthen and consolidate existing instruments. The panelists generally agree that this summer's IAEA security conference and the Nuclear Security Summit of 2014 are ideal mechanisms to continue to improve the global security regime.

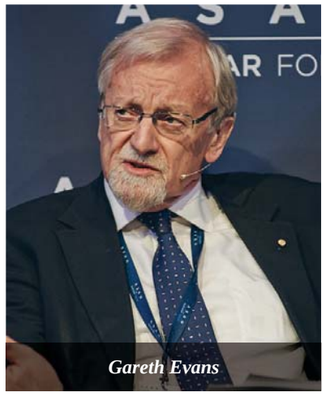
Plenary Session III

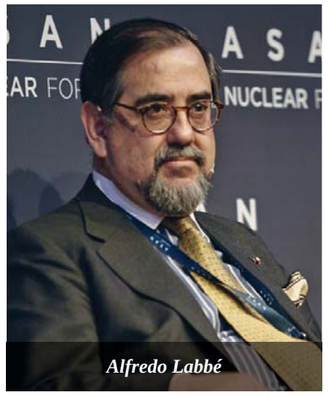
Date: February 20, 2013
Time: 10:30-11:45
Place: Regency Room

Energy Security or National Security

Moderator:	Scott Sagan, Stanford University
Speakers:	Gareth Evans, Australian National University
	Alfredo Labbé, Mission of Chile to the UN, Vienna
	Park Goon Cherl, KEPCO International Nuclear Graduate School
Rapporteurs:	Jenny Town, U.S.-Korea Institute at SAIS
	Duyeon Kim, Center for Arms Control and Non-Proliferation


Scott Sagan


Gareth Evans


Alfredo Labbé


Park Goon Cherl

Prior to 2011, several states had readied plans for the rapid expansion of civil nuclear power programs. Nuclear power was thought to be the answer to meeting rising electricity demands in developing countries and desires to achieve energy security, while also addressing climate change through the adoption of lower-carbon energy sources. However, the disaster at the Fukushima Nuclear Power Plant in March 2011 brought to light serious safety and security concerns associated with nuclear power. While expansion plans have slowed since then, the demand for nuclear power has certainly not gone away.

Scott Sagan, Caroline S.G. Munro Professor of Political Science at Stanford University, began this session by identifying the core question: Can we have the spread of nuclear power without the spread of nuclear weapons? He pointed to the fact that despite the nuclear disaster at Fukushima, nearly thirty countries have still sought technical assistance from the International Atomic Energy Agency (IAEA) to develop nuclear power programs. Of these countries, many are ranked low on World Bank indices for political stability and high for corruption; they also tend to have less democratic institutions and weaker regulatory infrastructures. This formula raises many national security concerns about the ability of these states to develop civil nuclear power peacefully. Their success will ultimately depend on several factors, events, and decisions, such as which states acquire nuclear power, how the energy security-national security dichotomy is balanced, how future rules and regulations will dictate conditions and states' access to nuclear power, whether issues are addressed on a national versus international platform, and more. Professor Sagan, while acknowledging criticisms that nuclear weapons states are not doing enough to reduce the numbers of nuclear weapons, challenged the panelists to also think about what more non-nuclear weapons states can be doing towards these efforts.

Park Goon Cherl, president of the KEPCO International Nuclear Graduate School, began his remarks by directly linking energy security to national security against the backdrop of a rapidly changing security environment in an information-based society, as well as China's rapid rise and the world's resource diplomacy. Dr. Park contended that the connection between national security and energy security is the continuation of nuclear power generation and not just the matter the nuclear security. Securing stable energy resources is imperative because of Korea's continuously increasing consumption—the country is the ninth top consumer in the world, and a majority is consumed by industry. He used Korea's energy situation to explain the challenges of adopting a nuclear zero policy plan, referencing Germany and Japan's announcements to phase out nuclear power plants. He cited research by the Korea Economic Institute, which projected that if Korea shut down 11 nuclear power plants by 2030, the economic costs would approximate US$103-187 billion and personal electricity costs would increase 44-71 percent. He concluded that as a major consumer and exporter, nuclear power and energy security are absolutely necessary for South Korea's national security.

Gareth Evans, former Australian Foreign Minister and chancellor of Australian National University, highlighted the need for change in how the global community addresses the issue of energy security and promotes the nonproliferation agenda. He noted that the tension between energy security and national security is an ongoing and long-term struggle and that despite Fukushima's impact, many states are not confident they will be able to generate enough electricity based on renewable sources. The Fukushima incident, while tragic, is not a deterrent for countries contemplating on expanding their nuclear energy programs. According to the IAEA, at least 29 new states are considering civil nuclear power programs, with seven planning to implement programs in the immediate future. Evans argued that national security problems arise from three risk areas. The first is proliferation with respect to the ability and desire to weaponize with the acquisition of civil nuclear power program. The second is terrorism with risks associated with the theft, trafficking, and smuggling of nuclear materials and sabotage of facilities. The final is nuclear security with respect to disarmament, positing that some states may be reluctant to reach zero in the final stage of disarmament if they find there are enough states with unrestricted rights.

Professor Evans noted that while there is a desirability to address risk factors and areas, there is a "huge case for doing more on the regional and global level as well." He added that the Fukushima accident demonstrated the need for stronger international governance on nuclear safety. Although the security summits have made some progress, it is imperative to incorporate more accountability and enforcement mechanisms to keep participants in check. To conclude, Professor Evans referenced a recent paper by the Asia Pacific Leadership Network for Nuclear Non-Proliferation and Disarmament, which proposed a nuclear energy community in the Asia-Pacific. This region is critical in determining the future direction of nuclear energy and will need strong international governance and cooperation. Such a network would operate on a higher level with regard to subject matter and participation, and embrace projects encouraging high-level consultation, dialogue on mechanisms of better practice (nuclear safety, security, and safeguards), collaborative re- search programs, and nuclear fuel cycle collaboration.

Alfredo Labbé, Chilean Ambassador to the UN, Vienna began by posing the question, "Why energy security or national security? Why the apparent dichotomy of the two types of security at a time of globalization and interdependence that should be compatible and mutually reinforcing?" Speaking as a representative of a relatively small nation, Ambassador Labbé stated the need for smaller and middle-sized countries to introduce more creative policies that are also grounded in the understanding that national interests are grounded in a country's history and culture. National interests should also factor in human rights. He argued that when it comes to energy security, national policies should be made compatible with global security requirements and international law. Thus, he proposed that the framework for this discussion should be national energy security as articulated within international energy security. Nuclear security and safety are mutually inclusive and are global issues, which necessitates greater transparency and sustained dialogue. If a law-abiding state is responsible and cooperates with international rules and norms, their demands would not damage national or international energy security.

Ambassador Labbé emphasized that although Article IV of the Nuclear Noproliferation Treaty (NPT)

recognizes a state's "inalienable right" to nuclear energy for peaceful purposes, it can only be legitimately given to countries that are in compliance with Article II and III. He went on to argue that "the nuclear option poses nuclear risks that should be dealt with in ways that don't harm the legitimacy and political sustainability of the NPT." Ambassador Labbé also stressed that, "through diplomatic means and multilateral mechanisms, we should tackle this, we shouldn't create a new layer of discrimination, or we shouldn't open a new flank for offensive attack against the NPT by creating a new category of have and have-nots." Rather, than "demonizing" certain technologies, diplomacy and multilateral engagement should be an avenue for encouraging countries to follow less dangerous options in energy policy.

In the subsequent discussion, Professor Sagan expressed his skepticism in response to Dr. Park's statements on how nuclear energy is a fundamental part of South Korea's national security. Dr. Park explained South Korea's pyroprocessing efforts and noted the continuing growth of the country's nuclear power plant program. Questions of the proliferation implications of South Korea's quest for pyroprocessing were also raised, conveying concerns that the technical community seems to treat pyroprocessing as separate, rather than a part of, the issue of security. Dr. Park stressed that pyroprocessing is deeply related to security and that "all Korean activity is under the watch of the US and IAEA, which is why Korea wants to be a leading country in nuclear safety and security. Even if we do pyroprocessing, we don't do it alone, we do it based on the research done with the US." Ambassador Labbé followed up Dr. Park's statements, acknowledging that South Korea's current situation is similar to what other countries with nuclear energy programs will eventually encounter. Given this understanding, the priority is to maintain the NPT and uphold its three pillars, stating that it is unacceptable to undermine peaceful uses of nuclear energy with risks, and thus the international community must find creative measures to handle the issue. He also emphasized that states that defy the international order are doomed to failure, referencing Henry Kissinger's insights from *A World Restored* to contextualize the current issues at hand regarding North Korea.

Continuing this focus on the Korean Peninsula, Professor Evans noted that South Korea's technical community did not appear insensitive to the larger security implications of pyroprocessing, rather that there is more grounds for concern about the call for tactical nuclear weapons. As a leader in the civil nuclear program process, South Korea has both the ability and obligation to take charge in promoting safety, responsible use, and disarmament, particularly in Asia. When asked about potential initiatives beyond technical studies, such as permanent safeguards under the IAEA, Dr. Park pointed to a work by the Korea Institute of Nuclear Non-proliferation and Control to build a training center (Center of Excellence) for nuclear safety and security. Ambassador Labbé re-emphasized the importance of understanding the interplay of the NPT's three pillars and upholding all of them vis-à-vis multinational and diplomatic efforts to "gently cajole" states.

During the discussion, a question was raised about planning and preparing for cases of political instability when creating nuclear policies. Professor Sagan positively agreed that it is critical to have international emergency mitigation plans, although from a seller's perspective, this is a sensitive topic when talking with at-risk entities. He asserted that democracy should be a prerequisite in evaluating a country's ability and access to nuclear power programs. He cites two reasons: 1) the system of checks and balances keeps democratic states accountable; and 2) only non-democratic states have been caught cheating on the NPT by establishing nuclear weapons programs while members under of the NPT.

The audience and panel briefly discussed the possibility of imposing permanent safeguards that should also be complimented by multinational approaches. One expert proposed the IAEA should be obligated to safeguard such facilities. Professor Sagan responded that while some in the United States would be receptive to incorporating permanent safeguards, he did not personally support mandatory IAEA inspections because of existing resource constraints. However, a feasible alternative would be for the United States to volunteer facilities for inspection availability and also offer more multinational control over facilities.

The final question posed to the panel was why countries are willing to risk danger and instability of the proliferation pillar in the name of the nuclear energy pillar. Further, why have there yet to be proposals that address this issue, or is this a non-issue for other states? In response, Ambassador Labbé stated that the NPT faith is Trinitarian, and in Chile's case, international security is fundamental to Chile's success. He underscored that Chile prioritizes establishing a reputation as a responsible member of the NPT. Accordingly, Chile was the first Latin American country to ratify the Additional Protocol and was willing to relinquish its HEU stores in the first Nuclear Security Summit (NSS). If the country eventually decides to develop nuclear energy, they expect suppliers to be eager to do business.

Session 5

Date: February 20, 2013
Time: 14:00-15:15
Place: Regency Room

De Facto Nuclear Weapons States and the Noproliferation Treaty Regime

Moderator: Aruni Wijewardane, James Martin Center for Nonproliferation Studies
Speakers: Ariel Levite, Carnegie Endowment for International Peace
Mushahid Hussain Sayed, Senate of Pakistan
Manpreet Sethi, Center for Air Power Studies, New Delhi
Rapporteurs: Gordon Wyn Jones, King's College London

In terms of strengthening the nonproliferation regime and resolving the nuclear challenges of Iran and North Korea, there is a view that more attention should be focused on the position and role of the three so-called "de facto" Nuclear Weapon States (NWS)—Israel, India and Pakistan. The panel explored the perspectives of these three nuclear "outlier" states: their influence and linkage to each other and to recalcitrant states such as Iran and North Korea, as well as the bottlenecks and prospects for fuller participation and universalization of the Nonproliferation Treaty (NPT).

Aruni Wijewardane, director of the International Organizations and Nonproliferation Program at the James Martin Center for Nonproliferation Studies, opened the session with an outline of the perceived nonproliferation challenges of the so-called "de facto" Nuclear Weapon States (Israel, Pakistan and India), in terms of their respective positions towards the NPT and wider nonproliferation regime: their stances in connection with the nuclear paths of Iran and North Korea, and their external viewpoints regarding the issue of NPT "universality," legitimacy and possible future inclusion. Recognizing the NPT as a flawed instrument prone to criticism, the panel's attention was focused on the degree to which the de facto Nuclear Weapon States (NWS) complicate or compromise the Non-Nuclear Weapons States (NNWS), and their relevance to the key nuclear challenges posed by Iran, within the NPT, and North Korea, having exited the Treaty.

Ariel Levite, nonresident senior associate in the Nuclear Policy Program at the Carnegie Endowment for International Peace, emphasized the characteristics of the three de facto states: that none have ever joined the NPT nor broken any specific treaty rules, but the more significant differences in their respective security contexts, concerns and relationships. Dr. Levite outlined the nuclear paths of Pakistan and India, which set them aside from Israel's national position. Unlike India and Pakistan, Israel "neither is, nor seeks to be, a NWS," but decided and remains of the view that the NPT is incompatible with Israel's broader security concerns in Middle East region. As such, Dr. Levite stated his general discomfort with the formulation of "de facto NWS."

With respect to Iran and North Korea, Dr. Levite highlighted their "long and intimate strategic relations," as well as Pakistan's historical relationship with both countries (including two-way strategic trade) and India's "robust cooperation" with Iran (including energy relations and access to Afghanistan). He pointed out that Israel has nothing remotely similar, having moved from an earlier relationship of engagement with Iran to one of active containment. Dr. Levite stressed the significant differences between the situations and nuclear challenges of Iran and North Korea, but said that neither regime is likely to give up their respective nuclear programs. Such will remain an elusive goal and the best that can be expected is to "tolerate a hedge" and try to achieve a "mutually defined, agreed upon firewall," encompassing a degree of improved transparency, safety and security culture, along with ongoing efforts to "attrite the capability for breakout" in the case of Iran.

Questioned about the position of Israel in Iran's nuclear rationales, Dr. Levite acknowledged a best-case appreciation of Iran's perceived regional threats and security needs, but that Israel is not the primary factor influencing Iran's nuclear development. When asked what nuclear advice Israel would give to North Korea, Dr. Levite stressed Israel's broader conventional security focus and to avoid pinning hopes on nuclear assets as the key aspect of security, that "if you build your security on nuclear means, you are in great jeopardy."

On the question of NPT universalization, Dr. Levite saw little or no relevance between the status of Israel and the issues with Tehran and Pyongyang. In terms of Israel's status outside the NPT and prospects for inclusion, it is clear from Israel's perspective that the NPT is not compatible with Israel's broader security interests and concerns in the Middle East and thus not currently attractive for Israel in its current form. Nevertheless, Israel has tried not to openly criticize NPT shortcomings and has shown its cooperation towards the nonproliferation regime (such as signing the CTBT, not blocking the FMCT debate in Geneva, and adhering to NSG guidelines).

However, with Israel having encountered a number of broken promises and disappointments from the United States with regard to nuclear matters since the 1970s, the US-India nuclear deal came as the "ultimate blow" to wary Israeli instincts regarding coming closer to the nonproliferation regime. Likewise, as far of the Middle East WMD free zone initiative is concerned, though Israel is still open to consider the broader security aspects associated with the concept, it doesn't see the utility or prospects of advancement through the NPT framework. Questioned as to whether more formal US extended deterrent arrangements might be an inducement for Israel to join the NPT, Dr. Levite countered that Israel neither wants nor would probably fully trust such assurances. Despite a broad convergence of security interests, it is better for Israel to operate on its own.

Mushahid Hussain Sayed, senator on a Pakistan Muslim League (Q) platform to the Senate of Pakistan, commenced with the qualitative distinction between the nuclear status of Iran and North Korea (with Iran still within the NPT, having neither tested nor acknowledged any nuclear weapons intention), and emphasized that linkage with the de facto three states is not a helpful frame of reference for understanding either situation. Providing a critique of post-9/11 nuclear geopolitics and policy inconsistencies (including the US-India nuclear deal), he highlighted a perception that nuclear weapons have gained greater legitimacy as tools for regime prestige and protection, reinforced by the experiences of Iraq and Libya, and Donald Rumsfeld's reported 2003 remarks that the difference between Iraq invasion and North Korea inaction was "because North Korea has nuclear weapons."

Senator Sayed expressed the view that Pakistan's nuclear path, and that of the other de facto and aspiring nuclear weapons states, should each be viewed through the respective contexts of perceived state security and survival. He thanked India for making it possible for Pakistan to "come out of the nuclear closet" and highlighted that Pakistan's nuclear decision was driven by factors of security rather than status. In general terms, however, he expressed his belief that the continuing "double-standards and dichotomies over nonproliferation do not, and will not, work" towards realizing lasting nonproliferation progress in troubled regions such as the Middle East and Northeast Asia.

He emphasized that it was the United States that committed the original sin and let the "nuclear genie out of the bottle," with subsequent policy flip-flops and selective strategic deals having weakened the credibility of the nonproliferation regime. From the experiences of newly emergent nuclear states outside the P5, US responses have predictably phased from initial rollback stances, through threats, inducements, to a final acceptance. He again highlighted the US-India nuclear cooperation deal as a prominent example of US strategic priorities and selectivity in approaching nuclear matters. Clearly, it was a case where "politics trumped the principles of nonproliferation," and was duly noted by key players in and out of the NPT. Nonproliferation consistency and trust remain in equally short measure, but despite the shortage of these key ingredients, Senator Sayed expressed a somewhat optimistic outlook regarding prospects for nuclear diplomacy in South Asia, Middle East and Northeast Asia.

In South Asia, he pointed to an embryonic peace underway between India and Pakistan, with nuclear weapons as a factor for strategic stability and major war between the two countries now seen as virtually unthinkable, though admitting that the two neighbors are still "accident-prone." In the case of North Korea and Iran, regime security concerns are at the core of their respective programs and there were missed opportunities for more enlightened diplomacy in both cases (notably North Korea in 2000 and Iran in 2003). It is not too late to engage. In closing, Senator Sayed emphasized that effective nonproliferation should move away from unproductive emphases on sanctions, isolation and demonization towards more active political and diplomatic engagement for countries such as Iran and North Korea. Instead of country specific waivers, a more equitable, consistent, criteria-based approach should be applied, which would recognize both India and Pakistan within the NP framework.

Manpreet Sethi, project leader on nuclear security at the Centre for Air Power Studies, framed her points of reference and started by emphasizing the important distinction between the NPT itself and the wider, multi-dimensional NP regime, including UNSCR 1540, the export control regime, IAEA safeguards regime and the Nuclear Suppliers Group. Though the health of the NPT is often assessed on the barometer of membership and focus on the "outliers," it is clear that the arbitrary nature and rigid definitions of NPT states (the 1967 dividing line between NMS and NNWS) cannot adequately accommodate the status of the three de facto countries. In this regard, the NPT is probably as universal as it is likely to get under the current conditions.

Dr. Sethi posited three contentions to draw out the crux of the NPT issue. Firstly, that the issues and deficiencies of the NPT go well beyond the challenge of the de facto NWS states; that the biggest issue facing the NPT today is the imbalance between nonproliferation and disarmament commitments and action, linked to shifting threat perceptions and big power rationales for nuclear retention, and that calls for universalization are perhaps more a masking exercise for the more fundamental fissures within the NPT.

Secondly, that NPT membership is not in itself a sufficient guarantee of compliance. Examples of countries which have indulged in, condoned or ignored nuclear non-compliance abound among NNWS and NWS alike. In contrast. Dr. Sethi highlighted the positive example of India in having substantively lived up to the principles of the NWS and NNWS and shown that responsible state behavior is a key criteria for making nonproliferation sustainable over time.

Thirdly, considering the options for accommodating the de facto NWS within the NPT, it is neither

realistic for the de facto NWS states to become NNWS, nor for all NPT members to disarm and become NNWS—thus leaving only the option of accepting the de facto NWS through some form of NPT amendment (or "creative approach" as former IAEA Director-General ElBaradei suggested back in 2006). Such a course would be a long-overdue recognition of nuclear reality, but would also need to address the issue of legitimacy and responsible nuclear behavior. In this regard, Dr. Sethi emphasized the need to disaggregate the de facto NWS and see them in their respective lights, seeking to encourage participation in the wider nonproliferation regime and instruments (beyond the inherent inequities of the NPT and its arbitrary, historical NWS criteria) and to effectively expand the "global web of commitments." In this respect, the US-India nuclear agreement, far from undermining the NP regime, represents a positive recognition and advertisement of responsible nonproliferation behavior, and how that consistent record of good compliance can change a country's status.

The lively panel discussion provided critical perspective on the limits and inconsistencies of the NPT itself, whilst minimizing responsibility for NPT shortcomings, negative impact on or relevance to the nuclear issues and motivations of Iran and North Korea. Each panelist emphasized the uniqueness of their respective national security positions and the need to view their nuclear activities in the wider contexts of regional security concerns and within the broader international nonproliferation regime, beyond the specific, limited framework of the NPT. For India and Pakistan, the quest for nuclear status recognition was apparent, whereas Israel distanced itself from the other de facto states and demonstrated a desire to limit its nuclear profile.

Session 5

Date: February 20, 2013
Time: 14:00-15:15
Place: Grand Ballroom I

How Viable Are Nuclear Weapons Free Zones?

Moderator: William Potter, James Martin Center for Nonproliferation Studies
Speakers: Emiliano Buis, Non-proliferation for Global Security Foundation
Peter Hayes, Nautilus Institute, RMIT University
Ta Minh Tuan, Office of the Government, Vietnam
Chun Chaesung, Seoul National University
Rapporteurs: Kristine Bergstrom, Carnegie Endowment for International Peace

Against the backdrop of the current debate on the possibilities of creating a Nuclear Weapons Free Zone (NWFZ) in the Middle East, analysts are assessing the conditions under which such Zones could be established in different regions. The distinguished panel of Dr. William Potter, Professor Ta Minh Tuan, Dr. Peter Hayes, Dr. Emiliano Buis, and Dr. Chun Cheasung sought to address the various obstacles and advantages to creating Nuclear Weapons Free Zones.

William C. Potter, director of the James Martin Center for Nonproliferation Studies, opened the discussion by pointing out that in light of recent progress in creating new NWFZ it is not surprising that a number of additional zones have been proposed for the Middle East, the Korean Peninsula, and the Arctic.

Emiliano Buis, professor and researcher at the Non-proliferation for Global Security Foundation, noted on the positive side that NWFZs compliment the Nuclear Nonproliferation Treaty (NPT), they are regional, and they contain protocols that commit countries to not deploy nuclear weapons in the region. But on the negative side NWFZs are merely a means toward the elimination of nuclear weapons and not an end. They lack practical enforcement practices; the geographical scope is very limited—for example 60 percent of all states are within a NWFZ but only 39 percent of the world's population are living in those areas—and finally some countries preserve the right to use nuclear weapons in NWFZs in certain circumstances. In order to function, Dr. Buis concluded that NWFZs have to be naturally created, multilateral, and multidisciplinary, as well as global.

Chun Chaesung, associate professor at Seoul National University, noted that there are certain assets that can create favorable conditions for a NWFZ. Historically the success of NWFZs in Latin America, the South Pacific, Southeast Asia, and Africa has been based on several agreements: threshold states should

not manufacture nuclear weapons; nuclear threats from states in the region should be permanently eliminated; offshore great powers should not station or transport nuclear weapons which might endanger regional states. With the agreement, there followed solid mechanisms for international assurance including negative security assurances and positive negative security assurances, and well-founded routes for verification. Political and strategic common views are also crucial by confirming the recognition of peaceful status quo, permanent need for arms reduction, and the maintenance of multilateral security mechanisms.

In Northeast Asia, he added, there are also assets of which a NWFZ can be created: Japan's three Non-Nuclear Principles of not possessing, not producing, and not permitting the introduction of nuclear weapons; the Joint Declaration of South and North Korea on the denuclearization of the Korean Peninsula; the United Nations' recognition of Mongolia's self-declared nuclear weapon free status. However, there are serious harmful elements to take into account as well, including North Korea's manufacturing of nuclear weapons; rising voices for nuclear armaments in South Korea and Japan; the geo-strategic competition between the United States and China; and the aggravating relationship between China and Japan.

Under these conditions, concluded Dr. Chun, the prospect for reaching an agreement for a complete NWFZ is quite moderate, but it is possible to set up more feasible targets, such as confirming the status of Non-Nuclear Weapons States for South Korea, Japan, and Mongolia; working toward the denuclearization of North Korea; developing multilateral security mechanisms, nuclear deterrence and assurances; working for the elimination of the nuclear security dilemma between the United States and China; and finally establishing a full-scale NWFZ in the region.

Peter Hayes, co-founder and executive director of the Nautilus Institute at RMIT University, made the point that, as a great power, the United States has long-term interests in the region that mostly do not revolve around North Korea. The United States should therefore strive to establish a framework that primarily addresses the nuclear insecurities of the five parties—not North Korea—as the first step. Looking at the need to reduce the risk of Taiwan Strait-induced US-South Korea nuclear use, the need to moderate the Sino-Japanese conflict axis and the potential for Japanese nuclear weapons, as well as the need to set South Korea up so that it remains non-nuclear in the long-run, there is only one framework that can manage the cross-cutting interests of the Nuclear Nonproliferation Treaty Nuclear Weapons States and Non-Nuclear Weapons States, said Dr. Hayes, and that is a NWFZ. To get there, argued Dr. Hayes, you need a comprehensive security settlement that includes a termination of the state of war, the creation of a Permanent Council on Security to monitor the agreement, a mutual declaration of no hostile intent, provisions of assistance for nuclear and other types of energy, termination of sanctions, and ultimately the creation of a NWFZ.

But, argued Dr. Hayes, we do not know how valuable a legally binding guarantee, a multilateral one at

that, that they will not be attacked with nuclear weapons is to the North Koreans. We have not listened to them on this score on the past, but they have been consistent in saying it is one of the most important issues for them. That may have shifted now that they declared themselves "forever nuclear-armed." There is only one way to find out and that is to engage them. If they say no, we ignore them and proceed, as a regional NWFZ is in our interests anyway. We do not give veto power to North Korea. If they say yes, then we make room in the NWFZ for them to enter, either at the outset, or over time.

It is perfectly feasible for the United States to make a guarantee to Non-Nuclear Weapons States in the region in a NWFZ, including North Korea, that it will not use nuclear weapons against North Korea or other Nuclear Weapons States, noted Dr. Hayes and added that residual nuclear extended deterrence will still exist for South Korea and Japan, only rhetoric and legal form will realign with the restructured forces that no longer include any form of forward-deployed theater or tactical nuclear weapons on the part of the United States. That is good, according to Dr. Hayes, because it is the essence of credibility that this alignment exists, and it is currently badly out of whack, which negatively affects the perceptions of our adversaries, allies, and third parties. Meanwhile, nuclear deterrence will continue to flow "around" the NWFZ between the Nuclear Weapons States. Should a Nuclear Weapons State or a nuclear armed state such as the DPRK use or threaten to use nuclear weapons against a Non-Nuclear Weapons States party to the NWFZ, then it would face residual nuclear extended deterrence, and it would render moot US and other Nuclear Weapons States' guarantees to not use nuclear weapons in or against the Zone parties.

Ta Minh Tuan, assistant to the Deputy Prime Minister in the Office of the Government, Vietnam, made the case for NWFZs but pointed out that there are four conditions to their success: the treaty must be comprehensive both in verification and enforcement; each party must willingly legislate on issues that strengthens the treaty, for example on radioactive waste; a regional organization must take action in case of violations; and Nuclear-Weapon States must respect the Zone and not ignore their commitment at the

risk of rendering the Zone futile. As for the prospect of a NWFZ in Northeast Asia and the Middle East, Professor Tuan argued that the creation of treaties would be difficult for several reasons: there is mistrust among countries in the region, certain countries such as Japan and China have historical luggage that and political realities that make a Zone difficult to establish, the existence of Nuclear Weapons States within the Zone such as China, and territorial disputes.

Dr. Potter continued the discussion by saying that while NWFZs share some basic characteristics, each Zone has a number of distinctive features. The Central Asian NWFZ, for example, is distinctive in its emphasis on environmental problems caused by uranium mining and milling, as well as by its requirement for members to adhere to the IAEA Additional Protocol. He also pointed to general obstacles to overcome before the establishment of a NWFZ is possible, starting by the fact that NWFZs are challenging to negotiate, difficult to define from a geographical perspective, and hard to define in terms of activities to be prohibited or permitted within the zone. There are also conflicting interests of prospective between zonal members, the relationship of new zone to other international agreements, and the concerns of extra- zonal parties.

Dr. Potter also pointed out a recent obstacle, which is the inclination of states party to some Zones to disregard legally binding provisions that are seen as economically or politically constraining. These restrictive provisions are explicit in the Treaties of Raratonga and Pelindaba, and the Central Asian NWFZ Treaty is even more restrictive in its insistence that recipient countries have in place the Additional Protocol to the IAEA. And yet a number of parties to these treaties such as Australia, South Africa, and Kazakhstan now act as if there are no treaty obligations in this regard. If members of existing Zones do not fully implement their own legally-binding obligations, added Dr. Potter, it renders the case for additional Zones, such as the one in the Middle East, much less compelling.

So what are some of the lessons we can learn from the Central Asian experience? Dr. Potter highlighted two main lessons: First, seize the moment. While patience is fine, delay can be disastrous, so for those who want a Zone: seize the opportunity whenever it presents itself. Second, tailor the Zone to regional peculiarities and common interests. NWFZs vary in the activities that are prohibited and permitted, and each Zone tends to introduce distinctively new features. In the case of the Central Asian states, the glue that made possible the negotiation of the treaty was the common environmental damage they suffered due to Soviet mining and milling of uranium on their territories, noted Dr. Potter.

Dr. Potter concluded by saying that proponents of NWFZs must seize upon opportunities as they appear: a number of existing NWFZ treaties are far from perfect and might have been improved in a variety of ways. Moreover, in some regions lacking a history of cooperation on issues of peace and security, NWFZs may offer a potential mechanism to further regional cooperation in pursuit of shared interests and threat perceptions.

The presentations were followed by questions from the audience where one audience member asked Professor Tuan if territorial disputes could not be a good starting point for low-level cooperation between states to resolve the disputes, to which he responded that in such cases the treaties have to define clearly the zone of application.

Another member of the audience asked Dr. Chaesung what to do about Japan, to which he answered that in Japan the cost of reprocessing is being questioned and that it would be best to find a solution regionally.

In the concluding remarks, Professor Tuan said that he is positive that a NWFZ can happen. Dr. Hayes argued that to implement a NWFZ on the Korean Peninsula would entail a change in position from the United States that would have to give up its right to station nuclear weapons in South Korea. Dr. Chaesung added that only if North Korea gets back in the NPT can the United States provide security assurances. Dr. Buis noted that as a lawyer he is the least inclined to believe in the success of disarmament by legal measures and that a treaty is not an end, only a means to an end. Dr. Potter wrapped up the discussion by pointing out that most treaties are far from perfect, so it is important to seize on the opportunities for NFWZs as they appear, to be open to new approaches for extending the reach of nuclear weapons free space, and to be as attentive in fully implementing the provisions of existing NWFZs as advocating for the negotiation of new NWFZs.

Session 5

Date: February 20, 2013
Time: 14:00-15:15
Place: Grand Ballroom III

How Safe Are Nuclear Power Plants in South Korea?

Moderator: Ahn Joonhong, University of California, Berkeley
Speakers: Kim Jiyoon, The Asan Institute for Policy Studies
Lee Jong-In, Korea Institute of Nuclear Safety
Suh Kune Yull, Seoul National University
Rapporteurs: Paolo Venneri, Korea Advanced Institute of Science and Technology

The forum itself dealt largely with transnational issues related to nonproliferation, North Korea, and nuclear weapons. This session addressed an equally important aspect of nuclear security: the security and safety of civilian nuclear power plants. The topic of this session was narrowed down to the security of South Korean nuclear plants and how they were able to measure up to security needs and public opinion in lieu of recent corruption scandals and the accident at Fukushima.

The session began with the moderator Ahn Joonhong, professor and vice chair of the Department of Nuclear Engineering at the University of California Berkley, explaining how despite him no longer residing in South Korea, he was still very interested in the safety of Korean nuclear power plants, and was looking forward to the opportunity to pose questions and ask the opinion of a panel of experts on the subject. He set the stage by presenting a series of questions and considerations that were then later addressed by the panel members. His questions related largely to the prediction and mitigation of safety and security issues that surround a civilian nuclear power plant. He explained that considerations have to be taken into account from the initial design and construction of the reactor, confidence must be built in how they are operated, and a proper regulatory body has be developed that cannot be controlled by the industry. Beyond these initial considerations, Dr. Ahn posed the realistic situation of the world being a dynamic environment in which things change and previously unseen of events occur. Because of our dynamic environment, Dr. Ahn posed issues and questions relating to how we will deal with unforeseen events, what is being done to mitigate these accidents, and how can we predict what kind of effect such accidents will have not only on the power plants themselves, but on the world outside of them as well. The rest of the panel broadly addressed these questions from each of their own perspectives and backgrounds.

One of the first issues to be brought up was how to measure safety and how to guarantee that level of safety. As Lee Jong-In, senior advisor at the Korea Institute of Nuclear Safety, pointed out, safety is not an engineering term. It is difficult to quantify, and very difficult to guarantee in absolute terms. While engineers and designers try to think of everything that could possibly go wrong and how to address them, the task itself is daunting. In response this, engineering terms such as defense in depth, sufficient safety margin, and ALARA (As Low As Reasonably Achievable) have become common engineering terms that acknowledge the vagueness and difficulty of the requirements.

In trying to achieve these goals, Dr. Lee explained that South Korea is actually doing quite well, not withstanding the recent scandals. He explained that the safety of nuclear power plants was the number one priority in the Korean nuclear industry, and the Korean regulatory body had been established in accordance with this basic tenant. He explained that the regulatory body had five basic principles: to be independent of the industry, be open to the public, operate efficiently, offer clarity on nuclear issues, and be able to assure the reliability and safety of Korean nuclear power plants. He cited South Korea's excellent safety record and credited its continued success to changes currently happening within the regulatory body, including the improvement of technical standards and the willingness of the regulatory body to learn and act on external reviews and events outside of South Korea. He paid particular attention to the efforts made in response to Fukushima, citing internal and external review efforts following the Fukushima accident, and the direct implementation of solutions to issues found during those reviews. Yet even after explaining all the impressive improvements and progress the regulatory body has made, Dr. Lee was still left with a critical question which he posed to the panel and the audience: how safe is safe enough?

Kim Jiyoon, research fellow and director of the Public Opinion Studies Center at the Asan Institute for Policy Studies, was able to provide a very unique perspective to the question posed by Dr. Lee. Through her research and work in public opinion polls, she was able to shed light on what the public feels about the safety of nuclear power. While the data she presented was often seemingly contradictory, she mentioned some critical trends that she believed could indicate some telling aspects of South Korean popular opinion.

The first trend was the sudden emergence of nuclear safety in the minds of the general public. Prior to Fukushima, the vast majority of South Koreans supported nuclear power for mainly economic reasons, and only a small minority disapproved of it. Following Fukushima, public opinion took a markedly different turn with close to a majority of South Koreans opposing the building of new nuclear power

plants. Yet at the same time, the numbers of South Koreans who supported nuclear power as an industry was still in the majority. Accompanying this trend was the large portion of the public that felt that that nuclear power was necessary, but unsafe at the same time.

Underlying all of the polls, however, was the basic feeling that Koreans strongly believed in the economic profitability of the nuclear industry, even after the rise in safety related concerns. The largest objection the public seemed to have towards the nuclear industry and nuclear related accidents seemed to be a lack of transparency on the part of the government in the event of such an accident occurring. Dr. Kim made the point that according to her polls, the South Korean public does not trust the government in general, about 60 percent. She clarified her point however by pointing out that in general, supporters of the government registered approval whereas opponents voiced sentiments of distrust, making the point seem trivial, except for the fact that through out, trust in the nuclear industry has remained fairly constant. She hypothesized that this could be because the nuclear industry has never been a truly politicized issue, and had thus avoided intense public scrutiny.

This last line of reasoning prompted the question by Dr. Ahn of what the government should do related to increasing public confidence in the industry and its ability to resolve any accidents that occurred. Dr. Kim responded that the first problem it should address is the lack of information available to the public. She pointed out that as a non-specialist, she had neither the competence nor the information with which to accurately gauge the safety of nuclear power. All she had available is information provided to her by the mass media, which as she pointed out, is not enough information to form a reasonable opinion.

One of the manners by which information regarding the nuclear industry could be disseminated would be to finally make it a part of the political discussion. In this way it would be discussed, multiple opinions addressed, and the public at large would have the opportunity to subject the different issues to an unprecedented level of scrutiny. Perhaps this way, the public could come to form a well-informed opinion regarding the safety of the nuclear industry and increase its trust in its own government through its transparency on the issue..

Suh Kune Yull, professor in the Nuclear Engineering Department of Seoul National University, brought an eclectic and varied perspective to the discussion. His first point was related to the growing possibility of North Korea becoming a de-facto nuclear power. He worried that such an instance would the spark a domino effect, causing other countries to follow suit, and placing South Korea in rather awkward position. This led him to his second point of questioning the ability of a nuclear power plant complex surviving a direct missile attack without releasing radioactive material. He pointed out that the power plant itself is well protected inside layers of armored concrete, and that it was the facilities around the plant, particularly the spent fuel pool, that were at the greatest risk.

Next was a worry regarding the renegotiation of the US-South Korea nuclear cooperation agreement and

its effect on the fuel supply chain in South Korea. If the renegotiations were to fail, South Korea would face very serious difficulties in ensuring that its nuclear power plants were supplied with the required fuel, and as such posed a serious threat to South Korea’s energy security. This then smoothly led to his three main points: the near-term shortage of qualified man power to effectively operate South Korean nuclear power plants, the lack of an exit strategy for the decommissioning of South Korean nuclear power plants and the consolidation of the nuclear regulatory body into the scientific research branch of the Korean government.

The final issue prompted Dr. Ahn to ask Dr. Lee to respond with his opinion. Dr, Lee explained that yes, there is a certain amount of interaction between the regulated and regulators, but nothing that could be construed as being inappropriate. In order to make meaningful and appropriate regulations, there has to be input from the regulated, and that when it finally came down to the actual regulation, the regulating body acted independently and according to its mandate. Dr. Suh responded to this by pointing out that the situation was similar to if the United States decided to combine the US Nuclear Regulatory Commission and the US Department of Energy into a single government body. This had been done previously, but the two had been separated for the same concerns he had. Dr. Suh reiterated that nuclear safety was composed of three things: plant safety, manpower qualifications, and safety culture. If the regulator and the regulated were both part of the same government body where the regulated could influence the regulator, Dr. Suh argued that the regulator would be unable to adequately ensure all three components of nuclear safety.

This question and the other comments by Dr. Suh prompted the audience to ask him exactly how safe he believed Korean nuclear reactors were. After a moment of thought, Dr. Suh responded that despite his criticism, the South Korean nuclear industry was very safe. When pressed to give the industry a grade, he gave it a 98 out of 100. Safety in Korean nuclear power plants was very good, but as he had pointed out, there were still some issues that needed to be resolved. Even in this case, Dr. Suh responded that South Korea was going in the right direction as far improving its own practices. It was effectively taking measures following the accident at Fukushima and was currently looking at its oldest nuclear power plants and subjecting them to European style stress tests, which according to Dr. Suh, is the right way to go about verifying and improving the safety of the South Korean nuclear power plants. When Dr. Lee was asked the same question regarding what grade he would give the South Korean nuclear industry for safety, he responded with a shrug and smile that he would keep working and do his best.

Dr. Kim closed the session with a statement that summed up the opinions and attitudes of all the speakers. She agreed with Dr. Lee’s statement of safety not being a purely technical term. It is a term that is affected by public perception, and as such is highly variable. She pointed out, however that because 43 percent of Korea’s energy is supplied by nuclear energy resources, opinions regarding its safety should be done in an informed manner. She stressed that while she was arguing that the issue should be politicized, she was not arguing for making it into a partisan issue. Rather than turning the discussion into a partisan one of pro and anti nuclear, it should become an earnest discussion on how to ensure nuclear safety.

Session 6

Date: February 20, 2013
Time: 15:30- 16:45
Place: Regency Room

Bolstering Counter-proliferation Regime

Moderator:	Bong Youngshik, The Asan Institute for Policy Studies
Speakers:	Choi Kang, Korea National Diplomatic Academy
	Pierce Corden, American Association for the Advancement of Science
	Matthew Kroenig, Georgetown University
	Jim Walsh, Massachusetts Institute of Technology
Rapporteurs:	Mira Rapp-Hooper, Columbia University

The "Bolstering Counter-proliferation Regime" panel reached consensus on the fact that certain counter-proliferation tools have been sharpened in recent years, especially the Proliferation Security Initiative (PSI). There was, however, a fair amount of dissent among the speakers about how we should balance nonproliferation versus counter-proliferation priorities going forward.

Bong Youngshik, director of the Center for Foreign Policy at the Asan Institute for Policy Studies, opened the panel by laying out some crucial distinctions between counter-proliferation and nonproliferation. Nonproliferation can be thought of as preventing the spread of nuclear materials and is often achieved through multilateral legal frameworks. Counter-proliferation may be defined as a focus on problem states and producers, and is often achieved unilaterally or through smaller groups of states. There has been a shift in recent years to placing priority on the latter. Dr. Bong laid out several questions to guide the discussion: How should we approach the conceptual difference between the counter-proliferation and nonproliferation regimes? How should we weigh the use of military tools versus diplomatic sanctions? Should we focus on states or technologies? And are the nonproliferation and counter-proliferation regimes contradictory or complimentary?

Choi Kang, director of Policy Planning at the Korea National Diplomatic Academy, argued that the Proliferation Security Initiative constitutes real progress on counter-proliferation. The initiative began with ten countries and now comprises half of the United Nations members. There was initial concern that the PSI would interfere with states' jurisdiction rights and allow for undue American interference, but those worries have largely been dispelled, Dr. Choi noted. Unlike the nonproliferation regime, whose power is primarily normative, the PSI is action-oriented. There is, however, more work to be done on this important initiative. Full participation by all states should be a goal. China has failed to fully participate, and will be a crucial actor going forward.

Other near-term challenges for the PSI include interdiction from non-state actors and pariah state proliferators. Participants need to do more to bolster the power of PSI. Additional states must be brought into PSI. States that are part of PSI need to work together to develop the domestic capacity to bolster this capability. They must also debate among themselves the connection between nonproliferation and counter-proliferation. If we hope to have a more successful counter-proliferation regime in the future, we should establish a standing institution to house counter-proliferation efforts.

Pierce Cordon, visiting scholar at the Center for Science, Technology and Security Policy at the American Association for the Advancement of Science, argued that we can look at European examples of Confidence and Security-Building Measures (CSBMs) to understand how non-legally binding agreements among groups of states may be successfully brought about. These agreements apply to a limited group of states, are not legally binding, and were formulated by individual members of the group. Following this model, groups of states (i.e. within a region) may commit to securing nuclear or radiological materials using standards that they themselves impose. Other useful agreements could include advanced notification measures, whereby states would commit to give advanced notice of missile or other military tests. An established notification network between governments could reduce the risk of crisis, and open lines of communication would be useful goals in and of themselves. According to Dr. Cordon, reversing proliferation will become especially important as the world moves towards nuclear zero.

Matthew Kroenig, assistant professor and international relations field chair in the Department of Government at Georgetown University, argued that the primary constraint on the effectiveness of the counter-proliferation regime is not capabilities, but prevailing norms and interests. It is incumbent on the international community, Dr. Kroenig stated, to develop a new set of norms that acknowledges our responsibility to intervene to prevent proliferation, using coercion and military tools if necessary. Major powers can interdict illicit nuclear materials or carry out military strikes, but states tend to hesitate to intervene in proliferation efforts because they prioritize short-term interests (such as economic ties or near-term political stability) over long-term ones. Norms of sovereignty date back to the Treaty of Westphalia, and have been enshrined in the UN Charter. Many countries therefore start with the principle that the use of force to prevent proliferation is illegitimate.

Like the adoption of the Responsibility to Protect (R2P) doctrine that allows international intervention to prevent mass atrocity, Dr. Kroenig argued that we should adopt a Responsibility to Prevent Proliferation (R2PP) doctrine that elevates the longer-term interest of preventing the spread of nuclear weapons over the existing norm of state sovereignty and states' shorter-term interests. This may be accomplished through coercion, and the use of military force if necessary. If, in fact, states believe that the spread of nuclear weapons is a threat to international peace and security, they must act to make proliferation unacceptable by raising the norm of intervention above the norms of sovereignty and non-use of force. When countries act to prevent proliferation, Dr. Kroenig argued, we should not condemn them as pariahs, but direct our ire at those states that stand idly by as the world's most dangerous weapons spread.

Jim Walsh, research associate and faculty at the Massachusetts Institute of Technology's Security Studies Program (SSP), argued that counter-proliferation is a post-Cold War invention. Counter-proliferation focuses on a particular target, is aggressive, and is sometimes kinetic. Counter-proliferation may be a relatively new term, but these concepts are old. There are many instances of countries considering the use of military force to prevent proliferation, and in most cases countries have demurred. This is wise.

Many countries have appeared to pose greater nuclear threats than North Korea does today, including China under Mao or Pakistan more recently. Counter-proliferation is attractive because it involves technology and military action, but in fact counter-proliferation efforts have ranged from irrelevant to counter-productive. The few instances of peacetime strikes on emerging nuclear programs cannot necessarily be counted as successes (these include Israel's strike on Iraq's Osiraq reactor in 1981, Israel's strike on Syria in 2007, and the United States' 2003 invasion of Iraq). States that succeed in acquiring nuclear weapons are those that attach political priority to their program. By intervening militarily, outside states can add urgency to this proliferation quest that didn't necessarily exist before. Nonproliferation mechanisms, by contrast, have been extremely effective throughout history, and have thrived because states with legitimacy built and adhere to the regime. Nonproliferation is a resounding success story, Dr. Walsh argued, and we should be thankful for it rather than turning to risky counter-proliferation tools that are unlikely to accomplish our goals.

Dr. Bong then posed a question to Dr. Walsh: Following North Korea's third nuclear test, is engagement still a good option for North Korea and Iran? Dr. Walsh argued that we are unlikely to see much engagement with North Korea in the near term because we are caught in a cycle of provocations and sanctions. The current ROK military posture is forward-leaning, Dr. Walsh argued, and could lead to escalation following a provocation. This is especially true given that there are four new leaders in Northeast Asia. A deal does not seem possible with North Korea at the moment, but may still be possible with Iran.

Dr. Kroenig then stated that nonproliferation and counter-proliferation were not necessarily alternatives, and that the cases involving each type of tool cannot easily be compared. Cases in which non proliferation tools have succeeded are relatively easy cases; cases in which counter-proliferation tools have been used are more difficult ones. In any given case of proliferation, the international community has a variety of options: negotiating, using sanctions, cyberattacks or covert action, military options, waiting for regime change or living with the problem. It is always preferable to solve these problems diplomatically, Dr. Kroenig argued, but if this cannot be accomplished we must decide what comes next. In the case of Iran, the nuclear clock appears to be ticking faster than the regime change clock. Military action is a viable option there because we know where relevant facilities are located and can destroy them. North Korea's program is more disbursed, making military action less feasible. Additionally, we could likely manage the military retaliation that would follow an attack on Iran, whereas we may not be able to absorb retaliation form North Korea.

Dr. Bong then opened the panel for questions and answers. One audience member asked Dr. Kroenig whether a counter-proliferation effort modeled after R2P would be feasible. In particular, military action to prevent proliferation would have to be accompanied by very careful criteria. There had been substantial backlash to R2P because many states viewed it as another rationalization for the West using military force wherever possible. Furthermore, in 1992, the UN had broadened its Chapter 7 mandate to include the prevention of proliferation.

Another audience member argued that the crucial focus of counter-proliferation was to identify decisions and decision-makers early on in the proliferation process, and intervene to stop those. Dr. Kroenig responded that a R2PP doctrine would absolutely have to be accompanied by criteria for the use of force, and that he also agreed with the importance of intervening early on in states' nuclear pursuits. The questioner replied that creativity on issues of nonproliferation was to be welcomed, but that the R2PP concept was a little scary, noting that an attack on Iran would have bad consequences for the nonproliferation regime.

The next question asked how we should approach issues of escalation control. Should a focus be placed on alliance coordination and management? One audience member noted that there appeared to be a consensus that PSI was a success. How do we measure its success, and why do we refer to it as opposed to UN Resolution 1874, which gives states the right to interdict?

In closing, Dr. Walsh commented that South Korea's proactive deterrence posture made escalation more likely, and that it was hard to reassure an ally while also restraining it. He expressed a general concern that we may forget how much the nonproliferation regime has accomplished, and cease to focus on these good tools. Dr. Kroenig stated that there is no contradiction between counter-proliferation and nonproliferation, and that counter-proliferation is a second line of defense. Dr. Cordon concluded that we have to approach the proliferation problem at various stages of the process. Dr. Choi raised the question of whether a policy like Dr. Kroenig's R2PP might have negative consequences for those involved in PSI.

Session 6

Date: February 20, 2013
Time: 15:30-16:45
Place: Grand Ballroom I

Non-State Stakeholders in Preventing WMD Proliferations

Moderator: Gabriele Kraatz-Wadsack, United Nations
Speakers: Togzhan Kassenova, Carnegie Endowment for International Peace
Lv Xiaodong, United Nations
Shin Chang-Hoon, The Asan Institute for Policy Studies
Rapporteurs: Natalia Sharova, Hudson Institute

Governments and policymakers have long recognized the threat of military use of weapons of mass destruction (WMD) and acknowledged the need to prevent their proliferation. However, they have underestimated the role of non-state stakeholders and civil society in this process. Therefore, the danger posed by non-state entities aiming to acquire weapons of mass destruction (WMD) and the potential role of industries and civil society in nonproliferation processes urged the United Nations Security Council to adopt Resolution 1540.

Resolution 1540, which was unanimously adopted on April 28, 2004, obliges all states to refrain from any assistance to non-state actors in developing, acquiring, manufacturing, possessing, transporting, transferring, or using nuclear, chemical or biological weapons and means for their delivery. The resolution also binds all states to set up appropriate domestic controls over related materials to prevent their illegal trafficking. Not less importantly, it encourages enhanced international cooperation in such efforts. However, seeking to prevent WMD proliferation, policymakers have downplayed the role of non-state stakeholders and civil society in the process. In this regard, the perspective on WMD nonproliferation efforts ought to be changed in order to instigate the resolution's implementation process.

In the context of the resolution, a non-state actor is an individual or an independent entity that does not act under the lawful authority of any state. The Security Council Committee was established in pursuant to the resolution in 2004, and its purpose was and is to report on the resolution's implementation. On April 20, 2011, the Security Council adopted Resolution 1977, which acknowledges that WMD and their means of delivery continue to threaten international peace. The purpose of Resolution 1977 (2011) was also to extend the original one for ten more years to 2021. This decision demonstrated that implementation of Resolution 1540 is a long-term process that requires consistent commitment from all states at national, regional and international levels. In addition, to ensure the effectiveness of the resolution's implementation, the Security Council established two Comprehensive Reviews: one in 2016 and one before the end of the Resolution 1977 mandate.

The sixth session of the *Asan Nuclear Forum*, titled "Non-state Stakeholders in Preventing WMD Proliferation," discussed the real and potential role of industries, international organizations, and civil society in WMD nonproliferation. In addition, panelists expressed their ideas on how to instigate UNSCR 1540 implementation. Gabriele Kraatz-Wadsack, chief of the weapons of mass destruction branch in the Office for Disarmament Affairs at the United Nations, opened the session by reminding the audience of the importance of Resolution 1540 due to the increased threat posed by numerous terrorist groups and entities attempting to acquire WMD. She emphasized that according to the resolution, the main responsibility for its implementation lies on the member states, and the effectiveness of the process depends on the degree of their efforts and commitment.

Togzhan Kassenova, associate in the Nuclear Policy Program at the Carnegie Endowment for International Peace and Stanton Nuclear Security Fellow, noted that, in the past, the only source of potential proliferation was military and defense industries. However, due to today's technologies, the amount of such sources has dramatically increased, with the trade of dual-use technologies in sectors not related to military becoming widespread and dangerously escalating the risk of WMD and delivery system proliferation.

Dr. Kassenova listed several reasons explaining why it is crucial to engage industry in nonproliferation efforts. For starters, she stressed that companies are the best positioned to distinguish a client's odd behavior since the industry knows the specifics of products they are producing, the markets they are working on, and, most importantly, the interests of their clients. For instance, when a client rejects maintenance support or orders unusually large quantities of materials that can be used for WMD production, companies can be the first to recognize and report such potentially illicit intentions to the Security Council. The ability to do so is industry's major advantage over policymakers and think tanks, a characteristic that makes it a key player in nonproliferation efforts.

Second, industry has experience that allows it to judge the feasibility and effectiveness of nonproliferation policies and laws. Corporate knowledge is critical to the process of designing mechanisms intended to monitor dual-use goods and WMD materials trade that governments should use to implement Resolution 1540. Industry can accelerate or impede the proliferation of deadly weapons, yet policymakers and academia have not yet established a stable and effective dialogue with industry. To date, policy experts and think tanks have failed to recognize that industry is the "first line of defense against proliferation." States must build communication channels with companies in order to make cooperation possible and increase corporate willingness to help.

Moreover, governments should establish some benefit system at the domestic and international levels for

cooperative companies since industry faces numerous challenges when trying to contribute to nonproliferation. For instance, it is expensive for a company to conduct checks of their clients and to turn them away if they are suspicious, to monitor sold dual-use goods, to sort out export control norms of various states, to prevent diversion of products and technologies to sanctioned countries, and so forth.

To motivate industry to contribute to the nonproliferation process, Dr. Kassenova suggested easing the process of giving out licenses and various permissions essential for businesses to cooperative companies, along with other benefits. In conclusion, she noted that policymakers should remember that it is often unprofitable and challenging for industry to act in the interest of the nonproliferation process, and thus governments should reach out first and build a convenient and feasible communiqué with them.

Lv Xiaodong, a member of the Expert Group of UNSCR 1540 Committee at the United Nations, opened her presentation by highlighting the unique characteristics of Resolution 1540. She emphasized that the resolution was the first binding instrument that addressed threat posed by non-state actors, such terrorist organizations, seeking to acquire WMD, their means of delivery and related materials. Ms. Lv also noted that the resolution generated a special platform for cooperation, not only at the international level, but also at the regional and sub-regional levels among the member states.

Ms. Lv referred to Dr. Kraatz-Wadsack's introduction and stressed that the resolution requires all member states to establish effective domestic controls over illicit materials, including physical protection, export and border controls. Through Resolution 1540, the Security Council established an effective program of steps to prevent non-state actors from acquiring WMD and their means of delivery. Moreover, it supplements the Nonproliferation Treaty (NPT) and the conventions banning biological and chemical weapons.

Resolution 1540 recognizes that the key responsibility for its implementation rests on the member states, which means that the United Nations is accountable only for enforcing the implementation process. For instance, it helps to bring together and build a rapport between various non-state stakeholders, including national, regional, and sub-regional organizations. Such cooperation greatly contributes to the member states' efforts to implement the resolution's key requirements because it allows sharing implementation experiences and practices that greatly facilitate countries' mutual nonproliferation efforts. Ms. Lv also noted that regional and sub-regional organizations are particularly crucial to the implementation process because they are well aware of the needs and challenges of specific areas, and thus have the best capability to develop appropriate control and enforcement instruments. The efforts to build such cooperation proved to be successful; the 1540 Committee and the Expert Group are currently working with nearly 40 regional and sub-regional non-state stakeholders in mutually beneficial ways. Ms. Lv pointed out that the most rigid cooperation was established with international organizations that have mechanisms to conduct nonproliferation expertise such as the IAEA.

It is important to note that the resolution also engages some intergovernmental organizations such as customs and criminal police units. Such intergovernmental parties have vast potential in providing subsequent assistance and should be more widely involved in the implementation process, as well as another prominent but not the most active actor—civil society. According to Ms. Lv there is no official definition of the term "civil society," but it should be a broad concept that could include academia, think tanks, the private research sector, and industry. She contended that the United Nations devotes its efforts to building productive and innovative links between international organizations and civil society, which will be able to help reinforce national and international nonproliferation efforts. She named the Civil Society Forum conducted by the United Nations Office for Disarmament Affairs (UNODA) as a recent result of the UN's efforts in this sphere. Representatives of more than fifty civil society organizations participated in the forum, where they expressed their intention to become more constructively involved in the implementation process.

Wrapping up her presentation, Ms. Lv agreed with Dr. Kassenova that industry's awareness and role should be enlarged since companies are the implementers of nonproliferation regulations and are dealing directly with their customers. She noted that Resolution 1540 and 1977 encourage industry to cooperate with governments and to unify their implementation efforts. Last year's first conference of International, Regional and Sub-Regional Industry Associations should serve as an example of successful cooperation. The conference was held in April, in Wiesbaden, Germany and was co-organized by the UNODA with financial support from Norway, the United States, and the European Union.

Shin Chang-Hoon, director of the Nuclear Technology and Policy Center at the Asan Institute for Policy Studies, then argued that the prevention of WMD proliferation is a matter of national security that requires a thorough regional approach. He agreed with other panelists that UN Resolution 1540 is a unique sup-

plement to the NPT since it includes a prohibition of dual-use materials and means of WMD delivery. Next, he distinguished two key steps that can greatly contribute to regional security and are particularly relevant for ensuring security in Northeast Asia.

First, Dr. Shin noted that civil society's role should be no exception regarding nonproliferation and ought to be expanded. Public awareness about non-state actors aiming to acquire WMD and related materials is an instrument capable of preventing proliferation of deadly weapons and dual-use materials necessary for their production. Moreover, he contended that it is crucial to increase public awareness of Resolution 1540 and create a "nonproliferation culture" since it will help to instigate the process of its implementation. For instance, civil society should participate in national rule making for the resolution's implementation while its role in monitoring national legislation should become more widespread.

Second, Dr. Shin emphasized the importance of a regional approach in Northeast Asia and in the ASEAN countries. He said that Northeast Asian civil society is lacking relevant knowledge regarding WMD and nonproliferation issues should be included in education systems. Such an approach is indeed essential for the region due to the presence of North Korea. He argued that it is crucial to build a regional network that would include government agencies, regional and sub-regional organizations, civil society actors, and private industry to counter North Korean attempts to proliferate illicit materials and technologies, as well as to prevent it from acquiring such goods from non-state actors.

Dr. Shin also expressed regret that there is not enough attention to chemical and biological weapons and only the nuclear part of the issue received a great deal of attention at the political and public levels. He noted that the NSS played a great role in the implementation of Resolution 1540 regarding nuclear materials. Thus, he suggested organizing similar international summits devoted to other types of WMD. However, Dr. Shin admitted that, unfortunately, it is unlikely to happen in the near future.

Session 6

Date: February 20, 2013
Time: 15:30-16:45
Place: Grand Ballroom III

Regional Cooperation in Nuclear Safety

Moderator:	Kelsey Davenport, Arms Control Association
Speakers:	Gun-Aajav Manlaijav, Nuclear and Radiation Regulatory Authority of Mongolia
	Kim Sang Yun, Korea Institute of Nuclear Safety
	Sato Heigo, Takushoku University
Rapporteurs:	Samuel Brinton, Massachusetts Institute of Technology

Radiation does not abide by national boundaries nor does it discriminate among citizens of differing countries. Because of this indiscrimination, regional cooperation in nuclear safety is of paramount importance. South Korea, Japan, and China, as neighboring countries with active civilian nuclear programs, have begun to communicate their experiences in a formal and informal network in hopes of increasing their ability to deal with nuclear disasters should they occur. This session continued an important conversation on the difficulties and successes of regional cooperation, emphasizing the critical need for communication opportunities in the Northeast Asian nuclear world.

Kelsey Davenport, a nonproliferation analyst for the Arms Control Association, welcomed the audience and thanked the panel for attending the Forum and bringing such expertise to the discussion. She mentioned that the issue of discussion is a timely one due to the Fukushima disaster, highlighting a regional need for cooperation. This session would consider the need to coordinate emergency response and mitigate possible emergencies with advanced sharing of information. This outreach can take a variety of forms and all those involved hope that this cooperation can be accomplished as quickly and efficiently as possible in response to disasters such as Fukushima.

Gun-Aajav Manlaijav, member of the Nuclear and Radiation Regulatory Authority of Mongolia, began the discussion by stating that, since Fukushima, nuclear power plants and all nuclear applications are under heightened scrutiny. In response to the accident, the member states of the Nonproliferation Treaty (NPT) under the auspice of the IAEA should seek to strengthen the safety culture of the nuclear regime. A significant challenge in this strengthening is the large socioeconomic differences in the region. He stated that the discrepancy in expertise has caused a need to harmonize and fill the legal gaps of the framework behind the cooperation of nuclear communities.

Although every country is responsible for its own nuclear safety, Mr. Manlaijav reminded the audience that similarly Chernobyl has shown that a nuclear accident has no national border. To address the gaps, the public trust should be built on public education at all levels and in many dimensions. This will lead each country, such as Mongolia, to meet its own nuclear science and engineering policy and human resource capability goals.

To secure the next generation of nuclear power plants, all members of the nuclear community will be responsible. These include the industry producing the power, the regulators enforcing the legislative framework, and the non-governmental organizations bringing the voice of the public to the regulatory bodies. In Mongolia, the public is informed and has the opportunity to voice its concerns through multiple workshops on nuclear safety procedures. The Nuclear and Radiation Regulatory Authority of Mongolia has also been working in conjunction with the Nuclear Regulatory Commission of the United States to develop best practices. A critical issue in the development of best practices and safety procedures for developing nations is the significant dependence on a human resources infusion from suppliers of the nuclear technology. Development of these resources in a country is critical to creating an environment of nuclear safety and through regional cooperation, courses, and educational opportunities this development will be possible.

The next panelist, Kim Sang Yun, the director of the Research and Policy Division at the Korea Institute of Nuclear Safety, began his remarks by highlighting the need of post-Fukushima regional cooperation to solve the problems faced by the nuclear safety community. His remarks concentrated on the creation and expansion of the Top Regulators' Meeting (TRM). The TRM on Nuclear Safety among Japan, South Korea, and China was established in 2008 to promote the exchange of information on nuclear safety as well as the enhancement of regional cooperation in emergency preparedness and response in Northeast Asia. The group is working to take initiative in nuclear safety with multiple meetings held, with experiences shared on construction and operation of nuclear power plants, and with Fukushima response data.

Mr. Kim also introduced the goal of an information exchange framework which is still in discussion with a goal of trilateral sharing of emergency and non-emergency data. This will be set up between the nuclear regulatory bodies of Japan, South Korea, and China initially. The main goal of this information exchange framework will be to provide an efficient and yet timely response to nuclear accidents which might occur in the area. The time and location of an accident, as well as data on radiation release, in terms of meteorological conditions, will be shared. Mitigation procedures, which are underway, will also be provided, so that opportunities for coordination of these efforts may be possible. Mr. Kim mentioned that not only emergency situation data would be of importance to share, but also information on the normal operations of the nuclear facilities so that a standard upon which to base out of the ordinary events can be created. For the periods of time, in which the network is not in a state of emergency, the operational data of the nuclear power plants in the area will be shared among all three groups on a new combinatory website.

The major design features of the nuclear power plants will also be shared to help neighboring countries understand the situation, if they are unfamiliar with the nuclear power plant construction and operational features. Environmental monitoring of radiation levels in proximity to the nuclear power plants will also will be uploaded for up-to-date response actions. When asked about the language used in the information exchange network, Mr. Kim stated that this will need to be discussed in further detail to allow ease of transfer and comprehension.

Sato Heigo, faculty member of the Institute of World Studies at the Takushoku University, was proud to state that the nuclear industry is now deeply involved in the region with expansion seeming imminent despite the Fukushima disaster. It seems evident, he mentioned, that nuclear safety is crucial for this expansion. Beginning with a citation of the Asia Pacific Leadership Network for Nuclear Non-Proliferation and Disarmament report, Mr. Sato urged the need for stronger cooperation among the nations in the region. Although success exists in sharing data relating to the construction and initial operation for nuclear power plants, information relating to emergency conditions and human errors leading to these emergencies is lacking. An example of the complacency is in the security measures for nuclear power plants which must be repeatedly updated and applied.

Mr. Sato mentioned that once a nuclear power plant is started, the public is self-convinced that its safety is guaranteed. He asked that we begin to apply the study of social science to this problem, which will be able to incorporate research techniques and solutions which have been previously unconsidered. For example, a nuclear crisis develops in linear fashion, but social science may be able to approach the problem after the physical disaster in the many phases of public information exchange and reaction. The largest challenge in this area is that a mechanism to exchange the information on the accident is hard to

facilitate. There must be transparency but the government will also want to differentiate the information it provides to an international community and its own citizens. This two-sided issue ignores the regional responsibilities that lie between a global and domestic transfer of information. Mr. Sato stated that we must promote mutual cooperation as well as mutual responsibility. For this reason, crisis management design should be revisited on a regional basis. His comments concluded with the point that the nuclear energy community has become reluctant to update its security since this seems to be in conflict with the idea that the nuclear power plant must be inherently safe in order to be operating.

A variety of important questions were addressed to the distinguished panelists, and this summary will seek to capture their content as well as the answers provided. The first of these questions was as to whether the information exchange framework provided by Mr. Kim would solve the issue of regional security of nuclear facilities rather than just a trilateral exchange. Mr. Sato responded that the framework is necessary but that the regional system may be too large of a network with to share the sensitive information. Mr. Kim added that a trilateral agreement between China, Japan, and the Koreas must be at the core of this framework. These companies maintain a strong and advanced nuclear industry, but it has been proven that during emergency situations, they must expand the speed and efficiency of information sharing. Mr. Kim reminded the audience that the TRM was established in 2008 after a Japanese proposal following a minor nuclear incident. China was beginning to build nuclear power plants in earnest, and so the TRM was formed to begin fixing the problem of divergent safety practices between the nations involved. There was not much initial activity but following Fukushima, TRM began to provide more of a framework for support. This was due to the issue that arose in which it was difficult to receive information from Japan since its government was working to deal with their domestic issues of greatest priority. Mr. Kim concluded that TRM is in the beginning stages of development, and thus should not be expected to provide a significant amount of initial information. However, through sharing small amounts of information, progress will occur over time toward a robust information exchange framework.

The panel continued with discussion on sharing information beyond a coordinated emergency response. In emergency conditions, the reliability and validity of information is key and the panelists agreed that the IAEA should thus be responsible. In non-emergency situations, however, the facility operational baseline data will be useful. Mr Kim noted that good communication during the non-emergency times will allow for better communication during an emergency. When asked what role the nuclear regulators could play in the expansion of this nuclear information exchange and nuclear energy in general, Mr. Gun-Aajav mentioned that the IAEA states that promotion and regulation should be separate. Mr. Sato added that the IAEA measures the gaps between a country's regulatory framework and international standards. Unfortunately, the IAEA has a lack of resources, so solely relying on them will not be prudent. Therefore, regional cooperation should also serve as a precursor. Mr. Kim gave an example in which the IAEA should share the information on an accident to the member countries, but that a neighboring country should still perform its own analysis, since it will have more accurate regional information such as meteorological systems. After Fukushima, countries had difficulty getting complete information from Japan. Therefore, strong relationships between regulators must be built, and the proposed information exchange can help build those relationships.

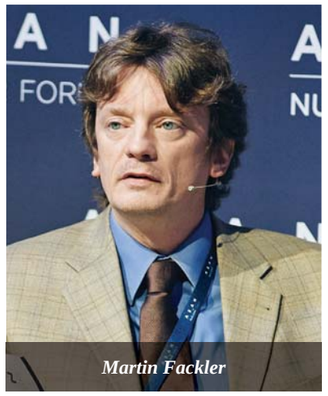
In their final statements, the panelists reiterated their common dedication to continuing a conversation on nuclear safety and the role of regional cooperation in strengthening that safety. This cooperation may include sharing experiences in the construction and operation of nuclear facilities, information exchange on nuclear regulatory issues, emergency preparedness and response, and cooperative development of nuclear safety features. Mr. Sato stated that nuclear safety has many features, and we are only beginning to realize how wide and complex a system it truly is. Forums like the *Asan Nuclear Forum* allow for more conversation, which is a necessity. Mr. Kim concluded by detailing the natural progression of trust-building in nuclear safety, in which good communication to the public is followed by gentlemen agreements, voluntary agreements, and finally formal agreements on policies and procedures to maintain a safe nuclear system. For Mr. Gun-Aajav, the Forum was of great importance since the Northeast Asian politicians and public are sensitive to the issue and thus this is the time to work on this issue.

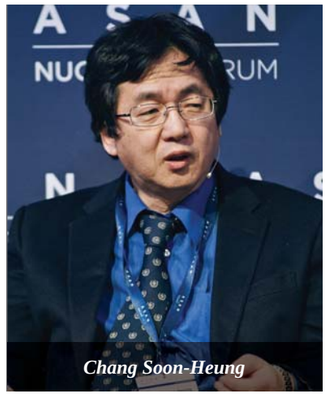
Plenary Session IV

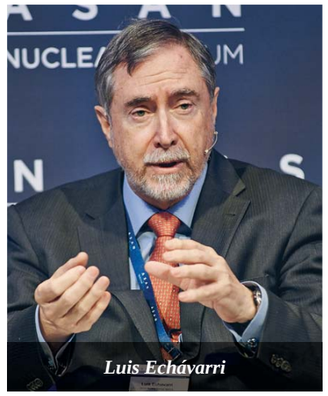
Date: February 20, 2013
Time: 17:00-18:15
Place: Regency Room

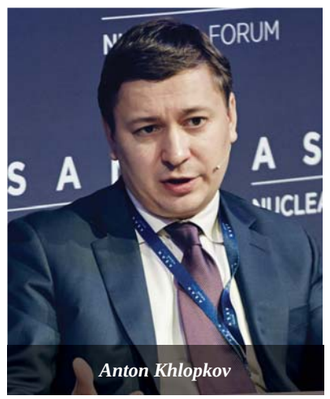
Challenges and Opportunities after the Fukushima Nuclear Disaster

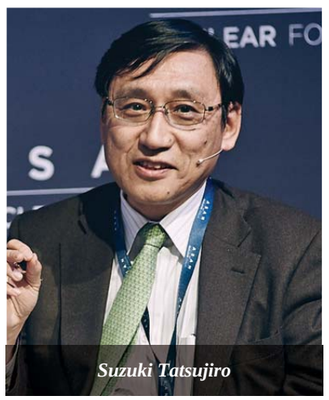
Moderator: Martin Fackler, The New York Times
Speakers: Chang Soon-Heung, Korea Advanced Institute of Science and Technology
Luis Echávarri, OECD Nuclear Energy Agency
Anton Khlopkov, Center for Energy and Security Studies
Suzuki Tatsujiro, Japan Atomic Energy Commission
Rapporteurs: Samuel Brinton, Massachusetts Institute of Technology
Seukhoon Paul Choi, Council on Foreign Relations


Martin Fackler


Chang Soon-Heung


Luis Echávarri


Anton Khlopkov


Suzuki Tatsujiro

Creating both challenges and opportunities for the nuclear industry, the Fukushima accident caused countries to review their nuclear agendas and policies. This panel evaluated the repercussions of the accident and identified lessons learned. Martin Fackler, Tokyo bureau chief for the *New York Times*, commenced the discussion by highlighting that although civilian nuclear programs may seem tamer and safer than nuclear weapons programs, the Fukushima accident demonstrated that this is not the case. He reviewed what had occurred describing that a large earthquake in March 2011 set off a Tsunami that hit the Fukushima Daiichi Power Plant and caused its reactors to meltdown. Consequently over 100,000 people were evacuated and up until today 90,000 of those dislocated have been unable to return.

Mr. Fackler noted that for such an accident to have occurred in a country as technologically and technically outstanding as Japan demonstrated that such an event could happen anywhere. Japan's nuclear industry and operations were and are a model for the region and the world. The Fukushima accident focused attention on nuclear safety—the dangers of collusion and the need for greater transparency, oversight, global standards, and an international policing mechanism. For Japan, public trust was severely damaged and a lack of confidence persists until this day two years after the accident. Discussion of nuclear safety is similar to that of security. Issues include the problem of ensuring the safety of materials in reactors and used fuel rods, the effect on civilian populations, crises management and a government's ability or inability to respond effectively on short notice, as well as the type and amount of information that should be communicated to the public.

Chang Soon-Heung, professor of nuclear and quantum engineering at the Korea Advanced Institute of Science and Technology, discussed lessons learned from the Fukushima accident in regard to how to enhance nuclear safety and public confidence. He argued that nuclear power plants must be prepared for blackouts and equipped with passive safety systems, in particular a method with which to remove decay heat in the case of a shut down. In the future, to cope with such incidents, Dr. Chang recommended that plants be prepared with functions that use gravity to generate electric power or a power supply system located in bunkers. Furthermore, he argued that reactors and plants should be built that emphasize radiation containment to the extent that people living around the plants will not have to evacuate even in the case of such an accident. He noted that there was no radioactive release from the Three Mile Island accident because of robust containment.

Enhancing this function at current and future plants would not only enhance nuclear safety but help garner public confidence. The Fukushima accident did not result in any injuries or deaths. Nevertheless, it did cause public concern regarding the potential psychological and radiological consequences. The greatest disruption however was mass evacuation. Dr. Chang argued however that there lacked scientific studies of low radiological levels and their effects. Thus, it is debatable whether so many residents needed to be evacuated following the Fukushima accident. He stated that more information should be given to the public about what level of exposure has significantly negative effects on health.

Dr. Chang also explained the necessity of nuclear energy, comparing South Korean use of this type of power versus fossil and renewable energies. He stated that the latter only contributed a negligible amount of power for the country. And although nuclear isn't completely safe and clean, it is better in these two areas than fossil energy. Ultimately, he recommended that more data about these different types of energy be given to the public so that they can make a decision on their preferred combination and balance of power sources.

Luis Echávarri, director-general of the Nuclear Energy Agency in the Organization for Economic Co-operation and Development, noted that prior to the Fukushima accident there was discussion about a renaissance of nuclear power, however now this is not the case. He argued that nuclear programs must have public support and emphasized the importance of public confidence in system safety. He noted that another challenge for the industry was to understand the technical implications of the accident. It is important to recognize the difference between the Fukushima accident and those at Chernobyl and Three Mile Island. Furthermore, whereas the huge seismic event and tsunami killed 90,000 people, radiation from the plant did not cause any deaths. He noted however that reaction to the accident was not what one would expect from a great power. A plant cannot afford to lose electricity. This was the clear challenge in this case, making it important to understand the actual problems of the Fukushima plant and modify the site accordingly.

Mr. Echávarri argued that the accident also presented opportunity. While Germany, Switzerland, and Belgium have decided to shut down their programs, most other countries with nuclear plants have decided to maintain theirs. The Fukushima accident should not raise questions about nuclear power in general, but about the specific conditions, technologies, and protocols of that site. Stopping plant operation is not necessary. The industry can respond to the accident through improvements that guarantee that this type of disaster does not occur again.

The disaster at Three Mile Island was as important as the Fukushima accident. Nevertheless, countries continued to pursue nuclear power. Current construction of reactors continues. Furthermore, countries are still announcing plans for new reactors. Mr. Echávarri recognized that the Fukushima accident may delay industry progress by three to five years. And although there is a clear need for nuclear power, especially in Asia, the future of nuclear energy will depend not only on the logic of having this energy but also public acceptance. It is important to reinforce independent regulatory authorities and communication with the general public.

Anton Khlopkov, director of the Center for Energy and Security Studies, concentrated his remarks on Russia's concerns and development in countries in the Middle East, an important region of expansion of nuclear power despite the Fukushima accident. With Iran starting its nuclear power plant in 2011, the United Arab Emirates starting construction, and Turkey preparing a licensing application, the region is of significant interest in the nuclear expansion arena.

Citing the progress made in the construction of the UAE's first nuclear power plant at Barakah as the first country in 27 years to start construction on such a facility, Mr. Khlopkov praised the materialization of progress on nuclear power, which before had only been plans on paper. Jordan also expects to start building a 750-1200 MWe nuclear power unit in 2013 for operation by 2020. Jordan has had to review and revise its plans, which before had been a strong in theory. The positive effects of Fukushima are not limited to growth of the industry alone, however. Smaller countries such as Bahrain have postponed its plans to adopt nuclear energy as a source of power by 2017. Kuwait is also scrapping plans to build four nuclear reactors by 2022. Mr. Khlopkov mentioned that this may positive due to the plans having been extremely infeasible for these nations.

Concerns for nonproliferation are justified and it has been an issue in the region for many years with examples of proliferation situations occurring in Iran, Syria, Iraq, and Israel according to Mr. Khlopkov. Following Fukushima, most countries have decided that next generation power plants would be the sole consideration for construction, which have improved safety characteristics as well as proliferation resistance. Another important consideration besides the proliferation resistance will be the significant growth in the need for human resources. With over 1,000 individuals needed to operate the nuclear power plants the supply of engineers and scientists educated in the field are simply not to be found in the area. Mr Khlopkov stated that a mere seven of such qualified individuals are currently being trained in Jordan, which may lead to a slow and halted program if measures are not taken to correct the deficit.

Mr. Khlopkov's conclusion was that Fukushima has brought many positive outcomes to the region due to small countries abandoning projects that seemed infeasible, a review and revision of simply theoretical plans, a decision to pursue next generation power plants, and a realization of the dire need for human resources.

Suzuki Tatsujiro, vice chairman of the Japan Atomic Energy Agency, began his remarks with an apology for the negative impact that Fukushima has had on the nuclear industry as a whole and the people of Japan. He reminded us that the accident is not over with many still struggling to finalize the site management, including dealing with the spent fuel and contaminated water. There is also still a large refugee population that is not allowed to return to their homes in the area. These citizens have been removed due to concerns of radiation and, until measurements and procedures are changed, they will not be able to return to their daily lives and work.

Dr. Suzuki mentioned that Fukushima has brought about a paradigm shift in nuclear safety and the scale of nuclear power in Japan. An internationalization of nuclear safety policy is needed according to Dr. Suzuki since the nuclear regulatory governance in Japan has fallen behind the international standard due to domestic interests taking precedence. When asked about the collusion between industry and regulators and if Japan has actually improved its regulatory work with lessons learned from the disaster, Dr. Suzuki responded in the affirmative. He stated that the improvement has started but it will take time. An increased transparency has begun with more open meetings and public communication being presented by the new regulatory body.

During the question-and-answer session, an important question was asked of the panel concerning the lack of data for regulators to analyze in preparing for nuclear disaster situations such as Fukushima. These disasters are rare and it is thus difficult to create adequate regulations and emergency plans for those countries that are only beginning to operate and construct nuclear facilities. Mr. Echávarri, responded by stating that the national framework can be built on existing data that is needed to fulfill the legal requirements of those developing countries. International regulatory bodies, however, do not have many legal frameworks or the authority to mandate the international experience-driven best practices to be applied. Thankfully, cooperation between regulatory bodies has started and the regulators of new reactors are meeting regularly to share their experiences. Those countries which have experienced these disasters such as the United States, Russia, and Japan must continue to study the situations that led to the nuclear disasters in their country so that expertise can be provided to the countries that have yet to begin their journey in nuclear power plant construction and operation.

The panel covered a variety of relations to the Fukushima disaster from those who experienced the horrors of the natural disaster to those who are helping to prepare countries to construct and operate safe and reliable nuclear power plants in developing nations. The toll of Fukushima is yet to be fully recognized but the strong cooperation of the industry in its response to this disaster has already been demonstrated. Learning from such incidents as Three Mile Island and Chernobyl, the nuclear industry and its regulatory bodies are working to apply the knowledge gained from the Fukushima disaster. Regulatory organizations are sharing their time and resources with their international partners so that standards can be formed to which all nuclear power plants must adhere. Although the deaths occurring by nuclear radiation or disaster at Fukushima are non-existent, the earthquake and tsunami disaster claimed the lives of thousands of Japanese citizens and must be remembered. The nuclear industry must continue to perform its safe and secure operations while also improving its facility and workforce safety to prevent another such disaster from occurring.

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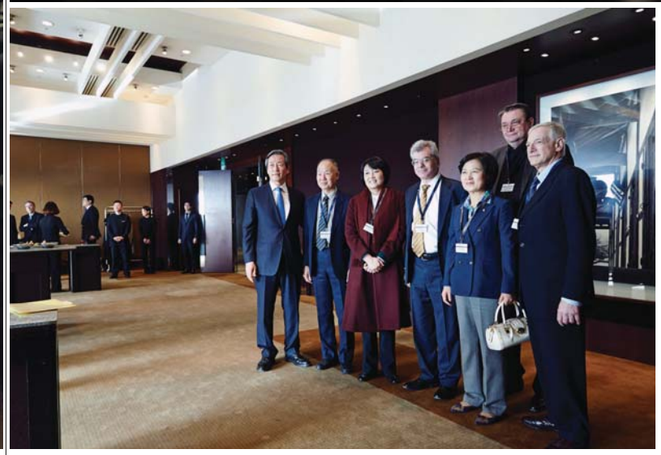


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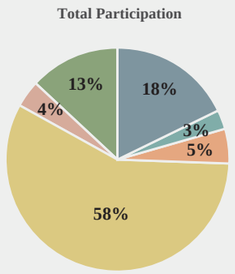
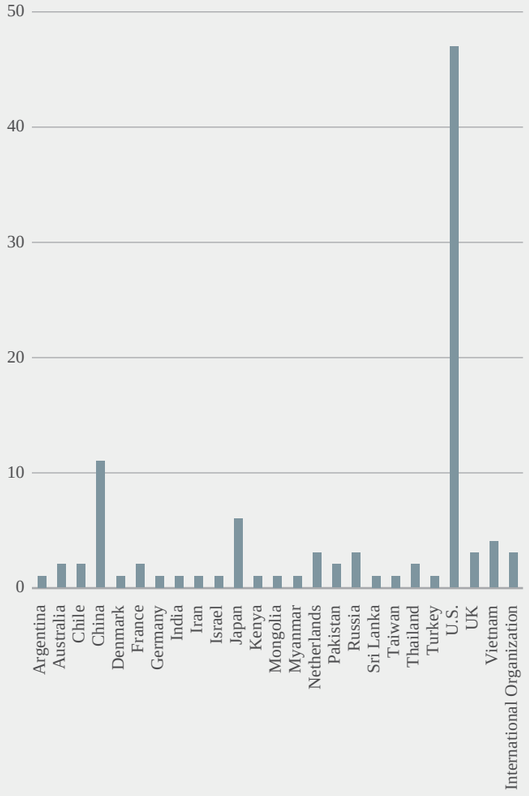
Statistics

Total Participation		
Final List Total	**500**	
Speaker	88	18%
Rappoteur	13	3%
Observer (Overseas)	25	5%
Observer (Domestic)	290	58%
ASAN (Speakers Included)	18	4%
Press	66	13%

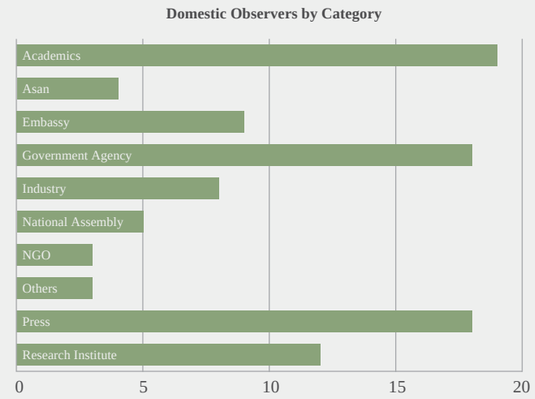
* Domestic Observers include RSVP, walk-in and separate press registration.



Overseas Participation by Country		
Argentina	1	1%
Australia	2	2%
Chile	2	2%
China	12	11%
Denmark	1	1%
France	2	2%
Germany	1	1%
India	1	1%
Iran	1	1%
Israel	1	1%
Japan	6	6%
Kenya	1	1%
Mongolia	1	1%
Myanmar	1	1%
Netherlands	3	3%
Pakistan	2	2%
Russia	3	3%
Sri Lanka	1	1%
Taiwan	1	1%
Thailand	2	2%
Turkey	1	1%
U.S.	50	47%
UK	3	3%
Vietnam	4	4%
International Organization	3	3%



Domestic Participation		
Academics	70	19%
Asan	14	4%
Embassy	34	9%
Government Agency	67	18%
Industry	30	8%
National Assembly	19	5%
NGO	11	3%
Others	13	3%
Press	66	18%
Research Institute	46	12%



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