[SE5-GB-3] Peaceful Use of Nuclear Energy

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Full Summary

The panel covered four aspects of the peaceful use of nuclear energy in following order: future of nuclear energy, international and domestic governance, nuclear non-proliferation, and spent nuclear fuel. The panel speakers in orders of presentation were: Sharon Squassoni, Trevor Findlay, Sandy Specter, and Tom LaTourrette. Miles Pomper from the CNS moderated the panel.

1. Sharon Squassoni: Future of Nuclear Energy

Sharon Squassoni's presentation on future of nuclear energy consists three main points. First, unlike conventional wisdom widely spread, nuclear energy option is not a universal solution for energy security as well as reducing carbon emission. Second, Fukushima accident makes nuclear energy more expensive. Third, nuclear power plants itself are not part of proliferation concern. Fourth, Fukushima's accident is the cause of nuclear industry in US. Last, there is a need to address fuel cycle issue, and now is a good time to initiate collaboration.

Before these points, a brief overview on nuclear energy is provided. Today, nuclear energy generates over 14% of electricity worldwide, with 25 countries plus Taiwan operating approximately 433 nuclear power plants with handful of enriched uranium commercially reprocessed for spent nuclear fuel. As of today, there are no geological repositories open for commercial nuclear fuel.

Nuclear energy option is not a universal solution, according to Sharon Squassoni who challenges conventional drivers for expanding nuclear energy. Three drivers commonly identified are: energy security, electricity growth, and climate change.

One aspect of energy security is access to reliable and accessible energy. In this context, nuclear energy is not a cure-for-all solution. For example, looking at resource-poor South Korea that faces dire energy insecurity, Korea finds itself in a mismatch between nuclear power plants and uranium production; South Korea lacks uranium reserves as well as other indigenous resources, relying 97% of its energy supplies on import. While potentially a

problem, this can be resolved through fast reactor technology. However, no other country has yet reached this point of recycling uranium.

On electricity growth, it is often based on the assumption of GDP growth, that with economic advancement, their demand for electricity decreases. However, one of the issues here is the accuracy of the forecast. It takes approximately 15-30 years to plan, construct, and operate nuclear power plant. Within this phase, states may phase out of their current juncture, making accurate forecast difficult.

On the environmental front, to reduce carbon emission, the cheapest and quickest gains are in efficiency. However, because the construction of nuclear power plants takes at least 10 to 15 years, we should keep a critical lens when Saudi Arabia wants 16 nuclear reactors by 2020 to meet its carbon emission reduction targets. Countries need to reduce emissions by 2015, as quicker the reduction the greater the benefit.

On cost, it varies widely among countries. For example, in South Korea, nuclear energy is very cost effective option. This is not a case for other states. Ways to make nuclear energy competitive is to tax carbon dioxide emissions, but such implementation has proven to be arduous. Biggest component of nuclear cost is in financing, for all supply cost has been rising. Essentially, nuclear energy is not a universal solution.

2. Safety, Waste, nonproliferation, and more

In the wake of Fukushima accident, some countries have shut down their current plants or their future plans. For countries with nuclear plants or plans to build them in the future, they must incorporate safety concerns in newer design of reactors, making nuclear energy option more expensive.

Fukushima also means more attention on nuclear waste, as we seen the risks associated with nuclear fuel. If more attention is given to the waste issue, and greater willingness to absorb cost, then there is likelihood of action on cradle to grave fuel supplies, a positive outcome.

On the nonproliferation side, Sharon makes it clear that the nuclear power plant themselves do not provide proliferation risks, but Enrichment and Reprocessing (E&R) facilities that does. Important questions to consider include where enrichment is going to take place, what happens to the waste, and consider whether domestic enrichment and reprocessing is legally binding.

Sharon Squassoni ends by discussing the future of nuclear energy after Fukushima. With shockwave of the accident, IAEA's forecast of 65 countries planning nuclear plants appears too optimistic. A number of states, including Italy, Switzerland, and other states have already declared to halt their plans.

However, the accident would not eradicate advocacy for nuclear energy in the world. Although putting the Gini back maybe impossible, Squassoni raises concept nuclear governance to minimize safe, secure, and proliferation risks. In her view, this conference has not addressed a critical component of nuclear energy—management of fuel cycle. Given the current juncture after the Fukushima, Squassoni believes that now is a good time to start collaboration.

After presentation, she was asked from the moderator Miles Pomper how Fukushima accident affects South Korea's desire to become global nuclear technology exporter. She believes it remains unchanged, and urges South Korea to increase transparency within the Nuclear Suppliers Group (NSG) that has fallen since the US-India deal.

3. Trevor Findlay:

Trevor Findlay's presentation on global governance first provides analysis of statistical survey on emerging nuclear states. Then he goes on to make three following points: first, although renaissance of nuclear energy is likely dampen with the Fukushima crisis, it would still cause greater safety concerns and accidents and allow terrorists and other non-state actors to obtain fissile materials. Second, global governance arrangements strengthened traditionally only after a crisis. Third, threat with nuclear revival is emergence of states equipped with nuclear program for the first time. Fourth, there is a growing need to strengthen nuclear governance. Measures recommended to strengthen governance include creating universal treaties, further strengthening nuclear safeguards, and providing more funding to the IAEA.

The Fukushima accident has led to a number of states to reconsider nuclear option. According to a survey by Trevor that tracks nuclear development for emerging states, 45 states have initially expressed a serious intent for nuclear program. However, that number plummeted to low 30s after the Fukushima accident, as Italy and others rescinded. Still, with more than 30 newcomer states to nuclear program equipped with nuclear energy for the first time, they may potentially cause greater safety concerns and accidents, allowing terrorists and other non-state actors to obtain fissile materials. As a newcomer states to nuclear program, they lack institutional arrangements foundational for providing smooth operations in terms of safety,

security, and safeguards. Also missing are the safety culture, appropriately trained and capable personnel, and national authority that can make important policy decisions.

It is within this context this presentation lays out the importance of global governance. By global governance, it means various treaties and agreements, institutional arrangements, and established norms. Going further in depth, he introduces three different but interrelated categories of governance: safety, security, and nonproliferation. He argues that global governance arrangements strengthened traditionally only after a crisis. For example, only after the US learned about Iraq's desire for nuclear program, it added additional protocol safeguards. On a similar note, only after Chernobyl and the Three Miles Accident did the United States added safety concerns and procedures into its security architecture. In essence, area of security is driven by crisis rather than methodological approach. After the Fukushima, we can expect areas of safety, security, and nonproliferation to strengthen, since they are interrelated.

One of the threats Mr. Findlay identifies with nuclear revival is emergence of states equipped with nuclear energy for the first time. They lack institutional arrangements that can provide smooth transitions in terms of safety, security, and safeguards. Also missing are the safety culture, appropriately trained and capable personnel, and national authority that can make policy decisions. Trevor emphasizes all three factors as necessity in nuclear governance.

Incorporating these factors, IAEA estimates that it takes at least 10 years before states can host first nuclear power plants. IAEA has played an effective advisory role assisting states not to rush filling these requirements, and successfully deterred some states from proceeding with rash decision.

For instance, Kenyan government took IAEA's advice to take 10 more years of preparation before proceeding with its nuclear power program. Nigeria government also decided not to proceed with its nuclear program upon consultation with IAEA. Last on this list of deterred states was Jordan. After IAEA advised that the current reactor site was deemed unsafe, Jordan took that into consideration and relocated its site.

Although he views nuclear revival to be shrinking, he emphasizes the need for strengthening nuclear governance, since some states acquiring nuclear energy for the first time impose international concerns. He makes several recommendations:

First, we need universalized treaties. Some states pursuing nuclear energy are not parties to international agreements, while some state do not fulfill comprehensive requirements. Similarly, additional protocol strengthens nuclear safeguards, and number of states with

additional protocol is increasing. So we need to encourage newcomers with entire new set of safeguard system. We also need to strengthen convention on nuclear safety, its amendment, and apply it to domestic safety of nuclear materials. There are whole groups of nuclear liability and accident conventions that also need to achieve universal standard. India just joined nuclear liability convention.

Second initiative is to further strengthen nuclear safeguards. They are not perfect, but still is an improvement over the status quo. Advisory group such as IAEA needs greater technological support not just for conducting safeguard related activities but checking on non-declared materials. Therefore, greater financial support is needed for the IAEA. In the area of nuclear safety, it is becoming increasingly important after Fukushima. We should have a mandatory system of checks for nuclear safety. Currently we have a peer review system done in periodic meetings. However, there is no mandatory onsite inspection, and no mandatory peer review system for state's overall convention. In the area of nuclear security, there is no peer review system, and stronger compulsory measure is needed, considering that nuclear security is a lot more sensitive than nuclear safety. In addition, states should seek to be more transparent and be willing to share wealth of information with their peers to not jeopardize nuclear safety.

Finally, for states seeking nuclear for the first time, the agency needs more resources to provide advises and assistance to the states, as the Agency provides holistic assistance to the states.

4. Leonard Spector:

The third speaker is Sandy Spector who advocates for greater nonproliferation controls beyond status quo. While such idea has floated before by many other nonproliferation experts, Mr. Spector's approach differs in ways of enforcement. Rather than taking binding action, Mr. Spector advocates for softer approach. By softer approach he calls it nudging, convincing nuclear suppliers to only sell to states that meet certain requirements. The lists included: mandating nuclear suppliers to require adopting additional protocol for nuclear consumers. Enforcing greater safety requirements in commercial transaction, and ratify convention on nuclear terrorism. Ideally, as states engage in nuclear power plant sale, the supplier states must check to see if clients meet these requirements.

Spector mentions a new paradigm unfolding in the United States, which is a nonproliferation credentials. Essentially, even if you signed all treaties but are exporting nuclear supplies states such as Iran, then the state is still not free from the checklists. Other areas of credentials include requirements on export controls on terrorism and biochemical weapons.

These factors establish criteria of as to how we can judge our clients. The Congressman Berman introduced H.R. 1540, a legislation that articulated these sets of criteria in the Congress.

Then the question is how can the states collaborate to adopt this criterion. He provides several approaches. It should be noted that UAE epitomizes this case, which signing and pledged to all checklists. While convincing all members of the Nuclear suppliers Group is difficult, there are only seven enterprises around the world that sell nuclear power plants—South Korea, Japan, Russia, US, China, France, and the Great Britain. Convincing these states to request additional protocols for buyers should not be as difficult to convincing all members of the NSG. However, this is not a nudge approach, but a hard approach resembling a cartel approach. Continued approach of nudging instead of demanding was recommended and emphasized by Mr. Spector.

According to Spector's data, most of nuclear states in exception to Argentina and Brazil have signed additional protocol. Vietnam provides a successful case of nudging, for Japan refused to supply with out it. As a result, Vietnam is on the brink of ratifying the protocol.

One area that Spector believes his soft nudge approach appear out of line is on restricting enrichment and reprocessing (E&R) capabilities. But he emphasizes that, in reality, nudging has worked well. For example, Jordan is close to accepting restriction agreement similar to the UAE's restriction agreement on E&R. Other successful example includes Eastern European states voluntarily sending their spent nuclear fuel to Russia.

5. Tom, LaTourette, Spent Fuel Management:

Tom LaTourette acknowledges that the US started its nuclear path without careful planning on accumulating spent fuel. When plan to designate Yucca mountain as a permanent repository got terminated, the US retreated to step 1. Indeed, the ideas Blue Ribbon Commission has been debating are the same ideas debated thirty years ago. Nevertheless, he provides several options on spent fuel management. Although a lot of technical dimensions are involved in making decisions on such matter, the end decisions are political rather than technical. Below are the options.

First, states can maintain its on-site storage. Second is a two-stage strategy: first start out with central storage, and then move into permanent repository site. Second, States can aggressively pursue fuel cycle and postpone disposal cycle. This would greatly reduce capacity requirement from spent fuel management perspective. Third approach is wait and see. Wait some years and identify trigger to take for action.

Give these challenges, how do we pursue what is appropriate? Instead of examining from technological perspective, Tom discusses that it is important to examine from social context and measure which strategy is most consistent with priority. One priority is we got to solve fuel disposal problem quickly. Related concern is irresponsible to pursue energy policy without end strategy. Or, if we want fast strategy, just re-pick up Yucca Mountain. Another priority is to pave way for US growth. The point is, start moving fuel somewhere. Contract between utilities and government. Go Yucca or go centralized storage, while developing permanent site for repository.
Third priority or issue often coming up: we have no confidence in government decision-making process. A lot of people don't trust government decision process. Rather, take two-stage process. Take centralize storage, and meantime, start selective process.

We know nuclear is going to grow, and we are really concerned with repository and uranium. Then, you want advance fuel cycle. Reduce amount of waste. Final priority is, this is too uncertain, and we cant transfer and burry it. Best to just wait and see. We need to decide what we want to achieve.
One of the factors that has not come up was volume of waste; Repository capacity argument. From spent fuel management perspective, advance cycle really has no argument. In this context, the choices left are going back to yucca, or two-stage storage process of going to central storage first then selective process. The two-stage storage process was recommended for the United States.