Nuclear Energy, Nuclear Weapons and Security in the Asia-Pacific Region

Presentation Summary

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Dr. Wieninger opens his talk by pointing out how the energy derived from splitting the atom continues to vex mankind with its great potential for both prosperity and destruction. He then proceeds to discuss how this plays out in the Asia-Pacific to date, highlighting important trend lines for the immediate future and identifying areas for regional cooperation and conflict.

Almost 70 years after the Chicago pile started operations, the International Atomic Energy Agency (IAEA) identifies 441 power reactors worldwide providing some 374,692 megawatts of electricity, with 251 of these operating in Asia (including 104 in the U.S.). Dr. Wieninger points out that if the U.S. and Russia are dropped from the count, Asia accounts for 116 reactors or 26 percent of the world's reactors. But with 60 percent of the world's population, Asia is still lagging in nuclear power generation.

Sixty-five years after the detonation of the first atomic bomb, Asia is unfortunately the site of a more proportionate number of the world's nuclear weapon states, with 45% of known weapons states (China, India, Pakistan, and North Korea) found in the region. Moreover, it contains two of the world's most dangerous flash-points (India-Pakistan and the Korean Peninsula), the sensitive issue of Taiwan, as well as being the global sub-region with the highest number of terrorist attacks (South Asia). In terms of numbers, estimates vary, but the Center for Defense Information states China, India, and Pakistan have 250-320, 50+, and 40-70 nuclear weapons, respectively, with North Korea estimated to possess 4-8 weapons. Thus, Asia is currently in the unenviable situation of maximum danger and minimum opportunity with regard to nuclear technology. Dr. Wieninger argues that this needs to change. He adds that the good news is that least in terms of nuclear energy, there are some positive developments. Prior to the catastrophe at the Fukushima nuclear power plant in Japan in March 2011, the International Atomic Energy Agency (IAEA) reported that 49 of the 60 reactors under construction worldwide were in Asia, although the region still has relatively fewer of current operational power reactors. He provides a breakdown of the state of nuclear reactors in the region as follows:

- China is without question the most ambitious and furthest along with 13 operating reactors and 23 currently under construction;
- Russia has the second most ambitious plan, with 32 operating reactors and 11 reactors in the works;
- South Korea, whose 21 nuclear power plants generate 40 percent of her electricity, has five reactors under construction;

- India has 20 nuclear power plants supplying 3 percent of the nation's electricity and has 4 reactors under construction (notably, one report indicates that India could import up to 40 reactors by 2020);
- Taiwan has 6 operating reactors supplying 17 percent of electricity and two under construction; and
- Vietnam is pursuing power reactors and has signed initial agreements with the U.S. to do so, although the timeline for construction remains uncertain.

Unfortunately, experts also foresee a growth in nuclear weapons in the coming decade. Dr. Wieninger points out that:

- Although North Korea's plutonium production facilities at Yongbyon have not been restarted since 2008, it is quite possible that they are growing a hidden uranium enrichment program;
- Pakistan continues to grow its arsenal, with an ongoing uranium enrichment program and a growing plutonium production capability; and
- India's access to fertile material dramatically increased subsequent to the 2008 nuclear agreement with the U.S. (although to date there is no indication this has led to an increase in fissile material production).

Despite the suboptimal situation with regards to weapons proliferation (which is mostly vertical proliferation), there are a number of areas for international cooperation, notably in the terms of safety, security and fuel supplies. For instance, there was robust cooperation among various stakeholders in safe reactor design, construction, and operation even prior to the incident at Fukushima, as demonstrated by the continuing cooperation between Westinghouse, Southern Power and China on construction and the eventual operation of AP1000 reactors in the U.S. and China. With good leadership, the tragedy at Fukushima could lead to much greater regional and international collaboration on safety as it did in the U.S. in the wake of the Three-Mile Island accident in 1979 that led to the subsequent creation of the Institute of Nuclear Power Operations.

Dr. Wieninger also suggests that a regional nuclear society to foster information exchanges and expert knowledge could be another form of collaboration, pointing out that Europe has such an agency called the European Nuclear Society that includes 27 national members and many corporate members. Scientific exchanges between technical experts have proven beneficial in promoting better international relations in the past, so this could be a powerful tool for enhanced regional cooperation.

Finally, a third area for potential cooperation among countries could be in the process of nuclear fuel cycle itself. Countries in the region either have nuclear-related requirements or resources and capabilities that animate the cycle at different phases, while some states have uranium supplies (Mongolia) or possess robust fuel production capabilities (Russia), others have a growing demand for clean energy (China, Vietnam). There will be political obstacles that could temper fuel cycle cooperation, but regional energy leaders should regard it an important avenue for consideration.

Dr. Wieninger concludes with a discussion of issues that will shape the nuclear landscape. First are technological advances that could allow for the enrichment of uranium using lasers. Experts have investigated laser isotope separation for years, but have yet to be commercially viable. Were the technical and engineering challenges to be mastered, it would likely reduce the cost of fuel for power reactors. Given that the cost of fuel is not a major impact on the economics of nuclear energy, this would not heavily impact the attraction to nuclear power. However, such technology would also greatly increase the risks of weapons proliferation as it would theoretically be easier to operate clandestine facilities for the illicit production of fissile material for weapons.

Second, he argues that the risk of major accidents can never be completely eliminated. Historically, accidents such as the Three Mile Island and Chernobyl have prompted dramatic shifts in the use of nuclear power in much of the world. However, this need not always be the case. For example, France maintained its course on nuclear power despite the two major accidents. Additionally, the U.S. Navy's long history of safe reactor operations demonstrates that with the proper human systems in place, the risk of accidents will be extremely low. For all the horrors of a major accident, the simple truth is that mortality risks from nuclear power are dwarfed by those posed by fossil fuels, whether one considers particulate pollution, carbon emissions, supply stability, extraction pollution or transportation accidents. Ultimately, it will be incumbent upon leaders in the energy security arena to highlight the relative risks of different sources of energy generation.

Finally, nuclear power remains problematic due to proliferation concerns. For this reason, government policy will need to play a key role in all things nuclear, particularly in the establishment of a strong and effective regulatory framework that reduces the dangers of nuclear weapons proliferation, nuclear facility incidents and waste management. Moreover, states should also enhance international cooperation to optimize the use of nuclear energy, given its potential to mitigate pollution and climage change.