

# **Virtuous Circles: Linking Business and Nuclear Security**

August 2017

Intermountain Energy Summit

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Thank you, Noel, and many thanks to Mayor Casper, Roger Plothow, and John Kotek for the opportunity to participate in this eclectic and engaging conversation about energy security, and to visit Idaho Falls for the first time. As Mayor Casper mentioned in her opening comments yesterday, there are many aspects of energy security. For this morning's remarks, I will consider two ways in which nuclear energy technology intersects with national security interests: 1) avoiding the spread of nuclear weapons to state or non-state actors and 2) maintaining a strong US voice in the global nuclear conversation.

National security challenges require the active participation and contributions of private-sector and industry actors to achieve efficient and enduring outcomes. Such cooperation should be embedded into the way companies do business, and in the way government engages with them as a "virtuous circle," in which doing the right thing from a security perspective is also rewarded in ways that business leaders recognize.

Nuclear energy's connection to nuclear weapons both through proliferation of dual use technology and through diversion of weapons-usable material make it a critical example of this concept. For too long, the nuclear energy business has looked at nuclear security as a burden, as a drain on the bottom line. How can we create nuclear energy systems in which doing right by security is also doing right by shareholders? How do we make nuclear security good for business, and make the nuclear business good for security?

Nuclear energy's security risks must be understood clearly. A light-water reactor fueled by low-enriched uranium by itself poses no proliferation risk – this is an advantage as we consider the growing demand for nuclear energy in the context of

global economic development and reducing carbon emissions. The risks come from the inherently dual-use nature of current fuel cycle technologies – enrichment and reprocessing. Fortunately, a very small number of such facilities can serve a widely distributed set of power plants around the world. Additional risks come from existing stocks of highly enriched uranium and plutonium – whether in small quantities such as at research reactors, or in large civilian fuel cycle plants, or in military programs. These materials call for special care and attention to prevent their theft or misuse. Looking to the future, fast breeder reactors fueled with highly enriched uranium and/or generating plutonium could be additional sources of proliferation risk, along with the fuel cycle facilities associated with these or other potential nuclear energy concepts. Smaller, more flexible advanced reactors have the promise to bring nuclear energy solutions to new countries and new applications, but may also create new vulnerabilities if care is not taken in their design and deployment. Looking across this spectrum, nuclear industries have a powerful role to play in managing risks from each of these elements, and national security actors have technology and insight to offer in pursuit of secure nuclear energy.

We have already proven examples of aligning interests between business and nuclear security. The US-Russian highly enriched uranium purchase agreement, the US Assured Fuel Supply and the IAEA LEU Fuel Bank, and the “black box” around European enrichment technology used in the US-based URENCO plant show that business and nonproliferation goals need not compete with each other. Security measures can enhance the bottom line instead of draining it.

Governments and industry need to work together to find additional ways in which good nonproliferation outcomes go hand in hand with good business outcomes.

One place to start in this joint effort is to consider the “wish list” for each piece of this puzzle. From a nonproliferation and nuclear security perspective, there are several key goals:

- Secure HEU and separated Pu as if they are the weapons they could become
- Phase out production/transport/use of HEU and separated Pu in the commercial sector

- Reduce stocks of weapons-usable material
- Limit spread of enrichment and reprocessing technologies

If these are looked at in isolation, they can seem to create limits or burdens on the expansionist, profit-driven nature of the nuclear industry. Industry has often looked at these goals as either a cost to be shifted to government, or policies to be opposed or undermined. But we have seen, from the examples above, that this doesn't always have to be the case.

The nuclear industry has its own wish list:

- Durable spent fuel solutions
- Reliable supplies of expertise, materials and financing
- Stable legal and regulatory environment
- Reasonable return on investment
- Government support (exports, loan guarantees, policies)
- Level playing field with other energy sources

We should be looking for ways to examine these two sets of goals to develop tools that bring them together. Governments have some tools at their disposal that can help shape the business environment towards the kind of “virtuous circles” that will benefit both sides of the nuclear coin:

- Loan guarantees and other financing arrangements
- Access to federal assets (land, technology)
- Opportunities for international cooperation (such as 123 agreements)
- Government purchasing power
- Taxes and tariffs
- Technology substitution (e.g., Mo-99 production using accelerators)
- Trade advocacy

Business and other non-government actors have tools at their disposal as well.

- Attractive technologies for export markets
- Sharing of best practices (e.g., World Institute for Nuclear Security)
- Security- and safeguards-by-design

- Codes of conduct
- Industry-based nuclear security standards & certifications (e.g., ISO-type standards)

Given the challenges of the Generation III and III+ reactors currently under construction, advanced reactors (Gen IV and others) provide a unique chance to “bake in” virtuous circles from the beginning. Since none of these reactors have been built yet, it is more possible than ever to apply security-by-design and safeguards-by-design to advanced reactor designs – and their associated fuel cycles – right from the start, which should reduce costs and increase efficiencies. These reactors – being smaller, cheaper, factory-built, and in some cases having lifetime cores – are intended to be more attractive than larger, gigawatt-scale reactors on price, schedule, grid-appropriateness, and fuel management grounds.

If they live up to these expectations, advanced reactors could have the additional benefit of bringing US back to the front of the line for reactor exports, and this region has important assets that could contribute to that outcome. This restoration will have not only economic benefits, but will also yield national security benefits by increasing interest among the “nuclear newcomers” in buying American (instead of Chinese or Russian) and in signing the Agreements for Nuclear Cooperation, or 123 Agreements, required for access to US nuclear technology and its “brand” attributes of world-class safety and security performance. These agreements, by law, contain stricter nonproliferation and nuclear security provisions than what China or Russia requires, and thereby wrap signatories into a web of commitments that reinforce the global nonproliferation regime and maintains a US voice in global nuclear rules and norms. In this way, national security goals and nuclear commerce goals are aligned.

Another tool to align security and commerce may be found in the creation of industry-based standards for nuclear security. While national regulations create a baseline of nuclear security compliance, we know that some operators have decided to make improvements beyond what regulations require, based on judgements around corporate liability or local security risks. What if advanced reactor designers begin now to incorporate principles of security-by-design and

safeguards-by design? What if nuclear operators could work together to identify standards for nuclear security and safeguardability, analogous to LEED building standards, with gradations from good to better to best? When advertised, such recognition could enhance reputations and provide a deterrent to would-be thieves, but what if they could also be tied to financial benefits such as access to financing or variable insurance rates?

If security is seen to be in tension with profits, we will continue to be at risk from the kind of nonproliferation failures we have seen in the AQ Khan network, or from the potential for theft, diversion and misuse of nuclear technology or materials by states or terrorists. The most durable nuclear system is one that makes nuclear security good for business, and business good for nuclear security. I believe that the US is best positioned to deliver this kind of system, and that this region has the technology, experience, and commitment to make it happen.