

Nuclear Security Project

The vision and steps for a safer world

Securing the Nuclear Future

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Many thanks to Dr. Burchill and the ANS for giving me this opportunity to speak to you this afternoon. It's great to be here in Atlanta, the home town of NTI's two founders, Sam Nunn and Ted Turner, so thanks also to our local hosts. As you heard from my boss, Sen Nunn, this morning, we believe it is necessary to broaden the discussion of a secure nuclear future that supports advances in nuclear energy and technology and at the same time reduces nuclear threats. This requires that we step back a bit from the specific and look at the issue through a wider frame.

The threat is real – and growing

Sophisticated terrorists + ~50kg HEU = Hiroshima-scale event

- ~40 countries have weapons-usable material (HEU or Pu) – civilian & military
- A. Q. Kahn shared bomb technology with Iran, Libya, Al Qaeda, others?
- More countries have nuclear weapons
 - 1970: 5
 - 2009: 9
 - 2020: ???
- More interest in fuel cycle facilities
 - Enrichment and separation technologies are inherently dual-use
- Increased globalization of nuclear industry
 - International impact of corporate behavior
- More countries with nuclear weapons + more countries with fuel cycle facilities = more weapons materials + increased risk of diversion or theft
- Global effect of single event

*A nuclear problem anywhere is a nuclear problem...
everywhere.*

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Today's nuclear risks are well known: not only the pursuit of nuclear weapons by nations such as Iran and North Korea, but the expressed ambition of terrorists to equip themselves with tools of catastrophic destruction. These risks are interconnected: the more weapons and fuel cycle facilities there are, the more weapons materials are produced and the greater the risk of diversion or theft.

A single terrorist attack with nuclear material, or—god forbid—with an improvised nuclear device with the destructive scale of Hiroshima, would destroy public confidence in nuclear energy for generations, in the US and around the world. And we should understand that some of the terrorist groups known to be seeking nuclear weapons capability are patient, well-funded, and technically savvy. The globalized nuclear supply chain and the interconnected global economy – described so vividly by Steve Winn a moment ago – and the ready availability of information around the world means this threat cannot be managed effectively by any single actor. No nation or industry can insulate itself from these global effects.

Current path is not sustainable

- Fuel cycle decisions are driven by inconsistent concerns and motivations
 - Legitimate (carbon reduction, security of supply, waste management, etc.)
 - Dangerous (weapons program hedge, technology proliferation)
- President Obama: "...we should build a new framework for civil nuclear cooperation..."

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A critical prerequisite of a strong nuclear future is effective management of the nuclear present.

It is impossible to imagine sustainable international development without an increase in the role of nuclear power in global energy production. Nuclear power has the potential to limit greenhouse gas production, to conserve fossil fuel, to increase nations' energy independence, and to support nuclear disarmament. In order to reap these benefits, we need to develop new approaches to nuclear power that solve the safety, waste management, and proliferation risks we face today.

The advances in nuclear safety and operations over the last 20 years have contributed powerfully to the increased public support for nuclear power – maintaining this upward trajectory requires continuous improvement. The next generation of nuclear power plant designs has incorporated and built on these principles, and improved standardization of design holds out the promise of efficiencies in regulation and construction. And while recent US decisions on plutonium recycling and permanent storage of used fuel have opened questions about long term back-end solutions, the technical consensus on the medium-term safety of dry cask storage gives us time to develop a sustainable, science-based approach from environmental, economic, and security points of view.

Despite this progress, current approaches to nuclear energy remain inadequate to the challenge before us. Current reprocessing approaches have created large and growing stockpiles of weapons-usable plutonium. The spread of enrichment and separation technologies makes it incredibly difficult to distinguish between legitimate fuel cycle activities and illicit weapons programs and creates the potential for “virtual” nuclear weapons states. New approaches are required, especially to maintain and expand political support for nuclear power, both domestically and internationally.

Near-term steps: assurance of supply

- IAEA fuel bank
 - ~60MT LEU owned by IAEA
 - Stored & safeguarded in host state(s) outside primary enrichers
 - Available to member states
 - Based on objective access criteria
 - In case of political disruption of supply
 - ~\$160M in pledges from NTI, US, Norway, UAE, EU, Kuwait
 - IAEA BOG decision expected in September 2009
- Other proposals under discussion
 - National fuel reserves (Russia, US, others?)
 - Russian LEU reserve
 - Angarsk International Uranium Enrichment Center (Russia)
 - Multilateral Enrichment Sanctuary Project (Germany)
 - IAEA-managed information system (Japan)

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Some of these new approaches can be achieved today. One example is the IAEA fuel bank proposed by NTI in 2006 as a way to jump-start action toward limiting the spread of enrichment technology. To the degree that legitimate needs for enrichment can be met through multinational or multilateral approaches, they can diminish incentives to develop national enrichment programs and lessen the inherent risks of diversion for weapons purposes. We hope that a decision this fall by the IAEA Board of Governors will create the first link in a network of fuel assurance mechanisms designed to meet the diverse needs of nuclear fuel consumers.

In the medium- to long-term, additional solutions to spent fuel management, reductions of HEU and plutonium from weapons dismantlement, waste storage, electricity transmission, and other challenges will have to be created. It is likely that such efforts will require extensive international cooperation to achieve the desired results. NTI hopes to contribute to this development.

NTI NSP fuel cycle study

- Key step in Shultz-Perry-Kissinger-Nunn vision of “a world free of nuclear weapons”
- Consider characteristics of a nuclear energy system that reinforces disarmament goal
 - As a process
 - As an end-state
- Central proposition: nuclear commerce and nonproliferation objectives must be aligned
 - Nonproliferation cannot be seen as an obstacle to nuclear energy progress
 - Nuclear energy development cannot be seen as a threat to global security
- Engage experts from industry, nonproliferation, R&D, government, and international institutions
 - February 2009 workshop
 - 20+ interviews
 - Fall 2009 international conference

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As the secretariat of the Nuclear Security Project which promotes the vision and the steps laid out by the “four statesmen,” NTI has launched a study of fuel cycle issues as they relate to the goal of a “world free of nuclear weapons.”

The four statesmen recognize this goal may take decades to achieve. For this reason, we have chosen to avoid a discussion of specific fuel cycle technologies. Instead, we have begun with the end in mind and tried to identify attributes and models that might be applied to nuclear energy systems over that time frame.

In this regard, we are looking both at the process of disarmament, in which nuclear weapons are being both reduced and maintained, and at the end point, when the impact of so-called “virtual” weapons programs could be much higher because no one has actual weapons.

Our central proposition has been that nuclear energy and disarmament are mutually reinforcing, and that the path forward must involve aligning the objectives of nuclear commerce and nonproliferation. In other words, what kind of system will eliminate commercial gain from dangerous behavior, and reinforce the profitability of actions that enhance nuclear security? How do we break the cycle of suspicion between the nuclear industry and nonproliferation communities, and resolve the false tensions between nuclear energy and nonproliferation?

It is in this spirit that we have engaged a number of experts from around all elements of the nuclear community and around the world to help us begin this work. We will be refining it over the summer and intend to convene an international conference this fall to present some initial findings and propositions, and to engage in a constructive discussion of a path forward.

Attributes of a Secure Nuclear Fuel Cycle

- Produces the smallest quantity of weapons-usable material in the fewest facilities in the fewest countries
- Ensures the world-class physical security of all weapons-usable materials – both in facilities and during transit
- Sustains the system in the midst of changing technologies, economies, and political climates
- Designs financial incentives into the system to strongly encourage compliance
- Exposes bad behavior early and enforceably
- Ensures equitable and reliable access to nuclear power to all countries

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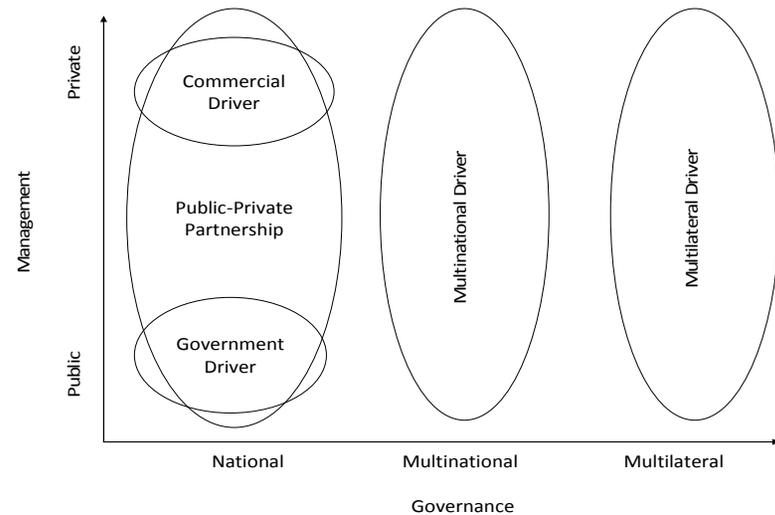
Our work on this project has led us to develop a set of notional attributes by which various fuel cycle models could be judged in determining their compatibility with the goal of nuclear weapons elimination.

We propose these attributes to provoke both discussion but also analysis. These principles are not novel or mysterious, but they are challenging to meet, as evidenced by our current nuclear energy system, which scores poorly on all six attributes. We need new and better ideas for how to achieve these outcomes.

We also have observed that these attributes pose questions of priority setting and trade-offs between approaches that score well against some of these attributes but score poorly on others. For example, there is an inherent tension between the first attribute and the second – one effect of concentrating production facilities in the smallest number of countries is likely to be longer transportation routes, which brings a higher risk factor. Further discussion of these attributes can, we hope, sharpen them and clarify their relative importance.

Models for a Secure Nuclear Fuel Cycle

- Ownership
 - Public/private/hybrid
 - Facilities/technologies/output
- Governance
 - National/multinational/multilateral
 - Monopoly/cartel/competition
- Oversight
 - Safety/safeguards/security
 - Transparency/verification/enforcement



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Today's global nuclear energy system is a motley collection of institutions, structures, and relationships that has grown organically over the past 6 decades and has resisted all past efforts to channel them in pursuit of some overarching principle or approach. It includes examples of almost every element of the ownership, governance, and oversight concepts noted here, and probably others we haven't named. This diversity has consequences in the form of differing and in some cases competing incentive structures and interests.

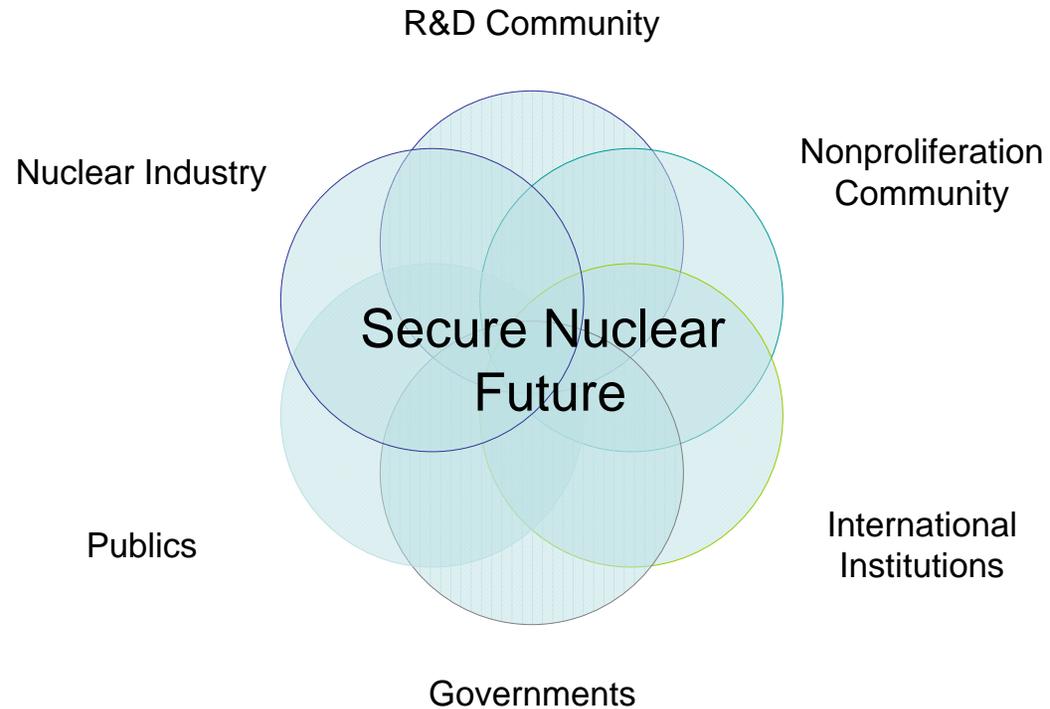
A new global fuel cycle needs mechanisms to harmonize incentives and interests to make progress toward the attributes we mentioned a moment ago. Would such a system be dominated by government ownership, private-sector ownership, or some hybrid of the two? Are there relevant distinctions to be made, when discussing ownership, among facilities, technologies, and output?

Many proposals have been made, dating to the 1940s, for removing fuel cycle facilities from national control and moving to multinational or multilateral approaches as being more protective of nonproliferation principles, but with only the most limited success. And the cautionary tale of A.Q. Khan's role in proliferating URENCO's enrichment technology illustrates that multinational approaches are not, in and of themselves, a fool-proof solution.

Other questions reflect the challenges of ensuring a reliable supply of nuclear fuel services at predictable and affordable cost, and whether that implies preferences for monopolies, cartels, or managed competition among a small set of actors.

And finally, the interplay between national and international interests in ensuring safe and secure operations, under some kind of international safeguards, raise questions about verification, transparency and enforcement.

All together now...



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If we are to develop answers to these and the myriad other questions imbedded in the aspiration of a secure nuclear future that advances nuclear energy in concert with nuclear nonproliferation, we need a constructive process that engages all the relevant voices. NTI hopes to be part of that process, and to contributing to the development of a common vision of our future security, and to the definition of a shared mission to pursue this vision informed by agreed priorities and norms.

The ANS code of ethics states, in part:

“ANS members as professionals are dedicated to improving the understanding of nuclear science and technology, appropriate applications, and potential consequences of their use. To that end, ANS members uphold and advance the integrity and honor of their professions by using their knowledge and skill for the enhancement of human welfare and the environment; being honest and impartial; serving with fidelity the public, their employers, and their clients; and striving to continuously improve the competence and prestige of their various professions.”

This code provides ample basis for the ANS to join with NTI and others to work together towards a secure nuclear future, and we look forward to your constructive engagement toward this end.