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Atoms for Peace after Fifty Years

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President Eisenhower's hopes for nuclear technology still resonate, but the challenges to fulfilling them are much different today.

On December 8, 1953, President Eisenhower, returning from his meeting with the leaders of Britain and France at the Bermuda Summit, flew directly to New York to address the United Nations General Assembly. His presentation, known afterwards as the "Atoms for Peace" speech, was bold, broad, and visionary. Eisenhower highlighted dangers associated with the further spread of nuclear weapons and the end of the thermonuclear monopoly, but the president also pointed to opportunities. Earlier that year, Stalin had died and the Korean War armistice was signed. Talks on reunification of Austria were about to begin. The speech sought East-West engagement and outlined a framework for reducing nuclear threats to security while enhancing the civilian benefits of nuclear technology. One specific proposal offered to place surplus military fissile material under the control of an "international atomic energy agency" to be used for peaceful purposes, especially economic development. Eisenhower clearly recognized the complex interrelationships between different nuclear technologies and the risks and the benefits that accrue from each. The widespread use of civilian nuclear technology and absence of any use of a nuclear weapon during the next half-century reflects success in his approach.

Today, the world faces choices about nuclear technology that have their parallels in the Eisenhower calculus and its legacy. Although his specific fissile material proposal was never implemented, his broader themes gave impetus to agreements such as the nuclear Non-Proliferation Treaty (NPT) and institutions such as the International Atomic Energy Agency (IAEA). The resulting governance process has promoted some and restricted other nuclear technology. Perhaps even more influential was Eisenhower's overarching recommendation that we try to reduce the risks and seek the benefits of nuclear technology. Whether seen as an effort to rebalance investment in a dual-use technology or as the foundation for a "bargain" between nuclear haves and have-nots, Eisenhower's speech brought together concepts that furnished the theoretical underpinnings of the nuclear technology control regime that has governed for nearly half a century. Some believe that Eisenhower's basic concepts remain sound and will provide the foundation for the future. Others believe they were never sound and promulgated dangerous dual-use technology around the world. Many are still debating exactly what Eisenhower meant to say.

Forces shaping the future

The post-Cold war world provides a new context for discussion of nuclear technology. Emphasis on the thermonuclear "Sword of Damocles" as a deterrent to superpower use of nuclear weapons has nearly disappeared. Nuclear weapon stockpiles of the superpowers, which peaked under the Johnson and Brezhnev administrations, have been greatly reduced and continue to shrink. Nuclear weapons, once seen as the "cheap" substitute for conventional armaments, are now weapons of last resort, whose primary purpose is to deter others from using weapons of mass destruction (WMD) or to retaliate if they do. Today, however, growing regional competitions raise the challenge of multipolar deterrence, and technology-empowered terrorists, against whom retaliation is difficult, if not impossible, call into question the effectiveness of deterrence itself. As Eisenhower spoke, only three nations possessed nuclear weapons, each a permanent member of the United Nations Security Council. Today, some 189 nations are parties to the Nuclear Non-Proliferation Treaty (NPT), and 4 states have voluntarily

given up their nuclear weapons. Seven nations have nuclear weapons. Israel and North Korea are believed to have them, and others appear to be pursuing them. The emergence of nuclear weapons in troubled regions such as the Middle East, South Asia, and the Korean Peninsula may make nuclear conflict more likely than during the Cold War, and the growing latency of nuclear weapon capability increases concerns about weapons getting into the hands of “rogue states” or even sub-state actors or terrorists.

In 1953, when Eisenhower first touted the benefits of nuclear technology, nuclear power plants were still on the drawing board. Over the next two decades, hundreds of nuclear power reactors were either built or begun in over forty countries. Concerns about economics, safety, and proliferation have now led to a near cessation of new reactor construction, leaving future growth uncertain. Existing reactors will in many cases continue to operate for the next fifty years or so, but we cannot know if the public and the market will accept new reactor designs or fuel-cycle technologies. Indeed, other applications of nuclear technology such as in agriculture and medicine, which Eisenhower emphasized in his speech, have achieved greater public acceptance.

Much of the optimism about what Walt Disney popularized as “our friend the atom” has disappeared in the face of the public’s deep-seated apprehension of things radioactive. Limited stocks of fissile material that Eisenhower saw as a potentially valuable resource have now grown and become a huge overhang of nuclear materials and waste whose future use or disposition is highly uncertain despite programs for regional repositories, waste minimization, transmutation, or reuse as fuel. “Not in my backyard” (NIMBY) attitudes and near-zero tolerance for environmental risk have replaced the national sense of urgency that drove the application of nuclear technology in the 1950s. Lack of confidence in international institutions, national governments, and industry, as well as public skepticism about risk/benefit analyses have frequently paralyzed change. Neither a consensus nor even a working plurality exists to address some important challenges and opportunities.

Existing nuclear reactors and legacy materials will keep the nuclear technology question on center stage for many decades to come, but progress is unlikely unless we develop a comprehensive long-term vision for the future of nuclear technology. In charting a path we need to consider powerful forces such as climate change, rapidly developing technologies, and geo-economic or strategic pressures. We can control many of these forces, but some transforming events may surprise us. Interest in nuclear technology could be stimulated by air quality concerns, economic growth in the developing world with large increases in energy demand, oil politics, technological advances in power plants, regulatory reform, successful waste management, or new medical and food applications. Or it could be discouraged by political gridlock over waste management, increased alarm about proliferation and terrorism, a major nuclear accident, NIMBY, progress in alternative energy technologies, or tighter environmental rules.

Benefits and risks

How likely nuclear weapons might expand under various future political circumstances still depends upon how widely nuclear weapons technology diffuses. About 75 countries have, had, or will soon have nuclear reactors (for power and/or research). In October 2003, IAEA director general Mohamed ElBaradei expressed his concern that the “margin of safety” was becoming too small and said that we live in a world with “35-45 countries in the know.” To illustrate the scope of peaceful nuclear materials activity, he noted, “50 countries have spent fuel stored in temporary sites.”

The wide prevalence of nuclear activities is further complicated by the international movement of knowledge and materials. The transfer of key technology, material, and services

takes place at many levels of sophistication and by many channels, including gray and black markets. Dual-use equipment and facilities and especially components have gained commodity status, too ubiquitous for export control or site monitoring. Incremental accumulation of capability and “just in time” production of components or weapons makes decisive reaction even more difficult. Parallel tracks of confrontation and engagement and divergent histories of relations among nations complicate developing international and domestic consensus on enforcement. On the demand side, regional military calculations are welded to domestic political aspirations that are difficult to address. In the case of ethnic and religious extremism and suicide mentalities, governments have difficulty even understanding how violent specific groups or individuals may become, or how indigenous populations will react to such violence.

In the face of these new threats, President Bush called in February of this year for tougher controls on nuclear fuel production, expansion of the Nunn-Lugar program to secure Russian nuclear materials and technology, and an expansion of the Proliferation Security Initiative that aims to intercept unconventional weapons and materials through a coalition of the willing, as opposed to a formal treaty. He also proposed bolstering the organization of the IAEA to focus on safeguards and limiting the spread of enrichment and reprocessing facilities to those now possessing them.

Clearly, the future of civilian nuclear technology is linked to the future of international and domestic security. Indeed, nuclear power may contribute to policy objectives such as defense, nonproliferation, energy security and protecting the environment. These contributions however, are significantly less compelling if nuclear power is not economically viable.

Can nuclear power advocates successfully go beyond mitigating risks to make the case that security is positively enhanced by nuclear power or that nuclear power is at least neutral in this regard? The fundamental link is between prosperity and security, not only for the Western democracies but also for countries of concern in the developing world. There, the benefits of power must be perceived as being of greater value than weapons, a questionable proposition in some of the key countries of concern particularly in the oil-rich regions. Many advocates of nuclear power hope that a dual-track approach combining aggressive nonproliferation and disarmament can increase support for building more reactors. Some believe that government and international ownership of civilian facilities, in addition to increasing security, may give nuclear power a better image with opponents, especially in this age of proliferation and terrorism. Balancing the various desires of the many participants in the debate will not be simple.

Some envision a new “grand bargain” that would bring the non-members of the NPT into the regime in exchange for their implementing tight export controls. Yet the problem has been the ability to enforce existing export controls and commitments of states already party to the NPT. Furthermore, bringing these additional weapon states into the regime drive other countries out so as to obtain the same bargain? If India and Pakistan were allowed to join the NPT and keep their weapons, why can't Iran or Brazil or others be allowed to acquire nuclear weapons and expect nuclear cooperation? Some look to fulfillment of the NPT Article VI goal of nuclear disarmament in order to gain greater acceptance of the peaceful applications of nuclear technology. Yet past reductions have neither prevented horizontal proliferation nor eliminated the motivations of terrorists.

New directions

Alternative futures for nuclear technology are possible, yet the most likely outcomes are not obvious. We confront a legacy of large nuclear weapon stockpiles, huge civilian and military fissile material inventories, large and growing quantities of nuclear waste, and a level of public skepticism that is not reassuring to those who advocate more civilian use of power.

The futures of civilian and military use suffer from fragmented visions. The medical community avoids the term nuclear, and the power industry tends to trivialize the connection to proliferation. The public is left confused without a comprehensive picture of the risks and benefits, and the new and uncharted reality of terrorism further clouds the risk picture.

Security is an over-riding issue for all of technology, but especially nuclear technology. Without reasonable assurances of security, there can be little confidence in nuclear technology and therefore at best sub-optimal utilization of this technology for either civilian or defense purposes. The rising specter of WMD terrorism accompanies a growing interest in nuclear power to protect the environment and provide more geo-politically secure sources of energy. Concern over terrorism even permeates consideration of the growing field of nuclear medicine with its improved and successful treatments for cancer and other diseases. Potential nuclear proliferation through violations of the NPT, or through the withdrawal by law-abiding states that wish to join with the nuclear weapon states and the nuclear weapon-possessing states outside the NPT, may significantly reshape the international security environment.

Effective security will require vision and action in at least two areas:

Reducing the incentive for countries to acquire nuclear weapons. Dealing with the fundamental security and political motivations for proliferation needs more explicit attention of the sort that we have given to supply-side restraints. Particular emphasis should be placed on improving security conditions and guarantees.

Strengthening the effectiveness and enforcement of the NPT regime. Support for the NPT is strong, but there are serious divisions about the treaty regime's ability to address the emerging challenges of spreading technology. Central to the debate over management of the nuclear future is the question of which principles or rules should be applied universally and which should be tailored to specific circumstances and/or timeframes. How NPT parties should relate to non-parties remains an issue, involving what benefits come from being a party and what responsibilities for restraint accrue when not being a party. Possible actions to improve the *status quo* include expanding the IAEA's mandate beyond monitoring and verification into more active oversight of management and control of materials and facilities, enhanced export controls, and the use of the most up-to-date technology for safeguards and security.

Ultimately, progress will depend on a better-informed public. This should begin with building public confidence through comprehensive risk-benefit assessments. The marketplace primarily will determine the extent of civilian applications, and governments will mostly determine future applications for defense purposes. In neither case, however, does a single group control decision-making, which will be driven by increasingly complex factors. Society needs a comprehensive analysis of risks and benefits in terms of the entire nuclear technology system. This is what President Eisenhower began in his Atoms for Peace speech. Today, this will require a more thorough and explicit assessment of the danger of proliferation and terrorism and a better understanding the cooperative roles that must be played by industry and government.

More and better dialogue and engagement with the public on nuclear technologies and on security and civilian benefits and risks, including radiological terrorism, will help clarify the actual versus perceived risks. But the problem will not be resolved until the public has greater trust that the nuclear industry and the government regulatory procedures are giving safety and security greater weight in decisions.

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