

## **International Security on the Road to Zero**

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This consultation is a wonderful opportunity for like-minded diplomats, former officials, nongovernmental experts, and activists to exchange ideas before the Non-Proliferation Treaty Review Conference. Our discussions have been filled with excitement that the conditions might finally be right to rid the world of nuclear weapons. But that optimism is tempered by intense frustration about the difficulty of inching forward. This week alone, obstacles on the road to zero grew larger as U.S. Senate Democrats lost a seat that had been held by long-time arms control champion Ted Kennedy, new START negotiations remained stalled, and Pakistan blocked consensus on an agenda for the Conference on Disarmament (CD).

As we commiserate, it is easy to attribute all of the problems to somebody else — states that cling to the power and prestige associated with nuclear weapons, or special interest groups that prevent national leaders from acting for the greater good. A more constructive response might include examining our own beliefs and actions to see whether we might inadvertently be doing things that are counterproductive and that are more within our power to change than somebody else’s behavior.

If we are honest, we will admit that deep ambivalence exists, not only among those who doubt the possibility or desirability of eliminating all nuclear weapons, but also among many who wholeheartedly support that goal, but are uncomfortable about the larger changes to security policy that would be necessary to reach it. Concentrating on the vision of “no nuclear weapons” obscures important questions about alternative security arrangements as we reduce, and then eliminate or fundamentally transform, both the weapons themselves and the institutions built around them.

During these consultations, I have heard four main areas of ambivalence. The first involves strategic stability on the road to zero, especially among Russia, China,

and the United States. The second involves alliance relations, particularly how to ensure NATO cohesion and preserve extended deterrence as nuclear arsenals decline. The third involves global governance at a time when states care more about preserving flexibility and minimizing short-term costs than they do about the long-term benefits of cooperation. The fourth involves peaceful nuclear technology, now and if global use expands dramatically to avert catastrophic climate change.

Disagreements about how to handle these four areas of ambivalence reflect real and current concerns, not misperceptions or outmoded Cold War mindsets. Failure to address them will make the diplomatic and political environment progressively less favorable even for incremental arms control or nonproliferation advances, let alone for truly transformational leaps. Mishandling them by making domestic and allied support for nuclear cooperation contingent on moves that will predictably increase international opposition, or vice versa, will make it impossible to get the multi-level support required to move forward.

A more productive strategy, I will suggest, involves confronting our own ambivalence, then considering how each of us — as influential individuals, non-governmental activists and analysts, or national representatives — can practice systematic mutual reassurance not only among those countries counted as part of this like-minded group, but including everybody whose cooperation is needed to fulfill the long-term objectives of the NPT. Even though this means broadening our agenda of challenging issues that must be addressed in order to eliminate nuclear weapons, I believe that pursuing this broader cooperative security agenda is essential to building winning coalitions.

## **Strategic Stability**

During the Cold War, the primary function attributed to both nuclear weapons and arms control was to preserve strategic stability — to minimize incentives for a disarming first strike, for pre-emption in a crisis, for escalation from a limited conflict to a general nuclear war, and for wasteful or dangerous arms racing.

A common question asked of those working for a nuclear weapon-free world is how to keep the risk of deterrence failure from going up as the number of U.S. and Russian nuclear weapons goes down. In theory, at least, strategic stability might be harder to preserve at very low numbers for many reasons, including concerns about ensuring the survivability of a sufficient retaliatory force; fears that low-level

cheating on arms control would be more militarily significant; and worries that a second-tier nuclear weapon state might be more tempted to challenge a first-tier state that no longer had overwhelming nuclear superiority.

In these consultations and in other writings by nuclear arms control and nonproliferation experts in, or close to, the United States, the typical response is that overwhelming U.S. conventional military superiority will ensure strategic stability on the road to zero nuclear weapons. Wittingly, or not, this builds off the Bush administration's new strategic triad, in which reductions in offensive nuclear weapons are offset by increases in precision conventional offense, missile defense, and a responsive infrastructure that could rapidly build new nuclear weapons if future U.S. policymakers decide that changed strategic circumstances warrant it.

This answer is an effective way to reduce American and allied concerns about strategic stability because it assumes that their side would have far more overall strategic capability than potential rivals in a world with few or no nuclear weapons. Furthermore, this conventional superiority could be used without breaking the nuclear taboo, generating radioactive fallout, or causing disproportionate civilian casualties. The responsive infrastructure would also provide a much larger hedge against nuclear uncertainty and a greater ability to exploit future technological developments for non-nuclear strategic advantages.

From the perspective of Russian and Chinese strategic planners, though, international cooperation to reduce nuclear weapons without corresponding constraints on other U.S. strategic capabilities looks highly destabilizing. It validates a security paradigm in which security relations among the big three remain fundamentally competitive while changing the rules and the tools of the game in ways that further favor the side that is already in the strongest position.

Their concerns about strategic stability are compounded by the shift in the 2002 U.S. National Security Strategy from an emphasis on deterrence to coercive prevention. The United States and its network of formal allies and other close friends believe that overwhelming U.S. superiority should only be a problem for countries contemplating aggression. But anyone outside this U.S. alliance system has legitimate concerns about the U.S. declaration of intent to use all means at its disposal to prevent untrustworthy states and terrorist groups from acquiring advanced technologies that might be used for weapons of mass destruction. They also fear that the United States will take more risks in crises and conventional conflicts, with potentially disastrous results not only for the original belligerents, but for many others as well. Even many within the U.S. alliance system are quietly

concerned about the consequences for their own security and economic welfare if the United States resumes making highly unilateral decisions about the development and use of its conventional military superiority.

Much as the United States might like to keep nuclear arms control completely separate from missile defense and space weapons, the three are inextricably linked for Russia and China. The July 2009 Joint Understanding between presidents Obama and Medvedev specified that a new START accord should include “the situation regarding the relationship of strategic offensive and defensive weapons.” Disagreement about that topic has been a prime impediment to replacing the now-expired START I. Russian and Chinese statements in the CD have also consistently underscored that the placement of any dedicated weapons in space, especially missile defense interceptors, and the use of force against space objects (e.g. the actual employment of any capability as an anti-satellite weapon) would undermine existing strategic stability, impede nuclear arms reductions, and generate a new strategic competition as dangerous and expensive as the Cold War.

We need to address concerns about strategic stability on the road to zero in a way that does not calm U.S. domestic and allied anxieties through words and actions that inadvertently intensify insecurity for everybody else. Of course, it would be equally counterproductive to answer Russian and Chinese concerns by making further nuclear reductions depend on first equalizing or eliminating U.S. advantages in conventional offense and missile defense because that would generate blocking opposition from U.S. domestic and allied interests.

A more realistic and effective strategy would accept the existing imbalance of strategic capabilities as a basic feature of the global security environment that is not going to change dramatically anytime soon, given the huge disparity in defense spending and technology development over the past two decades. But instead of assuming that overwhelming U.S. military superiority automatically enhances security for us and anyone else who does not want to challenge the status quo, we should treat it as a mixed blessing – like nuclear weapons themselves – that needs to be carefully managed to have net positive effects on security rather than to stimulate dangerous counter-reactions.

If the primary function of Cold War arms control was to stabilize mutual deterrence between two roughly equal powers, now the primary function should be to provide mutual reassurance among many diverse states with widely differing capabilities and complex relationships. As part of our strategy to convince Russia and China to do more on nuclear reductions and nonproliferation, we should be

trying to provide more concrete and credible reassurance about how the U.S. and its allies intend to use their current non-nuclear strategic advantages, and how we intend to develop them in the future. This means using our current advantages in information, advanced technologies, and military capabilities in ways that improve the security and well-being of all countries rather than provide gains for us at others' expense. It also means supporting equitable rules about access to, and use of, these twenty-first century sources of power, so that other countries do not feel that we are trying to keep them in a perpetually subordinate position.

An obvious step would be to formally renounce coercive prevention as the guiding principle for the U.S. National Security Strategy. But we will not be able to reduce the salience of nuclear weapons if we default back to making deterrence the dominant principle of security policy, albeit with some modifications for growing challenges such as catastrophic terrorism, anti-satellite weapons, and cybersecurity. Instead, if we want the rest of the world to accept or even welcome U.S. conventional military dominance without retaining large nuclear arsenals or developing other asymmetrical ways to offset U.S. advantages, then we should be developing, discussing, and using those capabilities in ways that benefit everyone. Deterrence will still have a residual role in security policy, but our guiding objective should be to place progressively more emphasis on mutual reassurance.

The Obama administration understands the value of strategic reassurance. Deputy Secretary of State James Steinberg gave a speech before the president's first trip to China in which he argued that the United States had a compelling need to cooperate with China on numerous vital issues. He expressed ambivalence about China's growing power, though, and said the United States needed reassurance that China's "development and growing global role will not come at the expense of security and well-being of others." He highlighted strategic nuclear weapons, space, and cybersecurity as arenas where the "risks of mistrust are especially acute." But he did not acknowledge that China has as much or more reason to want strategic reassurance from the United States, and that the United States as the dominant power is in a stronger position to take the first steps.

Since space and missile defense are the two strategic realms where the Russians and Chinese have been most pointedly asking for strategic reassurance, it makes sense to consider what the United States could do there to improve the prospects for nuclear cooperation. It is not realistic to reinstate the Anti-Ballistic Missile Treaty, so we need some other way to provide credible reassurance that any future missile defense system will be designed and operated in a way that provides protection against a small number of missiles from proliferators or terrorists, but

that does not undermine the Russian or Chinese nuclear deterrent so long as it is central to their security strategy vis-à-vis the United States.

So far, the Obama administration has responded to Russian concerns by reviving old proposals for increased missile defense transparency, early warning data exchanges, and possible future joint operations. The most it currently offers China is “strategic dialogue.” These kinds of confidence-building measures pale in comparison to the administration’s open-ended plans to keep enhancing long-range missile defense capabilities in the United States while working harder to build and integrate increasingly capable regional missile defense systems in Europe, Asia, and the Middle East. The Obama administration may trust itself to make more reasonable, less provocative decisions about missile defense than the Bush administration did. But so far, it is not giving Russia or China any more reliable commitments to long-term restraint than its predecessor offered.

If the Obama administration wanted to provide more meaningful strategic reassurance, it could start by ruling out the testing and use of space-based missile defense interceptors, the basing mode that is technologically least mature and most expensive, but that (theoretically, at least) would be uniquely capable of boost-phase intercepts against launches from internal locations or large countries. This move could be taken unilaterally or multilaterally, alone or in conjunction with a comparable norm or legal prohibition on the testing and use of hit-to-kill anti-satellite weapons. The Obama administration should also shift from passively supporting discussions about space codes of conduct and transparency measures to actively promoting serious negotiations over stronger steps to prevent weapons from being tested or used in space and to protect peaceful satellites from both deliberate and inadvertent threats.

The United States and its allies should also look for new opportunities to use day-to-day operational engagement to provide mutual reassurance about conventional regional security. A good place to start would be to build on current NATO-Russia efforts to enhance Euro-Atlantic airspace safety and security, moving beyond limited coordination to prevent airborne terrorism towards progressively fuller integration of civilian and military airspace management across the entire region.

## **Alliances**

So far, I have argued that trying to preserve strategic stability by substituting precision conventional offense and missile defense for nuclear capability will have

the unintended consequence of perpetuating nuclear deterrence as the basis for U.S. security relations with Russia and China. The same is true of addressing American allies' ambivalence about nuclear reductions not only by building up non-nuclear strategic military capabilities, but also by political actions undertaken to show that the alliances will be as strong, cohesive and important as ever.

A potent argument against deep U.S. nuclear reductions is the assertion that unless the United States keeps more nuclear capability than it needs to deter Russia or China from attacking the United States, its allies will lose confidence that the U.S. nuclear umbrella has extra room to shelter them, and they will develop their own nuclear weapons. This logic is faulty: Keeping more U.S. nuclear weapons does not make it correspondingly more likely that the United States would risk Los Angeles to retaliate for a nuclear attack on Tokyo. The evidence of allied propensity to proliferate is also extremely weak — typically private conversations with unnamed officials or public comments by individuals who are not representing a well-considered government position. But the assertion still carries weight in policy debates, in part because of the symbolic role played by nuclear weapons in alliance politics. Some allies are genuinely concerned that a more restrictive U.S. nuclear-use doctrine, the removal of tactical nuclear weapons from Europe, or other changes to U.S. nuclear weapons policy would have a negative political effect on a relationship that is critical to their security policy.

Those who want to reduce the role of nuclear weapons in U.S. security policy typically respond to these concerns about alliance politics in one of two ways, depending on whether their preferred long-term goal is to keep a minimized nuclear deterrent or to eliminate all nuclear weapons. Both responses start by affirming that regional threats confronting U.S. allies are real and growing, and that increasing allied military capability and cohesion is the appropriate response. Minimal deterrence proponents then argue that by planning to use nuclear weapons only in response to a nuclear attack on the United States or its allies, the United States is reserving nuclear threats for the two scenarios where they would be most credible and is acknowledging the need for non-nuclear options to address all other cases. Advocates for elimination go a bit further, suggesting progressive steps to “de-nuclearize NATO” and reconfigure the alliance relationship between the United States and Japan by replacing the U.S. nuclear guarantee with closer and more equitable cooperation on missile defense and advanced technologies for precision conventional offense.

These strategies for addressing allied ambivalence about U.S. nuclear reductions compound the strategic problems with Russia and China by reaffirming the

continued centrality of exclusive alliances whose purpose, cohesion, capabilities, and budgets all benefit from worst-case depictions of external threats. This creates a very unfavorable political context for cooperation among the existing nuclear weapon states to stop proliferation and eliminate risks from existing arsenals.

With the end of the Cold War, Russia hoped that the nascent cooperative security institutions in Europe would evolve to replace bilateral alliance confrontation as the dominant mode of security organization. China began to engage more actively and constructively in numerous multilateral security fora in the expectation that they would become progressively more important for managing global security. Instead, the Bush administration took a number of unilateral actions to make the context for security policy increasingly unipolar. It initiated a war against Iraq without Security Council approval; it rejected or blocked any new multilateral constraints on U.S. military capabilities; it supported NATO membership for Ukraine and Georgia; and it forged a new strategic partnership with India. The Obama administration has returned to a more multilateral orientation, but so far it has done more to reaffirm multilateral organizations that exclude Russia and China, and that are at least partially directed against them, than it has to rebuild organizations where they could have an equal voice and receive equitable security benefits.

One of the strongest arguments for the global elimination of nuclear weapons, accepted as self-evident by many members of the U.S. alliance system at these consultations, is that discriminatory rules for nuclear weapons are self-defeating and unsustainable. But how can we expect all NPT nuclear weapon states to give up the perceived security and prestige benefits of membership in one exclusive club when some see no prospect of either joining or disbanding the world's other most powerful and prestigious security club, the U.S. alliance system?

In posing this question, I am not proposing that alliance relationships which have stood their members in good stead for decades should be weakened as the precondition for Russian and Chinese help on nonproliferation. That would only increase U.S. domestic and allied opposition to the nuclear risk reduction agenda. Instead, I am suggesting that we find ways to reassure current members of the U.S. alliance system about their security on the road to zero that have a positive, or neutral, rather than a negative effect on the security of those outside the alliance system. At the same time, we should be strengthening existing regional cooperative security institutions and creating new ones so that we have efficient, effective, and inclusive options available for addressing a progressively wider array of regional security challenges.



A good place to begin would be by replacing regional threat assessments with more comprehensive joint evaluations of regional security conditions by military, diplomatic, and economic experts. Such evaluations would consider how different kinds of security risks have increased or decreased since the end of the Cold War, along with potential mitigating factors such as changing levels of economic interdependence and information flows. They would also survey the full range of options for managing risks, minimizing conflict, and maximizing cooperation on regional security problems, weighing the net effects of building up national or alliance military capabilities against the net effects of other options.

Even if these comprehensive joint security assessments were conducted only among countries that are already members of the U.S. alliance system, the effort could have reassuring effects for both insiders and outsiders. Exaggerated threat perceptions could be corrected, while well-grounded concerns could be more widely acknowledged and more effectively addressed with fewer unintended consequences on military, economic, and political relationships with others in the region. Even more mutual reassurance could be provided by including countries outside the U.S. alliance system in such comprehensive joint regional assessments and by using the results to build support for strengthening inclusive cooperative security organizations.

### **Institutional Capacity for International Governance**

Talking about building inclusive cooperative security institutions to complement, and someday perhaps, to replace exclusive military alliances raises a third common cause of ambivalence about progressive nuclear risk reduction — the weakness of existing governance mechanisms. In our darker moments, many of us wonder how we can talk seriously about the verified elimination of nuclear weapons when the Conference on Disarmament has not negotiated anything for over a decade and the Security Council cannot decide on a coherent response to Iranian non-compliance with its existing nuclear obligations.

More effort has been devoted by states and nongovernmental actors to building the global nuclear restraint regime than to developing principles, norms, rules, joint decision-making procedures, and compliance mechanisms for any other security issue. It has never been easy. Given the enormity of the stakes, countries have always been reluctant to compromise with each other or cede much power to an implementing organization. But knowledge of the vast devastation caused by a

single fission bomb and of the likely consequences of a thermonuclear war spurred negotiators and activists to keep working against strong resistance.

The end of the Cold War brought major advances in both the constraints and the compliance mechanisms that states were willing to accept on their nuclear programs. Instead of building on this progress, though, some of the states and non-governmental actors who had historically been the strongest supporters of legally binding agreements and effective verification decided they were no longer worth the trouble. The Bush administration's attitude represents the most dramatic reversal from earlier U.S. leadership in building the nuclear restraint regime. But a number of countries and advocacy organizations that still favored denuclearization of security policies also shifted their emphasis. Some decided that the likelihood of large-scale nuclear war was now low enough that they should concentrate on land mines, small arms, and other weapons that kill many innocent civilians on an annual basis. Others continued to view nuclear proliferation and terrorist acquisition as urgent security priorities. But they hoped that the end of the Cold War would make it possible to gain the requisite cooperation through "innovative" instruments: political declarations, codes of conduct, transparency and confidence-building measures, and cooperative threat reduction.

Ironically, now that the Obama administration wants to lead a global effort for the verified elimination of nuclear weapons, we have fewer governance tools and less ability to create new ones than we did during the Cold War. Many of the most critical legacy agreements no longer exist or are in jeopardy; vital organizations like the International Atomic Energy Agency (IAEA) are under-staffed and under-resourced; the United States and other key countries have lost much of their relevant diplomatic and technical expertise; and the sole multilateral negotiating forum for disarmament has forgotten how to function after a decade of disuse.

We can all agree that this is an unfortunate state of affairs, but we do not seem able to agree even within our like-minded group on a response. Should we invest more heavily in trying to strengthen state capacity to do governance activities that only states can do—such as negotiate and implement legally binding agreements and operate inter-governmental organizations with substantial authority, budgets, and staff? Or should we shift more attention and resources towards informal policy coordination and nongovernmental cooperative initiatives in hopes that they can accomplish more for less in a shorter period of time?

The Obama administration is clearly ambivalent about this question, as are a number of other governments. Part of their ambivalence reflects the difficulty of

deciding whether the benefits of legal agreements that constrain others' behavior, reduce misperceptions, and increase predictability outweigh the costs of future constraints on their own flexibility and freedom of action. Another part stems from difficulty deciding whether the long-term value of building the strongest possible mechanisms to eliminate nuclear risks outweighs the short-term costs of negotiating, ratifying, and implementing legally binding agreements with effective verification, compliance management, and enforcement provisions.

The governance dilemma is even sharper for nongovernmental analysts and advocates. They may understand intellectually that of all the global governance challenges, nuclear weapons are—and should remain—at the end of the issue spectrum where governments have the most control over outcomes. But nongovernmental actors often have little insight into why governmental efforts to reduce nuclear risks move as slowly as they do. They also know that the more state-centric the approach is, the less directly they can contribute.

To make progress on the governance problem, a first step is to acknowledge that there is no easy way out. Even if a significant number of countries have decided that they are safer without nuclear weapons regardless of what others decide to do, we cannot realistically expect to persuade all states to reduce or eliminate their nuclear weapons without clear-cut legal obligations, unprecedented verification arrangements, and highly evolved implementing organizations. If minimizing nuclear risks is a top security priority, then we should be willing to make a substantial investment to develop the institutional infrastructure that will become increasingly important as we advance toward that goal.

For example, parallel presidential nuclear initiatives (PNIs) looked like the fastest way to address urgent concerns about control of nuclear weapons during the break-up of the Soviet Union, especially tactical weapons that were not being addressed in the strategic negotiations and that were most likely to fall into the wrong hands. But the non-binding pledges regarding tactical nuclear weapons could have had much greater value over time if the two leaders had followed their public announcements by directing teams of diplomats, lawyers, and technical experts to develop a more detailed accord specifying what each side had committed to do, how they would document that they had done it, and whether or not they were obligated not to undo it in the future. There would be less uncertainty, and fewer unsubstantiated accusations, regarding tactical weapons covered by the PNIs if these steps had been taken. We would have a bigger pool of governmental and nongovernmental experts with more shared knowledge about all kinds of non-strategic nuclear weapons. And we would have a stockpile of precedents, including

definitions, monitoring technologies, and dismantlement procedures, which could be used now that some of the same people who insisted that we did not need formal controls on tactical nuclear weapons in the 1990s believe that we cannot have further strategic reductions without them.

A second recommendation is to use the institution-building resources that we have more efficiently and effectively. We can bemoan the loss of arms control agreements and expertise over the past decade, but the fact that we are sitting here today is a testament to the governments, nongovernmental organizations, foundations, and devoted individuals who refused to let the Bush administration bury formal arms control as an outmoded relic of the Cold War. Now the Obama administration and other governments, as well as numerous independent entities engaged in nuclear analysis and advocacy, have started trying to rebuild and expand their capacity to negotiate, ratify, and implement arms control and nonproliferation accords. But no matter how much renewed energy and additional funds we can bring to this project, it will be a long time before the combined assets on the side of cooperative security come anywhere close to those on the side of competitive security. Therefore, we must be much smarter and more creative, doing our best to cooperate rather than compete amongst ourselves.

The problem of counterproductive competition among groups advocating for the elimination of nuclear weapons has already been noted several times during this consultation. On paper, each group is committed to working synergistically with other initiatives. But in practice, competition for a larger share of limited funding and policy attention can lead groups working on the same issue to withhold information that might be more usefully shared, and to build up the perceived value of their group by putting down the others. NGO competition and product differentiation can encourage creativity and efficiency, but it can also be counterproductive if it creates confusion or causes skeptics to ridicule the idea of international cooperation to eliminate nuclear weapons because the community of like-minded proponents cannot even cooperate effectively with each other.

There is another type of counterproductive competition within the nuclear arms control and nonproliferation community that I notice. Several times at this consultation, I have heard the word “academic” used as a pejorative by diplomats and activists who want to suggest that their analysis is realistic and results-oriented, in contrast to work done by scholars who supposedly inhabit ivory towers. Such a sweeping dismissal of everything academic can have unintended negative consequences. It undermines the professional standing of those in universities who are doing policy-oriented research, making it harder to use their

research to inform debates and influence outcomes. That plays into the hands of anti-arms control ideologues who do not want contrary facts to complicate their agendas. It impedes the flow of ideas and individuals between universities and organizations doing day-to-day policy work, with damaging effects now and on the training and career aspirations of potential future nuclear experts. It also provides a convenient way to avoid uncomfortable questions about whether “practical” plans for eliminating nuclear weapons have a comprehensive and realistic enough understanding of the problem to achieve the desired results.

Governments could also do a better job of using all kinds of independent experts to inject new ideas about nuclear weapons and cooperative security into bureaucratic policymaking and negotiating processes, instead of expecting nongovernmental analysts, activists, and academics to help build public support for governmental decisions developed largely without their participation. One step would be to reconsider who is identified as a “credible independent expert” on nuclear security. Governments use such prominent individuals on commissions and advisory boards to provide supposedly nonpartisan or bipartisan recommendations to facilitate interagency agreement and increase public support for difficult policy decisions. Governments and advocacy organizations also use them to testify for or otherwise validate budget requests supporting nuclear risk reduction, treaties being considered for ratification, and other policy initiatives. All too often, though, these “opinion shapers” end up reinforcing existing opinions rather than changing them, or inadvertently legitimating policy developments that complicate the prospects for cooperative security.

This problem can be illustrated by the make-up and results of the U.S. Strategic Posture Commission co-chaired by William Perry and James Schlesinger. Half of the members were selected by congressional Democrats who thought that the commission could best build bipartisan support for major changes to U.S. nuclear weapons policy if their commissioners were all people that Republicans would recognize as having had many decades of experience on nuclear policy, mainstream views, and substantial technical or military expertise. Many of the Republican-nominated commissioners, by contrast, were people at the far end of the ideological spectrum on nuclear weapons during the Cold War and who could be expected to use their position on the commission either to preserve Cold War-era nuclear policies or to update them in the direction of using nuclear weapons for new types of military missions. It should have come as no surprise that the commission recommended a renewed emphasis on some traditional arms control measures, but nothing that would be a major conceptual or practical change, and

that it could not even agree to endorse a very mainstream measure, Comprehensive Test Ban Treaty ratification.

If the Obama administration wants independent policy advice and validation that increases the prospects for progress on the president's nuclear agenda, then it needs to treat as credible experts whose attitudes towards nuclear weapons and arms control were not forged around Cold War deterrence. There are people with many decades of experience arguing that arms control could be used to do much more than just stabilize deterrence, as well as younger experts who understand the strategic, technical, economic, legal, and political dimensions of twenty-first century cooperative security challenges. Expanding the pool of "credible independent experts" to include more of these people, both by bringing their views into internal policy deliberations and by validating their credibility in public fora, will increase the amount of new thinking available to shape and support governmental nuclear risk-reduction efforts.

Some steps to strengthen nuclear governance require governments to confront their own ambivalence about the associated costs and risks. Getting the CD functioning smoothly again or replacing it with one or more negotiating bodies that would be more effective involves both strong and weak states deciding that the ability to negotiate new multilateral security agreements is more important than maintaining absolute veto power over anything that might be proposed for negotiation in the future. All states still need strong assurances that their concerns will be considered carefully and that they will not be expected to sign any agreement that does not serve their security interests. But those positive functions of the consensus process can still be accomplished without allowing any one member to block all work on a topic of great interest to the rest of the community, or to prevent the rest of the members from reaching an agreement that would serve their security interests well.

In addition to showing skeptics that the international community is capable of negotiating new agreements to reduce nuclear risks, governments who support this objective must also demonstrate that they can cooperate to ensure compliance with existing nuclear agreements. This was one of the essential points in President Obama's Nobel Prize acceptance speech, which laid out difficult choices that governments must be willing to make, even when they are domestically popular, if they want a world where nuclear weapons play little or no role in security policy.

For security to rest on the rule of law, we need a broader spectrum of options to address non-compliance, along with a greater ability to get international agreement about which option is best suited for fixing a given problem and for ensuring full

compliance in the future. When the rules are unclear or a state lacks the capacity to fulfill its obligations, the international community needs the diplomatic, legal, technical, and financial resources to provide clarification or capacity-building assistance. If non-compliance is a bargaining strategy to increase attention to unresolved security concerns, then other states should show that it is easier to address those concerns through cooperation than through adversarial bargaining. Economic carrots and sticks can be helpful or counterproductive, depending on the circumstances, but increased trade or tighter sanctions will not change behavior if the underlying motives involve security, rather than economics or prestige. Force might be necessary to uphold the rule in the most egregious cases. But it would be much easier to get Security Council authorization if all nonviolent options had been exhausted and if the members all committed to supporting evenhanded enforcement of equitable rules rather than selective enforcement of discriminatory arrangements.

### **Peaceful Nuclear Programs and the Challenge of Global Warming**

The current international standoff over Iran's nuclear program raises another source of ambivalence within the nuclear nonproliferation community — the fact that the NPT is designed to facilitate the peaceful use of nuclear energy even though its primary function is to stop proliferation and promote disarmament. The treaty places no limits on states' "inalienable right" to develop and use nuclear energy for purely peaceful purposes without discrimination. It also specifies that all members have an obligation to facilitate, and a right to participate in, the fullest possible exchange of equipment, materials, and information for the peaceful use of nuclear energy. The problem, of course, is that some of the same equipment, materials, and information used for peaceful nuclear purposes could be used clandestinely, or openly after treaty withdrawal, for weapons applications.

The NPT's solution to this dilemma is to use IAEA safeguards to confirm the accuracy and completeness of non-nuclear weapon states' claims that all their nuclear materials and facilities are being used for peaceful purposes. The basic safeguards obligations were deliberately designed to be low-cost, non-intrusive, cooperative, and nondiscriminatory because most countries using nuclear energy when the treaty was negotiated either already had nuclear weapons, and thus were exempt from the safeguards, or were democratic states expected to keep their nonproliferation commitments even without close international scrutiny. The NPT safeguards regime has been strengthened in recent decades, but it still rests on the basic principle that any state can have its own advanced nuclear capabilities,

including enrichment and reprocessing facilities, capable of producing weapon-grade fuel, as long as those nationally operated facilities are subject to IAEA oversight.

The Iranian case makes nonproliferation experts especially uncomfortable due to the unusual nature of that regime, its failure to fully cooperate with the IAEA, and its rejection of Security Council resolutions demanding that it stop enriching uranium. But rather than treat Iran as a unique case, we should see it as the leading example of a dilemma that will only intensify as more countries that do not already have nuclear weapons and are not deemed inherently trustworthy decide to use nuclear energy.

The nonproliferation community's current response is to put more money into the IAEA safeguards system, to encourage more countries to accept the Additional Protocol and expand IAEA oversight of their programs, and to establish fuel banks or suppliers' consortium that offer fuel for power plants at an attractive enough price that it does not make economic sense for most countries to build their own enrichment or reprocessing facilities. These incremental measures can help at the margins, especially if the global use of nuclear energy remains relatively flat, as it has for decades. But the countries of greatest concern right now are not likely to give up advanced nuclear capabilities for purely economic reasons. Furthermore, the whole system of international safeguards on national nuclear programs will be overwhelmed if, as looks likely, the global use of nuclear energy needs to expand dramatically in coming decades in order to avert catastrophic climate change.

To make a significant contribution on climate change, global nuclear energy expansion must be much greater than is commonly understood. Installed nuclear capacity would need to nearly triple, rising from 372 GWe in 2008 to about 1,070 GWe in 2050, for just one of seven "wedges" in a comprehensive climate stabilization strategy. It would need to rise even more sharply if increased efficiencies and other carbon-free energy technologies prove unable to provide the other six wedges, or if global economic growth occurs more quickly than projected.

Most of the demand growth for electricity, and hence most of this projected increase in nuclear power, will be parts of the world that are undergoing rapid economic development. China already has a very ambitious program to bring new nuclear plants and advanced fuel cycle facilities on line. India, Brazil, Indonesia, South Africa, Turkey, Saudi Arabia, and Egypt are among the other countries with little or no nuclear power now, but a declared interest in significant expansion. If



this expansion occurs on the basis of existing reactor designs and oversight arrangements, proliferation concerns will intensify, especially if the world has not made equally significant progress in diminishing the perceived security and prestige value of nuclear weapons. The initiation or rapid expansion of nuclear power programs in countries with little or no prior experience will also intensify concerns about operator error leading to reactor accidents and about terrorist sabotage or acquisition of nuclear materials.

There is a potential way to avoid being forced into an unpalatable choice between nuclear disaster and catastrophic climate change, but that requires revisiting the central insight of the Acheson-Lilienthal Report. It argued that the only realistic way to enjoy the benefits of peaceful nuclear energy without the risks posed by competitive national nuclear weapons programs would be to establish an international agency with direct operational control over all dangerous nuclear materials and activities.

The Acheson-Lilienthal logic was compelling then, and remains so today. Political circumstances are arguably more favorable now that the dominant security concern involves keeping nuclear capabilities away from outlaw states and terrorist groups, not balancing major powers' nuclear forces to deter attack and minimize coercion. Technological developments are also underway that could be used to keep tight control over sensitive materials, facilities, technologies, and expertise without internationalizing the entire global nuclear energy generation system.

Nuclear power is currently generated by very large light water reactors (100-1600 MWe) that are extremely expensive and time-consuming to build, difficult to site appropriately, and challenging to operate safely. Researchers around the world have been working for several decades on designs for much smaller reactors (under 300 MWe) with advanced safety features and sealed cores containing enough fuel to last for multiple years. Efforts are underway to license and build several of these “nuclear batteries” as demonstration projects. But they are currently being envisioned as a way to serve niche markets that lack the money, electrical grid capacity, expertise, or other requirements for very large reactors, not as a technology that could become the standard for a global hub-and-spoke system of nuclear power generation.

Efforts to develop small reactors could be redirected to prioritize designs that offer the most proliferation-resistance even if they are not the designs that are closest to becoming commercially available. This would favor designs that could operate for 30 to 40 years at full power on a single fuel charge without plutonium or highly

enriched uranium. It should be possible to mass produce these reactors at a small number of internationally operated regional fuel centers and transport them by trucks, trains, or boats to places that need nuclear power. They could be sited underground and operated without any local access to dangerous nuclear materials. They would be designed to exclude the possibility of significant radiation releases in the event of an accident, with a passive safety design that would not require any local intervention before an international team of emergency experts could arrive. At the end of the reactor's lifetime, it would then be returned intact to the regional fuel center for secure management of the nuclear waste.

Such a truly proliferation-proof arrangement for expanding global nuclear energy use enough to have a significant environmental effect would require both nuclear disarmament and subordination of national and commercial advanced fuel cycle operations to international control. That is hard to envision under current conditions, but it is even harder to figure out how we can simultaneously avert global warming and prevent proliferation in a less radical way.

## **Conclusion**

The organizers of this consultation probably regret giving me so much time to talk about international security on the road to zero. I have taken what is already a very difficult job – trying to fulfill the promise of the NPT and eliminate nuclear weapons – and put it in the much larger, even more demanding context of trying to create a world where security is based primarily on consensual arrangements rather than the threat or use of any type of force.

The bad news is that some of the strategies we have adopted over the years to build support for arms control and nonproliferation within and among our like-minded countries have had the unintended effect of decreasing support for nuclear cooperation outside of the U.S. alliance system. Likewise, some of the “innovative” ways to get something done quickly and easily in the name of nuclear cooperation end up neither providing as much direct security benefit as their proponents originally hoped, nor helping to develop the institutional infrastructure needed for more ambitious and effective forms of cooperation. I say this not to denigrate the hard work and creativity that we have all poured into nuclear arms control and nonproliferation over the decades, but to encourage you to make sure that whatever you are doing in hopes of reducing nuclear risks does not inadvertently perpetuate the problem or recreate the same competitive security dynamics in a non-nuclear guise.

One piece of good news that flows from this analysis, though, is that there are a lot of things about our own attitudes and strategic choices that can be changed to get more productive results. For each of the four areas of ambivalence, I have tried to give concrete suggestions for steps that are within our own control and that could provide both internal and external reassurance, rather than addressing our own concerns at a potential cooperative partner's expense. Once you start thinking about nuclear risk reduction as a two-level game where the only realistic way to get the desired result is to find moves that increase the prospects for both domestic and international agreement, then you will be able to identify practical things that your government or organization can do at home or in your interactions with other countries that might not be "like-minded" but whose participation is key to the success of cooperative security arrangements.

Recognizing the complex connections between the nuclear risk reduction agenda and other types of global challenges makes it easier to work productively with people who do not share our obsession with nuclear weapons, but do share our broader commitment to building equitable and inclusive governance arrangements that enhance mutual security and well-being. Rather than bemoaning the fact that global warming is receiving more media coverage and policy attention than nuclear weapons do, or arguing about where nuclear weapons should rank as a security priority compared with the problems of ending civil violence and building sustainable peace in Iraq and Afghanistan, we should look for potential synergies among these disparate issues. Seen in this way, the number of national, intergovernmental, and nongovernmental actors working on cooperative responses to global challenges far outnumbers the people and resources devoted to purely military solutions. That does not automatically make it easier to reduce the central role that nuclear weapons and competitive military programs have come to play in the world today, but it should make it easier to find partners, combine resources, and choose effective strategies for the hard, but vitally important, work ahead.