

# THE PAST AND POTENTIAL ROLE OF CIVIL SOCIETY IN NUCLEAR SECURITY

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## Abstract

Civil society has played a very important role in nuclear security over the years, and its role could be strengthened in the future. Some nuclear organizations react against the very idea of civil society involvement, thinking of only one societal role – protesting. In fact, however, civil society has played quite a number of critical roles in nuclear security over the years, including highlighting the dangers of nuclear terrorism; providing research and ideas; nudging governments to act; tracking progress and holding governments and operators accountable; educating the public and other stakeholders; promoting dialogue and partnerships; helping with nuclear security implementation; funding initial steps; and more. Funding organizations (both government and non-government) should consider ways to support civil society work and expertise focused on nuclear security in additional countries. Rather than simply protesting and opposing, civil society organizations can help build more effective nuclear security practices around the world.

## 1. INTRODUCTION

Many nuclear organizations have an instinctively negative reaction to civil society playing a role in nuclear issues, thinking of them only as protesters outside their gates. In fact, a broader set of civil society – non-government organizations, academic groups, the press, and more – has played an important role in strengthening nuclear security over the years.<sup>1</sup> With appropriate support, civil society could play an even more important role in the future, in more countries. Civil society organizations can often be more flexible, more able to draw back and take a strategic view, and more able to explore new ideas than governments or operators can. At the same time, civil society organizations do not have to cope with the costs or inconveniences of what they propose, sometimes do not have the same view about what information is sensitive, and often do not have access to detailed inside information that might offer a different perspective. Governments and operators may sometimes find the interventions of civil society groups exasperating – but the reality is that nuclear security around the world is stronger today because of the interventions of civil society organizations than it would have been without them.

Key roles in strengthening nuclear security that that civil society organizations have played include (among others):

- highlighting the dangers of nuclear terrorism and the need for action to address them;
- providing research and ideas for next steps;
- nudging governments to act;
- tracking progress and holding governments and operators accountable;
- educating the public and other stakeholders;
- promoting dialogue and partnerships;
- helping with nuclear security implementation; and
- funding initial steps.

In this paper, we will offer brief examples of civil society's role in each of these areas, address limitations on the nuclear security roles civil society can play, and discuss briefly how civil society's valuable roles could be

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<sup>1</sup> In principle, commercial firms are part of civil society, but for the purposes of this paper, we treat governments, the nuclear industry, and civil society as separate categories.

strengthened in the future. The examples are only illustrations; inevitably, a short paper cannot cover all the countless civil society initiatives that have contributed to nuclear security over the years.

## 2. HIGHLIGHTING THE DANGERS OF NUCLEAR TERRORISM

Ever since John McPhee's seminal *The Curve of Binding Energy* in 1973, civil society experts have been central to calling attention to the dangers nuclear security systems are designed to protect against, helping to motivate governments to act [1]. Part of U.S. President Barack Obama's strong interest in nuclear security came from reading Graham Allison's alarming account, *Nuclear Terrorism: The Ultimate Preventable Catastrophe* [2]. In 2014, when nuclear security summit participants could not agree to a briefing on the threat by any particular government, the Dutch hosts organized a briefing for the Sherpas developed by a joint U.S.-Russian civil society team [3]. In 2016, the Latin American and Caribbean Leadership Network for Disarmament and Nuclear Nonproliferation (LALN) released a detailed study of the potential economic and political impacts of nuclear terrorism, intended as a "call to awareness and action." [4] Not constrained by the need to focus on the interests of any one organization or program or by the rigors of interagency approval, civil society experts are often better able to integrate information from a wide range of sources, offer compelling narratives of the danger, and provide a coherent outline of steps to address it than either government or industry experts are.

## 3. PROVIDING RESEARCH AND IDEAS

Civil society organizations have also played prominent roles in doing in-depth research on nuclear security issues and then suggesting ideas for government or industry action. Officials in government or managers in industry, busy running their programs and coping with the events of the day, often do not have time to do in-depth research and assessment, to draw back and take a strategic view, or to brainstorm new ideas. These are important ways that civil society contributes to nuclear security.

For example, as the Soviet Union neared collapse, Ash Carter, then a professor at the Harvard Kennedy School, led a team that assessed the coming dangers and outlined a cooperative approach for addressing them [5, 6]. Carter and others in the group then helped draft the Nunn-Lugar legislation on U.S.-Russian cooperation to secure and dismantle the excess weapons of the Cold War. This effort led to the deactivation of thousands of nuclear weapons, the dismantlement of hundreds of nuclear-armed missiles, bombers, and submarines, and major improvements for security of nuclear weapons, plutonium, and highly enriched uranium (HEU). Later, one of the authors (Bunn, with his colleague Anthony Wier), based on research showing the slow pace of global nuclear security improvements, first suggested the four-year effort to secure nuclear material around the world that was the key commitment agreed to at the first Nuclear Security Summit in 2010 [7]. The Nuclear Threat Initiative (NTI) has played a prominent role in providing both research and ideas for action for governments around the world, often working with counterparts in other countries. (For an example, focused on ideas for reviving U.S.-Russian nuclear cooperation and done jointly with Moscow's Center for Energy and Security Studies, see [8].)<sup>2</sup>

Many operators around the world have implemented suggestions from the good practice guides of the World Institute for Nuclear Security (WINS), compiled through an integration of research, information from workshops, and the authors' past experiences, contributing to nuclear security improvements around the world [9].

Organizations participating in the Fissile Materials Working Group (FMWG), an international coalition of civil society groups working on nuclear security, suggested a range of ideas to officials preparing for the 2010-2016 nuclear security summits, a number of which were incorporated in summit communiqués or gift baskets.<sup>3</sup> Most of the gift basket on minimizing HEU, for example, was drafted by civil society groups.

## 4. NUDGING GOVERNMENTS AND INDUSTRY TO ACT

Civil society actors have used a wide variety of tools – from discussions with particular policymakers to exposés in the media – to convince governments or nuclear industry organizations to take action to improve nuclear

<sup>2</sup> Disclosure: Both of the authors have, at different times, been paid consultants to NTI, which has also supported some of our research. Both have participated in NTI's project with CENESS.

<sup>3</sup> Disclosure: Both of the authors are participants in the FMWG; Bunn serves on the Steering Committee.

security. In the early years following the collapse of the Soviet Union, for example, the PIR Center in Moscow (then newly established) published interviews with officials, legislative testimony, and essays in its journal *Yaderny Kontrol* (Nuclear Control), many of them making the case for steps to improve security and accounting for nuclear materials. (See, for example [10].)

Groups participating in the FMWG have used public briefings, private meetings with officials, publications, comments in the media, and other strategies to convince the U.S. government to take steps ranging from increasing funding for particular nuclear security programs to supporting efforts to shift production of medical isotopes away from the use of HEU.

In the United States, the Nuclear Control Institute (NCI) repeatedly succeeded in changing policy by revealing to the media steps the U.S. government was taking that NCI experts believed would weaken nuclear security; on one occasion, for example, after public reporting of a Nuclear Regulatory Commission (NRC) decision to end its program of force-on-force exercises, the NRC reversed course [11]. The Project on Government Oversight (POGO) hired an expert who had previously been an investigator on the staff of the U.S. Congress and had served as a senior security advisor to the Secretary of Energy. POGO then prepared a range of reports challenging weaknesses in U.S. nuclear security arrangements. (See, for example, [12].) These reports sometimes provoked Congressional hearings, which led to pressure to change nuclear security arrangements. Many in government and industry saw NCI and POGO as anti-nuclear critics who would never be satisfied; but there is little doubt that their efforts led to stronger nuclear security requirements than would have existed without them.

Disposition of excess weapons plutonium was another major policy area related to nuclear security where civil society organizations played a substantial role. Many U.S. policies in the area were first proposed in a report by the Committee on International Security and Arms Control (CISAC) of the U.S. National Academy of Sciences [13].<sup>4</sup> The National Academies were established as an independent body specifically for the purpose of advising the U.S. government on issues of science, technology, and medicine. The CISAC study highlighted the dangers of insecure plutonium and HEU and called for a global security and transparency regime to address them. It also suggested a two-track approach to plutonium disposition, pursuing both use of the plutonium as mixed-oxide (MOX) fuel in existing reactors and immobilizing the plutonium with high-level wastes for disposal. Many civil society groups strongly opposed the MOX program, raising concerns about both costs and security. As the costs of the program skyrocketed, the effort became vulnerable; civil society groups ultimately played a key role in convincing the Obama and Trump administrations and the Congress to cancel the program.

Overall, while both the U.S. government and the U.S. nuclear industry have often found the interventions of non-government groups annoying, or disagreed with their suggestions, a strong case can be made that U.S. nuclear security approaches today are substantially stronger than they would have been in the absence of pressure and suggestions from civil society.

## 5. TRACKING PROGRESS AND HOLDING GOVERNMENTS AND OPERATORS ACCOUNTABLE

Civil society organizations have played a particularly important role in tracking nuclear security progress (or steps backward) and holding governments accountable for them. The media and the public are more likely to trust independent assessments than statements from governments and industry groups touting their own accomplishments. These progress-tracking efforts are important for understanding what has been accomplished and what remains to be done, and have themselves sometimes led governments to accelerate or expand their nuclear security efforts.

NTI, for example, regularly publishes a “Nuclear Security Index” rating countries around the world on a set of criteria relating to whether it can be publicly documented that they have particular nuclear security measures in place. Officials from several governments have reported that the index has contributed to decisions to address particular gaps the publication highlighted.

The International Panel on Fissile Materials (IPFM), while not specifically focused on security for the nuclear material it is tracking, has played a fundamental role in providing data on stockpiles, production, and use or disposal of plutonium and HEU around the world. (See, for example, [14].) Governments and non-government analysts around the world have relied heavily on their estimates. The IPFM, with representatives from a range of

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<sup>4</sup> Disclosure: One of the authors (Bunn) was the study director for this report. Bunn now serves as a member of CISAC.

countries using fissile materials, has also been active in making suggestions for ending both military and civilian production of fissile materials, reducing stockpiles, and minimizing civilian use of both plutonium and HEU.

For political reasons, no government or international organization published an assessment of how well governments were fulfilling the many commitments they made at the nuclear security summits. The Arms Control Association, the Partnership for Global Security, and the FMWG stepped in to fill this gap with a series of reports that found that most states did, in fact, follow through with the vast majority of the individual country commitments made at the summits [15, 16]. The knowledge that these commitments were being tracked and that the media would report on lack of follow-through increased governments' attention to getting their commitments done. Indeed, civil society actors have been very active in promoting state reporting on nuclear security and offering ideas for how such reporting could be done without undue burden on states – suggestions which contributed to the joint statement on reporting at the 2016 nuclear security summit and the Dutch proposal on a format for such reporting [17].

For decades, our team at Harvard has produced in-depth assessments of nuclear security progress around the world, tracking what has been done and gaps that still remain. These assessments are coupled with concrete suggestions for action – many of which have been adopted over the years. (See [18] for the 2019 edition.)

## 6. EDUCATING THE PUBLIC AND OTHER PLAYERS

From universities to think tanks, civil society actors play a particularly important role in education – as reflected by the large number of them participating in the IAEA's International Nuclear Security Education Network (INSEN). This includes not just educating the general public, but educating the media, legislators and other government officials, and even nuclear security operators. On training and education, civil society organizations have worked closely with governments, international organizations, and industry, participating in (and sometimes helping to develop) programs sponsored by institutions in all of these sectors.

Russia has taken the lead in several areas, with the first masters-level course on nuclear security in the world offered at the Moscow Engineering Physics Institute (MEPhI, also known as the National Research Nuclear University) beginning in the 1990s. Several other Russian universities also offer programs related to nuclear security. Working with the IAEA, the universities and groups participating in INSEN have developed both a certificate program and a master's degree program in nuclear security, and a number of institutions outside of Russia are now offering these courses [19]. Institutions such as the James Martin Center for Nonproliferation Studies, the Vienna Center on Disarmament and Nonproliferation, and King's College, London have long offered executive programs training diplomats and other government officials to better understand nuclear security issues. King's College and the University of Georgia have been particularly active in education on nuclear security culture.

Among the most important civil society education and training efforts is the WINS Academy. The WINS Academy offers training and professional certification in an array of nuclear security disciplines. It has now provided this certification to hundreds of nuclear security professionals in dozens of countries [20].

The Strengthening Nuclear Security Implementation Initiative, agreed to at the 2016 Nuclear Security Summit (but now open to all states), commits participants to “ensure that management and personnel with accountability for nuclear security are demonstrably competent.” [21] Most of the training and certification required to achieve that demonstration of competence will undoubtedly be done by government training centers – but civil society initiatives like the WINS Academy and the courses offered by other organizations in the INSEN network can play an important role as well. Indeed, this passage was a civil society suggestion, originating with WINS' leadership.

## 7. PROMOTING DIALOGUE AND OTHER PARTNERSHIPS

A key civil society role which underlies many of the others is their role in promoting dialogue, building networks, and encouraging partnerships and cooperation among other actors. Civil society organizations are less constrained than governments or firms, and can invite whoever they wish to a meeting, call meetings on any topic they can convince people to come and talk about, and establish whatever ground rules seem most conducive to progress. They can therefore make major contributions above and beyond what governments and industry can do without them.

While there are countless examples, NTI's "Global Dialogue on Nuclear Security Priorities" is a particularly important one, bringing together government officials, industry experts, and civil society experts to discuss key issues and ideas in a more informal and creative way than would ever be possible in government-to-government negotiations. Participants in the Global Dialogue, who come from all inhabited continents, from developed and developing countries, and from states with and without nuclear weapons, are encouraged to represent their own views, not necessarily those of the institution they represent; many of the ideas that found their way into summit-level "gift baskets" at the nuclear security summits were first discussed in the Global Dialogue.

The FMWG has also played a key role in fostering international dialogue on nuclear security. The FMWG organized the civil society summits that accompanied the first and last nuclear security summits and played a key supporting role for the civil society events at the 2012 and 2014 summits. These events provided an international forum for discussing a wide range of ideas and issues related to nuclear security. The FMWG itself, as an international coalition, has helped promote dialogue and cooperation among civil society groups working on nuclear security in different countries, and has helped focus these civil society groups on working together to achieve particular objectives, from reducing the civil use of HEU to ensuring high standards of security for both military and civilian nuclear stockpiles. For the 2016 summit, the FMWG established a partnership with the nuclear industry organizations pulling together the industry summit, and the industry summit and the civil society summit held a joint session to discuss issues of common concern.

The Institute of Nuclear Materials Management (INMM), the professional society for experts on issues such as nuclear security, safeguards, and waste management, has also played a key role in promoting dialogue on nuclear security. INMM brings together hundreds of technical and policy experts from government, industry, and civil society to present research on a wide range of nuclear security issues; while the majority of the participants in its meetings are Americans, many come from countries around the world as well.

The U.S. National Academies, working with counterpart groups in other countries, has also played a very important role in fostering dialogues on nuclear security and nuclear and radiological terrorism. Technical experts from the National Academies have often been able to explore issues and raise ideas in ways that opened the door for later government-to-government cooperation [22-24].

Civil society organizations have played important roles in a wide range of other dialogues on particular topics related to nuclear security, from working with the United Nations to promote effective implementation of UN Security Council Resolution 1540 to working with the government of Norway and others on a series of global meetings focused on minimizing the use of HEU to organizing meetings around the world to discuss the benefits of adopting the amended Convention on Physical Protection of Nuclear Material and Facilities.

Even in non-democracies without fully independent civil society groups working on nuclear security, such dialogues can be important. NTI has for years co-sponsored dialogues in China on a broad spectrum of international nuclear issues, along with conversations more focused on nuclear security, including tabletop exercises with former senior U.S. and Chinese officials. The Chinese and U.S. governments, recognizing the value of civil society groups exploring issues and feeding ideas into more formal government dialogues, have designated NTI and the China Arms Control and Disarmament Association (CACDA, a group affiliated with the Chinese Foreign Ministry) to lead non-government U.S.-China dialogues on nuclear security. Our team at Harvard has produced a series of reports on nuclear security in China (in some cases jointly with Chinese colleagues), assessing China's evolving approaches and recommending next steps [25, 26]. These have been coupled with workshops in China bringing Chinese and American experts together to discuss topics that the formal government-to-government dialogues were not yet exploring in detail. On one occasion, for example, a U.S. expert who led force-on-force exercises at a major U.S. nuclear facility got into a lively discussion with Chinese experts who had previously been focusing only on conducting such exercises at training facilities about the advantages of conducting such tests at operating nuclear facilities and how safety and security could be maintained while the tests were underway. Some of the ideas discussed in these reports and workshops, such as a national-level design basis threat and requirements for regular force-on-force exercises, appear to be incorporated in the most recent draft revision of China's nuclear security regulations.

Civil society organizations can also promote dialogue and cooperation within, rather than between, countries. In the 1990s, for example, Roger Howsley, then the chief of security and international safeguards for British Nuclear Fuels, Limited (BNFL), worked with civil society groups to establish an ongoing dialogue about approaches to managing and securing BNFL's plutonium stockpiles. While the participants had fundamentally different views, and there were strong limits to the information about security arrangements the civil society groups could receive,

the series of discussions that ensued built a degree of trust on all sides, and Howsley reports that he implemented some of the ideas that arose from those talks, improving BNFL security as a result [27]. This illustrates that (a) some nuclear security information can be shared with the public, in ways that actually contribute to nuclear security, and (b) operators can benefit from in-depth engagement with their civil society critics, even in sensitive areas such as nuclear security.

In September 2016, to take another example, as disagreements between the Republican-controlled Congress and the Obama administration were undermining U.S. nuclear security programs and the two sides had little productive dialogue, our Harvard team organized, in effect, a “Track 1.5” dialogue, with key participants from both sides participating and Harvard experts leading the discussion. The participants agreed to a number of key principles, and the dialogue reduced the heat of the debate.

## 8. HELPING WITH NUCLEAR SECURITY IMPLEMENTATION

In some cases, civil society organizations have worked directly with operators to help with implementation of nuclear security (often with funding from governments or industry). WINS, for example, has carried out peer reviews of corporate governance of nuclear security on request. The James Martin Center for Nonproliferation Studies has worked with Georgia, Moldova, and Malaysia to help locate radiological sources (in part using social media posts) and improve their security. A team from the University of Georgia worked with Indonesia to develop and implement a security culture self-assessment (and helped draft the IAEA guidance on security culture self-assessment). As noted earlier, a number of civil society organizations have contributed to training at nuclear facilities, particularly in areas such as security culture and approaches to coping with insider threats.

## 9. FUNDING INITIAL STEPS

Governments and operators have far more resources than most civil society organizations have and will inevitably bear the lion’s share of the costs of nuclear security. But civil society organizations can sometimes move faster and be more flexible, demonstrating and funding new initiatives in the hope that governments and industry, with their greater resources, will follow up.

In the early 2000s, for example, a variety of non-government organizations, including our Harvard team and NTI, were proposing a program to remove weapons-usable nuclear material around the world from potentially vulnerable sites. This effort included in-depth analyses, memos to senior officials, briefings for Congressional staff, work to draft legislation authorizing such a program, and more. NTI’s ability to fund a demonstration effort played a key role at a critical juncture. The U.S. government was working with what was then the government of Yugoslavia (later Serbia) to remove tens of kilograms of weapons-usable HEU from the Vinča Institute for Nuclear Research. The Serbians no longer needed the HEU, but insisted that, in return for cooperation on removing the HEU, they should receive help managing irradiated fuel that was posing safety hazards at their site. The leaders of the relevant U.S. programs claimed they had no legal authority to spend nonproliferation money managing spent fuel safety hazards, and it looked like the deal might fall through – until NTI agreed to pay \$5 million to help with the spent fuel [28]. That investment and the many other analysis and advocacy efforts civil society organizations were making ultimately led the U.S. government to launch the Global Threat Reduction Initiative, much of which focused on helping countries eliminate unneeded stocks of HEU and plutonium; as a result, today, more than half of the countries that once had separated plutonium or HEU on their soil have gotten rid of it.

NTI also took the lead in another important effort of this kind. Before the September 11, 2001 attacks in the United States, the IAEA had only a handful of people working on nuclear security, in the Department of Safeguards. One of the authors (Bunn), working as a consultant to NTI, developed a proposal for NTI to give the IAEA a \$1 million gift to support its nuclear security work (in the hope that governments would contribute more thereafter); as it happened, the proposal was considered at a meeting of NTI’s board in the days immediately after the attacks. NTI made the gift a matching grant, conditional on governments at least matching the gift. That NTI gift and the matching grant from the U.S. government were the founding gifts of what is now the Nuclear Security Fund.

## 10. PROTESTING PROBLEMS

Of course, the anti-nuclear protests that many governments and industry groups associate with non-government groups have also been a prominent feature of civil society activity for decades. Such protests can interfere with operations, cause embarrassment, and undercut the public reputation of nuclear organizations; dealing with them can impose substantial costs in some cases. Such protests can even undermine nuclear security – by revealing sensitive information about shipments or vulnerabilities, by compromising security arrangements (as when protesters surround transports on the road, for example), by creating large groups in which real adversaries might be able to hide, and by distracting security managers and personnel.

Such protests, however, usually reflect genuine public concerns that need to be addressed. And on occasion, as painful or embarrassing as they may be, they can lead to progress. The 2012 intrusion by an 82-year-old nun and two other elderly protesters at the Y-12 nuclear site in Tennessee, for example, led the National Nuclear Security Administration to carry out a number of searching examinations of its approaches to nuclear security at that site and elsewhere, which led to a variety of improvements. Indeed, an argument can be made that the nun and her colleagues, rather than being thrown in jail, should have been rewarded for revealing serious security vulnerabilities and allowing them to be fixed before more serious adversaries exploited them. (For one official account of this episode, see [29].)

## 11. LIMITATIONS ON CIVIL SOCIETY'S NUCLEAR SECURITY ROLE

Civil society's role in nuclear security, while more important than is often recognized, is inevitably limited. Governments and operators are the key actors implementing, regulating, and making policy for nuclear security, and always will be. Civil society's role is complementary, never a substitute.

Civil society actors face a wide range of obstacles and constraints in their efforts to contribute to nuclear security. They often face hostility or unwillingness to engage from both government and industry, both of which sometimes suspect that non-government organizations are uninformed, misguided, a risk to their programs, or lack the technical understanding to contribute to nuclear security (which, indeed, is sometimes the case). They usually do not have access to sensitive information, and in many countries the publicly available information about nuclear security is very limited. Nuclear security is usually not a priority concern for the general public, and hence the level of civil society effort on the topic is inevitably modest. In most countries, only very limited funding is available to support civil society work on nuclear security, limiting the initiatives civil society groups can undertake and making it quite difficult to establish civil society work independent of government or industry as a viable career path for a trained engineer or nuclear security professional.

Even in democracies, governments may put pressure on groups attempting to comment publicly in a sensitive area such as nuclear security, and in non-democracies such pressures can make genuinely independent civil society work effectively impossible (though interactions between government-supported groups and the government itself can still contribute to nuclear security progress, as noted in China's case above). By their nature, civil society groups each have their own agenda, and trying to organize them into a coherent view can be like herding cats; this lack of a single voice makes it difficult for governments, operators, and international organizations to work with them. (Providing a first step toward such a single voice has been an important role of the FMWG coalition.)

In short, while civil society groups have made very important contributions to nuclear security in the past and have the potential to do even more in the future, it is important for both civil society groups and the governments and firms they work with to be realistic about what these groups can and cannot do.

## 12. EXPANDING THE CIVIL SOCIETY CONTRIBUTION TO NUCLEAR SECURITY

Several steps could strengthen the role that civil society organizations around the world can play in strengthening nuclear security. Governments, operators, and international organizations should work to understand how particular actors in civil society, be they universities, think tanks, media organizations, or non-government groups, could contribute to their nuclear security efforts. Civil society groups should seek to develop expanded partnerships and dialogues that can help give them a voice in nuclear security issues.

Although we have cited examples from many countries in this paper, civil society groups have had a larger impact in the United States than anywhere else, for three reasons. First, the U.S. government is democratic and amenable to changing policy in response to public suggestions or criticism, giving civil society organizations hope that their efforts might have a real impact (and there is a long track record that such efforts *have* led to real change over the years). Second, the United States openly publishes more information about its nuclear security arrangements than any other country, giving civil society organizations more data to form the basis of their arguments. (In a few cases, civil society actors have been granted security clearances, either to allow them to consult for the government or industry or to allow them to participate in legal cases related to classified nuclear security issues.) Third, philanthropic foundations are much larger in the United States than elsewhere, and they have provided the resources needed for at least a few civil society organizations to develop and sustain expertise on nuclear security. Unfortunately, even in the United States, only a very few experts outside government and industry actively monitor and comment on nuclear security developments.

Some of these lessons could be applied elsewhere on an expanded scale. Foundations, governments, and industry groups should provide funding to civil society groups they think can make a positive contribution to nuclear security. As a civil society “gift basket,” at the 2016 nuclear security summit, the MacArthur Foundation and the Carnegie Corporation of New York announced that they would provide up to \$25 million in funding to groups advancing nuclear security. (While that gift strengthened nuclear security work, that opportunity is now past.) Groups with long experience in nuclear security should help train and support similar groups elsewhere. With a modest investment of funds and training, it would be possible to establish and sustain groups monitoring and contributing to nuclear security in most democratic countries with major nuclear facilities or weapons-usable nuclear materials. In non-democracies, and in democracies where the issue is considered especially sensitive, such groups might have to be more closely affiliated with governments, and gentler in any criticism or suggestions they offered, but could still play a potentially important role.

One particular opportunity that should be explored arises from the establishment of Centers of Excellence (COEs) for nuclear security in many countries. These centers, providing training in a wide range of nuclear security skills, inevitably employ significant staffs of nuclear security experts who have (or who develop) substantial expertise in their country’s approaches to nuclear security – and typically also get exposure to experts from other countries, learning about good practices elsewhere. Where these experts identify areas where their country’s nuclear security arrangements could be strengthened, they should work to make those changes happen. Experts at COEs, in other words, could potentially fulfill one part of civil society’s nuclear security role – and do so from a deeper well of expertise than civil society groups usually possess. Moreover, COEs could also provide training to, and host dialogues with, civil society organizations, allowing civil society groups to better understand their country’s nuclear security arrangements and play a stronger role in contributing to nuclear security improvements.

### 13. CONCLUSIONS

In short, civil society has played and should continue to play a fundamental role in strengthening nuclear security around the world. With their freedom from bureaucratic restraints, time to draw back and look at the big picture, and ability to suggest ideas beyond those currently blessed by governments or international organizations, civil society organizations are able to make a wide range of contributions that governments, industry, and international organizations simply cannot make without them.

Unfortunately, today much of the potential for civil society to contribute to nuclear security remains unrealized. Funding organizations (both government and non-government) should consider ways to support civil society work and expertise focused on nuclear security, strengthening civil society organizations in this area where they already exist and establishing them in additional countries. Rather than simply protesting and opposing, civil society can help develop and push for ideas that lead to more effective nuclear security practices around the world.

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