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Toward a More Proliferated World?

The Geopolitical Forces that Will Shape the Spread
of Nuclear Weapons

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Executive Summary

The United States and the international community have been relatively successful at preventing the spread of nuclear weapons, but there are new reasons to question whether this track record will last into the future.

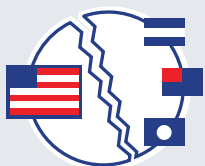
Working with partners, the United States has steadily built a framework of disincentives and barriers to prevent proliferation. These include: 1) international treaties and agreements that have erected legal, political, and normative barriers to the bomb; 2) U.S. security commitments to allies that dampen their own perceived need for nuclear weapons; and, 3) a set of tough penalties (e.g., sanctions) for those who get caught trying to build the bomb. In other words, the barriers to entry to the nuclear club are high, and those countries that want the ultimate weapon need to be willing to accept significant risks. This helps explain why, although many countries have explored or pursued nuclear weapons, only nine states have them today.

But several trends are eroding the foundation on which this formidable set of barriers rests. These trends are rooted in, and being shaped by, changes to the nature and structure of the international system: namely, the decline of U.S. influence and its gradual withdrawal from the international order that it helped create and lead for more than 70 years, and the concurrent rise of a more competitive security environment, particularly among great powers. These trends (detailed below) will have three broad implications for proliferation and U.S. policy. First, they stand to increase pressures on countries to seek nuclear weapons or related capabilities as a hedge. Second, they will almost certainly challenge the U.S. ability to effectively wield the traditional “carrots and sticks” of nonproliferation and counterproliferation policy and dilute the effectiveness of those tools. Finally, they could increasingly pit U.S. nonproliferation goals against other policy objectives, forcing harder tradeoffs.

In Sum: Seven Trends that Will Shape the Future of Proliferation



1. Nuclear threats are increasing, and regional security environments are becoming more tense, thereby creating proliferation pressures.



2. U.S. allies and partners are losing trust and confidence in the United States—including Washington's willingness to uphold its security commitments—increasing the risk that they will seek nuclear weapons or weapons-relevant capabilities.



3. The rise of authoritarian leaders is increasing the chances of nuclear proliferation.



4. Prospects are dim for arms control measures that can further reduce U.S. and Russian nuclear weapons or cap growing global nuclear weapons arsenals. As a result, the bargain at the heart of the Nuclear Non-proliferation Treaty (NPT)—whereby nonnuclear weapon states refrain from acquiring nuclear weapons and in exchange nuclear-armed states work toward disarmament—is likely to come under further strain.



5. The ability of the United States to use civil nuclear energy sales and assistance to advance nonproliferation objectives is declining.



6. The effectiveness of sanctions as a nonproliferation tool will likely diminish as countries develop ways to reduce their impact and U.S. financial dominance erodes over the long term. In addition, the risks and costs of sanctions use for the United States will increase as future sanctions targets will increasingly have the ability to retaliate.



7. The more competitive relationships between the United States and Russia, and the United States and China, will likely impede cooperation on nonproliferation and complicate U.S. implementation of nonproliferation policy.

Seven Trends that Will Shape the Future of Proliferation

1. Nuclear threats are increasing, and regional security environments are becoming more tense, thereby creating proliferation pressures.

Countries that pose a threat to the United States and its allies—including Russia, China, and North Korea—are modernizing and expanding their nuclear arsenals and behaving more aggressively. Even if Iran refrains from producing nuclear weapons, its latent capacity to do so and malign activities in the region will require U.S. attention. These developments threaten the United States and its allies directly and are placing additional stresses on the U.S. alliance system. Although not determinative of proliferation, deteriorating security environments and nuclear threats can act as primers for countries to reassess their own nuclear needs.

2. U.S. allies and partners are losing trust and confidence in the United States—including Washington’s willingness to uphold its security commitments—increasing the risk that they will seek nuclear weapons or weapons-relevant capabilities.

Relatedly, the United States could find itself hard-pressed to adequately assure allies to address any proliferation ambitions that do emerge. Since the early years of the Cold War, U.S. commitments to provide for the security and defense of other countries have played an important role in keeping proliferation at bay. And when confronted with an ally considering nuclear weapons, the United States has threatened to reduce these security commitments—or alternatively, to enhance them—to prevent an ally from proliferating. But fundamental trust in the United States appears to be on the decline, increasing the risk of proliferation by U.S. allies and partners.

3. The rise of authoritarian leaders is increasing the chances of nuclear proliferation.

There is a correlation between certain types and characteristics of autocratic rulers and their propensity to go after the bomb.¹ These leaders face fewer domestic checks on nuclear weapons ambitions and might be more willing to try to weather international pressure. The rise of authoritarianism as a global phenomenon—particularly among some U.S. allies and partners—is therefore worrying from a proliferation perspective.

4. Prospects are dim for arms control measures that can further reduce U.S. and Russian nuclear weapons or cap growing global nuclear weapons arsenals. As a result, the bargain at the heart of the Nuclear Non-proliferation Treaty (NPT)—whereby nonnuclear weapon states refrain from acquiring nuclear weapons and in exchange nuclear-armed states work toward disarmament—is likely to come under further strain.

Cooperation between the United States and Russia on nuclear issues is nearly nonexistent, and arms control agreements are an endangered species. An arms race—or even the perception of one—will make it harder for Washington and Moscow to defend the notion that they are living up to their NPT commitment. The expansion of other countries’ nuclear arsenals does not bode well for treaties and agreements not yet in force (e.g., the Comprehensive Nuclear Test Ban Treaty and the prospective Fissile Material Cut-Off Treaty), and whose implementation many nonnuclear weapon states see as vital for the health of the nonproliferation regime and the NPT.

5. The ability of the United States to use civil nuclear energy sales and assistance to advance nonproliferation objectives is declining.

Washington has long leveraged the ability of the United States to export nuclear reactors, fuel, and technology as a means to promote nonproliferation controls (such as constraints on enrichment and reprocessing activities by countries receiving U.S. nuclear technology and the adoption of the Additional Protocol (AP), which enhances the authorities of international inspectors) and as a stick to convince countries to end nuclear weapons programs. But the United States is no longer the major player in the nuclear energy market. The increasing ability of China, Russia, and others to provide nuclear assistance on more competitive terms—and with fewer nonproliferation strings attached—is eroding the U.S. ability to write the rules of the game. If the United States has fewer nuclear energy clients, it is less able to monitor and shape the nuclear trajectory of key countries, including if necessary threatening to cut off its energy partnership to curb proliferation behavior.

6. The effectiveness of sanctions as a nonproliferation tool will likely diminish as countries develop ways to reduce their impact and U.S. financial dominance erodes over the long term. In addition, the risks and costs of sanctions use for the United States will increase as future sanctions targets will increasingly have the ability to retaliate.

U.S. overuse of economic sanctions is prompting a backlash. Countries and actors are developing work-arounds and seeking ways to shield themselves from—and respond to—economic penalties imposed by Washington. This will make it harder for the United States to dissuade countries from engaging in sensitive activities related to nuclear weapons or their means of deliver, and make it harder to convince third parties (such as allies) to follow the U.S. policy line. It will also diminish the effectiveness of U.S. counterproliferation measures that seek to block countries' ability to fund illicit weapons programs or purchase technologies abroad.

7. The more competitive relationships between the United States and Russia, and the United States and China, will likely impede cooperation on nonproliferation and complicate U.S. implementation of nonproliferation policy.

A new era of deepened mistrust, competition, and differing objectives between Washington and Moscow and Beijing is already hampering cooperation on arms control. That discord is beginning to spill over into coordination on nonproliferation. Additionally, a focus on strategic competition as the top policy priority could, in some cases, be at odds with nonproliferation objectives and lead to those objectives taking a back seat. This could occur because the United States is loath to put pressure on a proliferating ally for fear that doing so would jeopardize cooperation against a shared adversary. It could also occur if, in seeking to bolster allied conventional military capabilities and enhance burden sharing, the United States provides or allows capabilities that improve a country's ability to build nuclear weapons and/or the means to deliver them.

Policy Recommendations

U.S. policy must adapt unless Washington wants to be faced with a more proliferated world in the future. Nevertheless, the structural and systemic changes that are driving many of these trends mean that it will be difficult to arrest or reverse them. The best and most durable solutions are also ones that, because of the very nature of these trends, would be extremely challenging to implement over any sustained time frame. Thus, to be effective, sustainable, and realistic, U.S. policy needs to work with—rather than against—these trends. With this in mind, the United States should endeavor to:

Pursue nuclear deals with Iran and North Korea in a way that limits the risk of follow-on nuclear proliferation and broadens the application of enhanced nuclear monitoring and verification practices.

- Build on the Iran nuclear deal (known as the Joint Comprehensive Plan of Action, or JCPOA) by working to regionalize nuclear limits and transparency measures.
- Establish a forum to discuss regional issues in the Middle East, including missile and conventional capabilities, and work to develop confidence-building measures.
- Think through where “denuclearization” fits in an arms control approach with North Korea.

Repair the trust deficit with allies, adapt alliances to be more resilient to the stressors of the geopolitical environment, and update assurance concepts to new threats.

- Make it a top priority to signal U.S. commitment to allies and their security and end unnecessary sources of friction.
- Hold off on big changes to nuclear policy and posture at the outset of a new Democratic administration.
- Carry out a strategic review of how to update allied assurance to meet today's threat environment.

Maintain a flexible and pragmatic approach—and acknowledge inherent limitations—to using U.S. civil nuclear cooperation for nonproliferation purposes.

- Do not go for gold: Be flexible on approaches to so-called 123 agreements (the legal frameworks that underpin U.S. civil nuclear cooperation with other countries and govern recipients' uses of the technology).

- Establish a bipartisan commission to investigate what it would require for the United States to become a competitive player in the global nuclear energy market.
- Enable U.S. allies in the nuclear energy market.

Assess, test, and strengthen the U.S. coercive toolkit as it applies to future proliferation threats, and identify and mitigate associated vulnerabilities.

- Conduct a comprehensive review of U.S. sources of leverage and vulnerabilities against potential proliferators, their enablers, and key players with a stake in the outcome of proliferation scenarios.
- Carry out a series of tabletop exercises to better understand the benefits and limits of these coercive tools—and how proliferators might respond.
- Pass new legislation that updates the triggers for U.S. action against proliferators and the consequences that the United States can impose.

Focus on, and invest in, improving early detection of proliferation.

- Better connect U.S. government efforts to leverage open source information, big data, and other advanced technologies to proliferation detection and counter-proliferation policy needs.
- Increase the International Atomic Energy Agency's (IAEA's) budget and encourage further investment in modern monitoring technologies.

A Note on the Goals and Scope of this Study

This project—a collaborative effort between the Center for a New American Security and the Center for Strategic and International Studies—is a survey of the geopolitical forces that will shape the proliferation landscape and the U.S. ability to manage it over the next 10–20 years.

In this way, it is different from studies that focus only on specific countries or regions of proliferation concern. Both approaches have strengths and weaknesses.² Assessing whether and when a specific country might go nuclear allows for detailed analysis of particular political and technical circumstances. But such studies are limited in their ability to identify or evaluate the broad array of trends that can potentially drive or restrain proliferation, and how those trends affect the U.S. nonproliferation toolkit. This study is an attempt to fill that gap. It does not explicitly try to predict the number of nuclear weapons states in the future, nor does it undertake a thorough assessment on the likelihood that any particular country will develop nuclear weapons (although it does evaluate three countries—South Korea, Saudi Arabia, and Turkey—against the trends identified in the report). Rather, it primarily aims to serve as a guide for policymakers and analysts regarding what they should be worried about when it comes to proliferation, why, and what can be done about it.

CHAPTER 1

The Current Nuclear Landscape

To gauge the impact of geopolitical trends on nuclear proliferation and nonproliferation, a baseline is needed. Two questions in particular are relevant: Why do countries seek nuclear weapons? And what policy tools do the United States and the international community have at their disposal to try to prevent and manage proliferation?

Drivers of Nuclear Proliferation

While there is no formula that can perfectly predict when and where proliferation will happen, research has identified key factors that can help explain its occurrence and point analysts in the right direction of where to look.³ These can be grouped into three general bins: 1) security threats; 2) leaders, values, and national identity; and 3) domestic and bureaucratic factors. None of the factors within these categories is determinative, nor is this list exhaustive.⁴ And there is extensive debate over which of these factors matters the most. But if predicting proliferation was akin to predicting a heart attack, these drivers might be viewed as the underlying conditions—poor diet, no exercise, high blood pressure, smoking, etc.—the presence of which would make us more concerned about the spread of nuclear weapons.

SECURITY THREATS

A body of literature suggests that the presence of perceived external security threats plays an important role in leading states to develop nuclear weapons or hedge.⁵ Some research indicates that severe conventional security threats are sufficient to prompt nuclear weapons pursuits (for example, Israel's development of nuclear weapons to deter numerically superior Arab military forces). Other research emphasizes the presence of a nuclear-armed adversary as playing a particularly strong role in driving proliferation. (For example, India's nuclear program took a turn toward weaponization after China's nuclear test.) Mitigating factors—such as reliable security guarantees from a superpower—can help alleviate security concerns, and therefore reduce proliferation pressures, according to this school of thought. On the flip side, the absence of such a guarantor or questions about the guarantor's reliability can stoke proliferation desires.⁶

A variation of this theme argues that countries develop nuclear capabilities—or threaten to do so—in part to increase their negotiating leverage, so that they can trade them away for security commitments or other advantages. Italy and Japan, for example, in the past worked to leverage their nuclear pursuits in part for this purpose.⁷ Iran's current nuclear expansion is likely intended in large part to put pressure on the United States to reenter the

nuclear deal and provide sanctions relief. To be sure, the line between genuine fears of abandonment and negotiating leverage as a driver of nuclear ambitions is likely blurry and can change over time. But if allies come to question U.S. security guarantees or a more competitive security environment provides incentives for countries to try to create such leverage, this driver may be particularly relevant.

LEADERS, VALUES, AND NATIONAL IDENTITY

Research has shown that certain types of autocrats—"personalist dictators" and those with "rebel" experience—are more likely to proliferate and to face fewer domestic obstacles in doing so.⁸ Another study has proposed that "oppositional nationalist" leaders—who combine a deep-rooted fear of a foreign enemy with an intense pride in their nation's potential to face the enemy down—are most likely to pursue nuclear weapons.⁹ In other words, fears of domestic insecurity, forms of nativism and nationalism, and unchallenged political power in the hands of a single individual can matter. Relatedly, national pride and the prestige associated with possessing nuclear technology were key motivators for India's program and drive Iran's nuclear ambitions today. Egypt's desire to be a leader of the Arab world also drove its nuclear weapons ambitions under President Gamal Abdel Nasser. Although such concepts might seem abstract, they are critical to assessing the likelihood of future proliferation: If autocracy is gaining ground, for example, that is bad for nonproliferation.

Iran's current nuclear expansion is likely intended in large part to put pressure on the United States to reenter the nuclear deal and provide sanctions relief.

DOMESTIC AND BUREAUCRATIC FACTORS

Political coalitions, government organizations, and even individuals can help catalyze or sustain nuclear weapons ambitions within a country.¹⁰ For example, the military and nuclear scientific establishment has often helped to jump-start (or constrain) weapons programs.¹¹ Brazil and Argentina began their programs under military governments but gave them up in the transition to civilian rule. The scientific establishments in South Korea and India were key sources of pro-nuclear weapons sentiment. By contrast, such scientific communities are believed to be a considerable constraint should Japan consider

FIGURE 1.

Nuclear Temptations: States that Have Explored, Pursued, or Acquired Nuclear Weapons¹⁴

Upward of 30 countries have at least explored nuclear weapons development, with 10 of those successfully crossing the finish line. This number includes South Africa, which produced nuclear weapons but later dismantled them.

going nuclear today. Some research suggests that ruling domestic political coalitions that embrace integration into the global economy are less likely to proliferate than coalitions that reject such integration.¹² By creating nuclear “myths”—a compelling narrative that casts nuclear weapons as a solution to strategic challenges—these factions can persuade decisionmakers by providing them with a strategic rationale for nuclear weapons.¹³

These factors have led upward of 30 countries to at least explore nuclear weapons, as seen in Figure 1. While true that it is rare for a state to cross the nuclear finish line, it has not been uncommon for countries to start out down that path. Understanding why so few have successfully developed nuclear weapons requires an understanding of the myriad policies, tools, and strategies developed over time to prevent proliferation.

Constraining Nuclear Proliferation: A Survey of the Toolkit

Today, Washington’s toolkit to prevent and counter proliferation is relatively robust.¹⁵ It has been refined and expanded over the course of decades. As a policy goal, nonproliferation is backed by narrow U.S. self-interest: More countries with nuclear weapons would make it harder for the United States to operate in the world and constrain, if not complicate, Washington’s options. Nonproliferation is also pursued out of concern that more nuclear weapons would pose risks to global stability and security and ultimately endanger the possibility of their elimination. Nonproliferation remains a widely shared objective within the United States and the international community. Thus, while the United States has developed and used a range of unilateral policy options, it has also shown a general preference for gaining and building international support for nonproliferation measures. (For an overview of some of these tools, see Figure 2.)

But today’s consensus on preventing the spread of nuclear weapons did not always exist. In the early years of the Cold War, some officials in the United States argued

that because proliferation was inevitable, having more nuclear-armed allies would be an advantage in the standoff against the Soviet Union.¹⁶ By the mid- to late 1960s, however, this viewpoint had decidedly shifted in favor of nonproliferation.¹⁷ Washington and Moscow, realizing the risks of open-ended proliferation, backed the Nuclear Non-proliferation Treaty (NPT), under which countries that did not already have nuclear weapons pledged not to produce them. This treaty, widely viewed as the cornerstone of the nonproliferation regime, helped nudge nuclear weapons fence sitters to make a choice.

Over time, additional international tools have been created to address proliferation loopholes. For example, the Nuclear Suppliers Group established in 1974 has helped tighten controls over the export of sensitive nuclear technologies. Similarly, the 1987 Missile Technology Control Regime sought to strengthen supply-side mechanisms to prevent the proliferation of sensitive missile technologies. The adaptation of the International Atomic Energy Agency's (IAEA) safeguards system since its founding in the late 1950s has been critical to nonproliferation. For example, the surprise revelations about Iraq's nuclear progress after the 1991 Gulf War and later North Korea's nuclear program helped lead to the creation of the Additional Protocol (AP) in the late 1990s, which enhances the inspection authorities of the IAEA. Countries' adoption of the AP has improved trip wires to detect proliferation

and is now being used to facilitate better access to Iran's nuclear program. Gaps in export controls that were exploited by states, individuals, and companies to sell and purchase materials and technologies related to weapons of mass destruction (WMD) resulted in measures such as the Proliferation Security Initiative to help detect and prevent illicit activity.

In addition to these multilateral tools, U.S. security commitments to allies in Europe and Asia—including in many cases the extension of the U.S. nuclear umbrella—have been motivated in part by concerns that, without such a guarantee, these countries would be more inclined to develop their own nuclear arsenals. These commitments and alliances have been key to stemming proliferation in Japan, South Korea, Germany, and Taiwan, among others. For example, under the Ford and Reagan administrations, the United States threatened sanctions and a reevaluation of the U.S. security commitment if South Korea did not halt its pursuit of nuclear weapons technologies (and also promised to retain those commitments should South Korea cease its nuclear weapons activities).¹⁸ Additionally, U.S. threats of military abandonment appear to have played a key role in West Germany's cessation of nuclear weapons exploration.¹⁹ Washington also maintains close defense and security partnerships with several countries in the Middle East that, while not formal alliances, convey a sense of U.S. commitment to their security.

In addition to security commitments, the United States has honed other unilateral options as well. Sanctions, nuclear energy assistance, interdictions, and diplomacy have all played a role in inhibiting the spread of nuclear weapons. For example, U.S. threats to cut off civil nuclear energy cooperation and end economic and military aid to South Korea and Taiwan were important factors that convinced those countries to end their weapons programs.²⁰ Arms sales and transfers to allies and partners and troop deployments to their territory have aided nonproliferation policy by bolstering their ability to defend against threats. In addition to the multilateral export control measures above, the United States and its allies have expended significant diplomatic efforts to convince countries to adopt and implement effective national export control systems. The unilateral toolkit also includes covert measures and intelligence tools. For example, the United States and Israel were allegedly responsible for the late 2009/early 2010 Stuxnet cyberattack against Iran's nuclear program.²¹



Representatives of 18 nations convene to discuss nuclear disarmament on July 18, 1968, after the opening of the Nuclear Non-proliferation Treaty (NPT) for signature on July 1 of the same year. Washington and Moscow drove the drafting of the NPT, realizing the risks of open-ended proliferation. (Daily Express/Pictorial Parade/Archive Photos/Getty Images)

Perhaps the most important evolution in the U.S. toolkit since the end of the Cold War has been the ability and willingness of the United States to inflict economic harm on would-be proliferators via sanctions. Although the development of economic sanctions began in the 1970s, their use has increased significantly since the 1990s. The United States has been particularly willing to wield the tools of economic warfare when it comes to so-called rogue states. Washington levied massive economic sanctions—at times putting at risk its relationships with allies, global oil supplies, and other priorities—against Iraq, Libya, North Korea, and Iran to try to shift the calculus of their leaders that the cost of their nuclear programs outweighed the benefits. Where possible, the United States has used its unilateral sanctions programs, U.N. Security Council (UNSC) sanctions regimes, and sanctions by partners to create a reinforcing architecture of pressure on proliferators. For Libya and Iran, this diplomatic and economic isolation—and the prospect of its removal—played no small part in their decisions to reverse course and negotiate a solution that rolled back their nuclear programs.

Of course, the U.S. track record is not perfect. Israel, Pakistan, and India stand out as instances where a combination of determined proliferators, delayed detection, and a lack of U.S. willingness to apply coercive pressure led to proliferation. North Korea points to another case where collective action has failed. And of course, U.S. policies carried out in the name of nonproliferation have had negative consequences: The U.S. invasion of Iraq is the most extreme example. But on balance the track record is one of success, especially given the dire predictions of proliferation in the early years of the Cold War.

To be sure, the United States is not solely (or perhaps even in some cases primarily) responsible for the development of these tools. And many of them are not the purview of the United States alone. But broadly speaking, the formation and maintenance of these barriers share a common thread: U.S. leadership. These tools grew out of a world in which the United States possessed the attendant levers of political, economic, and military influence that come with a dominant position. And Washington operated within an international system that it had shaped to its principles and preferences. But past performance is no guarantee of future results. Shifting global power dynamics raise new questions about the utility and adequacy of these tools—and the ability of the United States to wield them—to meet future proliferation risks.



U.S. Ambassador to the United Nations Nikki Haley votes at a meeting of the U.N. Security Council to impose sanctions on North Korea in December 2017. The United States' ability to inflict economic harm on would-be proliferators is a key element of the U.S. nonproliferation toolkit. (Spencer Platt/Getty Images)

Assessing the Strengths of the Nonproliferation System

When it comes to slowing the spread of nuclear weapons, what is working well? Where do the bulwarks of nonproliferation remain robust? There are several trends and tools that will likely continue to bolster international efforts to constrain proliferation in the coming years. For that reason, the decision to embark on a nuclear weapons program will remain a risky one.

These trends and tools include, but are not limited to, the following:

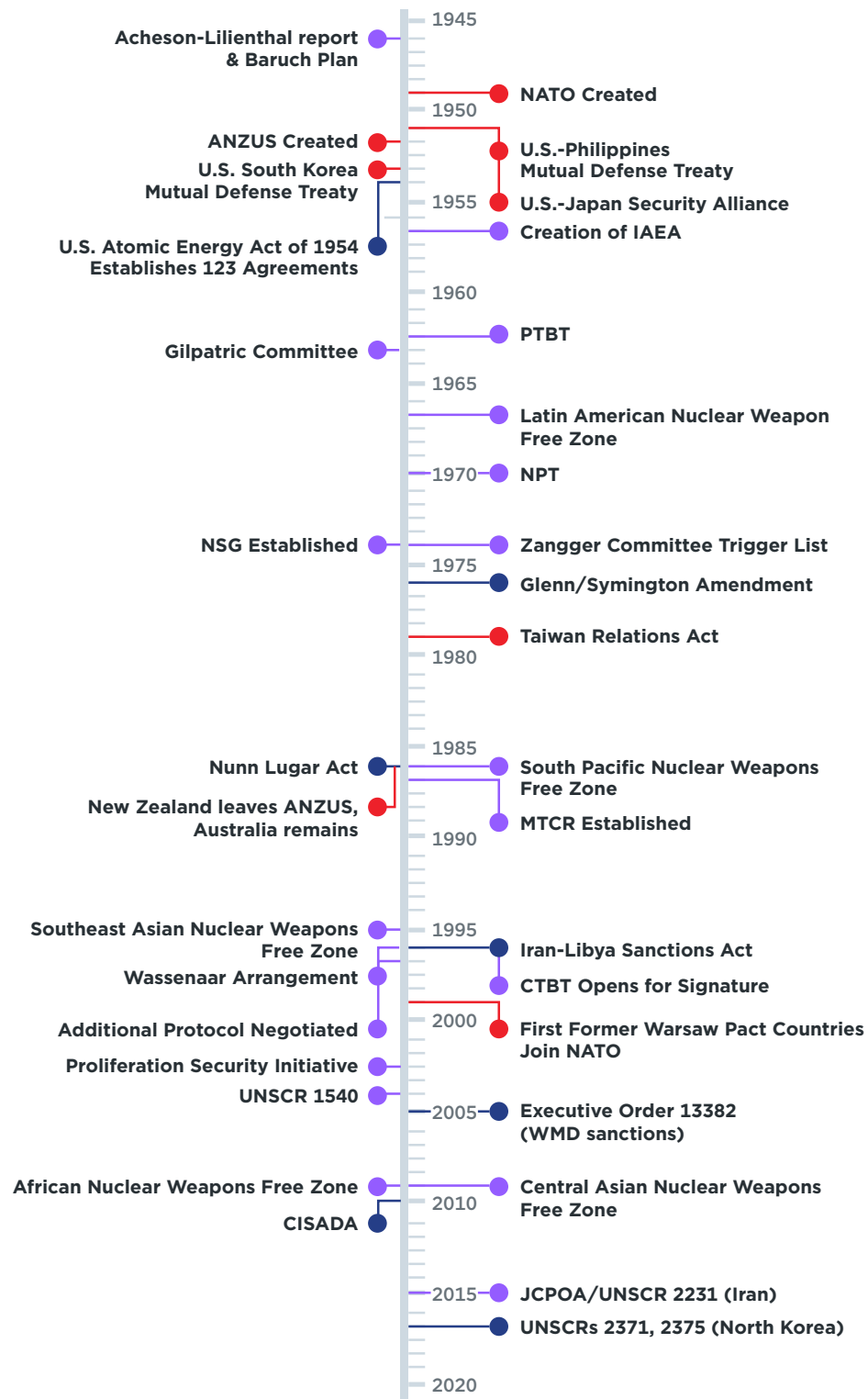
The sale or transfer of sensitive nuclear technologies—such as enrichment and reprocessing (ENR) capabilities—by most governments to countries that do not yet have these capabilities remains unlikely.

This makes it difficult for states that might want to acquire these capabilities to purchase them. This is in part due to commitments made by supplier states in international regimes such as the Nuclear Suppliers Group. It is also because doing so would undercut some supplier countries' nuclear export models and economic interests (which rely on the sale of such fuel and spent fuel take-back arrangements) and because of general recognition that aiding nuclear proliferation is not in their strategic interests. There are valid concerns that Russian and Chinese dominance of the nuclear energy export market could mean looser nonproliferation restrictions on budding nuclear energy programs.²²

FIGURE 2.

The Nonproliferation Toolkit: A Timeline

- MULTILATERAL TOOLS
- SECURITY COMMITMENTS
- U.S. UNILATERAL TOOLS



The United States and the international community have established a variety of treaties, organizations, and other tools to prevent the spread of nuclear weapons. These can be broadly organized into three categories: U.S.-provided security commitments, multilateral tools, and unilateral tools and policies employed by the United States. This timeline is intended to be illustrative and highlight key developments; it is not exhaustive.

(See Trend 5 for a discussion of these risks). But there are few reasons to believe the governments in Moscow, Beijing, or other major powers would sell enrichment or reprocessing technologies directly and knowingly in the current environment.

The IAEA—the organization charged with verifying that nuclear materials are used only for peaceful purposes—on balance remains highly capable, providing the international community with an important means of detecting and pursuing potential proliferation concerns. The adoption of the AP by many countries has aided this ability (though is still lacking in several important cases, including Argentina, Brazil, Egypt, Saudi Arabia, and Syria). The successful use of more sophisticated monitoring technologies in Iran suggests a potential future where such tools can be more widely applied, providing greater confidence that programs remain peaceful. (See the Policy Recommendations chapter for more on how to do so.) The United States and allied countries will need to continue to complement the IAEA's role in monitoring and detection with their own independent intelligence capabilities.

There is much nonproliferation inertia. Generally, nonproliferation remains a widely desirable goal within the United States and across the international community. Nearly every country that does not already have nuclear weapons is a party to the NPT, and only one country has ever withdrawn. Though there are variations among states over exactly how important nonproliferation is, which policies best advance it, and which harm it, there is general consensus—particularly among liberal democratic states—that increasing the number of nuclear-armed states would be harmful to international security. The conscious and public decision by almost all nonnuclear weapon states to renounce nuclear weapons—and for many of those states, bureaucratic investment and commitment in that decision—makes it difficult to reverse.

The United States and several other countries remain capable—if needed—of carrying out military strikes against proliferation programs that pose a threat. The threshold for doing so would probably be high, and the consequences and response by the targeted country could be substantial. The United States and its allies

would also need to detect such programs far enough in advance and have sufficient information about them. And such efforts might only disrupt and delay a program rather than outright end it—a concern that persists over the debate on any U.S. strike against Iran's nuclear program. These are all reasons why this option has been rarely used throughout history. (Examples include Israel's strikes on Iraq's program in 1981 and on Syria's covert reactor in 2007.) But in a world in which softer nonproliferation tools have dominated, it is important to recognize that this option still exists.

Although the U.S. role as the financial heavyweight is declining, economic statecraft can continue to play a supporting role for nonproliferation and counterproliferation. Indeed, few countries would want to risk the economic devastation that Iran has suffered due to its nuclear pursuits. Continuing to use these economic tools, however, will require a more judicious approach, and their utility will not remain indefinitely. (See Trend 6 for more on these risks.)

CHAPTER 2

Seven Trends that Will Shape the Future of Proliferation

The preceding strengths notwithstanding, there are new reasons to question whether the international community's relatively successful nonproliferation track record will last into the future. The barriers that the United States and its partners have helped erect to thwart the spread of nuclear weapons—most of which are rooted in a world in which the United States was *a*, if not *the*, dominant power—are strong, but not self-sustaining. As the international system evolves, the foundation on which this formidable set of barriers rests is eroding.

Two likely hallmarks of the emerging international environment stand out as particularly relevant for proliferation: declining U.S. influence and gradual withdrawal from the international order, and a more competitive security environment, particularly among major powers.

First, the U.S. role in—and relationship with—the international order that it helped create and lead for more than 70 years is changing. While challenges to this order and U.S. dominance of it—defined often as the “liberal” or “rules-based” international order—are not new, they have accelerated. In addition, Washington now seems less inclined to support, defend, and advocate for the pillars of this order—such as alliances, international institutions, and free trade—than it has in the past.²³ The question of whether the United States *wants* to lead—and whether it sees the rules-based order as necessary or desirable for that leadership—is increasingly relevant, urgent, and as of yet, unanswered.

Some have pinned these developments and views squarely on President Donald Trump and his administration. But that is an oversimplification. While Trump's “America First” approach has fueled the erosion of the rules-based order, it certainly did not start it, nor will it end when he departs office. Skepticism of free trade, international institutions, and foreign military commitments will likely remain in American politics. Indeed, one of the few areas of emerging bipartisan agreement is that the United States must be more circumspect and restrained in its use of military force (with a spectrum of views on exactly how restrained) and that allies must do more for their own security. How parties and presidents implement this in practice will vary, but the consensus is notable. Across the political divide, retrenchment is increasingly viewed as a necessary, if not desirable, strategy to address a variety of America's political, economic, societal, and security problems.²⁴ Moreover, as seen from the United Kingdom and Brexit to political shifts in Hungary and Turkey, these patterns of growing nationalism, retrenchment, and resentment of globalization are not limited to the United States.



As a presidential candidate, Donald Trump speaks out at a rally at the U.S. Capitol against the Iran deal in September 2015. Three years later, in May 2018, President Trump withdrew from the agreement. Deep political polarization continues to make it difficult for Washington to agree on sustainable approaches to address nuclear challenges. (Chip Somodevilla/Getty Images)

Even for those who wish to sustain the current international system and the U.S. position within it, there are serious questions about the U.S. ability to do so. An unpredictable oscillation between engagement and retrenchment every four to eight years would bring its own challenges and make it incredibly difficult for allies to place their trust—let alone security—in U.S. hands.²⁵ Deep political polarization at home also makes it harder for Washington to agree on sustainable approaches to address nuclear challenges. The U.S. participation in the Joint Comprehensive Plan of Action (JCPOA), followed by its withdrawal and now again debates about whether to reenter, provides one example.

A second defining feature of the emerging environment with implications for proliferation is the more competitive security environment—namely, competition between the United States and China, and the United States and Russia. It is impossible to predict how the nature of this competition will evolve over time, but managing contestation itself will likely play a central role in U.S. national security planning.

If current trends are any indication, this competition will be global in scope, and take place across multiple domains (e.g., trade, geography, space, etc.). It will also put a premium on working with allies and partners. This will be easier said than done, as allied views of the threat and appropriate policy measures are not always in alignment with those of the United States. In the nuclear realm, the effects of this competition to date have been

most noticeable in the decline of arms control, which some fear is leading to a new arms race. But strategic competition will likely have consequences for nuclear proliferation and nonproliferation as well. Reaching consensus on nonproliferation challenges will be harder, and China's growing influence may afford it a greater ability to counter or dilute U.S. nonproliferation and counterproliferation policy measures in a way that neither Beijing nor Moscow could during the Cold War.

These structural changes will have important implications for proliferation and U.S. policies to combat it. The following section details seven key trends that are rooted in, or will be shaped by, these geopolitical shifts. Collectively, these trends have three broad implications for proliferation and U.S. policy. First, they stand to increase pressures on countries to seek nuclear weapons or related capabilities as a hedge. Second, they will almost certainly challenge the U.S. ability to effectively wield the traditional "carrots and sticks" of nonproliferation and counterproliferation policy and dilute the effectiveness of those tools. Finally, they could increasingly pit U.S. nonproliferation goals against other policy objectives, forcing harder tradeoffs. This suggests that the United States must adapt its policies unless it wants to be faced with a more proliferated world in the future.

1. Nuclear threats are increasing, and regional security environments are becoming more tense, thereby creating proliferation pressures.

Countries that pose a threat to the United States and its allies—including Russia, China, and North Korea—are modernizing and expanding their nuclear arsenals and behaving more aggressively. Even if Iran refrains from producing nuclear weapons, its latent capacity to do so and malign activities in the region will require U.S. attention. Russia and China in particular are throwing their military, political, and economic weight around in new ways that, to varying degrees, threaten the United States and its allies directly, and are placing additional stresses on the U.S. alliance system. Although not determinative of proliferation, deteriorating security environments and nuclear threats can act as primers for countries to reassess their own nuclear needs.

After a period of nuclear decline, Russia is revamping its nuclear and missile arsenal in ways that complicate U.S. and NATO deterrence. This includes dual-capable conventional and nuclear forces, a variety of new delivery systems (e.g., hypersonic missiles, nuclear-armed unmanned underwater vehicles, etc.), nonstrategic systems, and a potential willingness of Moscow to use

It is too early to predict how the COVID-19 pandemic will shape international power dynamics. Nevertheless, early developments suggest that without an about-turn in U.S. management of the disease, the pandemic is likely to accelerate existing geopolitical trends. Indeed, the U.S. and Chinese reactions to the COVID-19 pandemic appear to both reflect and reinforce competition as the defining feature of the relationship. The result could be a world in which U.S. credibility and influence are further degraded, perhaps significantly.

nuclear weapons in smaller numbers early in a conflict.²⁶ In addition, Russia's military intervention and seizure of territory in Georgia (2008) and Ukraine (2014) and attempts to influence and destabilize domestic politics in Europe and the United States are fueling concerns that, after a post-Cold War peace, the Russian threat has reemerged.

China's slow but steady pace of improvements to its conventional and nuclear forces—such as increasing the range, precision, and survivability of its missile force—are increasing U.S. concerns about its ability to access and operate in the region during a conflict.²⁷ Beijing's attempts to expand influence and leverage—from its 5G network, to the Belt and Road Initiative, to military bases in the South China Sea—have the United States and some of its allies on edge. And China appears increasingly willing to use these levers to penalize countries for adopting policies inimical to Chinese interests: China's sanctions against Seoul in response to the 2017 deployment of the U.S. Terminal High Altitude Area Defense (THAAD) missile defense system cost South Korea billions of dollars, and in June of this year Australia suffered a broad and sophisticated cyberattack that almost certainly originated in China.²⁸ China's growing ability to contest U.S. military dominance in the region and its use of coercive gray zone tactics have kicked off a yet unresolved debate among the United States and its European and East Asian allies about the best means to address them.

North Korea's nuclear arsenal continues to grow unchecked. No longer a country with a handful of potentially undeliverable nuclear weapons, North Korea has nuclear and missile capabilities—probably including thermonuclear weapons—that are expanding. Pyongyang now has the ability to reach the United States with an intercontinental ballistic missile (ICBM)—a capability it did not have just a few years ago—and can deliver nuclear weapons to targets within the region.²⁹ The question of



China's military showcases its new DF-41 intercontinental ballistic missile at a parade. The missile can reportedly reach the United States and bear both conventional and nuclear warheads. China's efforts to improve its conventional and nuclear forces have raised concerns about the United States' ability to confront China in the region if conflict were to unfold. (Kevin Frayer/Getty Images)

alliance decoupling has again become real, and the prospect of denuclearization is increasingly small. The threat from North Korea and questions about U.S. reliability have led to increased public debate over the past several years among South Korean politicians and pundits about Seoul's nuclear options.³⁰ North Korea's advancing nuclear and missile capabilities have also led Japan to consider developing its own missile strike options to prevent or respond to a North Korean attack.³¹

At the time of this writing, Iran has cast aside many of the key constraints imposed on its nuclear program by the JCPOA in response to the U.S. withdrawal from the deal. As a result, Iran's nuclear program continues to gradually expand, shrinking its breakout timeline. But even if the United States had remained in the JCPOA—and even if a new diplomatic arrangement can be found to halt and roll back Iran's progress—over time, Iran's technological advancement and fewer constraints on its civil nuclear program will inevitably add to Tehran's nuclear latency, putting it in a better place to produce nuclear weapons. This will pose its own challenges, including increased anxieties among Iran's neighbors—such as Saudi Arabia—and potentially feed their need for nuclear expansion.

These security challenges will not automatically result in nuclear weapons programs, but they provide fertile ground for weapons ambitions to take root, especially when combined with doubts about the credibility of U.S. security commitments.

2. U.S. allies and partners are losing trust and confidence in the United States—including Washington's willingness to uphold its security commitments—increasing the risk that they will seek nuclear weapons or weapons-relevant capabilities. Relatedly, the United States could find itself hard-pressed to adequately assure allies to address any proliferation ambitions that do emerge.

Since the early years of the Cold War, U.S. commitments to provide for the security and defense of other countries—be it through treaty-based alliances or less formal commitments and partnerships—have played an important role keeping proliferation at bay. In short, allies do not need their own nuclear weapons because they can rely on the U.S. nuclear umbrella, so-called trip wire troops stationed abroad, and advanced conventional military capabilities. And when confronted with an ally considering proliferation in the past, the United States

threatened to reduce these security commitments—or alternatively, to enhance them—to prevent an ally from proliferating. But fundamental trust in the United States appears to be on the decline, increasing the risks of proliferation by U.S. allies and partners.

A loss of allied confidence is worrying precisely because it is concerns about the credibility and reliability of U.S. security commitments that have historically motivated U.S. allies to revisit their nuclear weapons options, and in some cases work to develop the bomb. This list includes West Germany, Japan, South Korea, Australia, and Taiwan.³² For example, President Richard Nixon’s policy announced in 1969 that allies should do more to shoulder the burden associated with their defense (i.e., the “Nixon Doctrine”), planned troop drawdowns, and U.S. efforts to normalize relations with communist China helped stimulate South Korean and Taiwanese nuclear weapons ambitions.³³

Of course, allied hand-wringing about U.S. reliability is as old as the alliances themselves. And to be sure, the degree to which allies and partners are concerned about U.S. reliability today—and the specific reasons why they are concerned—differ, as do their potential options to address those concerns. (For an illustration of these differences, see the case studies in Chapter 3.) But the current crisis of confidence in U.S. leadership is notable because its underlying causes are both acute and chronic. Trump’s transactional approach to alliances—specifically, his view that the United States should be financially compensated by its allies for U.S. troop presence and security commitments—is a sharp break from past practice, which emphasized shared objectives and values. His frequent and public musings about whether the United States would honor its defense commitments and his open maligning of allies—while embracing the very authoritarian leaders the alliances are designed to

Allies and partners thus fear that the problem is not confined to Trump alone, but rather reflective of a broader shift in the U.S. political debate.

defend against—have justifiably alarmed Washington’s partners. And it is not mere rhetoric: His snap decision to curb U.S.-South Korean joint military exercises after meeting with North Korean leader Kim Jong Un and the sudden decision to withdraw a third of U.S. troops from Germany—apparently made without consulting Berlin—are just two examples of real-world impact.³⁴



U.S. President Donald Trump and South Korean President Moon Jae-in participate in bilateral discussions in 2018 in New York City. The Trump administration’s insistence that South Korea increase its contributions to the costs of hosting U.S. forces in South Korea by 300 percent has drawn strong criticism from South Korean officials. (The White House/Flickr)

But, as discussed above, in many ways Trump and his administration’s skepticism of and hostility to the pillars of the international order are not unique to him or his administration. The structural changes to the international system and the U.S. role in it—including a shift in the U.S. domestic debate toward retrenchment and belief that the international order no longer advances U.S. interests—cannot be entirely disentangled from Trump’s worldview and those who support it. Allies and partners thus fear that the problem is not confined to Trump alone, but rather reflective of a broader shift in the U.S. political debate, and the turning away of the American people from the commitments and costs of upholding the international order. It is therefore not difficult to imagine how allied confidence in the United States could similarly wane to a point where partners reevaluate their nuclear options.

While no country appears to be bolting for the bomb yet, several countries—such as South Korea and Japan—have the basic knowledge and capabilities to build one, and polls suggest the majority of South Koreans support a nuclear weapons program.³⁵ In 2018, Saudi Arabia threatened to build nuclear weapons if Iran does, and in 2019 Turkey hinted at nuclear weapons aspirations as well.³⁶ There has also been an uptick in the public debate in Germany in recent years on alternatives to relying on the U.S. extended deterrent, and a prominent Australian defense thinker has argued that Australia may find itself

in a position where it needs to develop its own nuclear weapons.³⁷ And these are just public statements. It is almost impossible to know based on open source information what types of discussions may be going on behind closed doors in allied capitals.

A decision by allies and partners to withdraw from the NPT and dash for the bomb is unlikely. A more practical and likely approach would be to advance hedging strategies by improving their nuclear or conventional capabilities in ways that better position them for nuclear weapons. For example, several countries appear to be furthering development of indigenous ballistic or cruise missile capabilities, including Saudi Arabia, South Korea, Taiwan, and Turkey.³⁸ Japan also is advancing its space launch program, including successful development of a three-stage solid fuel rocket.³⁹ Although these programs are at vastly different stages of technical progress and there is no overt connection to nuclear weapons ambitions, they nevertheless can improve potential nuclear delivery options. (See Chapter 3 for more information on South Korean, Saudi, and Turkish nuclear ambitions and capabilities). Managing these developments will be challenging for the United States: On the one hand, allied acquisition of more advanced conventional (and in some cases, even nuclear) capabilities might enhance deterrence and aid burden sharing. On the other hand, they could come with destabilizing proliferation potential. (See Trend 7 for more on these challenges in an era of strategic competition.)

It is possible that the United States—recognizing this credibility gap and being confronted with a proliferation challenge—could adequately address allied concerns about deterrence and assurance. This could occur through some combination of retaining or adding troops or conventional capabilities—or perhaps even nuclear weapons capabilities—to the region, conventional arms sales to the ally, or successfully encouraging them to invest in their own defense. But the same geopolitical shifts that lead to allied concern are likely to constrain the U.S. ability to apply some of these traditional measures. U.S. pullback from the international community, its inability to transfer capabilities that a country believes it needs, and continued domestic challenges for allies increasing their defense expenditures could make a solution elusive. Thus, assurance gaps—and therefore nuclear motivations—would remain. In a worst-case scenario, allied perception that Washington’s security guarantees were no longer credible would also challenge the U.S. ability to use these commitments as nonproliferation leverage. (As previously mentioned, Washington has successfully used security guarantees to curb

nuclear weapons exploration in countries such as South Korea and West Germany.)⁴⁰ If allies do not perceive Washington as willing and able to provide for their security, then threats to withdraw such commitments or promises to reinvigorate them will have little impact on allied decisions about whether to proliferate.

It is difficult to predict when these dynamics could lead a country to seek nuclear weapons. Conventional wisdom holds that U.S. partners will pursue their own nuclear options once they have lost faith in the United States as a security guarantor. But such a conclusion is likely to be gradual, opaque, more informal than formal, and subject to debate and revision. As such, it will be hard for the United States to know when such a moment has arrived. Moreover, leaders considering whether to build the bomb down the road have to make guesses *now* about their future security environment. For that reason, their beliefs about whether the United States is likely to become more or less reliable, whether threats are likely to increase or decrease, and whether tensions in the alliance are likely to be more or less frequent and intense matter a great deal. It is hard to see how they would predict greater stability and reliability over the long term. As a result, the United States will need to keep a close watch on the nuclear motivations and capabilities of some of its closest partners.

3. The rise of authoritarian leaders is increasing the chances of nuclear proliferation.

There is a correlation between certain types and characteristics of autocratic rulers and their propensity to go after the bomb.⁴¹ These leaders face fewer domestic checks on nuclear weapons ambitions and might be more willing to try to weather international pressure. The rise of authoritarianism as a global phenomenon—particularly among some U.S. allies and partners—is therefore worrying from a proliferation perspective.

Personalist dictatorships—that is, regimes in which a single individual “enjoys enormous personal discretion over government decisions”—are both more likely to pursue nuclear weapons and face fewer political constraints in doing so than other types of leaders, according to research by Christopher Way and Jessica Weeks.⁴² Such leaders might also exhibit traits of “oppositional nationalism”—which is a combination of both fear and pride—that makes particular leaders inclined toward nuclear weapons development.⁴³ To the degree that future autocratic leaders participated in a rebellion against existing governing structures on their path to power, they are more likely than other “nonrebels” to

see nuclear weapons as valuable.⁴⁴ Current Egyptian President Abdel Fattah el-Sisi, for example—who was involved in the 2013 coup that removed democratically elected leader Mohammed Morsi—fits that criteria.

Not only do personalist authoritarian leaders seem more inclined toward the bomb, but their hold on power can in some ways make it easier for them to carry out their plans. Weaker or less-independent government institutions, cowed political opposition, and curbs on a free press reduce potential checks on a nuclear weapons program. Such leaders might also be more willing to flout their legal commitments under the NPT and be less concerned with international nonproliferation norms.

Unfortunately, the rise of authoritarian rulers—many of them fitting the “personalist” model—and curbs on democratic freedoms and institutions are growing trends.⁴⁵ This includes NATO allies. Hungarian Prime Minister Viktor Orban has effectively diminished political opposition and has curbed independent institutions.⁴⁶ Under Polish President Andrzej Duda, politics have drifted to the extreme right and the independence of the judiciary and media has been curtailed.⁴⁷ Turkish President Recep Tayyip Erdogan’s gradual consolidation of power has coincided with a widening strategic divide and mistrust between Ankara and Washington.⁴⁸ Of these leaders, only Erdogan has publicly hinted at the desirability of nuclear weapons. But the context of his comments—rooted in a critique of the fairness of the international system—is also worrying. While Turkey is

probably not looking to start a nuclear weapons program anytime soon, his comments suggest that the basic intent and worldview that can drive such programs are there.

Although Saudi Arabia and Egypt are no strangers to authoritarian governments, the personal influence and power of Crown Prince Mohammed bin Salman (MBS) and el-Sisi, respectively, is notable. The former has announced its intention to acquire nuclear arms if Iran does, and Egypt, under previous authoritarian leaders, has explored nuclear weapons in the past.⁴⁹ Both leaders are subject to few domestic checks on their power, making it easier for them to initiate and carry out covert nuclear activities should they choose to do so. Similarly, under far-right populist leader Jair Bolsonaro, Brazil has articulated plans to grow its already substantial nuclear program—including by expanding its enrichment capacity and building a nuclear-powered submarine. Bolsonaro’s son (who serves in Brazil’s legislature and is a close aide to his father) talked in 2019 about how possessing nuclear weapons would benefit Brazil.⁵⁰

There is one silver lining: Some hallmarks of authoritarian regimes—such as hollowed-out state capacity or the micromanagement of scientists by their political leaders—make these countries particularly bad at nuclear weapons development.⁵¹ While that might help build in additional time for detection and policy action, it is hardly a source of comfort. It is unclear how pervasive authoritarianism will be and whether democratic forces could recover ground in several of these countries. But the rise of autocratic leaders suggests that proliferation problems could begin to occupy more of the U.S. agenda.

4. Prospects are dim for arms control measures that can further reduce U.S. and Russian nuclear weapons or cap growing global nuclear weapons arsenals. As a result, the bargain at the heart of the Nuclear Non-proliferation Treaty (NPT)—whereby nonnuclear weapon states refrain from acquiring nuclear weapons and in exchange nuclear-armed states work toward disarmament—is likely to come under further strain.

The modicum of cooperation between the United States and Russia on nuclear issues that historically survived even rough patches in the relationship is nearly nonexistent. For much of the later years of the Cold War and post-Cold War period, it was taken almost as a given that the United States and Russia would continue to find ways to reduce their arsenals. The only question was how low they could go. These patterns of cooperation no longer



Turkish President Recep Tayyip Erdogan shakes the hand of Saudi Crown Prince Mohammed bin Salman (MBS) on a visit to Saudi Arabia in February 2017. Both Erdogan and MBS have sought to consolidate their own power within their respective countries. (Kayhan Ozer/Anadolu Agency/Getty Images)

hold, and arms control agreements that were crucial to limiting and reducing nuclear arsenals and contributing to strategic stability between Moscow and Washington are an endangered species: The Intermediate-Range Nuclear Forces (INF) Treaty is dead, and the New Strategic Arms Reduction Treaty (New START)—which the Trump administration has signaled it is not keen to extend—will expire in January 2021. Russia is already developing a suite of new nuclear weapons systems, and the United States has fielded and plans to develop new capabilities in response to perceived gaps in deterrence.⁵² The reasons for the demise of bilateral arms control measures are multiple and beyond the scope of this report, but it is highly likely that the result will be fewer formal constraints—and more unpredictability—between the world’s two biggest nuclear powers. An arms race—or even the perception of one—will make it harder for Washington and Moscow to defend the notion that they are trying to live up to their NPT commitments to work toward disarmament and, even outside of the NPT context, stands to have deleterious effects on nonproliferation.

Russia and the United States are not the only ones to blame. China, Pakistan, India, and North Korea are also modernizing and/or growing their nuclear weapons stockpiles and delivery systems (See Trend No. 1 for details). These trends do not bode well for the nonproliferation treaties and agreements not yet in force, and whose implementation many nonnuclear weapon states see as vital for the health of the nonproliferation

Russia and the United States are not the only ones to blame.

regime and the NPT. For example, it is hard to see how the Comprehensive Nuclear Test Ban Treaty (CTBT)—which opened for signature in 1996, making it the treaty that has been opened the longest without going into effect—will come into force anytime soon. The prospective Fissile Material Cut-Off Treaty (FMCT), which aims to prohibit the production of material that can be used in nuclear weapons, has failed to even reach the stage of negotiation. The potential for new agreements governing nonproliferation is uncertain at best (the fate of the Iran nuclear deal is one cautionary tale), particularly given the environment of distrust and the perception of growing politicization of arms control within the United States.

A decline in arms control agreements can impact proliferation in other ways as well. One potential consequence, for example, could be the U.S. deployment



The 2010 Nuclear Non-proliferation Treaty (NPT) Review Conference convenes its opening meeting at the United Nations in New York. As cooperation on arms control deteriorates, the norms the NPT has enshrined for decades are at risk. (Eskinder Debebe/United Nations/IAEA Imagebank)

of INF-range systems on allied territory. While this might enhance deterrence and assurance, it could also raise new nonproliferation challenges. For example, a U.S. INF-range system in East Asia would likely worsen North Korea’s threat perceptions, making it harder at least in the near term to reach a deal that limits the North’s nuclear threat. It could also cause China to increase its capabilities in ways that pose a threat to U.S. allies, especially Japan.

Vertical proliferation (i.e., an increase in the quantity or quality of nuclear weapons systems within countries that already have nuclear weapons) may not immediately or directly lead to horizontal proliferation (i.e., the spread of nuclear weapons to additional states that do not already have them), but it spells trouble for the health and viability of the NPT. Namely, it further calls into question whether nuclear weapon states are upholding their commitment to make progress toward disarmament (Article VI of the treaty). It is hard for the recognized weapons possessors to convince others that they are acting in good faith to meet their disarmament commitments if they are building new systems and appear to be deliberately shunning new ways to enhance stability and reduce nuclear risks.

Of course, countries do not make the fateful decision to acquire nuclear weapons based on whether disarmament is proceeding too slowly. But such frustrations have—and will—make it harder for countries to support strengthened nonproliferation controls (e.g., AP adherence and measures to prevent abuse of the NPT’s withdrawal

provision). These frustrations have also prompted the movement that led to the Treaty on the Prohibition of Nuclear Weapons (TPNW), which opened for signature in 2017 and is viewed by nuclear weapon states and many who benefit from the U.S. nuclear umbrella as undermining nonproliferation and disarmament goals because it operates separate from—and therefore erodes confidence in—the NPT. Finally, public statements in just the last few years by officials in Turkey, Saudi Arabia, and Brazil about the value of nuclear weapons show the limits of nonproliferation norms, and a growing dissatisfaction with the delineation between nuclear “haves” and “have-nots.”

Countries remain deeply vested in the nonproliferation regime, and its disappearance in the foreseeable future is unlikely. But it is at best an open question whether a consensus on that regime will remain “good enough” in a vastly different geopolitical environment.

5. The ability of the United States to use civil nuclear energy sales and assistance to advance nonproliferation objectives is declining.

Washington has long leveraged the ability of the United States to export nuclear reactors, fuel, and technology as a means to promote nonproliferation controls (such as constraints on enrichment and reprocessing activities by countries receiving U.S. nuclear technology, and increasingly the adoption of the AP) and as a carrot and stick to convince countries to end nuclear weapons programs. But the United States is no longer the major player in the nuclear energy market. The increasing ability of China, Russia, and others to provide nuclear assistance on more competitive terms—and with fewer nonproliferation strings attached—is eroding the U.S. ability to write the rules of the game. If the United States has fewer nuclear energy clients, it is less able to monitor and shape the nuclear trajectory of key countries, including if necessary threatening to cut off its energy partnership to curb proliferation behavior.

For decades, U.S. prominence in the civil nuclear energy market allowed it to influence the policies and technologies of nuclear aspirants, bending them away from proliferation sensitive activities. It did so in two primary ways. The first is through legal frameworks—known as 123 agreements—required for any nuclear sales; these agreements mandated that any country receiving U.S. assistance agree to a set of restrictions on what they could use the technology for, to include seeking the consent of the United States before enriching or reprocessing any nuclear material it provides.

Washington also used those same 123 agreements and the potential for U.S. nuclear energy assistance as leverage to convince countries to agree to additional restrictions on their ability to enrich or reprocess material and to implement the AP, which provides greater assurances that the nuclear program will be for peaceful purposes. This has not been a one-size-fits-all approach, but it has allowed the United States to require stronger assurances than would have otherwise been possible.⁵³ Cementing cooperation on civil-nuclear issues also provides the United States—via Americans working closely with foreign counterparts on major projects—to have insights into that country’s nuclear thinking, and therefore an opportunity to influence their decisions.

Second, the United States has leveraged countries’ dependency on U.S.-supplied nuclear technologies to rein in proliferation sensitive activities. For example, evidence suggests that Sweden’s dependence on U.S.-supplied heavy water and other nuclear technology—and the risks that nuclear weapons development would result in disruption of that supply—contributed to Stockholm’s decision to forgo nuclear weapons. In addition, U.S. threats to end civil nuclear cooperation with South Korea and Taiwan—both of which relied on U.S.-supplied materials and technologies to initiate what they hoped would be substantial nuclear energy programs—were important to forcing those countries to end their nuclear weapons ambitions in the 1970s and 1980s.⁵⁴



U.S. Under Secretary for Arms Control and International Security Ellen Tauscher and United Arab Emirates Ambassador Yousef Al Otaiba bring the U.S.-United Arab Emirates civilian nuclear agreement into force in 2009. The agreement is known as the “gold standard” for 123 agreements because the United Arab Emirates legally committed to refrain from any enrichment or reprocessing. (U.S. Embassy Abu Dhabi)

But the United States is now largely absent from the global nuclear energy market, and a handful of other suppliers, notably China and Russia, have stepped in to fill that gap. Beijing and Moscow offer more competitive financial terms (in large part because their nuclear organizations are state-backed entities) and do not require the same nonproliferation controls. Not surprisingly, Russia and China also see nuclear sales as a way to broaden their political, economic, and military ties with recipient countries, including U.S. partners.⁵⁵ This is confronting the United States with a dilemma: Push hard for more stringent nuclear restrictions (such as those on ENR) at the risk of having no deal, or back off to secure the sale. This threatens to both lower global nonproliferation standards and reduce U.S. leverage over potential future proliferators.⁵⁶

The United States is now largely absent from the global nuclear energy market, and a handful of other suppliers, notably China and Russia, have stepped in to fill that gap.

This is already occurring in the competition over Saudi Arabia's nuclear future, where Riyadh is playing U.S., Russian, Chinese, French, and South Korean offers off one another to secure the best deal with fewer nonproliferation restrictions.⁵⁷ Only the United States is pushing for a Saudi commitment to forgo any ENR and adopt the AP—requirements Riyadh has balked at so far. If the United States lowers its nonproliferation requirement to win the bid, the reactor contract would maintain an important lever to influence Riyadh's nuclear goals. But the Saudis' future ability to pursue ENR would be less restrained, and this could lead other countries in the region whose 123s are up for renewal—Egypt (December 2021) and Turkey (June 2023)—to press for similar bargains. This could prompt the United Arab Emirates—which has a clause in its 123 that allows it to renegotiate the terms of its deal if another country in the region is granted more favorable terms—to press for loosened ENR restrictions.

Without a major shift in the U.S. approach to its nuclear industry, Washington's ability to use this important nonproliferation lever will likely decline, and budding nuclear power programs will likely face fewer nonproliferation controls on their activities.

6. The effectiveness of sanctions as a nonproliferation tool will likely diminish as countries develop ways to reduce their impact and U.S. financial dominance erodes over the long term. In addition, the risks and costs of sanctions use for the United States will increase as future sanctions targets will increasingly have the ability to retaliate.

U.S. use—and some would argue abuse—of economic sanctions is prompting a backlash. Countries and actors are developing workarounds and seeking ways to shield themselves from—and respond to—economic penalties imposed by Washington. This will make it harder for the United States to dissuade countries from engaging in sensitive activities related to nuclear weapons or their means of delivery and make it harder to convince third parties (such as allies) to follow the U.S. policy line. It also will diminish the effectiveness of U.S. counterproliferation measures that seek to block countries' ability to fund illicit weapons programs or purchase related technologies abroad.

The U.S. use of economic sanctions has grown substantially over time. This is true for the number of entities (e.g., individuals, companies, government organizations) on the receiving end of sanctions, the number of sanctions programs, and the number of policy problems to which sanctions are applied.⁵⁸ Sanctions have been particularly popular as a nonproliferation and counterproliferation tool, used both to cause sufficient economic pain to force countries to reevaluate the wisdom of their nuclear programs, but also in a more targeted and tactical way to disrupt countries' ability to sell and acquire nuclear and related technologies. Whenever possible, Washington has tried to couple its own sanctions programs with sanctions through the UNSC and allied sanctions. But Chinese and Russian resistance to supporting tougher measures at the U.N., combined with gaps in enforcement, has left much of the work to U.S. unilateral sanctions and like-minded partners to pick up the slack. Sanctions played an important role in convincing Iraq, Libya, and Iran to reconsider their nuclear pursuits and have been viewed as an essential component to maintaining pressure on North Korea across multiple U.S. administrations. These efforts have been possible because of the dominant role of the United States and the dollar in the global economy. If countries want to do business, then they invariably must interact with the components of this economy, providing the United States with enormous leverage.

But there are three reasons why sanctions as we know them today will have diminishing returns as a nonproliferation tool and their employment will no longer be “consequence free” for the United States.

First, U.S. overreliance on sanctions as a foreign policy tool—particularly when the policy goal underlying their use is viewed with deep skepticism by partners—is causing countries to take steps to insulate themselves against U.S. economic warfare.⁵⁹ For example, the 2018 U.S. withdrawal from the JCPOA (a deal it negotiated with European allies and Russia and China) and the subsequent reimposition of sanctions on Iran—including the threat of secondary sanctions against European entities—prompted Germany’s foreign minister to call for a European payment processing system independent from the United States.⁶⁰ Such measures, although nascent, will gradually erode the power of U.S. secondary sanctions.

The flip side of this issue is equally problematic: Washington has not done well when it comes to removing sanctions and restoring a country’s economic health when that country “complies” with U.S. demands. Sanctions were reimposed on Iran despite the fact that it was adhering to the nuclear deal. Even prior to the U.S. withdrawal from the JCPOA, however, Iranian officials were frustrated that the deal did not bring the economic recovery they expected and had sold to domestic audiences, in part because of the chilling effect of the sanctions that remained. Similarly, reflecting in 2005 on whether his decision to abandon Libya’s WMD and related missile programs was worth it, then-Libyan leader Moammar Gadhafi remarked that while the United States and the United Kingdom had issued “nice words,” their follow-through to aid Libya in emerging from decades of international sanctions—which Gadhafi said was important to “show the world that those who wish to abandon the nuclear weapons program will be helped”—was lacking.⁶¹

Second, proliferators are finding new ways to work around sanctions. The game of using front companies, false end-user certificates, and flags of convenience to avoid U.S. and international counterproliferation tools is well known, and will no doubt continue. But countries are increasingly turning to new methods such as use of cryptocurrencies and cybertheft that are harder to counter. For example, North Korea’s cybertheft of billions of dollars from banks and cryptocurrency exchanges shows that hard-fought progress in passing new U.N. sanctions to cut off North Korea’s exports—and thereby reduce its revenue—can be wiped out in a couple of clicks.⁶² Washington will need to develop new tools if it hopes to keep pace with its adversaries.

Finally, the United States will not hold the keys to the international financial system forever. As the economic influence of other countries grows, U.S. clout and the power of the dollar will gradually be diluted. China, Russia, and Europe are to varying degrees pushing for alternatives to the U.S.-dominated international payments system known as SWIFT (Society for Worldwide Interbank Financial Telecommunication). Digital currencies are also gaining ground.⁶³ As a result, targets of U.S. sanctions will increasingly have the ability to avoid the U.S. dollar, and the United States will find it harder to impede unwanted nuclear activities. Relatedly, that shift in the balance of financial power is likely to both create new economic vulnerabilities for the United States, and incentivize and enable major financial players—namely, China—to increase their use of sanctions and other economic, trade, and financial “sticks.” Although Beijing has rarely used sanctions to date, that will almost certainly change as its economic clout and foreign policy ambitions grow.⁶⁴

But rising competitors are not the only countries where Washington will face sanctions challenges. Washington is most comfortable waging economic war against so-called rogue states. It is easier to attract international support (although by no means easy), and such countries have few means of meaningfully retaliating diplomatically or economically against the United States. However, given the risks posed by allied proliferation, the United States should begin thinking through how it might apply its economic coercive toolkit to partners in the future environment. U.N. sanctions



A new yuan-based digital currency backed by China’s central bank has allowed Iran to avoid dollar transactions and bypass U.S. financial institutions. (bfishadow/Flickr)

against “nonrogues” for proliferation behavior, however, will almost certainly be more politically complex: It could require making sensitive intelligence public. Washington also might find itself trying to shield its ally from international opprobrium. Perhaps most importantly, the international system is vastly different now than it was in the 1970s and 1980s—the last time the United States faced serious risks of allied proliferation. A full assessment of how allied dependencies vis-à-vis the United States have changed is beyond the scope of this study, but it is safe to say they are probably less. Although allies’ diplomatic, economic, and military ties to the United States in some ways present more levels

Allies have a more sophisticated list of response options than do states that are more politically and economically isolated from the world.

of influence than adversaries, pulling those levers for, say, Japan presents far more challenges and risks than a North Korea. And those levers are a two-way street: Allies have a more sophisticated list of response options than do states that are more politically and economically isolated from the world. Turkey’s threat to shut down Incirlik Air Base—widely believed to host U.S. nuclear weapons—in response to potential U.S. sanctions and a congressional move to recognize the Armenian genocide is one example.⁶⁵

The effects of these changes will not be felt overnight, and a variety of global developments could accelerate or slow efforts to find alternatives to the dollar. Nevertheless, the net result will be that the U.S. economic dominance that has enabled it to wield its economic toolkit so effectively, and with little thought of the consequences, will not persist forever.

7. The more competitive relationship between the United States and Russia, and the United States and China, will likely impede cooperation on nonproliferation and complicate U.S. implementation of nonproliferation policy.

First, a new era of deepened mistrust, competition, and differing objectives between Washington, Moscow, and Beijing is already hampering cooperation on arms control. That discord is beginning to spill over into

nonproliferation. Second, a focus on strategic competition as the top policy priority could, in some cases, be at odds with nonproliferation objectives and lead to those objectives taking a back seat. This could occur because the United States is loath to put pressure on a proliferating ally for fear that doing so would jeopardize cooperation against a shared adversary. It could also occur if, in seeking to bolster allied conventional military capabilities and enhance burden sharing, the United States provides or allows capabilities that improve a country’s ability to build nuclear weapons and/or the means to deliver them.

Debates over the extent, characteristics, and relevance of strategic competition are ongoing. And the precise nature of this environment and the perceived policies needed to manage it will no doubt evolve. But a recognition of the heightened rivalry among great powers—namely, the mounting challenges Russia, and particularly China, pose to U.S. strategic interests—stands out as a rare area of bipartisan consensus. So, too, does the perception that managing that rivalry should be an important, if not central, framework for guiding U.S. national security policy. There is also consensus that the United States cannot undertake this task alone: Allies and partners will be essential. At a minimum, therefore, it is worth examining how a more competitive environment could impact proliferation—and there is some reason to worry.

First, the lack of trust between the United States and Russia, and the United States and China, widening gaps in their perceptions of what is “good” for international security, and relatedly, the dearth of cooperation on global security challenges do not bode well for nonproliferation cooperation. The negative impact this is having on arms control is perhaps the most visible. But there are signs that practical cooperation on nonproliferation challenges—even a common recognition of the importance of nonproliferation—is breaking down. Russia and China increasingly turn a blind eye to North Korean and Iranian sanctions evasion and shield North Korea, Iran, and Syria from criticism for their proliferant behavior in international forums. For example, Russia has waged a campaign to cover up Syria’s use of chemical weapons.⁶⁶ There is therefore a risk that practical cooperation on key nonproliferation challenges will grind to a halt.

Since the mid-1960s, Washington and Moscow have been important sources of both nonproliferation “demand”—the general belief that fewer nuclear weapon states is better for them—and, albeit with imperfect records and variations, nonproliferation “supply,” by creating and upholding policies to promote

nonproliferation. China's track record is spottier, particularly when it comes to enforcing export controls (and it frequently condemns and opposes U.S. unilateral measures), but on balance Beijing has come to see nonproliferation as in its interest. But it is unclear whether—in a new environment of heightened competition and tensions—there will be sufficient consensus among these powers on nonproliferation's relative priority, what constitutes a future proliferation risk, and the steps required to counter it. As the Iran and North Korea cases show, for example, China's support (or the lack thereof) for the diplomatic process and its willingness to implement sanctions can make a major difference in the success of nonproliferation policy.

China's growing military, economic, and political influence also mean that China will get a bigger "vote" in how future proliferation crises play out. Beijing may no longer be content to emphasize dialogue and lowered tensions, but may feel increasingly confident and compelled to retaliate against U.S. or allied nonproliferation or counterproliferation measures that impinge on Chinese interests.⁶⁷ U.S. and allied vulnerabilities vis-à-vis China—from trade, to critical technologies and materials (e.g., semiconductors and rare earth elements)—provide China with a variety of potential response options. China is also likely to be particularly concerned should it conclude that U.S. allies in Asia were seriously considering nuclear weapons or developing capabilities that made it easier to produce them. The United States and China probably would not be aligned on either the perceptions of those risks or the necessary policy response and, unlike in the past, strategic competition would likely shape their views of the stakes and options.

Second, it is plausible that a perceived need to compete with Russia and China—or even regional nuclear powers like North Korea—and keep allies and partners on its side might lead Washington to downplay concerns about a partner's nuclear ambitions. Pressuring an ally over suspect nuclear activities or goals—developments that are almost never clear-cut—might be undesirable if the United States believed doing so would make cooperation harder on other priority issues, like countering shared adversaries. Greater U.S. emphasis on burden sharing and efforts to enhance allied capabilities—which, given U.S. domestic political and economic trends, is likely to take on an increasingly important role in U.S. policy—might also result in partners developing or acquiring capabilities useful for nuclear weapons and the means to deliver them, even if that is not the U.S. intention.

WHY THIS IS NOT A COLD WAR REDUX

Nonproliferation is generally perceived as something that great powers can agree on, and the United States and Soviet Union cooperated on nonproliferation during the Cold War. So why is this emerging period of strategic competition different?

The Cold War competition took place in a bipolar world between two peers. But the new competition is about the erosion of unipolarity (the U.S. place in the international system) and a transition to a more multipolar environment. Those transitions can be unpredictable, and multipolar worlds pose coordination challenges for nonproliferation.⁶⁸

During the Cold War, competition was primarily military and ideological: It was about two competing "systems," and spheres of influence and contested areas were relatively known, if not static. But the next phase of competition will likely occur across multiple intersecting domains with less regard to specific geographic boundaries. As a result, actions taken by one party for reasons totally unrelated to nonproliferation could have an impact on nonproliferation policy, and vice versa.

Rival powers are far more interdependent now than during the Cold War. As U.S. influence diminishes—and the clout of China and others grows—the United States will have more vulnerabilities, particularly in the economic realm. Economic tools are critical for nonproliferation, and Washington will not be able to wield these without costs and risks.

The Cold War had its shares of proliferation failures: India, Pakistan, and Israel went nuclear. And many more countries began—and later abandoned—weapons programs.

Allies or partners pursuing a hedging strategy could exploit this situation—a dilemma whereby the United States recognizes an ally faces a security gap but is unable or unwilling to fill it—to put pressure on Washington to allow them to acquire capabilities that improve their nuclear or missile capabilities. As noted above, one area where this is already playing out is in the civil nuclear energy market, where geopolitics—in addition to economics, energy, and nonproliferation—is an increasing factor in state decisions on whom to partner with for nuclear energy development. It is plausible that countries such as Saudi Arabia or Turkey might capitalize on U.S. fears that they are being drawn closer to Russia or China to push for similar U.S. concessions.

The idea that nonproliferation goals could lose out to other objectives is not without historical precedent.

Competing priorities limited U.S. willingness to use coercive measures to try to prevent Israel and Pakistan from developing nuclear weapons. For example, throughout the 1980s the Carter and Reagan administrations waived nonproliferation sanctions against Pakistan for its nuclear program because doing so would have endangered the U.S. ability to fight the Soviet invasion of Afghanistan. The United States also provided economic and military aid to Pakistan without any real conditions on Pakistan's nuclear program (other than asking Pakistan not to test nuclear weapons). The United States maintained this policy—and publicly argued that continuing aid made it less likely Pakistan would develop nuclear weapons—despite knowing of Pakistan's nuclear progress.⁶⁹

Developments involving Saudi Arabia and South Korea are two current examples that provide useful insights for how competition may influence U.S. nonproliferation policies.

The Trump administration has largely refrained from criticizing or enforcing any consequences for several Saudi decisions that were clearly contrary to U.S. policy interests and goals—the role of its leadership in the 2018 murder of U.S. resident Jamal Khashoggi being the most prominent among them. In defense of its policy decision and Saudi actions, U.S. officials have cited the broader geostrategic importance of the U.S.-Saudi relationship against Iran, and Riyadh's willingness to buy U.S. military hardware.

This same pattern can be seen in how the United States has recently handled nuclear and missile developments within the Kingdom. This includes reports that Saudi Arabia has been secretly working to enhance its missile and nuclear capabilities with Chinese assistance—developments that would normally set off alarm bells within the United States.⁷⁰ When the issue of Saudi's missile program came up during April 2019 testimony, Secretary of State Mike Pompeo responded that Saudi Arabia was “doing what they need to do to create a deterrence tool,” and he suggested it might be better if the United States (rather than China) sold Saudi such technology.⁷¹ These comments and an apparent lack of serious U.S. objection send the message to Saudi and other would-be proliferators: that when it comes to partners, the United States is willing to look the other way on proliferation concerns.

South Korea has reportedly explored on- and off-again the development of a nuclear-powered submarine, and President Moon Jae-in reportedly raised this issue with Trump in 2017.⁷² This capability could bolster allied efforts to counter North Korea, but Seoul could also try to leverage this as a justification for needing its own

uranium enrichment capability to fuel the submarine. Similarly, the range and payload limits on South Korea's missile program—put in place in 1979 as a result of U.S. proliferation concerns—have been periodically raised at the insistence of South Korean officials. Trump apparently agreed in principle to scrap the payload limits altogether after a likely appeal from Moon in a phone call a day after North Korea announced it had conducted a thermonuclear weapon test.⁷³ Since the lifting of those constraints, South Korea has carried out testing of an 800km-range missile with a payload capacity of 2 metric tons (large than any payload in South Korea's existing arsenal).⁷⁴ In July 2020, it was announced that the United States would allow South Korea to use solid fuel for the development of its space launch vehicles, which could indirectly aid Seoul's ability to develop even longer-range missile systems.⁷⁵ While these policy adjustments might improve South Korea's ability to deter and respond to a North Korean attack, they could also allow South Korea to improve its nuclear delivery options.

The point is not that the United States—or Russia, or China—will consciously decide to abandon nonproliferation in favor of proliferation. Nonproliferation in principle and in the abstract will continue to be seen as desirable, but it is in the specifics where harder tradeoffs and disagreements will occur. Individual policy choices and compromises over time could result in a shift away from nonproliferation, even if that is not the goal.

CHAPTER 3

Case Studies: Evaluating Three Potential Proliferators Against the Trends

The primary aim of this report is to identify and assess key geopolitical trends that will shape the future proliferation landscape. But because ultimately proliferation decisions are made by individual leaders and governments, it is useful to apply the trends identified in this report to three countries that—for various reasons—could develop nuclear weapons within the next 10–20 years: South Korea, Saudi Arabia, and Turkey.

South Korea

With deep nuclear expertise, an increasingly tense regional threat environment, and the state of its alliance with the United States in flux, South Korea presents a potential future proliferation risk. Although South Korea is major proponent of nonproliferation and a key player in the broader nonproliferation regime, it has pursued nuclear weapons in the past, and public support for a theoretical indigenous weapons program remains high. In recent years, South Korean elites and politicians have had an increasingly open debate about Seoul's future nuclear deterrent options. South Korea's nuclear path may also bear on that of other U.S. partners, including Japan. Seoul's perceptions of the credibility and durability of U.S. security commitments, and the evolution of the North Korean and Chinese threats and the way the United States chooses to manage them, are likely to bear strongly on whether South Korea chooses to develop nuclear weapons.

NUCLEAR HISTORY AND CAPABILITIES

Despite hesitations to join the NPT, under U.S. pressure South Korean President Park Chung-hee signed the treaty in 1968, although the country did not ratify it until 1975. Park began a secret nuclear-weapons program in 1970, prompted in large part by doubts about U.S. security commitments stemming from the Nixon Doctrine (which called on Asian allies to take on more responsibility for their own defense), the administration's decision to withdraw the 7th Infantry Division from South Korea, and pursuit of rapprochement with China.⁷⁶ This program operated at varying levels of speed, intensity, and cohesion throughout the 1970s. During that time, the United States pursued a concerted diplomatic effort to convince South Korea to end its program. This included threats to cut off U.S. support to South Korea's civil nuclear program and reevaluate its security commitments, as well as convincing potential suppliers (also U.S. allies) not to sell sensitive technology to Seoul. South Korea responded by trying to deny, resist, and periodically take steps to mollify the United States. After Park's assassination in

1979, his successor, Chun Doo-hwan, finally terminated South Korea's nuclear weapons-related activities.⁷⁷ Nevertheless, South Korea also engaged in periodic undeclared laboratory-scale experiments on enrichment and reprocessing technologies between 1982 and 2000, and some reports suggest South Korea considered a nuclear weapons program again in the early 1990s. Although these former experiments were carried out by civilian organizations and there is no evidence they were tied to a nuclear weapons program, South Korea did not initially declare these to the IAEA as required.⁷⁸ The IAEA has since (2008) certified that all of South Korea's nuclear material is declared and dedicated to peaceful activities.

Today, South Korea is a world leader in peaceful nuclear research and development, has a growing civilian nuclear export sector, and is a key nonproliferation advocate. It has 24 nuclear-power reactors that supply nearly one-third of its electricity, with four more planned to go online by 2022. While South Korea has no ability to enrich uranium or reprocess plutonium it remains interested in developing these technologies, and U.S. objection is a continued point of friction in the relationship.⁷⁹ Although the Moon administration has announced plans to phase out nuclear energy over the long term, it is unclear whether such plans will survive future governments. The country also has an advanced short-range ballistic and cruise missile program. South Korea thus retains much of the technical expertise that it could apply toward a nuclear weapons program if it ever chose to do so.



U.S. President Richard Nixon meets with President Park Chung-hee of South Korea in San Francisco in August 1969. Though Park signed the NPT in 1968, he began a secret nuclear-weapons program in 1970, prompted in large part by doubts about U.S. security commitments stemming from the Nixon Doctrine. (Dave Randolph/The San Francisco Chronicle via Getty Images)

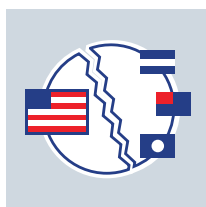
SOUTH KOREA COMPARED AGAINST THE SEVEN KEY TRENDS



1. Increasingly tense regional environments

North Korea's nuclear and missile programs are advancing, posing challenges to South Korea's ability to deter and defend against the North

Korean threat. The nascent North Korean ICBM capability also raises the prospect of "decoupling" Washington from Seoul during a crisis, and the likelihood of North Korean denuclearization seems extremely low. The emergent challenges of a rising China with increasing regional ambition, and uncertainty about the role South Korea plays in the growing U.S.-China competition, have created additional security challenges for South Korea. Historically tense relations with Japan have also taken a downturn, with nationalistic political parties leading the governments of both countries. With three nuclear-armed states in the region, some South Koreans desire their own nuclear weapons capability to "escape being a shrimp among whales."⁸⁰ South Koreans' expectations about their ability to manage these threats—and the degree to which they believe the United States and South Korea are in strategic alignment in facing them—will no doubt shape Seoul's future nuclear choices.



2. Decreasing confidence in U.S. defense commitments

Under the Trump administration, U.S.-South Korean relations have reached a low point. Trump's rhetoric and policy—for example, his indifference

to the alliance, the surprise announcement to halt joint military exercises in 2018 after his meeting with North Korea's Kim, and U.S. excessive demands and heavy-handed tactics during cost sharing negotiations associated with the U.S. troop presence on the peninsula (known as the Special Measures Agreement, or SMA)—have undermined South Korean trust and confidence in the United States as a security partner. This is particularly worrying because a crisis of confidence in the United States was also an important driver for South Korean pursuit of nuclear weapons in the 1970s. At the working level, the alliance remains strong and capable and retains bipartisan support in Congress. Nevertheless, Seoul remains concerned about the present state of relations and the long-term trajectory of U.S. foreign policy and the potential for U.S. retrenchment.



3. Rise of Authoritarianism

South Korea's history as a democracy is relatively short, but its democratic institutions are robust. Some developments—including abrupt political transitions and former presidents

being indicted on corruption charges—have contributed to political polarization within South Korean domestic politics and could over time erode public faith in government. But there is nothing to suggest South Korea is taking a turn back toward authoritarian government any time in the foreseeable future.



4. Arms control in decline and NPT under strain

South Korea is highly supportive of the NPT and committed to non-proliferation, with a large presence across multiple international

nonproliferation initiatives, including as a member of the Nuclear Suppliers group, and Operational Experts Group in the Proliferation Security Initiative. South Korea also hosted the second Nuclear Security Summit in 2012. These strong nonproliferation credentials, however, exist awkwardly alongside calls by some South Korean politicians and pundits for an indigenous nuclear deterrent. The potential for U.S. conventional INF-range systems in East Asia as well as any U.S. development and deployment of a sea-launched cruise missile (which could theoretically be deployed in Asia) would introduce new variables into the South Korean debate over the role of nuclear weapons in its security. For some, such capabilities might be perceived as enhancing assurance and deterrence, but for others, such moves could exacerbate the China threat and further erode the prospects for North Korean denuclearization.

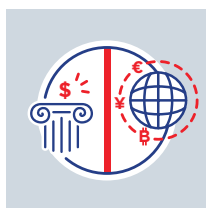


5. U.S. ability to leverage nuclear energy sales and assistance facing decline

South Korea's expertise in nuclear technology is robust. It is one of only a handful of countries oper-

ating in the reactor export market and has ambitions to increase its market share over the coming years. Thus, South Korea is no longer directly reliant on U.S. export credits and technology in the way that it was in the 1970s, when the United States threatened to withhold

that cooperation to curb Seoul's nuclear weapons ambitions. Nevertheless, South Korea relies on other countries (including U.S. allies) for uranium and enrichment services, and it uses U.S. technology in some of South Korea's nuclear reactors (nuclear power generates about 30 percent of South Korea's electricity) and its civil nuclear technology exports. This provides the United States and its partners with important leverage.⁸¹ In theory, the United States could cut off its technical involvement in South Korea's nuclear energy program, endangering its nuclear export ambitions and significantly damaging its domestic energy production at a likely cost of billions of dollars. But such a move is a double-edged sword: The United States would be losing out on an important nuclear partner, and it would undercut the U.S. ability to operate in the nuclear energy market. South Korea also manufactures some components for nuclear reactors being built in the United States, so a U.S. cutoff could presumably result in South Korean retaliation.⁸² South Korea is cognizant of the impact of its reliance on the United States: One of the reasons it wants to develop ENR capabilities is to escape such restrictions and be able to operate more independently (what South Korea has referred to as "peaceful nuclear sovereignty").⁸³



6. Effectiveness of U.S. sanctions diminishing

U.S. economic leverage over the South is in many ways lower today than it was during Seoul's 1970s weapons program, when the country

was more dependent on economic ties with the United States. South Korean trade with China now far exceeds its trade with the United States. Nevertheless, South Korea's economy is highly dependent on foreign trade (trade as a share of gross domestic product is over 80 percent) and relies almost entirely on energy imports, making it vulnerable to international sanctions.⁸⁴ Any attempts to impose economic costs on South Korea for proliferation behavior would also have to contend with the fact that South Korea is the 12th largest economy in the world: Thus, damage can be done in both directions.



7. Shifting global dynamics due to strategic competition

If the United States were worried that pressing Seoul on any proliferation concerns would endanger

the relationship and put at risk its ability to compete with China, Washington might find itself willing to ignore or downplay such concerns. The U.S. response to the revelations in the early 2000s about previously undeclared enrichment and reprocessing experiments—which was guided in part by not wanting to embarrass South Korea and create unnecessary hurdles with North Korea—provides an example for how Washington might respond.⁸⁵ If the United States had vague information, believed such work was in early stages, or thought it could be quietly managed bilaterally, Washington might once again look to shield its ally. In an effort to bolster Seoul's own defensive capabilities, Washington might take steps that—even if well intentioned—contribute to Seoul's ability to produce or deliver nuclear weapons. Given that China has a strong interest in South Korea remaining nonnuclear, Washington could find itself pressured by Beijing to take a stronger response or be forced to manage a scenario in which China initiates its own penalties on South Korea. These dynamics would have spillover effects and potentially aggravate the U.S.-China relationship and further undermine the U.S.-South Korea alliance.

WHAT TO WATCH FOR

Continued North Korean nuclear and missile advancements and provocations. While South Korea has probably "priced in" the continued growth of North Korea's nuclear and missile stockpile, a North Korean test (or series of tests) that established a reliable ICBM capability would resolve—in a very public way—the current doubts behind whether such a capability exists. This would add new urgency to concerns about alliance decoupling. Similarly, a surprise development could rekindle serious nuclear weapons debates in Seoul. This could come, for example, as rapid and unexpected North Korean progress toward fielding a submarine-launched ballistic missile (SLBM), or a severe crisis (such as one on par with the 2010 *Cheonan* sinking) that suggests a more aggressive and confident North Korea. North Korea is likely to increasingly adopt "gray zone" tactics in the coming years, creating opportunities for surprise that could potentially undermine U.S.-South Korea alliance cohesion.

The appearance of slackening U.S. commitment to the goal of denuclearization. There is a growing chorus of voices in Washington calling for an arms control approach with North Korea that either pushes denuclearization to the distant future or abandons it entirely.⁸⁶ Adopting such an

approach—particularly if Seoul felt it was not adequately consulted—would raise concerns, particularly among conservatives and moderates within South Korea, that Washington was accepting North Korea’s nuclear status and would potentially fuel Seoul’s nuclear weapons ambitions.

Unilateral U.S. moves that decrease South Korea’s faith in the viability of the U.S. security guarantee. Any serious debate over withdrawing a portion of U.S. troops from South Korea—akin to those of the 1970s—would prompt deep concern in Seoul. Even U.S. decisions to withdraw conventional forces elsewhere—such as Trump’s decision to curb and cap U.S. troops in Germany—would make South Korea nervous, as would any instance in which Washington was perceived to have not met its treaty obligations to come to the defense of an ally. Changes to U.S. nuclear policy and capabilities—such as the adoption of a No First Use policy—would likewise cause concerns.

Progress pushing on the enrichment and reprocessing door. The joint U.S.-South Korea study of the feasibility and implications of pyroprocessing—a technology that Seoul sees as holding promise to help with spent fuel management, but that is closely related to reprocessing, which can produce plutonium for nuclear weapons—is scheduled to conclude in 2021. Whatever the outcome, it is likely to fall short of a U.S. “green light” for the development of this capability and its eventual use. But it could lead to the ENR door opening a bit more. Similarly, the United States should continue to watch for South Korean civilian or defense initiatives that could be aimed—at least in part—to provide justifications for enrichment and reprocessing (such as the development of nuclear-powered submarines, mentioned in Trend 7).

Saudi Arabia

Saudi Arabia’s interest in nuclear capabilities is based on both strategy and prestige. Riyadh is most concerned about nuclear competition with Iran and argues that since the JCPOA allowed Iran to maintain some domestic enrichment capability, Saudi Arabia—as a close U.S. partner and nonviolinator of the NPT—should be able to have capabilities equal to Iran’s if not greater.⁸⁷ Intensifying regional competition between Iran and Saudi Arabia, and the progression of Iran’s nuclear program, may be the single most important driver of Saudi Arabia’s nuclear future. If Iran returns to compliance with the JCPOA or reaches a new agreement that keeps the program limited and under strict international monitoring, this will likely lead to restraint from Saudi Arabia on nuclear weapons (though it may not change Riyadh’s desire to at least keep open the option for enrichment). But if regional tensions escalate and Iran expands its nuclear program or actually produces nuclear weapons, this could trigger a regional arms race: Indeed, MBS, the crown prince, has publicly threatened to produce nuclear weapons if Iran does.

A second critical factor that will shape Saudi nuclear decisionmaking is its relationship with the United States. Washington has been the de facto guarantor of Saudi security for well over 50 years. But a series of developments—including a belief by Saudi leaders that both the Obama and Trump administrations have left Saudi Arabia exposed, albeit in different ways—have shaken Saudis’ trust in Washington. In addition, several developments—Saudi Arabia’s role in the Yemen conflict, its murder of Khashoggi, and a general sense that Riyadh is taking a more authoritarian and unpredictable turn under the influence of MBS—are prompting questions among U.S. officials about the sustainability of the relationship. Saudi Arabia’s nuclear capabilities remain minimal, and depending on the level of external assistance, it could take Riyadh years to well over a decade to develop nuclear weapons. But the situation is worth watching, as many of the strategic drivers of a nuclear weapons program or a hedging strategy are already present.

NUCLEAR HISTORY AND CAPABILITIES

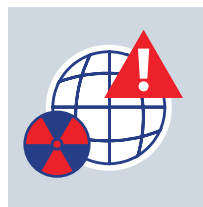
Despite bold initial public pronouncements about its nuclear plans (for example, in 2011, Saudi Arabia announced plans to build 16 nuclear reactors by 2030),⁸⁸ domestic uncertainty about the role of nuclear energy in its energy future and a lack of urgency have hindered Saudi Arabia’s ability to grow and develop its nuclear program. The country is party to the NPT and has a

Comprehensive Safeguards Agreement (CSA) with the IAEA (though its CSA will need to be updated as Saudi Arabia's nuclear program expands).⁸⁹ In 2015, although Saudi Arabia stated it would further develop its nuclear capabilities in response to U.S.-Iran negotiations, Riyadh had taken only modest steps forward.⁹⁰ Riyadh is nearing completion of a research reactor—the first such reactor in the country. In 2020, it was also reported that Riyadh had been developing a yellowcake production facility with Chinese assistance, but such claims have not been confirmed.⁹¹ Saudi Arabia has also announced intentions to develop several nuclear power reactors as part of its civil nuclear energy program and has solicited and received bids from the United States, China, Russia, South Korea, and France; however, these projects have been repeatedly pushed back, with most now scheduled to be completed by 2040.⁹²

The United States and Saudi Arabia for years have been in a dialogue regarding potential provision of U.S. technology and materials in support of this effort, and in 2008 they signed a memorandum of understanding demonstrating an intent to cooperate on nuclear activities.⁹³ But the two have thus far been unable to conclude a 123 agreement, which is required if the United States wants to build nuclear reactors in Saudi Arabia. Saudi Arabia has refused U.S. requests that Riyadh commit to refrain from enrichment and reprocessing and that it implement the AP, which would allow the IAEA to have greater access to the Saudi program.

It would be technically challenging for Riyadh to develop key elements of the fuel cycle or other elements of a weapons program given its limited nuclear expertise and defense industrial base. As a result, the Saudis would probably seek foreign assistance. Few, if any, countries would probably be willing to knowingly provide assistance with sensitive technologies such as enrichment or reprocessing. Saudi leaders have a close relationship with Pakistan, and it has been rumored that there is some type of bargain that would require Pakistan to aid a Saudi nuclear weapons effort, and perhaps even provide nuclear weapons itself.⁹⁴ This latter scenario seems unlikely given the consequences for Pakistan if it were found to have transferred a nuclear weapon to a country that did not yet have them. It is certainly plausible, though, and perhaps even likely that Saudi could seek out Pakistani assistance if it embarked on a covert nuclear weapons program.

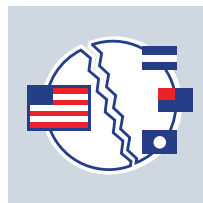
SAUDI ARABIA COMPARED AGAINST THE SEVEN KEY TRENDS



1. Increasingly tense regional environments

Saudi Arabia's ongoing rivalry with Iran for regional influence is a central factor in the kingdom's nuclear weapon calculus. Iran's

increased regional aggression—including attacks against Saudi oil facilities—and ramping up of its nuclear program after the U.S. withdrawal from the Iran nuclear deal have heightened the threat Iran poses to the Saudis. The conflict in Yemen along the Saudi southern border and demonstrated ability of the Houthis—a key Yemeni party to the conflict and who receive supplies and support from Iran—to launch attacks and missile strikes directly into Saudi territory have heightened Riyadh's sense of vulnerability.⁹⁵ Although Saudi Arabia continues to rely on the United States for its security and military equipment, it is noteworthy that, in the face of a growing Iranian missile threat, Riyadh has reportedly begun to take steps toward improving its own missile capability.⁹⁶



2. Decreasing confidence in U.S. defense commitments

A key part of the U.S.-Saudi relationship has always been the security guarantee offered by the United States since 1945 in exchange for

stable energy supplies. But this relationship is fraying. Since the shale revolution, the United States is no longer as reliant on Saudi oil supplies.⁹⁷ Further, recent events have also called America's commitment to defending Saudi Arabia into question. The Saudis felt betrayed by the Obama administration's pursuit of the JCPOA, which in their view did not address their concerns about Iran's regional behavior while leaving the Iranians too close to a nuclear weapon. However, the Trump administration's escalatory strategy toward Iran has also caused anxiety in Riyadh, especially when the United States did not respond to the Iranian attack on Saudi Aramco facilities at Abqaiq and Khurais in September 2019.⁹⁸ Meanwhile, with the exception of the strong personal ties between Trump and the Saudis, the remainder of the Washington establishment—including both Republicans and Democrats in Congress—is moving away from Saudi Arabia due to tension over the killing of Khashoggi, the humanitarian toll of the war in Yemen, and Saudi Arabia's

historic support for a conservative Wahhabi Islam that directly contributed to the 9/11 terrorist attacks against the United States (and more recently, the December 2019 shooting of several U.S. military personnel by visiting Saudi airmen at a U.S. base).⁹⁹



3. The rise of authoritarian leaders

MBS was initially seen as a progressive reformer by the West and has made positive changes to Saudi society. However, he has sought to consolidate his own power in the

kingdom and has pursued an aggressive, often reckless foreign policy. The crown prince was instrumental in starting the Saudis' military campaign in Yemen, the Gulf Cooperation Council (GCC) boycott of Qatar, and the attempted removal of Lebanese Prime Minister Saad Hariri.¹⁰⁰ MBS has also engaged in impulsive and brash behavior to cement his authoritarian grip on power, as he did when he orchestrated the murder of journalist and dissident Khashoggi, a U.S. resident at the time of his death.¹⁰¹



4. Arms control in decline and NPT under strain

Although party to the NPT, Saudi Arabia's use for arms control agreements rests largely on the ability for such an agreement to prevent Iran

from obtaining a nuclear weapon. Saudi Arabia's deep rivalry with Iran led to its skepticism of the JCPOA, despite the deal being broadly supported in the international community. Fears over Iran's long-term nuclear goals and a sense of prestige and need for parity with Iran have driven Saudi Arabia to insist on maintaining its right to enrich and reprocess. Riyadh has also dragged its feet on updating its safeguards arrangements with the IAEA, which will be necessary to allow inspectors to keep pace with Saudi nuclear ambitions.¹⁰² In addition, MBS threatened that Saudi Arabia will build nuclear weapons if Iran does—which would be in violation of Riyadh's NPT commitments.¹⁰³ Collectively, these positions have raised concerns about Riyadh's commitment to transparency and nonproliferation.



5. U.S. ability to leverage nuclear energy sales and assistance facing decline

U.S. negotiations with Saudi Arabia on a 123 agreement have stalled, with the Saudis continuing to refuse ENR

restrictions and adoption of the AP.¹⁰⁴ Riyadh is currently playing several countries off each other in addition to the United States—including Russia, France, China, and South Korea—in an effort to not only seek the best price for nuclear cooperation but also the most minimal non-proliferation restrictions. Should the United States lose out on this bid, Washington would lack a crucial lever for influencing the future of the Saudi nuclear program.



6. Effectiveness of U.S. sanctions diminishing

Congressional efforts—such as blocking arms sales to the Gulf nation—to exert oversight on the U.S.-Saudi relationship and to punish

Saudi Arabia for certain behaviors have so far failed to gain the necessary votes, highlighting the U.S. domestic political challenges of sanctioning Riyadh. Indeed, after the killing of Khashoggi, only limited sanctions on a set of Saudi officials were enacted despite calls from many for more extreme action.¹⁰⁵ Separately, existing U.S. nonproliferation legislation that could be invoked if Saudi Arabia pursued a covert enrichment program, for example, would have minimal impact because it targets export credits and other forms of assistance: Saudi Arabia is not a recipient of U.S. aid, but a major purchaser of arms, which gives it meaningful economic leverage. Moreover, despite the reduced U.S. dependence on Saudi oil, the Saudis remain the global swing producer, giving them sizable global economic clout that Riyadh could threaten to use if facing U.S. coercive pressure for proliferation reasons.¹⁰⁶ Given these factors, it is questionable whether the United States—if faced with a proliferation challenge from the Saudis—would possess sufficient political will to enact sanctions and whether existing measures would prove effective, making this threat of potentially limited value.



7. Shifting global dynamics due to strategic competition

Saudi Arabia, if unable to secure the commitments it needs from the United States in regard to defense and nuclear energy, may turn to

Russia and/or China. Beijing and Moscow would not only potentially offer the commitments and equipment Riyadh is looking for, but also do so with few if any concerns about Saudi Arabia's internal governance, Yemen policy, or proliferation risks.¹⁰⁷ The Saudi-Russia relationship is more tense given their competing interests as two major energy producers. But China is playing an increasingly important commercial role in the Middle East and is highly dependent on Middle Eastern oil, valuing access to energy supplies over all other interests in the Saudi-Chinese relationship.¹⁰⁸ If in the years ahead China's role in the Middle East expands, especially into the security space, there are plausible scenarios in which Saudi Arabia could further hedge on its dependence on the United States by aligning more closely with China. (It is worth noting that China has sold Saudi Arabia missile technology in the past.) In any scenario involving Saudi proliferation concerns, China would thus have its own sources of leverage that it could use to help or hurt U.S. interests. Finally, the fear of Saudi Arabia leaning toward Russia and China, and the risk that punitive policy measures would only push Riyadh further in that direction, could lead Washington to take a softer touch on any Saudi proliferation concerns.

WHAT TO WATCH FOR

Major advances in Iran's nuclear program. If the JCPOA breaks down entirely and Iran shrinks its breakout timeline, or if Tehran leaves the NPT, Saudi Arabia may respond by using the threat of proliferation to secure stronger defense commitments from the United States, including the U.S. nuclear umbrella. If sufficiently alarmed, and if its own nuclear capabilities remain minimal at the time of the event, Saudi Arabia might also reach out to Pakistan or other countries for expedited nuclear assistance to jump-start its own program.

A new nuclear agreement or return to the JCPOA over Saudi objections. If a new administration returns to the JCPOA without proper consultations with the Saudis or if the Trump administration cuts a deal with Iran that Saudi Arabia views as a betrayal, it could lead the Saudis to expedite their nuclear plans and invest in developing

more front-end nuclear fuel cycle capabilities (uranium conversion, enrichment, etc.). Even if Saudi Arabia acquiesced to a nuclear deal with Iran, if such a deal included so-called "sunsets" on restrictions to Iranian capabilities, Riyadh may also judge that this presents Riyadh with a "ticking clock" that it must use to build up its domestic nuclear program.

U.S. failure to respond to a severe Iranian attack on Saudi soil, especially one resulting in Saudi casualties. Given its doubt about U.S. security commitments, Saudi Arabia appears to be taking regional diplomacy into its own hands for now. But should Saudi Arabia perceive the United States as failing to come to its aid after a severe attack, particularly if that coincided with a sustained diplomatic impasse with Iran on a new nuclear deal, Riyadh may decide advancing its own nuclear or missile capabilities to be in its interest and would likely seek to acquire the necessary materials and technology with as little oversight and restrictions as possible.

Collapse of negotiations with the United States on a 123 agreement. If Saudi Arabia were to abandon negotiations with the United States in order to sign a minimally restrictive deal with another country, this would decrease the ability of the United States to restrict or oversee Saudi Arabia's nuclear program and stoke U.S. and international fears about Riyadh's nuclear intent. If Saudi Arabia inked a nuclear deal with Russia or China instead, this would have negative reverberations for the broader U.S.-Saudi relationship, deepening mistrust.

The trajectory of MBS' foreign policy. The verdict on the crown prince's foreign policy is still out. He may become more cautious, having learned from some of his early mistakes, or more emboldened and aggressive as he consolidates power. If the latter, this would be a strong indicator that he would be far less sensitive to the political, technical, economic, and military costs and risks of embarking on a nuclear weapons program.

Turkey

Concerns about the possibility of Turkey pursuing nuclear weapons stem from its competitive and dangerous neighborhood and from a widening gap between Turkey and the United States and NATO—which has been the lynchpin of Turkey’s security for almost 70 years—on a range of strategic issues. Most recently, the Syrian civil war on Turkey’s borders has reinforced Ankara’s concerns about regional instability and deepened its rift with the United States, as Turkish, American, and Russian proxies have come into direct conflict. The long-term challenge posed by Iran’s nuclear program—and the potential for Saudi Arabia to follow suit—is also on Turkey’s radar: If Iran quit the NPT or acquired nuclear weapons, this would likely lead Turkey to revisit its own nuclear deterrent needs. Turkey has long been part of NATO’s nuclear sharing program and likely hosts U.S. nuclear weapons at Incirlik Air Base.¹⁰⁹ But mistrust and diverging perspectives between the United States and Turkey are calling into question whether the interests that have guided that relationship still sufficiently overlap. Under Erdogan, Turkey has become more authoritarian and views itself as an important but independent player in a multipolar world. That the NATO nuclear security guarantee could cease to be viewed as relevant or credible in Erdogan’s eyes is not a stretch, particularly if the United States were to remove its nuclear weapons from Turkish soil. This could prompt a search for alternative military options, including investment in its nuclear capabilities as a hedging strategy or, in extreme circumstances, development of its own nuclear weapons.

NUCLEAR HISTORY AND CAPABILITIES

Turkey’s civil nuclear program has a long history but so far its capabilities remain modest and focused mainly on research and medical uses. Ankara has tried and failed to launch nuclear energy programs in the past. However, Turkey has several planned reactor projects underway now. In 1955, it joined the Atoms for Peace Program, which aimed to equip countries with the technological and educational resources to develop civil nuclear programs.¹¹⁰ Turkey ratified the Treaty on the Non-Proliferation of Nuclear Weapons in 1980 and the Comprehensive Test Ban Treaty in 2000.¹¹¹ Turkey possesses research reactors and a small-scale pilot fuel production facility. (Turkey has no enrichment or reprocessing capability.)¹¹² It also possesses uranium reserves. Russia is currently building the first of four planned reactors at Akkuyu, with the first reactor slated to begin operation in 2023.¹¹³

Turkey is one of several NATO countries that reportedly hosts U.S. nuclear weapons under the NATO nuclear sharing arrangement. The sharing system—under which the U.S. stores nuclear weapons in allied territory and trains and certifies NATO allies to deliver those weapons if needed—was in large part to prevent European allies from developing their own nuclear weapons. Through this program, Turkey is widely believed to host about 50 U.S. B61 nuclear gravity bombs at Incirlik Air Base (though there is no permanent air wing there certified to deliver nuclear weapons).¹¹⁴ Turkey’s ejection from the F-35 program and rumors that the United States was considering removing its nuclear weapons have added political and technical complications to Turkey’s nuclear role within NATO.

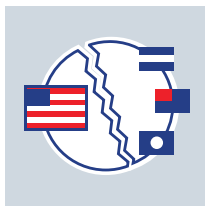
If Turkey ever decided to develop nuclear weapons, it would likely take years to do so, given its limited nuclear infrastructure and expertise.

TURKEY COMPARED AGAINST THE SEVEN KEY TRENDS



1. Increasingly tense regional environments

The Syrian civil war has resulted in mass refugee flow into Turkey and confrontations between Turkey and the United States, Russia, Iran, and Europe and the Gulf States. The United States and Turkey have fundamentally different objectives in the Syria conflict, and increasingly the region. Turkey views U.S. support to Kurdish forces in Syria as a direct threat to Turkey, and resulting Turkish military action against these groups has put U.S. troops in Syria at risk.¹¹⁵ Tensions have boiled over with Europe over Turkish management of the millions of refugees flowing in from Syria and whether Turkey would allow them to continue on to Europe.¹¹⁶ Turkey has also found itself isolated or in the minority on a variety of regional issues: It did not support the Gulf blockade of Qatar, and it has found itself working in opposition to Russia, Egypt, and the United Arab Emirates in Libya.¹¹⁷ Turkey also views Iran as a regional rival. While these tensions are likely contributing to Turkey’s sense of insecurity, it is highly unlikely that these developments alone would push it toward nuclear weapons.



2. Decreasing confidence in U.S. defense commitments

The growing mistrust between Turkey and the United States and sharply diverging perspectives on key issues are straining their rela-

tionship and the broader NATO alliance. The list of disagreements between the United States and Turkey has grown in recent years, as has the severity of those disagreements. As mentioned above, the United States and Turkey have backed groups in Syria that sometimes came into conflict with each other, and the U.S. support to the predominantly Kurdish militia has provoked anger not only from Erdogan but large sectors of the Turkish public since it began in 2014.¹¹⁸ Tensions between Ankara and Washington spiked again over Syria in the fall of 2019 when Trump imposed sanctions on Turkey in an effort to bring an end to its incursion into northern Syria.¹¹⁹ Erdogan's perception that the United States tacitly—and perhaps even actively—supported the attempted coup in 2016 has cast a shadow over U.S.-Turkish relations. U.S. refusal to extradite Fethullah Gulen—a prominent Turkish Islamic activist living in the United States whom Turkey accused as a conspirator in the coup—has fed this perception.¹²⁰ Turkey's insistence on acquiring the Russian-made S-400 air defense system despite strong U.S. objections, and despite the consequences of being removed from the F-35 program, has left Washington wondering why Turkey would risk NATO's interoperability and questioning exactly where Turkey's priorities lie. These concerns have led to growing bipartisan congressional support for a harder line against Turkey and reportedly resulted in U.S. plans to remove its nuclear weapons from Turkey. The future of the U.S.-Turkish relationship—and by extension, Turkey's role within NATO—will be a critical variable that shapes Turkish thinking on whether the U.S. extended deterrent is desirable and credible, or whether Ankara needs to invest in alternative options.



3. The rise of authoritarian leaders

Erdogan has held the reins of power in Turkey for 17 years. During that time, he has centralized his control over Turkey's government by suppressing political opposition and

dissent, diminishing oversight, curbing press freedoms, and installing loyalists throughout the government. He has incorporated populist and nationalist themes into his

governing style, while also fashioning himself a global Islamic leader and positioning Turkey as an independent “pivot” state rather than as allied exclusively with the “West.”¹²¹ Any decision to pursue nuclear weapons would likely be made by Erdogan—probably with input from a few key close advisors. His efforts to centralize power would mean that such a program would be subject to fewer outside checks.



4. Arms control in decline and NPT under strain

Turkey is a member of the NPT in good standing. Nevertheless, Erdogan's September 2019 remarks that it was unfair that some countries

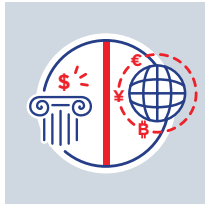
could possess nuclear weapons while others—including Turkey—could not points to Erdogan's frustrations with the current international order. Though almost certainly not an indicator that Turkey intends to build nuclear weapons now or in the near future, this might signal that Erdogan would feel less bound by nonproliferation norms should other factors tempt him to embark on a nuclear weapons project.¹²²



5. U.S. ability to leverage nuclear energy sales and assistance facing decline

Turkey's 123 agreement with the United States is set to expire in 2023.¹²³ Ankara is unlikely to commit

to restrictions on ENR activities—should the United States try to push for them. With Russia slated to build Turkey's first phase of planned nuclear reactors, there's little leverage for the United States in the near term (though Turkey's research reactors are produced by U.S. companies).¹²⁴ Failure to renew a 123 would risk the U.S. role in potential construction of reactors in Igneada, Turkey (a joint venture between Westinghouse and China's State Nuclear Power Technology Corporation).¹²⁵ But such a project is in a long line of planned Turkish reactor builds that are already behind. Thus, nuclear energy is unlikely to be a significant source of nonproliferation leverage over Turkey in the near to medium term.



6. *Effectiveness of U.S. sanctions diminishing*

For the first time, U.S. economic sanctions against Turkey entered into the bilateral picture in 2019 as a result of Turkey's policies in

Syria and its purchase of the S-400. This included the swift and dramatic act of the United States sanctioning Turkish government agencies and senior level officials for their role in Syria under a new executive order. Yet Trump's quick reversal of these designations (he revoked them less than a week later) and concern among some in Congress that sanctions could generate a backlash against the United States and push Turkey further into Russia's orbit highlight that Washington believes penalizing Turkey comes with risk.¹²⁶ Indeed, in response to U.S. pressure, Erdogan threatened to shut down Incirlik Air Base and a base that hosts a NATO radar station, signaling a willingness to escalate (and drag NATO allies into the confrontation) rather than back down.¹²⁷ Turkey no doubt took away lessons from this experience that it can incorporate into any scenario in which it finds itself at the receiving end of U.S. pressure for proliferation-related reasons. In that scenario, the United States should not expect Turkey to simply acquiesce to U.S. demands.



7. *Shifting global dynamics due to strategic competition*

Despite its NATO membership, Turkey is hedging its bets and diversifying its partners, to include growing cooperation with Russia.

As strategic competition between the United States (and by extension, NATO) and Russia and China heats up, it is unclear how long Turkey's strategy can last. Russia is not a feasible or desirable replacement for NATO and the U.S. nuclear guarantee, but so far Turkey is in effect taking steps that make practical elements of its NATO partnership untenable and a danger to the alliance. If Turkey concludes that its strategic interests and vision no longer align with the United States and NATO, but it has few other alternatives, that could serve as a powerful driver for consideration of a nuclear weapons program. Competition dynamics could influence Turkish choices in the civil nuclear arena as well. Much like Turkey's take on the S-400 purchase—and similar to Saudi Arabia's approach to selecting its nuclear power supplier—the 123 renegotiation with the United States could quickly become subsumed under geopolitics. Erdogan no doubt

understands that the United States increasingly views its civil nuclear energy through the lens of strategic competition, and such negotiation would be an opportunity to signal and exercise Turkey's strategy of decreasing its reliance on the United States.

WHAT TO WATCH FOR

The future of Turkey's civil nuclear energy program.

Turkey seems poised to finally get its nuclear energy program off the ground.¹²⁸ Turkey has no current need for enrichment or reprocessing capabilities. Thus, it will be telling whether Turkey protests any U.S. asks that Turkey commit not to engage in such activities during renegotiation of the U.S.-Turkey 123 agreement (which expires in 2023), and if so, what justification it provides.¹²⁹

Iran's nuclear status. If Iran leaves the NPT, produces nuclear weapons, or is believed to be close to having them, this would likely lead Turkey to consider whether it too needs to begin a nuclear weapons program.

Additional investment in domestic defense capabilities and diversification of defense partners. Increasing long-standing Turkish investment in its own defense industrial base—including its missile program or nascent satellite launch and space efforts—could serve to both reduce its reliance on the United States and NATO and contribute to advancing a potential nuclear weapons delivery capability (which might be an indicator Turkey was pursuing a hedging strategy).¹³⁰



A Russian cargo plane carrying the first shipment of S-400 air defense system components lands in Ankara. Turkey acquired the Russian-made S-400 air defense system despite strong U.S. objections. (Getty Images)

Escalation and retaliation over the U.S. and NATO reaction to the S-400. There is a chance that Turkey and the United States find a solution that allows Turkey back into the F-35 program, but that seems unlikely. Should this standoff escalate, Turkey might follow through on threats to purchase Russian fighter aircraft instead of the F-35, or take other actions that hem in NATO or U.S. operating capability. Depending on the steps taken by Ankara, this could lead to further U.S. punitive measures that deny Turkey other U.S. military technology.¹³¹ The result could be a downward spiral that would drive Turkey further toward Russia, and for all practical purposes mean that Turkey would not be trusted to operate as a NATO ally. This could prompt some soul-searching within Turkey about how to best provide for Turkish security.

U.S. removal of nuclear weapons from Turkey. Erdogan's implicit threats to use U.S. nuclear weapons on Turkish territory as a political hostage—even if Turkey has no real ability to control their use—is frightening. There is thus a strong argument for the removal of those weapons. Nevertheless, doing so would send an unambiguous signal to Turkey—whatever the privately offered U.S. rationale—that the United States no longer trusts it to fulfill a vital NATO function. This would severely undermine—if not outright collapse—any remaining Turkish confidence in the U.S. extended deterrent. That could be a powerful motivation and justification for Erdogan to decide to embark on a Turkish nuclear weapons program or adopt a hedging strategy.

CHAPTER 4

Conclusion and Policy Recommendations

The structural and systemic changes driving many of these trends mean that it will be difficult to arrest or reverse them. The best and most durable solutions are also ones that, by the very nature of these trends, would be extremely challenging to implement over any sustained time frame. For example, enhancing the U.S. conventional posture in Asia and Europe and maintaining planned modernization of U.S. nuclear forces might be enough to deter adversaries and assure allies (at least enough to prevent them from pursuing nuclear weapons). But such recommendations would almost certainly fail when confronted with the fiscal and political realities in the United States, to say nothing of the domestic political realities of some U.S. allies. Thus, to be effective, sustainable, and realistic, U.S. policy needs to work with—rather than against—these trends.

With this in mind, the United States should endeavor to:

Pursue nuclear deals with Iran and North Korea in a way that limits the risk of follow-on nuclear proliferation and broadens the application of enhanced nuclear monitoring and verification practices.

The value of securing deals that limit Iran's capabilities and roll back North Korea's weapons program are obvious: They would reduce the risk of proliferation within those two countries and, by limiting threat perceptions in the region, make it less likely that their neighbors proliferate. But the details of those deals and the way in which they are pursued could, perversely, stimulate regional proliferation: For Iran, expiring limits on its nuclear capabilities (so-called sunset clauses) and no constraints on its missile and regional activities make Saudi Arabia and others more nervous. For North Korea, sacrificing the goal of denuclearization to reach a deal—or even the appearance of doing so—would alarm Japan and South Korea. On the other hand, if done right, these agreements can reduce proliferation dangers in Iran, North Korea, and beyond.

Build on the JCPOA by working to regionalize nuclear limits and transparency measures. The United States and Iran should agree to mutually return to the nuclear deal or—should that prove unworkable—negotiate a more limited agreement to freeze or roll back Iran's nuclear program for some sanctions relief. In either case, they should immediately begin to build on that deal. This includes thinking about how to apply nuclear constraints and transparency mechanisms to Iran and its neighbors

across the Persian Gulf. One option could be to seek region-wide bans on production of weapons-grade uranium or reprocessing spent fuel. Unlike proposals to ban enrichment altogether—a capability that Iran already has, and that other countries in the region at least want the option to pursue—this ban could be more politically palatable. The United States should similarly use Iran's adherence to the AP and its implementation of enhanced monitoring mechanisms in the JCPOA to push for wider adoption of these measures by countries in the region. Monitoring of uranium mining and milling, or restrictions on weaponization activities, may be particularly beneficial. These efforts would ideally proceed in parallel to, and be closely coordinated with, P5+1 negotiations with Iran on follow-on arrangements to the JCPOA, but would not be contingent upon a new nuclear deal.

Establish a forum to discuss regional issues in the Middle East, including missile and conventional capabilities, and work to develop confidence-building measures. One of the key limits of the JCPOA was that it left Iran's regional activities and missile program largely unaddressed. As part of its efforts to build on the deal, the United States should work with regional actors to establish a regional forum—totally separate from the JCPOA process—that can address a broad variety of concerns in the Middle East, including missile and conventional capabilities, and aim to lower tensions. Iran is highly unlikely to allow its missile program to be part of nuclear negotiations. Therefore, an approach that puts discussion of its missile program in the context of broader regional security questions, including the conventional capabilities of other players in the Middle East (to include those of the United States), stands a better chance of success. The goals would be modest and may take years to accomplish but could address underlying security concerns and result in constraints that limit the risks of a missile race in the region.

Think through where “denuclearization” fits in an arms control approach with North Korea. A second-term Trump administration or its successor should give serious consideration to an arms control approach—whereby the focus is on limiting, and if possible rolling back, North Korea's nuclear capabilities rather eliminating them entirely—as part of its North Korea policy review. A critical part of this review, however, is a realistic assessment of the objectives that policy could hope to achieve and the implications of potential arms control approaches for the goal of denuclearization (i.e., North Korea completely giving up its nuclear weapons). This

is because altering—or the perception of altering—that long-standing tenet of U.S. policy would alarm allies and could potentially have negative ramifications for future proliferation if it appeared that the United States was “accepting” North Korea’s nuclear status. Rather than discarding an arms control policy option over these risks, the National Security Council (NSC) should lead a review that carefully examines how such risks might be managed and mitigated.

Repair the trust deficit with allies, adapt alliances to be more resilient to the stressors of the geopolitical environment, and update assurance concepts to new threats.

Washington cannot easily wish away some of the structural drivers of diverging perspectives with allies or their concern about U.S. staying power over the long term. But allied confidence is also based on the political signals it receives from the United States. The United States should take immediate steps to end unnecessary points of friction, improve communication, and develop mechanisms that make its alliances more resilient to the inevitable political, economic, and security constraints and challenges that are likely to emerge in the future. Recognizing that many actions will need to be tailored to individual country or region circumstances, there are several steps that would be broadly useful.

Make it a top priority to signal U.S. commitment to allies and their security and end unnecessary sources of friction. Without a sharp change in President Trump’s approach to alliances, this will likely be a task that falls to a future administration. For example, should former Vice President Biden be elected in November, the importance of alliances could be a theme featured in his inauguration speech and/or he could give an early address on restoring America’s global leadership and its commitment to allies. The president could also make one of his first foreign visits to U.S. allies in Asia or Europe. He should also immediately end unnecessary sources of tension with allies, such as working to quickly conclude cost-sharing negotiations with South Korea for U.S. bases. In considering senior level appointments (such as the secretary of defense, ambassadors, and other political appointments responsible for working with key allies), the president should weigh heavily those candidates who are known to, and respected by, the allied counterparts they will be interacting with and who have a good grasp of the central issues. These steps will signal that the United States

The United States should work with regional actors to establish a regional forum that can address a broad variety of concerns in the Middle East, including missile and conventional capabilities, and aim to lower tensions.

understands the seriousness of the confidence deficit and will provide allies with a trusted channel for communicating their concerns.

Hold off on big changes to nuclear policy and posture at the outset of a new Democratic administration. There are a variety of changes a Democratic president might want to make to U.S. nuclear policy, such as adopting a No First Use policy, scaling back expenditures on nuclear modernization, or even reducing or eliminating capabilities viewed as unnecessary. While there may be merit behind some of these ideas, pushing for them in the early days of administration is likely to alarm allies at a time when the United States needs to be recouping lost confidence. Some of these proposals would also require significant political capital with Congress that would be better spent on issues such as extending New START and a nuclear deal with Iran.

Carry out a strategic review of how to update allied assurance to meet today’s threat environment. As budgetary and political trends strain traditional assurance measures—such as large-scale U.S.-funded troop presence and nuclear capabilities—the NSC should lead a process to investigate whether new, more feasible measures could meaningfully add to allied assurance. For example, partnering and coordinating with allies on cyber capabilities, insulation against economic coercion, countering information warfare, and pandemic response could provide cheaper and more meaningful assurance against some of the most pressing threats that face the United States and its allies every day.¹³² As part of this relook, the United States should explore mechanisms that—like its tripwire forces abroad and the extension of its nuclear umbrella—give the United States “skin in the game” to bolster deterrence and assurance.

Maintain a flexible and pragmatic approach—and acknowledge inherent limitations—to using U.S. civil nuclear cooperation for nonproliferation purposes.

The United States should undertake a serious study of what it would take to be competitive in the global nuclear energy market. In the meantime—and should the U.S. role in the market continue to shrink—there are several approaches the United States could employ to derive nonproliferation value from civil nuclear cooperation.

Do not go for gold: Be flexible on approaches to 123 agreements. The United States does not need and cannot afford to insist on 123 agreements that require countries to permanently forswear ENR capabilities (so-called “gold standard” agreements). Aiming for the highest nonproliferation safeguards possible but tailoring the U.S. position to the realities of specific circumstances remains the optimum approach. The United States can explore a variety of different options, including: time-bound ENR restrictions, restrictions tied to certain needs and capability benchmarks, joint decisionmaking bodies to evaluate technical development decisions, or some combination thereof.¹³³ Another potential option: Former Energy Secretary Ernest Moniz and separately Robert Einhorn and Richard Nephew have proposed integrating many of the enhanced monitoring provisions of the JCPOA into U.S. 123 negotiations, possibly as an alternative to legal commitments not to engage in ENR.¹³⁴

Establish a bipartisan commission to investigate what it would require for the United States to become a competitive player in the global nuclear energy market. The revitalization of U.S. nuclear energy would require significant resource commitments and a political consensus that can survive multiple administrations. Trump’s U.S. Nuclear Fuel Working Group and the group’s report are steps in the right direction. But this group was largely run from within the administration and reported to the president, limiting its ability to gain bipartisan buy-in among legislators. Congress should therefore establish a bipartisan commission composed of respected experts to evaluate the requirements for U.S. competitiveness in the nuclear energy market (to include the role of the U.S. government in supporting the nuclear industry), and an assessment of their desirability, feasibility, and implications. The goal would be to provide lawmakers, policymakers, and the public with a clear-eyed assessment of what it would entail to bring the United States back to a place where it would be able to compete on

par with Russia and China in selling U.S. nuclear energy technology abroad.

Enable U.S. allies in the nuclear energy market. If the prospects for the United States to play a stronger role in the global nuclear energy market continue to shrink with little hope for a rebound, Washington should consider bolstering the ability of its allies—such as South Korea and France—to compete. Depending on the steps taken, this could be a significant shift and come with risks. For example, it might require resolving disputes with South Korea surrounding the role of U.S. intellectual property in one of South Korea’s reactor designs. It could also have negative ramifications on U.S. civil nuclear cooperation with China. But adopting this position would have nonproliferation and geostrategic benefits and recognize that fact that the U.S. role in the energy market would be one of an enabler and supporter.

Assess, test, and strengthen the U.S. coercive toolkit as it applies to future proliferation threats, and identify and mitigate associated vulnerabilities.

The United States tends to rely—sometimes instinctually—on the same tools (e.g., sanctions, demarches, etc.) when confronting a proliferation problem. But those methods probably will not suffice—and could come with significant risks—in a future environment marked by diminished U.S. influence, growing competition with rival powers, and risks of allied proliferation. To address these challenges, the United States should do the following:

Conduct a comprehensive review of U.S. sources of leverage and vulnerabilities against potential proliferators, their enablers, and key players with a stake in the outcome of proliferation scenarios. The effort should be focused on identifying sources of leverage first, then determining how to best preserve and advance that leverage if necessary, rather than just identifying various policy and legal tools and authorities owned by individual departments and agencies. It should also consider how to use these various levers in ways that minimize the damage to their long-term utility (e.g., avoiding the overuse of certain types of sanctions to preserve their effectiveness) and examine allied sources of leverage as well. This review would be led by the NSC, and include the departments of State, Defense, Treasury, and Energy, as well as the intelligence community, but importantly it also needs to include the Department of Homeland Security,

Department of Commerce and others that are at times not included in these conversations. The goal would be to develop a series of recommendations for principals that enable the United States to best use its leverage and mitigate risks.

Carry out a series of tabletop exercises to better understand the benefits and limits of these coercive tools—and how proliferators might respond. It is one thing to develop a list of tools that would theoretically be useful, and quite another to test them in a simulated real-world scenario. This exercise is particularly important when it comes to China's role and interests in future proliferation scenarios and the risk of allied proliferation. In the former, U.S. vulnerabilities are perhaps more pronounced, and in the latter, U.S. sources of leverage may be different, and more politically problematic to use. Without this type of assessment, the United States risks finding itself engaged in a series of coercive tit-for-tat measures with a proliferator or its defenders for which it is ill-prepared. This would need to be an interagency exercise, likely with the Intelligence Community and Department of State playing central roles.

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Pass new legislation that updates the triggers for U.S. action against proliferators and the consequences that the United States can impose. Current U.S. laws that require or enable penalties against proliferators have important gaps. For example, amendments to the U.S. Arms Export Control Act forbid certain U.S. economic and military assistance and credits if countries sell or acquire sensitive nuclear technologies, unless those technologies are placed under IAEA safeguards. But this focuses on denying a set of benefits that might not be relevant in many proliferation cases. Additionally, there is nothing to address scenarios in which countries rely minimally on outside assistance for their nuclear programs, the sources of such assistance are not readily apparent, or a country develops enrichment or reprocessing capabilities overtly and/or under IAEA safeguards (which may pose less of a direct risk of weaponization but provides

substantial nuclear latency). Congress should therefore broaden the available measures from the denial of certain benefits to sanctions that can target government, corporate, and financial entities and individuals. It should also provide potential penalties for any country that tries to develop these capabilities indigenously—even overtly—and hold the executive branch accountable for carefully monitoring and reporting on these developments. For particular countries of concern, Congress should require periodic briefings from the intelligence community about the status of these countries' capabilities and intentions. If conditions warrant, Congress should also require certifications from the president that a country is not pursuing ENR capabilities, with the potential for penalties to kick in if such certification could not be made (this would be deliberately broader and use a lower threshold than acquiring or having already developed these capabilities).

Focus on, and invest in, improving early detection of proliferation.

Detecting proliferation early on—and being able to share that information with relevant international partners—is key to providing the necessary policy space to stop it. The sooner the United States and the international community learn that a country is considering or seeking nuclear weapons capabilities, the more time and opportunity they will have to develop a response. But developing and maintaining an early detection capability is easier said than done. Resourcing against vague threats of uncertain likelihood—particularly amid other pressing priorities such as pandemics and growing threats from near-peer adversaries—and doing so in a fiscally constrained environment is a hard sell bureaucratically. But there are several steps the United States can take.

Better connect U.S. government efforts to leverage open source information, big data, and other advanced technologies to proliferation detection and counterproliferation policy needs. In addition to using traditional intelligence methods (e.g., HUMINT, SIGINT, etc.), the United States should continue to broaden its sources of information to detect proliferation, including information available in the open domain. Long gone are the days when this meant monitoring country newspapers and social media traffic—there is now a wealth of publicly available data (and data that would not normally be considered a state secret) that can provide useful insights on proliferation and enhance warning. The challenge is linking the data scientists with the all-source proliferation analysts.

A variety of efforts to take advantage of big data are underway in the U.S. government,¹³⁵ but too often these are disconnected from the actual needs of analysts, and technical, intelligence, and policy communities speak past each other. Policy needs and intelligence analysts should shape the development and application of tools to acquire and analyze such data, not the other way around. One practical way to do so may be to pair a team of data science experts with nuclear analysts and charge them with collectively evaluating how nontraditional types of data and advanced data analysis tools could be used on a real or hypothetical proliferation challenge. These efforts are important to advancing early detection in their own right. But they can also help protect sources and methods and make sharing of information—which is critical if the United States wants the international community to take action against a proliferation risk—easier.

Increase the IAEA's budget and encourage further investment in modern monitoring technologies. The expansion of the IAEA's work over time has outpaced its budget, leading to repeated calls from its leadership for funding increases from member states. The United States already contributes more than any other country to the IAEA (about \$200 million per year), but the benefit the agency provides—namely, verifying that countries' nuclear programs across the globe remain peaceful—is worth more. This is particularly true as the agency works to develop more advanced monitoring techniques that could further improve nuclear safeguards, and keep pace with emerging technologies. Washington should propose to Russia, China, and its allies that are also top contributors—such as Japan, Germany, France, the UK, and Canada—a coordinated approach to increasing funding. Inviting a larger number of contributors could help dampen concerns that the IAEA is becoming too beholden to Washington. But if such efforts to solicit funding increases fail, the United States should not hesitate to do so on its own. Ensuring that countries believe that undeclared activities will be detected is critical to deterring those very activities, and the IAEA plays an important role in that process.

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