

# Abstinence or Tolerance: Managing Nuclear Ambitions in Saudi Arabia

Over the last decade, Saudi officials repeatedly hinted that if Iran acquired nuclear weapons, Riyadh would be forced to respond in kind. As the late King Abdullah bin Abdulaziz reportedly warned U.S. officials in 2010, “if Iran succeeds in developing nuclear weapons, everyone in the region would do the same, including Saudi Arabia.”<sup>1</sup> The following year, former Saudi Director of General Intelligence Prince Turki al-Faisal publicly stated that in the event of an Iranian bomb, “It is our duty toward our nation and people to consider all possible options, including the possession of these [nuclear] weapons.”<sup>2</sup> Saudi officials made similar threats between 2013 and 2015 during the negotiations that led to the Joint Comprehensive Plan of Action (JCPOA) between the P5 + 1 and Iran, including declaring that Saudi Arabia would develop dual-use enrichment technology to hedge against Iran.<sup>3</sup> These threats initially rang hollow: not only did the Kingdom lack both the technical capacity and economic rationale for building fuel enrichment plants—having no power reactors it needed to fuel—it also risked incurring the wrath of the international community.<sup>4</sup>

However, after the completion of the 2015 Joint Comprehensive Plan of Action (JCPOA), the landmark Iranian nuclear deal, a more coherent Saudi nuclear hedging strategy came into focus. Instead of making empty threats, Saudi Arabia began to invest in its latent capacity to produce nuclear weapons

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by, as one analyst wrote, “building the physical infrastructure, developing the human capital, and acquiring the necessary technology for large-scale nuclear power programs,” all under the guise of an ostensibly peaceful energy diversification plan.<sup>5</sup> The Saudis knew Iran would be able to mass produce and stockpile enriched uranium once the physical constraints over its uranium enrichment program expired in 15 years under the terms of the JCPOA;<sup>6</sup> the nuclear deal effectively bought Riyadh, as another analyst assessed, “a decade during which they [could] continue with their nuclear push to better prepare themselves for Tehran’s rise.”<sup>7</sup> As Prince Turki al Faisal admitted in January 2016, Saudi Arabia jumpstarted “a very extensive training and skills acquisition program” in the nuclear sector so that “by the time 15 years from now has passed – when supposedly [the JCPOA] will be coming to an end – we should be in full stride in terms of human capacity for our own development of peaceful uses of nuclear energy.”<sup>8</sup> President Donald Trump’s decision to withdraw the United States from the JCPOA in April 2018 only accelerated this countdown clock for the Saudis.

**Over the last year, Saudi Arabia took a concrete step toward realizing its nuclear hedging strategy.**

Over the last year, Saudi Arabia took a concrete step toward realizing this hedge strategy by soliciting bids to build the first of its 16 planned nuclear power reactors, including from the U.S.-based Westinghouse.<sup>9</sup> As part of this process, U.S. officials including Energy Secretary Rick Perry met with the top echelon of Saudi leadership in December 2017 and throughout the winter of 2018 to discuss negotiations over a nuclear cooperation agreement, which is required by U.S. law in order to transfer nuclear materials, equipment, or components.<sup>10</sup>

At the same time, Saudi officials fired a shot across the bow by expressing potential interest in an indigenous enrichment program, a crucial step toward the bomb that could be taken without running afoul of the global nonproliferation regime.<sup>11</sup> As head of the Saudi nuclear energy institute, Hashim bin Abdullah Yamani announced in October 2017, the Kingdom is preparing to mine domestic sources of uranium ore as a “step towards self-sufficiency in producing nuclear fuel.”<sup>12</sup> In December 2017, Energy Minister Khalid al-Falih implicitly justified the development of enrichment technology by emphasizing, “whatever we do is going to be under strict compliance with international agreements,” but “we have large resources of uranium,” and “we will not deprive ourselves of accessing our natural resources.”<sup>13</sup> As Yamani and al-Falih are no doubt well aware, Saudi Arabia is allowed to enrich uranium under the peaceful uses clause of the Nuclear Nonproliferation Treaty (NPT), so long as it places all nuclear activities

under international safeguards and abides by Article II obligations not to manufacture nuclear weapons. By building nuclear reactors to establish demand for enriched fuel and then extracting uranium ore, the Saudis are positioning themselves to hedge against Iran without breaking international rules.<sup>14</sup>

The problem is that the Saudi hedge strategy runs the risk of setting off an arms race in the Middle East. In contrast to traditional nuclear weapons races, the strategic game between Iran and Saudi Arabia is more likely to spiral into a competition over the buildup of nuclear latency—the technical capacity to produce atomic weapons on short notice.<sup>15</sup> Indeed, this is a perennial fear among Israeli and American defense officials. In 2015, former Defense Secretary Robert Gates worried that Iranian latency “will provoke other countries in the region to pursue equivalent nuclear capabilities, almost certainly Saudi Arabia.”<sup>16</sup> The next year, Israeli Defense Minister Moshe Ya’alon announced, “We see signs that countries in the Arab world are preparing to acquire nuclear weapons, that they are not willing to sit quietly with Iran on brink of a nuclear or atomic bomb.”<sup>17</sup>

Going forward, the recent withdrawal of the United States from the JCPOA leaves Iran in a prime position to ramp up its enrichment activities again, perhaps in a gambit to blackmail the Europeans for sanctions relief.<sup>18</sup> As a result, Saudi Arabia could soon face incentives to expand upon its initial investments in nuclear technology to match Iranian enrichment capabilities, thereby pushing both sides toward the edge of the proliferation cliff. Even more worrisome, in March 2018, Saudi Crown Prince Muhammed bin Salman made the peaceful nature of the Kingdom’s nuclear program conditional on Iranian behavior: “Saudi Arabia does not want to acquire any nuclear bomb, but without a doubt, if Iran developed a nuclear bomb, we will follow suit as soon as possible.”<sup>19</sup>

Given the clear proliferation risks, Saudi Arabia’s adoption of a hedging strategy raises an important question: how should the United States attempt to manage the Saudi nuclear program? The conventional wisdom among nonproliferation advocates is that the United States must take decisive action against the Saudi nuclear program to forestall this looming “arms race in the Middle East.”<sup>20</sup> According to this argument, the resumption of bilateral talks over a nuclear cooperation agreement provides a prime opportunity for U.S. officials to pressure the Saudis into forswearing the acquisition of enrichment and reprocessing (ENR) technology—the so-called “Gold Standard” cooperation agreement. The Trump administration appears to be following this policy. In testimony before the Senate Foreign Relations Committee on May 24, 2018, Secretary of State Mike Pompeo stated, “we have told [the Saudis] we want a gold-standard Section 123 Agreement from them, which would not permit them to enrich. That is simply all I’ve asked of Iran, as well.”<sup>21</sup> According to Daryl Kimball, director of the Arms Control Association, anything less than the Gold Standard agreement would

constitute a “disturbing and counterproductive” outcome.<sup>22</sup> Any other agreement, according to Kimball and nuclear policy experts Kingston Reif and Kelsey Davenport, would mean “the prospects for a dangerous and destabilizing nuclear fuel-making race in the Middle East will greatly increase.”<sup>23</sup> Henry Sokolski and William Tobey, two nuclear experts and former U.S. government officials, have gone so far as to argue that pushing the Gold Standard “is the right thing to do and anyone who knows anything should know that attempting to do anything less would be absurd.”<sup>24</sup>

Of course, it is laudable to strive for an ideal future in which there is no longer any nuclear latency in the Middle East, and all countries in the region adhere to the most binding and indefinite pledges to forgo the most sensitive nodes of the nuclear fuel cycle. But that ideal goal is at odds with facts on the ground, given Iran’s mastery of uranium enrichment and the ongoing investments in nuclear energy technology by the Saudis.<sup>25</sup> The unfortunate reality is that Saudi Arabia is unlikely to curtail options for hedging against the reconstitution of Iran’s nuclear program, especially with the future of the JCPOA in doubt. Moreover,

**Gold Standard constraints may not be the best way for Washington to influence Riyadh’s nuclear ambitions.**

a nuclear cooperation agreement with Gold Standard constraints on enrichment may not be the best way for Washington to influence Riyadh’s nuclear ambitions. If Iran ratchets up its nuclear capabilities down the road, this type of total abstinence pledge could pressure the Saudis into giving birth to an enrichment program in secret. Instead, a standard nuclear cooperation agreement is superior because it would require Riyadh to seek prior consent from Washington before developing enrich-

ment or reprocessing technology that utilizes U.S. material or technology, which could both increase U.S. control over Saudi Arabia and even inject caution into prior Iranian calculations.

This article provides a comprehensive assessment of how the Saudi nuclear program is likely to evolve and impact regional security dynamics under three nuclear cooperation frameworks with the United States: (1) a standard agreement that gives Washington veto power over many forms of enrichment and reprocessing in Saudi Arabia; (2) an augmented Gold Standard agreement wherein Riyadh forfeits all enrichment and reprocessing activities; or (3) no agreement at all in favor of technology denial. Our analysis supports the conclusion of a standard nuclear cooperation agreement between the United States and Saudi Arabia to achieve longstanding nonproliferation objectives in the Middle East.

## The Power of Prior Consent

In order to assess the potential dangers of a nuclear deal with Saudi Arabia, it is useful to first understand the basics of how U.S. nuclear cooperation agreements work. The core objective of these pacts—often known as “123 agreements” after the relevant section of the U.S. Atomic Energy Act—is to minimize the risk of nuclear proliferation by setting strict rules for how recipient countries use American nuclear equipment and materials.<sup>26</sup> To be clear, the agreement is not a business contract or even a promissory note to build reactors or transfer nuclear materials; it merely establishes a legal framework for cooperation between the United States and the partner nation and provides for the strict nonproliferation commitments governing that cooperation.

The relative strength of the nonproliferation commitments in these agreements varies along a spectrum. On one end, the pacts signed with Japan (1987), EURATOM (1995) and India (2008) grant U.S. consent to these cooperating partners to enrich uranium and reprocess used nuclear fuel.<sup>27</sup> At the other end, the United Arab Emirates (2009) and Taiwan (2013) are the only countries with so-called “Gold Standard” 123 agreements that completely forbid the development or possession of ENR technology.<sup>28</sup>

Of the 23 agreements in force, however, the vast majority adhere to a standard set of mechanisms to inhibit proliferation. The potential recipient must agree to a laundry list of conditions including, among other things, a pledge not to use materials or equipment subject to the agreement for military purposes, not to develop or acquire nuclear weapons, to establish effective physical security measures and to refrain from enriching or reprocessing U.S.-origin nuclear material without prior consent from Washington.<sup>29</sup> Non-nuclear weapon states must also accept International Atomic Energy Agency (IAEA) safeguards on all nuclear facilities. If the country builds its nuclear reactor infrastructure with American assistance, this prior consent clause becomes quite powerful, as it effectively gives Washington a veto on whether the recipient can produce weapons-usable material using U.S.-supplied nuclear fuel and equipment.

How might this type of standard 123 agreement impact the Saudi enrichment calculus and regional security dynamics with Iran? We identify two main effects—one on Saudi Arabia and one on Iran itself.

First, nuclear cooperation would provide the United States with enhanced insight and influence into the evolution of the Saudi nuclear energy program. If and when it becomes operational, the nature of the Saudi nuclear energy

**Nuclear cooperation would provide the U.S. enhanced influence into the Saudi nuclear energy program.**

program would generate important international and domestic political obstacles to developing nuclear weapons, which would help counterbalance its increased technical capacity for doing so. For one thing, due to its rudimentary indigenous capabilities, Saudi Arabia will be highly dependent on imports of nuclear technology and materials, rendering its energy program extremely vulnerable to sanctions should it begin pursuing nuclear weapons or engaging in other suspicious nuclear activities.<sup>30</sup> Announcing an interest in nuclear energy has already attracted greater scrutiny of Saudi Arabia's nuclear intentions, and the international community's ability to monitor Riyadh's nuclear activities will only be increased by the safeguards and international trade that comes with an expanding nuclear energy program.

Precisely for these reasons, U.S. involvement in the Saudi energy program might have nonproliferation benefits that outweigh the costs. By providing Saudi Arabia with nuclear materials, equipment, or technology, Washington will have greater access to and leverage over the future direction of the Saudi program, rather than ceding control to suppliers like Russia or China. These countries are likely to provide the technology regardless of what Washington thinks, and would undoubtedly require weaker commitments.<sup>31</sup> Former Nuclear Regulatory Commissioner Victor Gilinsky and aforementioned nuclear expert Henry Sokolski have argued that Saudi Arabia is unlikely to be interested in Russian or Chinese reactors and instead would prefer South Korea as a supplier.<sup>32</sup> Even if this is true, though, Gilinsky and Sokolski themselves note that the nuclear cooperation agreement between Saudi Arabia and South Korea is far laxer than the conditions in a standard U.S. 123 agreement. The United States could help fill these nonproliferation gaps by concluding a nuclear pact with Riyadh.

The prior consent clause would give the United States significant control over how Saudi Arabia pursues sensitive enrichment technology. The nuclear cooperation framework between the United States and the Republic of Korea (ROK) provides an illustrative model. South Korea constructed its domestic nuclear reactor infrastructure based on Westinghouse technology in the 1970s, and then established itself as one of the leading suppliers of civil nuclear construction services with the sale of four modern reactors to the United Arab Emirates (UAE) in 2009. This move into the global supply market required close cooperation with the United States to export to, and construct reactors in, other countries.<sup>33</sup> Seoul repeatedly pushed for prior consent from Washington to enrich uranium and reprocess spent reactor waste at commercial scale.<sup>34</sup> Yet successive U.S. administrations refused to grant prior consent, thereby limiting the development of ENR technology beyond laboratory scale experiments in the ROK. In 2015, the United States and South Korea signed a new nuclear cooperation agreement that called for the establishment of a joint commission to study the economic and technical viability of enrichment and a unique form

of spent waste reprocessing technology in South Korea.<sup>35</sup> However, while this agreement opens the door for possible South Korean enrichment or reprocessing of U.S.-origin material, it does not commit the United States to allowing South Korean enrichment or reprocessing. The take-home point for Saudi Arabia is that a standard nuclear cooperation agreement with prior consent sets the foundation for Washington to constrain Riyadh's enrichment trajectory over the long term.

Second, by providing Saudi Arabia with a readily observable channel to signal its intent to pursue enrichment technology, the prior consent clause in the standard 123 agreement could bestow Riyadh and Washington with the means to deter Tehran from ratcheting up its own enrichment activities in the future. Given the recent exit of the United States from the JCPOA, Iran may be tempted to increase its nuclear latency in a calculated manner to put pressure on the Europeans or probe nonproliferation red lines in the future. Just as the South

Koreans have long pushed for advance consent on peaceful commercial grounds, the Saudis appear to be laying the foundation now to seek out U.S. support for enrichment down the road. But to make this case, Riyadh would have to justify the development of front-end nuclear fuel cycle services and conduct a diplomatic campaign in Washington well in advance.

Although the prior consent clause was not designed for this purpose, recent research demonstrates that nations sometimes can leverage discernable steps toward the bomb to practice deterrence or even compel concessions.<sup>36</sup> Applied to the Saudi case, Iran might worry that if it did not restrain its own enrichment program, the United States might grant Saudi Arabia prior consent to pursue commercial fuel enrichment. It is true that Washington has long been opposed to the spread of enrichment and reprocessing capabilities, and the Nuclear Suppliers Group (NSG)—the main multinational export control regime for nuclear trade—calls for supplier restraint in transferring these technologies.<sup>37</sup> Yet, Saudi Arabia would not be the first friendly country to receive more favorable treatment in this area; as noted above, the United States already grants prior consent to Japan, EURATOM, and India.

The standard 123 could thereby prove to have a stabilizing effect on regional security by incentivizing Iran to exercise restraint, lest Saudi Arabia gain consent from the United States to move forward with its own enrichment program. Of course, this strategy could backfire by igniting an enrichment arms race between the Saudis and the Iranians. Moreover, signing a standard 123 agreement with Saudi Arabia would give the UAE the legal right to seek revision to the

**A standard Saudi-U.S. 123 agreement could deter Tehran from ratcheting up its own enrichment activities.**

terms of its own agreement with the United States in order to remove their Gold Standard provisions, potentially complicating regional dynamics further.<sup>38</sup> As national security experts and former U.S. government officials Mieke Eoyang and Ambassador Laura Holgate explain, the UAE 123 agreement included a clause that “bound the U.S. to impose those same conditions [e.g. Gold Standard restrictions] in future agreements with other countries in the region, or if not, to lift them on the UAE.”<sup>39</sup> In the wake of the JCPOA, for instance, several high-ranking UAE officials toyed with the idea of renegotiating the Gold Standard constraints because they claimed that Iran had achieved a more favorable position in the region with its enrichment program.<sup>40</sup>

In order to manage these risks, Washington could consider modifications of a standard 123 agreement with Saudi Arabia without requiring the Gold Standard: namely, a Saudi declaration of intent (rather than political commitment) to refrain from any enrichment or reprocessing; and/or requiring the establishment of a joint commission, as in the ROK agreement, which would study the implications of enrichment or reprocessing in Saudi Arabia before granting Washington’s approval to utilize U.S. technology or materials to that end. This latter step would strengthen the prior consent clause by establishing a formal consultation process through which the United States could gauge Saudi intentions and influence their decision making. Former U.S. nuclear negotiator Robert Einhorn recently suggested other possible modifications, such as a shorter duration for the agreement (15 instead of the standard 25 years), or a shorter-term commitment not to enrich or reprocess.<sup>41</sup>

Most important, the United States should seek Saudi adherence to the Additional Protocol (AP)—a legal agreement that would give the IAEA additional tools to verify the peaceful nature of Riyadh’s nuclear activities. The conclusion of an AP would not require Saudi Arabia to forswear enrichment or reprocessing, but it would enhance the ability of the IAEA to monitor Saudi Arabia’s nuclear program and increase confidence that Riyadh is not concealing covert nuclear activities with possible military dimensions. In contrast to the Gold Standard, which is extremely uncommon,

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more than 130 countries have Additional Protocol agreements in force including Middle Eastern countries like the United Arab Emirates, Turkey, and Jordan.<sup>42</sup> Iran started provisional implementation of the AP as part of its JCPOA obligations, which should make it easier for Riyadh to accept politically.<sup>43</sup>

## The Golden Touch

To be sure, even with these modifications, a standard 123 agreement would leave open a few pathways for Saudi Arabia to pursue enrichment technology. With enrichment and reprocessing not formally barred by the agreement, Riyadh could conduct laboratory experiments on enrichment methods without approval from Washington, so long as these safeguarded activities relied upon purely indigenous or non-U.S. technology, equipment, and materials. The Saudis could then scale this domestic enrichment program up into a pilot fuel enrichment plant, but this step would require prior consent if they intended to use nuclear materials or equipment subject to the U.S.-Saudi agreement. This is a core reason that some argue Riyadh must go beyond the typical nonproliferation assurances in the standard 123 by requiring the so-called “Gold Standard.”

As noted above, the two recent Gold Standard agreements were atypical. Mark Hibbs, a nuclear nonproliferation expert from the Carnegie Endowment for International Peace, points out that even though Washington wielded unique power over the Emirates and Taipei, some U.S. officials and lawmakers still attempted “to universalize the UAE no-ENR provision as a ‘gold standard’ for all future agreements.”<sup>44</sup> Yet this quest for the Gold Standard ran into geopolitical challenges with other states “because the United States enjoys far less leverage, and may have overriding policy goals, in these cases.”<sup>45</sup> With Russia and Japan lined up to build nuclear reactors in Vietnam, for instance, Washington lacked the bargaining power to force Hanoi to accept a legal no-ENR pledge during negotiations over its 2014 nuclear cooperation agreement, and instead settled for a nonbinding Vietnamese political statement that it did not intend to acquire enrichment technology, and instead would rely on the international market for fuel.<sup>46</sup>

At this early stage of nuclear development in the Kingdom, it is conceivable that Washington may be able to put lucrative enough rewards on the table to induce Riyadh into forfeiting enrichment.<sup>47</sup> The United States has long used military arms sales and security assurances as tools to dampen the nuclear ambitions of allies.<sup>48</sup> However, Saudi Arabia already receives significant outlays of arms and support from the United States, so Riyadh might use the 123 negotiations as an opportunity to push again for an enhanced or even formal U.S. defense commitment.<sup>49</sup> Such a request would be politically controversial in Washington, the Trump administration’s pro-Saudi stance notwithstanding. The close strategic relationship between the United States and Saudi Arabia also makes it difficult for U.S. officials to make arms sales conditional on Riyadh accepting the Gold Standard; the threat is simply not credible.<sup>50</sup> While the United States did threaten to withhold military assistance from nations in actual pursuit of enrichment or reprocessing technology in the past, it would be an unprecedented move to

coerce Riyadh into publicly and prospectively renouncing its unrealized enrichment options.

Moreover, Saudi Arabia has argued that a legal pledge to forgo ENR represents “an unacceptable infringement on its national sovereignty.”<sup>51</sup> In fact, the United States and Saudi Arabia have been in periodic discussions since 2012 over the terms of a nuclear cooperation agreement. In the past, according to Reuters, Saudi officials flatly refused to “sign an agreement with Washington that would deprive it of enriching uranium.”<sup>52</sup> With foreign suppliers such as France, Russia, South Korea, China, or perhaps even Pakistan once again cued up to bid on Saudi nuclear energy contracts, U.S. negotiators face a herculean task to persuade Saudi Arabia to accept the full Gold Standard.<sup>53</sup>

Despite these odds, some argue that the United States must persevere in future rounds of 123 negotiations because the benefits of the Gold Standard are clear and manifold, especially when applied to a country with a track record of threatening to match Iran’s nuclear capabilities. The Gold Standard would make it more difficult and risky for Saudi Arabia to use its aboveboard civil nuclear energy program as the foundation to breakout to the bomb, à la India in 1974.<sup>54</sup> If the Saudis are ever detected pursuing ENR at any level (from bench-scale experiments to pilot projects and full-scale plants), the United States could use the Gold Standard provisions to terminate all assistance and contracts, even if the investments draw from purely indigenous materials and technologies. By turning the nuclear program into a sort of hostage, the Gold Standard may be able to dissuade Saudi Arabia from straying off the civil nuclear pathway.

But the Gold Standard proponents overlook one rather serious downside: even if Washington managed to convince Riyadh, a total abstinence pledge could

**A total Saudi ENR abstinence pledge could create a perverse incentive to “sneak out” to the bomb clandestinely.**

create a perverse incentive for Saudi Arabia to “sneak out” to the bomb with a clandestine enrichment and weapons program.<sup>55</sup> Assuming a strict follow-on agreement to the JCPOA is not negotiated, Iran will be in an optimal position to ratchet up its nuclear latency by claiming that the United States reneged on the deal in April 2018. If the Iranian program moves toward the cusp of the bomb again, the Gold Standard pledge would prohibit Saudi Arabia from developing any type of enrichment technology in response. In this context, Riyadh

might feel compelled to violate the Gold Standard commitment by secretly building a small fuel enrichment plant as a means to balance against Tehran’s weapons production capability.

While Saudi Arabia lacks the technological base to quickly master enrichment technology in secret today, it seems to be taking steps to be able to move down such a proliferation pathway in the future. As al-Faisal made clear in 2016, the prospect of an unconstrained Iranian nuclear program is the precise reason why “the Kingdom’s program for capacity building on the issue of nuclear energy is so vital and necessary and important.”<sup>56</sup> Once Saudi Arabia has a proficient well-managed nuclear program in place, mastery of simple gas centrifuge technology could be within its reach.<sup>57</sup> According to research by Scott Kemp at the Massachusetts Institute of Technology, the indigenous development of first-generation gas centrifuges has taken countries an average of just 24 months.<sup>58</sup> To be sure, this would be an extraordinary gambit fraught with high risks of detection given U.S. insight into the nuclear energy program. But it may well be the position that the Gold Standard pushes Saudi Arabia into if relations continue to deteriorate with Iran.

### **The Folly of Technology Denial**

If Saudi Arabia rejects the Gold Standard assurance, some advocate for the United States to focus efforts instead on denying Riyadh access to nuclear technology.<sup>59</sup> Since the Saudis have balked at legally-binding provisions over ENR in the past, U.S. officials should anticipate how to move forward in the face of continued resistance from Riyadh to the Gold Standard. The argument here is that the transfer of nuclear technology and knowledge to Saudi Arabia under the standard 123 will increase the risk of proliferation far too much. On initial consideration, this logic appears to be sound. Academic studies have found that this sort of nuclear cooperation agreement can increase the odds of countries pursuing or acquiring nuclear weapons, particularly when they are in unstable security environments, which Saudi Arabia certainly is.<sup>60</sup> Nuclear technology is dual-use, so gaining technology or expertise in the civilian sector inherently increases a state’s capability to produce nuclear weapons.<sup>61</sup>

Yet this misses the point when it comes to Saudi Arabia: it is going to get nuclear reactor technology one way or another, whether it comes from the United States or other eager suppliers listed earlier. An international embargo on nuclear cooperation with Saudi Arabia is simply not a viable political option; indeed, much of the nonproliferation regime is premised on the notion that states that make non-proliferation commitments should be able to benefit from peaceful nuclear technology (Article IV). As a

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party to the Nonproliferation Treaty since 1988, Saudi Arabia is likely to find willing sellers of nuclear reactors, so long as it appears to be devoting its program to peaceful purposes.

With Saudi officials carefully laying the groundwork to justify the aboveboard peaceful pursuit of nuclear reactors, uranium ore extraction, and perhaps even enrichment technology, Washington should be under no illusions about its unilateral ability to inhibit Riyadh's nuclear trajectory in the absence of a nuclear cooperation framework. The subsequent evolution of the Saudi nuclear program will depend upon the geostrategic interests of the suppliers that rush in to fill the vacuum. To be sure, Russia and China may want to sell the Kingdom complete packages of nuclear fuel cycle services that would undercut the need for indigenous enrichment. But it is hard to anticipate the level of influence Moscow or Beijing would be willing and able to wield over Riyadh's nuclear ambitions; the same goes for South Korea.

If Saudi Arabia finds itself with few constraints over the pursuit of enrichment technology, it could even seek out offers from foreign suppliers to openly build fuel enrichment plants in the Kingdom. Nuclear nonproliferation expert and former U.S. government official Fred McGoldrick points out that for almost four decades, no member of the venerable Nuclear Suppliers Group (NSG) has "transferred enrichment or reprocessing technologies to countries that did not already possess these capabilities."<sup>62</sup> Although it currently adheres to NSG guidelines, Pakistan may be willing to supply centrifuge technology down the road (as it has in the past) if it fails to gain NSG membership.<sup>63</sup> In September 2015, for instance, a former Pakistani official suggested that Islamabad should offer "civilian nuclear cooperation to developing countries, including Islamic countries [e.g., Saudi Arabia]," by setting up procurement channels outside of the NSG.<sup>64</sup>

Once Saudi Arabia builds up its nuclear reactor base and uranium extraction program, it would then be in a prime position to integrate Pakistani centrifuge technology into the front end of the nuclear fuel cycle. Indeed, there are long-standing rumors to the effect that Pakistan and Saudi Arabia might engage in secret nuclear cooperation; and while the possibility of an outright transfer of Pakistani nuclear weapons to Riyadh may be far-fetched, aboveboard collaboration on dual-use nuclear technology like enrichment certainly is plausible.<sup>65</sup>

## **Nuclear Latency and Arms Race Stability in the Middle East**

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In an ideal world, neither Iran nor Saudi Arabia would invest in nuclear technology with the potential to produce the fissile material at the core of the bomb. As Secretary of State Pompeo made clear in his May 2018 Senate

testimony, the Trump administration wants to achieve this goal by pressuring Iran to give up its enrichment program altogether, while also demanding the Saudis forfeit enrichment under a Gold Standard 123 agreement.<sup>66</sup> But inhibiting proliferation and managing the regional security landscape in the Middle East requires recognizing hard facts about nuclear latency. Iran became a latent nuclear power over a decade ago by mastering uranium enrichment technology. President Trump's decision to exit from the JCPOA in April 2018 means that Iran may cease complying with the physical constraints over its nuclear program. Tehran could decide at any point to exploit the dual-use nature of enrichment technology to walk back to the cusp of the bomb, all while maintaining plausible deniability about its intentions. Even before the JCPOA ended up on life support, Saudi Arabia launched an effort to enhance its nuclear latency by building up human capacity and industrial infrastructure in the nuclear energy sector; Saudi energy officials also started to test out talking points for the aboveboard pursuit of enrichment down the road. As the contours of this hedging strategy come into focus, the United States cannot afford to reach another impasse with Saudi Arabia over the terms of a nuclear cooperation agreement.

**Inhibiting proliferation in the Middle East requires recognizing hard facts about nuclear latency.**

Larger forces have steadily limited the efficacy of policy responses available to the United States. As the American nuclear industry continues to shrink and lose market share, it is becoming increasingly difficult for Washington to regulate access to nuclear technology around the world.<sup>67</sup> While technology denial and the threat of coercive sanctions have dissuaded many countries from pursuing illicit nuclear-weapons programs, these nonproliferation policy levers are less credible against an ally that pursues nuclear technology in full compliance with international safeguards to monitor peaceful use, and even less effective when the country can turn to many alternative suppliers.<sup>68</sup> The implication is that the United States also has limited leverage to pressure countries into forswearing ENR technology. Indeed, most of the 123 agreements in force today were negotiated during the bygone halcyon era of U.S. dominance over the global nuclear industry.

The upshot is that the prior consent clause in the standard 123 agreement provides the United States with a tool for inhibiting the development of ENR technology, which has so far proven successful in even technically sophisticated countries such as South Korea. When combined with Saudi adherence to the Additional Protocol, this would provide the United States with significant leverage and insight into the Saudi nuclear program. If stage-managed properly,

Washington could even use discussions over granting Riyadh advance consent to enrich as a way to rein in Tehran's nuclear ambitions in a post-JCPOA world.

By contrast, demanding the Gold Standard is unlikely to succeed; even if it does, it could create perverse incentives for a covert enrichment program in response to Iranian nuclear advances. Abstaining from any nuclear cooperation with Saudi Arabia, meanwhile, would deprive the United States of the leverage that comes with being a supplier, leaving the United States on the sidelines while Riyadh develops a nuclear energy program with the help of other nuclear suppliers.

As Russia, China, and other states rapidly supplant the United States as dominant suppliers of nuclear technology, Washington must engage with countries like Saudi Arabia in order to maintain its nonproliferation influence.<sup>69</sup> As scholar of Middle East security policy James Russel from the Naval Postgraduate School noted back in 2012, one benefit from Saudi Arabia's shift toward a "calculated hedging strategy" is that it "buys both the elites [in Riyadh] and the United States time to resolve the sources of regional instability."<sup>70</sup> In this geopolitical context, signing a standard 123 agreement would not only be consistent with decades of U.S. policy;<sup>71</sup> it would put the United States in the most advantageous position for influencing the future of the Saudi nuclear program in the shadow of Iranian enrichment.

## Notes

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1. Quoted in Yoel Guzansky, "The Saudi Nuclear Genie Is Out," *The Washington Quarterly* 38, no. 1 (January 2, 2015): 100, <https://doi.org/10.1080/0163660X.2015.1038176>.
2. Associated Press, "Prince Hints Saudi Arabia May Join Nuclear Arms Race," *New York Times*, December 6, 2011, <https://www.nytimes.com/2011/12/07/world/middleeast/saudi-arabia-may-seek-nuclear-weapons-prince-says.html>.
3. Nawaf Obaid, "Saudi Arabia Is Preparing Itself in Case Iran Develops Nuclear Weapons," *The Telegraph*, June 29, 2015, <http://www.telegraph.co.uk/news/general-election-2015/politics-blog/11705381/Nawaf-Obaid-Saudi-Arabia-is-preparing-itself-in-case-Iran-develops-nuclear-weapons.html>; and Karl Vick, "Saudis Show Off a Missile as Tensions Rise with Iran," *Time Magazine*, May 1, 2014, <http://time.com/84006/saudi-arabia-iran-tensions-rise/>.
4. For an overview of the Saudi bargaining strategy during the summer of 2015, see Tristan A. Volpe, "Atomic Inducements: The Case for 'Buying Out' Nuclear Latency," *The Nonproliferation Review* 23, no. 3–4 (July 3, 2016): 481–493, <https://doi.org/10.1080/10736700.2016.1246103>. On past technical and economic overviews of Saudi Arabia's nuclear ambitions, see Colin H. Kahl, Melissa G. Dalton, and Matthew Irvine, "Atomic Kingdom: If Iran Builds the Bomb, Will Saudi Arabia Be Next?," Center for New American Security, February 2013, [https://s3.amazonaws.com/files.cnas.org/documents/CNAS\\_AtomicKingdom\\_Kahl.pdf?mtime=20160906080505](https://s3.amazonaws.com/files.cnas.org/documents/CNAS_AtomicKingdom_Kahl.pdf?mtime=20160906080505); Sarah Burkhard, Erica Wenig, David Albright, and Andrea Stricker, "Saudi Arabia's Nuclear Ambitions and

- Proliferation Risks,” Institute for Science and International Security, March 30, 2017, [http://isis-online.org/uploads/isis-reports/documents/SaudiArabiaProliferationRisks\\_30Mar2017\\_Final.pdf](http://isis-online.org/uploads/isis-reports/documents/SaudiArabiaProliferationRisks_30Mar2017_Final.pdf). For a regional assessment in this vein, see Dina Esfandiary and Ariane Tabatabai, “Why Nuclear Dominoes Won’t Fall in the Middle East,” *Bulletin of the Atomic Scientists*, April 22, 2015, <https://thebulletin.org/why-nuclear-dominoes-wont-fall-middle-east8236>.
5. James A. Russell, “Nuclear Proliferation and the Middle East’s Security Dilemma: The Case of Saudi Arabia,” in *Over the Horizon Proliferation Threats*, ed. James J. Wirtz and Peter R. Lavoy (Palo Alto, CA: Stanford University Press, 2012), 48.
  6. U.S. Department of State, “Joint Comprehensive Plan of Action,” accessed January 16, 2018, <https://www.state.gov/e/eb/tfs/spi/iran/jcpoa/>.
  7. Yoel Guzansky, “The UAE’s Nuclear Push,” *Foreign Affairs*, February 19, 2017, <https://www.foreignaffairs.com/articles/iran/2017-02-19/uaes-nuclear-push>.
  8. Quoted in Dan Drollette Jr, “View from the Inside: Prince Turki Al-Faisal on Saudi Arabia, Nuclear Energy and Weapons, and Middle East Politics,” *Bulletin of the Atomic Scientists* 72, no. 1 (January 2, 2016): 19, 22, <https://doi.org/10.1080/00963402.2016.1124655>.
  9. Stephen Kalin and Rania El Gamal, “U.S. Firms Invited to Bid for Saudi Nuclear Plants,” Reuters, December 4, 2017, <https://www.reuters.com/article/us-saudi-nuclearpower-usa/u-s-firms-invited-to-bid-for-saudi-nuclear-plants-idUSKBN1DY0PT>.
  10. Rania El Gamal, “U.S. Energy Chief Says to Start Negotiations on Nuclear Pact with Riya,” Reuters, December 6, 2017, <https://www.reuters.com/article/us-saudi-usa-nuclearpower/u-s-energy-chief-says-to-start-negotiations-on-nuclear-pact-with-riyadh-idUSKBN1E02KC>; “123 Agreements for Peaceful Cooperation,” National Nuclear Security Administration, March 28, 2010, <https://nnsa.energy.gov/aboutus/ourprograms/nonproliferation/treatiesagreements/123agreementsforpeacefulcooperation>.
  11. Bureau of Public Affairs Department of State, The Office of Electronic Information, “U.S.-Saudi Arabia Memorandum of Understanding on Nuclear Energy Cooperation,” May 16, 2008, <https://2001-2009.state.gov/r/pa/prs/ps/2008/may/104961.htm>.
  12. Sylvia Westall, “Saudi Arabia to Extract Uranium for ‘Self-Sufficient’ Nuclear Program,” Reuters, October 30, 2017, <https://www.reuters.com/article/us-saudi-nuclear/saudi-arabia-to-extract-uranium-for-self-sufficient-nuclear-program-idUSKBN1CZ1ON>.
  13. Rania El Gamal and Katie Paul, “Saudi Arabia Hopes to Start Nuclear Pact Talks with U.S. in Weeks - Minister,” Reuters, December 20, 2017, <https://www.reuters.com/article/us-saudi-energy-nuclear/saudi-arabia-hopes-to-start-nuclear-pact-talks-with-u-s-in-weeks-minister-idUSKBN1EE2PJ>.
  14. For prescient forecasts of the Saudi hedge option, see Guzansky, “The Saudi Nuclear Genie Is Out,” and Russell, “Nuclear Proliferation and the Middle East’s Security Dilemma.” On nuclear hedging as a general strategy of proliferation, see Ariel E. Levite, “Never Say Never Again: Nuclear Reversal Revisited,” *International Security* 27, no. 3 (2003): 59–88, <https://doi.org/10.1162/01622880260553633>; Vipin Narang, “Strategies of Nuclear Proliferation: How States Pursue the Bomb,” *International Security* 41, no. 3 (January 1, 2017): 110–150, [https://doi.org/10.1162/ISEC\\_a\\_00268](https://doi.org/10.1162/ISEC_a_00268).
  15. Matthew Fuhrmann and Benjamin Tkach, “Almost Nuclear: Introducing the Nuclear Latency Dataset,” *Conflict Management and Peace Science* 32, no. 4 (September 1, 2015): 443–461, <https://doi.org/10.1177/0738894214559672>; Scott D. Sagan, “Nuclear Latency and Nuclear Proliferation,” in *Forecasting Nuclear Proliferation in the 21st Century*:

- Volume 1 *The Role of Theory*, ed. William Potter and Gaukhar Mukhatzhanova (Stanford Security Studies, 2010), 80–101.
16. Reid Wilson, “Robert Gates: We Have a Flawed Iran Deal. Make the Best of It.,” *Morning Consult*, August 5, 2015, <https://morningconsult.com/2015/08/05/robert-gates-we-have-a-flawed-iran-deal-make-the-best-of-it/>.
  17. Raf Sanchez, “Arab States Are Seeking Nuclear Weapons to Counter Iran, Israel Warns,” *The Telegraph*, February 14, 2016, <https://www.telegraph.co.uk/news/worldnews/middleeast/israel/12156598/Arab-states-are-seeking-nuclear-weapons-to-counter-Iran-Israel-warns.html>.
  18. For an assessment of similar dynamics penned before the U.S. withdrawal from the JCPOA, see Robert Einhorn and Richard Nephew, “The Iran Nuclear Deal: Prelude to Proliferation in the Middle East,” The Brookings Institution, Arms Control and Non-Proliferation Series, Paper 11, May 2016, [https://www.brookings.edu/wp-content/uploads/2016/05/acnpi\\_20160531\\_iran\\_deal\\_regional\\_proliferation.pdf](https://www.brookings.edu/wp-content/uploads/2016/05/acnpi_20160531_iran_deal_regional_proliferation.pdf).
  19. Tom DiChristopher, “Saudi Crown Prince Threatens to Develop a Nuke as Kingdom Seeks Foreign Nuclear Technology,” *CNBC*, March 15, 2018, <https://www.cnn.com/2018/03/15/saudi-crown-prince-threatens-to-build-nuke-as-kingdom-seeks-nuclear-tech.html>.
  20. Isaac Arnsdorf, “White House May Share Nuclear Power Technology With Saudi Arabia,” *ProPublica*, November 29, 2017, <https://www.propublica.org/article/white-house-may-share-nuclear-power-technology-with-saudi-arabia>. See also Henry Sokolski, “In the Middle East, Soon Everyone Will Want the Bomb,” *Foreign Policy*, May 21, 2018, <https://foreignpolicy.com/2018/05/21/in-the-middle-east-soon-everyone-will-want-the-bomb/>.
  21. Steven Mufson, “Pompeo: Saudis Must Not Enrich Uranium If It Seeks Civilian Nuclear Cooperation,” *Washington Post*, May 24, 2018, [https://www.washingtonpost.com/business/economy/pompeo-saudis-must-not-enrich-uranium-if-it-seeks-civilian-nuclear-cooperation/2018/05/24/714c5e30-5f92-11e8-a4a4-c070ef53f315\\_story.html](https://www.washingtonpost.com/business/economy/pompeo-saudis-must-not-enrich-uranium-if-it-seeks-civilian-nuclear-cooperation/2018/05/24/714c5e30-5f92-11e8-a4a4-c070ef53f315_story.html).
  22. Quoted in Jennifer Jacobs, Ari Natter, and Jennifer Dlouhy, “Trump Considers Easing Nuclear Rules for Saudi Project,” *Bloomberg*, December 12, 2017, <https://www.bloomberg.com/news/articles/2017-12-12/trump-is-said-to-consider-easing-nuclear-rules-for-saudi-project>.
  23. Kingston Reif, Daryl G. Kimball, and Kelsey Davenport, “The Risks of Nuclear Cooperation with Saudi Arabia and the Role of Congress,” *Arms Control Association*, April 5, 2018, <https://www.armscontrol.org/issue-briefs/2018-04/risks-nuclear-cooperation-saudi-arabia-role-congress>.
  24. Henry Sokolski and William Tobey, “A Poorly Negotiated Saudi Nuclear Deal Could Damage Future Regional Relationships,” *The National Interest*, February 5, 2018, <http://nationalinterest.org/feature/poorly-negotiated-saudi-nuclear-deal-could-damage-future-24367>.
  25. Rachel Bronson, “Power Shift in the Middle East,” *Bulletin of the Atomic Scientists* 72, no. 1 (January 2, 2016): 10–15, <https://doi.org/10.1080/00963402.2016.1124654>.
  26. Office of the General Counsel, U.S. Nuclear Regulatory Commission, Nuclear Regulatory Legislation, 112<sup>th</sup> Congress; 2<sup>nd</sup> Session, NUREG-0980, Vol. 1, no. 10, September 2013, <https://www.nrc.gov/docs/ML1327/ML13274A489.pdf>.
  27. Paul K. Kerr and Mary Beth D. Nikitin, “Appendix A. Key Dates for Bilateral Civilian Nuclear Cooperation (“Section 123”) Agreements,” Congressional Research Service, December 27, 2016, <https://fas.org/sgp/crs/nuke/RS22937.pdf>.

28. See Christopher M. Blanchard and Paul K. Kerr, "The United Arab Emirates Nuclear Program and Proposed U.S. Nuclear Cooperation," Congressional Research Service, December 20, 2010, <https://fas.org/sgp/crs/nuke/R40344.pdf>.
29. Paul K. Kerr and Mary Beth D. Nikitin, "Nuclear Cooperation with Other Countries: A Primer," Congressional Research Service, December 27, 2016, <https://fas.org/sgp/crs/nuke/RS22937.pdf>.
30. Nicholas L. Miller, "Why Nuclear Energy Programs Rarely Lead to Proliferation," *International Security* 42, no. 2 (November 1, 2017): 40–77, [https://doi.org/10.1162/ISEC\\_a\\_00293](https://doi.org/10.1162/ISEC_a_00293).
31. Ariel Levite and Toby Dalton, "Leveling Up the Nuclear Trade Playing Field," Carnegie Endowment for International Peace, September 7, 2017, <http://carnegieendowment.org/2017/09/07/leveling-up-nuclear-trade-playing-field-pub-73038>; Emma Lecavalier, "Russian Nuclear Power: Convenience at What Cost?," *Bulletin of the Atomic Scientists*, October 16, 2015, <https://thebulletin.org/russian-nuclear-power-convenience-what-cost8809>.
32. Victor Gilinsky and Henry Sokolski, "Facing Reality in the US-Saudi Nuclear Agreement: South Korea," *Bulletin of the Atomic Scientists*, April 10, 2018, <https://thebulletin.org/facing-reality-us-saudi-nuclear-agreement-south-korea11683>.
33. Fred McGoldrick, Robert J. Einhorn, Duyeon Kim, and James L. Tyson, "ROK-U.S. Civil Nuclear and Nonproliferation Collaboration in Third Countries," Brookings Institution, January 2015, <https://www.brookings.edu/wp-content/uploads/2016/06/ROK-US-Civil-Nuclear-and-Nonproliferation-Collaboration-in-Third-Countries.pdf>.
34. Miles A. Pomper, Toby Dalton, Scott Snyder, and Ferenc Dalnoki-Veress, "Strengthening the ROK-US Nuclear Partnership," CNS Occasional Paper #24, February 2016, <https://www.nonproliferation.org/wp-content/uploads/2016/02/Occasional-Paper-24-Strengthening-ROK-US-Nuclear-Partnership.pdf>.
35. Fred McGoldrick, "The New Peaceful Nuclear Cooperation Agreement between South Korea and the United States: From Dependence to Parity," Korea Economic Institute of America, Special Studies Series 6, September 2015, [http://blog.keia.org/wp-content/uploads/2015/12/KEI\\_Special-Studies-2015-FINAL.pdf](http://blog.keia.org/wp-content/uploads/2015/12/KEI_Special-Studies-2015-FINAL.pdf).
36. Tristan A. Volpe, "Atomic Leverage: Compellence with Nuclear Latency," *Security Studies* 26, no. 3 (July 3, 2017): 517–544, <https://doi.org/10.1080/09636412.2017.1306398>; Matthew Fuhrmann, "The Logic of Latent Nuclear Deterrence," SSRN Scholarly Paper (Rochester, NY: Social Science Research Network, September 8, 2017), <https://papers.ssrn.com/abstract=3052231>. For a quantitative assessment, see Rupal N. Mehta and Rachel Elizabeth Whitlark, "The Benefits and Burdens of Nuclear Latency," *International Studies Quarterly* 61, no. 3 (2017): 517–528, <https://doi.org/10.1093/isq/sqx028>.
37. David S. Jonas, John Carlson, and Richard S. Goorevich, "The NSG Decision on Sensitive Nuclear Transfers: ABACC and the Additional Protocol," *Arms Control Today*, November 5, 2012, [https://www.armscontrol.org/act/2012\\_11/The-NSG-Decision-on-Sensitive-Nuclear-Transfers-ABACC-and-the-Additional-Protocol](https://www.armscontrol.org/act/2012_11/The-NSG-Decision-on-Sensitive-Nuclear-Transfers-ABACC-and-the-Additional-Protocol).
38. Jim Green, "Sensitive Nuclear Technologies and US Nuclear Export Agreements | Wise International," *Nuclear Monitor*, August 23, 2013, <https://www.wiseinternational.org/nuclear-monitor/766/sensitive-nuclear-technologies-and-us-nuclear-export-agreements>.
39. Mieke Eoyang and Laura S.H. Holgate, "Why Flynn's Nuclear Advocacy Was So Dangerous," *Lawfare*, December 13, 2017, <https://lawfareblog.com/why-flynn-s-nuclear-advocacy-was-so-dangerous>.
40. Bronson, "Power Shift in the Middle East," 13.

41. Robert J. Einhorn, "On US-Saudi Civil Nuclear Negotiations: Finding a Practical Compromise," *Bulletin of the Atomic Scientists*, January 12, 2018, <https://thebulletin.org/us-saudi-civil-nuclear-negotiations-finding-practical-compromise11426>.
42. International Atomic Energy Agency (IAEA), "Status of the Additional Protocol," December 4, 2017, <https://www.iaea.org/topics/additional-protocol/status>.
43. IAEA, "Statement by IAEA Director General Yukiya Amano," October 13, 2017, <https://www.iaea.org/newscenter/statements/statement-by-iaea-director-general-yukiya-amano-13-october-2017>.
44. Mark Hibbs, "Negotiating Nuclear Cooperation Agreements," Carnegie Endowment for International Peace, Nuclear Energy Brief, August 7, 2012, <http://carnegieendowment.org/2012/08/07/negotiating-nuclear-cooperation-agreements-pub-49011>.
45. Hibbs, "Negotiating Nuclear Cooperation Agreements."
46. Mary Beth D. Nikitin, Mark Holt, Mark E. Manyin, "U.S.-Vietnam Nuclear Cooperation Agreement: Issues for Congress," Congressional Research Service, September 15, 2014, <https://fas.org/sgp/crs/nuke/R43433.pdf>.
47. Volpe, "Atomic Inducements."
48. Lewis A. Dunn, "Some Reflections on the 'Dove's Dilemma,'" *International Organization* 35, no. 1 (1981): 181–192, <https://doi.org/10.1017/S0020818300004136>; Bonny Yang Lin, "Arms, Alliances, and the Bomb: Using Conventional Arms Transfers to Prevent Nuclear Proliferation," Ph.D. dissertation, Yale University, 2012; Alexander Lanoszka, "Do Allies Really Free Ride?," *Survival* 57, no. 3 (May 4, 2015): 133–152, <https://doi.org/10.1080/00396338.2015.1046229>.
49. Helene Cooper, "Saudi Arabia Says King Won't Attend Meetings in U.S.," *New York Times*, May 10, 2015, <https://www.nytimes.com/2015/05/11/world/middleeast/saudi-arabia-king-wont-attend-camp-david-meeting.html>.
50. On the origins of the U.S.-Saudi relationship, see Rachel Bronson, *Thicker Than Oil: America's Uneasy Partnership with Saudi Arabia* (Oxford, UK: Oxford University Press, 2008).
51. Sigurd Neubauer, "Saudi Arabia's Nuclear Envy: Washington Should Help Riyadh Keep Up with Tehran," *Foreign Affairs*, November 16, 2014, <https://www.foreignaffairs.com/articles/middle-east/2014-11-16/saudi-arabias-nuclear-envy>.
52. Timothy Gardner, "Trump Officials Brief Hill Staff on Saudi Reactors, Enrichment a Worry," Reuters, December 15, 2017, <https://www.reuters.com/article/us-usa-nuclear-saudi/trump-officials-brief-senators-on-saudi-reactors-enrichment-a-worry-idUSKBN1E92M1>.
53. "UPDATE 1-France's EDF Plans to Bid in Saudi Arabia Nuclear Tender -Sources," Reuters, November 29, 2017, <https://www.reuters.com/article/saudi-nuclear-edf/update-1-frances-edf-plans-to-bid-in-saudi-arabia-nuclear-tender-sources-idUSL8N1NZ1YN>; "Rosatom Ready to Take Part in Any Saudi Arabia Nuclear Plant Tender," Reuters, November 2, 2017, <https://www.reuters.com/article/saudi-nuclearpower-russia/rosatom-ready-to-take-part-in-any-saudi-arabia-nuclear-plant-tender-idUSL8N1N87VZ>; "Korean Firms to Bid for Saudi Nuclear Power Plant Project: KHNP," Reuters, October 31, 2017, <https://www.reuters.com/article/us-saudi-nuclear-southkorea/korean-firms-to-bid-for-saudi-nuclear-power-plant-project-khnp-idUSKBN1D02J5>; "Saudi Arabia Signs Cooperation Deals with China on Nuclear Energy," Reuters, August 25, 2017, <https://www.reuters.com/article/saudi-china-nuclear/saudi-arabia-signs-cooperation-deals-with-china-on-nuclear-energy-idUSL8N1LB1CE>.

54. Robert J. Einhorn, "Identifying Nuclear Aspirants and Their Pathways to the Bomb," *The Nonproliferation Review* 13, no. 3 (November 1, 2006): 491–499, <https://doi.org/10.1080/10736700601071546>; see also "'Breakout' – What It Is, And What You Need To Know," Ploughshares Fund, April 23, 2014, <https://www.ploughshares.org/issues-analysis/article/%E2%80%9Cbreakout%E2%80%9D-%E2%80%93-what-it-and-what-you-need-know>.
55. For an overview of "sneak out" proliferation concerns, see James M. Acton, "Who Cares about an Iranian Nuclear Breakout? Beware of an Atomic 'Sneak-Out,'" *The National Interest*, November 4, 2014, <http://nationalinterest.org/feature/who-cares-about-iranian-nuclear-breakout-beware-atomic-sneak-11604>.
56. Quoted in Drollette Jr, "View from the Inside," 22.
57. Jacques E. C. Hymans, *Achieving Nuclear Ambitions: Scientists, Politicians, and Proliferation* (London: Cambridge University Press, 2012); Peter D. Zimmerman, "Proliferation: Bronze Medal Technology Is Enough," *Orbis* 38, no. 1 (December 1, 1994): 67–82, [https://doi.org/10.1016/0030-4387\(94\)90106-6](https://doi.org/10.1016/0030-4387(94)90106-6); Jeffrey Lewis, "Sorry, Fareed: Saudi Arabia Can Build a Bomb Any Damn Time It Wants To," *Foreign Policy*, June 12, 2015, <https://foreignpolicy.com/2015/06/12/sorry-fareed-saudi-arabia-can-build-a-bomb-any-damn-time-it-wants-to/>.
58. R. Scott Kemp, "The End of Manhattan: How the Gas Centrifuge Changed the Quest for Nuclear Weapons," *Technology and Culture* 53, no. 2 (May 17, 2012): 272–305, <https://doi.org/10.1353/tech.2012.0046>; R. Scott Kemp, "The Nonproliferation Emperor Has No Clothes: The Gas Centrifuge, Supply-Side Controls, and the Future of Nuclear Proliferation," *International Security* 38, no. 4 (May 17, 2014): 39–78, [https://doi.org/10.1162/ISEC\\_a\\_00159](https://doi.org/10.1162/ISEC_a_00159).
59. Victor Gilinsky and Henry Sokolski, "Exporting Nuclear Reactors: No Way to Fight Proliferation," *Bulletin of the Atomic Scientists*, November 16, 2017, <https://thebulletin.org/exporting-power-reactors-no-way-fight-proliferation11282>.
60. Matthew Fuhrmann, "Spreading Temptation: Proliferation and Peaceful Nuclear Cooperation Agreements," *International Security* 34, no. 1 (2009): 7–41, <http://dx.doi.org/10.1162/isec.2009.34.1.7>; Matthew Fuhrmann, *Atomic Assistance: How "Atoms for Peace" Programs Cause Nuclear Insecurity* (Ithaca, NY: Cornell University Press, 2012). See also Matthew Kroenig, "Exporting the Bomb: Why States Provide Sensitive Nuclear Assistance," *American Political Science Review* 103, no. 1 (February 2009): 113–133, <https://doi.org/10.1017/S0003055409090017>.
61. James M. Acton, "On the Regulation of Dual-Use Nuclear Technology," in *Governance of Dual-Use Technologies: Theory and Practice*, ed. Elisa Harris (Cambridge, MA: American Academy of Arts and Sciences, 2016). For an excellent historical overview of the evolution of dual-use nuclear technologies, see Steven E. Miller, "Cyber Threats, Nuclear Analogies? Divergent Trajectories in Adapting to New Dual-Use Technologies," in *Understanding Cyber Conflict: Fourteen Analogies*, ed. George Perkovich and Ariel E. Levite (Washington, DC: Georgetown University Press, 2017), 161–179.
62. Fred McGoldrick, "The U.S.-UAE Peaceful Nuclear Cooperation Agreement: A Gold Standard or Fool's Gold?," Center for Strategic and International Studies, Policy Perspectives, November 30, 2010, [https://csis-prod.s3.amazonaws.com/s3fs-public/legacy\\_files/files/publication/101130\\_McGoldrick\\_USUAENuclear.pdf](https://csis-prod.s3.amazonaws.com/s3fs-public/legacy_files/files/publication/101130_McGoldrick_USUAENuclear.pdf).
63. To be sure, Pakistan faces strong incentives not to transfer sensitive nuclear technology to Saudi Arabia so long as it aspires for NSG membership. See Mark Hibbs, "Riyadh's

- Uranium Enrichment Option,” Carnegie Endowment for International Peace, February 4, 2018, <https://carnegieendowment.org/2018/02/04/riyadh-s-uranium-enrichment-option-pub-75444>.
64. Munir Akram, “India-Pakistan: Hyphenated,” *Dawn*, September 13, 2015, [www.dawn.com/news/1206621](http://www.dawn.com/news/1206621).
65. See Christopher Clary and Mara Karlin, “The Pak-Saudi Nuke, and How to Stop It,” *American Interest* 7, no. 6 (June 2012), [www.the-american-interest.com/2012/06/10/the-pak-saudi-nuke-and-how-to-stop-it/](http://www.the-american-interest.com/2012/06/10/the-pak-saudi-nuke-and-how-to-stop-it/); Mark Fitzpatrick, “Saudi Arabia, Pakistan and the Nuclear Rumour Mill,” *Survival* 57, no. 4 (July 4, 2015): 105–108, <https://doi.org/10.1080/00396338.2015.1068562>.
66. Daniel B. Poneman, “The Case for American Nuclear Leadership,” *Bulletin of the Atomic Scientists* 73, no. 1 (January 2, 2017): 44–47, <https://doi.org/10.1080/00963402.2016.1264211>; see also “The U.S. Nuclear Energy Enterprise: A Key National Security Enabler,” Energy Futures Initiative, August 2017, [http://www.energyfuels.com/wp-content/uploads/2018/01/2018.01.16-Exhibits-to-Petition\\_Part2.pdf](http://www.energyfuels.com/wp-content/uploads/2018/01/2018.01.16-Exhibits-to-Petition_Part2.pdf).
67. Mufson, “Pompeo: Saudis Must Not Enrich Uranium If It Seeks Civilian Nuclear Cooperation.”
68. Nicholas L. Miller, “The Secret Success of Nonproliferation Sanctions,” *International Organization* 68, no. 4 (Fall 2014): 913–944, <https://doi.org/10.1017/S0020818314000216>; Volpe, “Atomic Inducements,” 484.
69. Mark Hibbs, “Does the U.S. Nuclear Industry Have a Future?,” Carnegie Endowment for International Peace, August 27, 2017, <http://carnegieendowment.org/2017/08/10/does-u.s.-nuclear-industry-have-future-pub-72797>.
70. Russell, “Nuclear Proliferation and the Middle East’s Security Dilemma,” 62.
71. Francis J. Gavin, “Blasts from the Past: Proliferation Lessons from the 1960s,” *International Security* 29, no. 3 (January 1, 2005): 100–135, <https://doi.org/10.1162/0162288043467504>.