

## Atomic Buyouts: Shifting U.S. Non-Proliferation Strategy towards Allies

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**Abstract:** This article makes the case for an updated strategy to limit the spread of sensitive nuclear technology around the globe. The problem is that traditional efforts by the United States to deny countries access to enrichment and reprocessing (ENR) technology are becoming difficult to enforce, while the threat of sanctions is not credible against U.S. allies with legal nuclear energy programs. As a result, the United States should shift towards a strategy of buying out an ally's ambition for sensitive nuclear technology. The rub is that a buyout will only work when offered at the earliest stage of technical development, before the country builds capabilities that will be hard or expensive to give up. Of course, there are some practical challenges to implementing such a strategy. But the conditions are right to see if lucrative nuclear energy offers, notably spent waste management solutions, can induce countries with emerging civil nuclear programs to foreclose the option to develop ENR technology in the future.

A storm is brewing over the spread of sensitive nuclear technology that will be hard for the United States to weather without an updated non-proliferation strategy. A handful of U.S. allies in Northeast Asia and the Middle East have refused to foreclose the option to develop enrichment or reprocessing facilities for civilian nuclear energy programs. There is no legal prohibition on developing either technology under the terms of the Nuclear Non-Proliferation Treaty (NPT), so long as the country permits international monitoring of peaceful use. Yet enrichment and reprocessing (ENR) technology can be used to produce the fissile material that forms the core of a nuclear weapon.<sup>1</sup> The United States has therefore pursued additional

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<sup>1</sup> A first-generation nuclear weapon generates effects by rapidly combining pieces of fissile material into a supercritical mass to enable a nuclear chain reaction. A gun type slams together subcritical masses of highly enriched uranium (HEU). An implosion weapon surrounds a subcritical mass of plutonium or HEU with high explosive material that is used to compress the fissile material into a denser, supercritical mass. See U.S. Department of Energy, *Restricted Data Declassification Decisions 1946 to the Present* (RDD-7, Office of Declassification, January 2001).

measures over the decades to deny even its closest partners from surmounting this technical chokepoint to the bomb.<sup>2</sup>

The last two U.S. presidential administrations attempted to erect new barriers to the supply of sensitive technology. In 2004, President George W. Bush called for the leading group of nuclear suppliers to ban the sale of ENR technology to states that did not already have it, but the proposal failed to garner political consensus.<sup>3</sup> The Obama administration fell back on a bilateral approach by trying to make some U.S. agreements for civil nuclear cooperation conditional on the recipient country forswearing ENR technology. By baking strict restrictions into nuclear cooperation agreements – colloquially known as 123 Agreements – this effort was supposed to usher in a new non-proliferation “gold standard.”<sup>4</sup> Although the United Arab Emirates and Taiwan accepted this restriction, Washington found it difficult to convince Vietnam and Jordan, not to mention the Republic of Korea or Saudi Arabia, to follow suit.

What is the best path forward to limit the spread of sensitive nuclear technology among allies? The traditional non-proliferation toolbox of technology denial, coercion, and incentives provided past U.S. presidential administrations with a range of effective options to choose from. But denying access to technology is becoming difficult to enforce against U.S. allies with a growing number of alternative supply options. Furthermore, sanctioning or even censuring allies is very hard and painful. Given the mutual economic and security benefits derived from U.S. alliance relationships today, there is little desire in Washington to incur the damage of coercing allies over civilian nuclear technology concerns.

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<sup>2</sup> Francis J. Gavin, “Strategies of Inhibition: U.S. Grand Strategy, the Nuclear Revolution, and Nonproliferation,” *International Security*, Vol. 40, No. 1 (Summer 2015), pp. 9-46.

<sup>3</sup> Wade Boese, “Bush Outlines Proposals to Stem Proliferation,” *Arms Control Today*, 1 March, 2004. Available online.

<sup>4</sup> Fred McGoldrick, *Limiting Transfers of Enrichment and Reprocessing Technology: Issues, Constraints, Options* (Cambridge, MA: Project on Managing the Atom, Harvard University, May 2011).

As technology denial and coercion become tough options to employ, the United States should consider shifting towards a strategy of buying out an ally's sensitive nuclear program. Substantial packages of political, economic, and military assistance may entice U.S. allies into agreeing not to exercise their legal right under the NPT to develop the full nuclear fuel cycle. The rub is that a buyout is only likely to succeed if offered at the earliest stage of technical development, before an ally builds capabilities that will be hard or expensive to give up. A non-proliferation strategy predicated on inducements offers a pragmatic path to limit the development of ENR around the globe if implemented in a coherent and timely manner.

### **The High Price of Technology Denial and Coercion**

In the past, Washington tried, with considerable success, to pressure supplier countries into limiting the export of sensitive nuclear technology. The United States worked with other supplier nations to create the Nuclear Suppliers Group (NSG) to impose conditions on the sale of nuclear technology around the globe. When business interests trumped security concerns, U.S. officials pressured NSG members such as France and Germany to cancel the sale of sensitive technology. Cut off from the ability to purchase turnkey facilities, countries such as Argentina and Brazil took much longer to develop their own indigenous enrichment technology, while Iran and Pakistan were forced onto the black market to slowly procure sensitive technology and components at great risk of discovery.<sup>5</sup>

Technology denial is one long-standing pillar of U.S. non-proliferation policy, but it is becoming easier to find a supplier. Chinese enterprises are producing components with applications in nuclear programs. Beijing's implementation of export controls has been lax in the

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<sup>5</sup> J. Samuel Walker, "Nuclear Power and Nonproliferation: The Controversy over Nuclear Exports, 1974-1980," *Diplomatic History*, Vol. 25, No. 2 (Spring 2001), pp. 215-249.

past, but hopefully will improve as new legislation comes into effect.<sup>6</sup> India, Pakistan, Iran, and North Korea remain outside the Nuclear Suppliers Group. Washington supports New Delhi's bid to join the NSG, and Iran's nuclear exports will be curtailed until 2030 under the terms of the nuclear deal it struck in July 2015.<sup>7</sup> Yet Pakistan and North Korea present enduring supply challenges. Pakistan wants to follow India into the export control regimes, but is unlikely to meet the strict requirements anytime soon.<sup>8</sup> On the illicit side, North Korea runs a criminal trade network with the operational security and tradecraft needed to smuggle nuclear components to a risk-acceptant buyer.<sup>9</sup>

To make matters worse, rapid innovations in manufacturing will make it easier to transfer and produce nuclear technology around the globe.<sup>10</sup> Additive manufacturing – more commonly known as 3-D printing – has the “potential to fundamentally change the nature of existing supply chains” for nuclear components regulated by multinational export control regimes.<sup>11</sup> The latest 3-D printers can produce a wide range of metallic objects from digital build files transmitted over the Internet.<sup>12</sup> Whereas specialized lathes used to machine uranium gas centrifuges are restricted by export controls, 3-D printers offer a true general-purpose manufacturing capability that is hard to control. The digital nature of production also opens the door to cyber theft, and

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<sup>6</sup> Ian J. Stewart, “China and Non-Proliferation: Progress at Last?” *The Diplomat*, 25 March 2015, available online.

<sup>7</sup> For an overview of the membership challenges facing the NSG, see Mark Hibbs, *The Future of the Nuclear Suppliers Group* (Washington, DC: The Carnegie Endowment for International Peace, 2011).

<sup>8</sup> Toby Dalton and Michael Krepon, *A Normal Nuclear Pakistan* (Washington, DC: Stimson Center and Carnegie Endowment for International Peace, 2015), p. 5.

<sup>9</sup> Andrea Berger, *Target Markets: North Korea's Military Customers* (London, UK: Routledge, 2016); Robert D. Wallace, *Sustaining the Regime: North Korea's Quest for Financial Support* (Lanham, MD: University Press of America, 2006).

<sup>10</sup> Matthew Kroenig and Tristan Volpe, “3-D Printing the Bomb? The Nuclear Nonproliferation Challenge,” *The Washington Quarterly*, Vol. 3, No. 38 (Fall 2015), pp. 7-19.

<sup>11</sup> Ian J. Stewart, “EU Export Controls: The State of Play and the Need for Reform,” Paper Prepared for the European Parliament's Sub-Committee on Security and Defense (October 6, 2015), p. 22.

<sup>12</sup> For a technical assessment of 3D-printing managing steel centrifuge components, see Grant Christopher, “3D Printing: A Challenge to Nuclear Export Controls,” *Strategic Trade Review*, Vol. 1, No. 1 (Autumn 2015), pp. 18-25.

bypasses the international transportation nodes authorities monitor to interdict suspicious shipments.

Denying allies access to sensitive technology comes at a high political price for the United States. During the Cold War, U.S. officials blocked sales and even threatened treaty allies, most notably the Republic of Korea in 1975, into abandoning plutonium programs. As a National Security Council report from March 1977 concluded, however, these “efforts to curb the spread of nuclear technology through unilateral embargoes and direct intervention have incurred substantial costs.”<sup>13</sup> Political relations with South Korea, West Germany, and France became strained, while U.S. businesses lost out on opportunities to sell nuclear reactor technology and services abroad.

The cost of sanctioning an ally that pursues a lawful nuclear program in full compliance with international monitoring and safeguards is even higher.<sup>14</sup> When denial policies failed to inhibit allies from pursuing ENR capabilities in the past, U.S. officials had to weigh the consequence of sacrificing geopolitical interests to achieve non-proliferation goals. Congress tried to influence this calculus by passing legislation in the 1970s to ban economic and military assistance to any country that developed ENR technology without following the regulations of the International Atomic Energy Agency (IAEA). But Washington was reluctant to allow South Korea to even be censured at the United Nations Security Council in 2004 for undeclared enrichment and reprocessing experiments that violated the safeguard agreement with the IAEA.<sup>15</sup> While the United States has become quite sophisticated at sanctioning adversarial regimes in

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<sup>13</sup> U.S. National Security Council, “Intelligence Report,” March 1977, in *Foreign Relations of the United States (FRUS), 1977–1980*, Vol. 26, p. 816.

<sup>14</sup> Nicholas Miller adroitly demonstrates that the threat of sanctions has deterred many countries from pursuing nuclear weapons programs over the last four decades; see “The Secret Success of Nonproliferation Sanctions,” *International Organization*, Vol. 68, No. 4 (2014), pp. 913-944. But the threat is far less credible against an ally that develops ENR technology in full compliance with the IAEA.

<sup>15</sup> James M. Acton, “The Problem with Nuclear Mind Reading,” *Survival*, Vol. 51, No. 1 (February-March 2009), pp. 136-137.

Pyongyang and Tehran, these coercive instruments are neither credible nor prudent options to shape the trajectory of an ally's civilian nuclear program.

### **The Case for Buying Out Sensitive Nuclear Programs**

The United States should consider shifting towards a strategy of buying out an ally's sensitive nuclear program. Many countries that pursue ENR technology consider trading away or at least constraining their quest for the right price. During the Cold War, officials in Rome and Tokyo implied they might retain civil nuclear programs outside of the NPT regime to pressure Washington into providing enhanced military assistance under the NATO alliance for Italy, and the territorial reversion of Okinawa in the case of Japan.<sup>16</sup> South Korea tried to develop a plutonium program to prevent the withdrawal of U.S. forces from the peninsula in the early 1970s.<sup>17</sup> These episodes led the U.S. Central Intelligence Agency in 1975 to predict, "Future nuclear politics will almost certainly include states which will exploit for political gain their threshold positions, as much or more than their actual [nuclear weapons] capabilities."<sup>18</sup> The forecast proved prescient as North Korea threatened to produce plutonium for nuclear weapons in 1994 as part of a bargaining gambit for energy assistance.<sup>19</sup> In 2015, Saudi Arabia threatened to match Iran's uranium enrichment capability to gain leverage over the White House for a formal defense treaty and advanced conventional weapons.<sup>20</sup>

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<sup>16</sup> Leopoldo Nuti, "'Me Too, Please': Italy and the Politics of Nuclear Weapons, 1945-1975," *Diplomacy and Statecraft*, Vol. 4, No. 1 (1993), pp. 137, 121; George H. Quester, "Japan and the Nuclear Non-Proliferation Treaty," *Asian Survey*, Vol. 10, No. 9 (September 1, 1970), pp. 765-778.

<sup>17</sup> Seung-Young Kim, "Security, Nationalism and the Pursuit of Nuclear Weapons and Missiles: The South Korean Case, 1970-82," *Diplomacy and Statecraft*, Vol. 12, No. 4 (December 2001), p. 60.

<sup>18</sup> U.S. Central Intelligence Agency, "Managing Nuclear Proliferation: The Politics of Limited Choice," Research Study, December 1975, National Security Archive [hereafter NSA], p. 39.

<sup>19</sup> Joel S. Wit, Daniel B. Poneman, and Robert L. Gallucci, *Going Critical: The First North Korean Nuclear Crisis* (Washington, DC: Brookings Institution Press, 2005), p. 37.

<sup>20</sup> Frederic Wehrey, "What's Behind Saudi Arabia's Nuclear Anxiety?" *CERI Strategy Papers*, December 17, 2012.

As this track record underscores, some countries decided they could gain more by trading away ENR in exchange for incentives from the United States. At other times, the promise of rewards was insufficient. A package of incentives is not a non-proliferation panacea, especially when it comes to dealing with adversaries. So when are nuclear inducements going to be most effective towards allies?

The United States is most likely to succeed if the offer is made at an early stage of development. Washington will be in the best position when the ally first demonstrates intent to pursue ENR technology, but does not have the actual capabilities in place yet. Instead of investing considerable resources, the ally can trade away its emerging aspirations for a package of inducements that will provide more immediate benefits.

Such incentives must be tailored to the ally's security, energy, and economic requirements. Allies in the Middle East and Northeast Asia are often keen to shore up local defenses through enhanced access to U.S. conventional weapons, military training, and intelligence support. On the nuclear energy front, countries want an assured supply of fuel for nuclear reactors, as well as a way to manage spent fuel and nuclear waste. Many allies also want to deepen economic cooperation with the United States, thereby creating an opportunity for Washington to bolster ties with regional partners while mitigating the desire for sensitive nuclear technology. Unlike technology denial or coercion, a strategy based on incentives does not require a hard choice between geostrategic interests and non-proliferation.

Governments are receptive to nuclear buyouts at this stage because it is very expensive and risky to move forward. Enrichment requires deep science and engineering expertise to master isotope separation techniques, such as gas centrifuges and gaseous diffusion, used to increase the proportion of fissile uranium. The plutonium route necessitates the construction of a

nuclear reactor to produce, and chemical reprocessing facility to separate out plutonium from spent waste fuel. Overcoming these scientific challenges requires sustained financial investment over time.<sup>21</sup> The government also has to incur political and security costs if the ENR program generates regional instability.

In return, the ally should provide an ironclad commitment to forgo developing sensitive nuclear technology. The civil nuclear cooperation agreement accepted by the United Arab Emirates sets a high standard because it includes a “legally binding provision” to forgo the development or possession of ENR technology, along with more stringent inspections of nuclear activities.<sup>22</sup> In the wake of the July 2015 Iran nuclear deal, however, Yousef al-Otaiba, UAE’s ambassador to the United States, indicated to a high-ranking member of Congress that his country might want to renegotiate the agreement. “Your worst enemy has achieved this right to enrich. It is a right to enrich now that your friends are going to want, too, and we won’t be the only country.”<sup>23</sup> The ambassador’s remarks highlight the crux of the commitment problem that an ally must solve. A country’s intent to forego ENR technology may change over time, so that the government is unwilling to live up to the promise at a later date. To reassure the United States and the international community, the pledge must be relatively immune to changing geopolitical and domestic conditions.

Just as Ulysses bound himself to the mast against the Sirens, so too can an ally take actions to commit itself over the long term. The UAE’s nuclear cooperation agreement is, in fact, a perfect example of a “hand-tying” pledge because it raises the future costs of breaking the

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<sup>21</sup> On knowledge barriers to the production of sensitive technologies, see Alexander H. Montgomery, “Stop Helping Me: When Nuclear Assistance Impedes Nuclear Programs,” in Adam Stulberg and Matt Fuhrmann, eds., *The Nuclear Renaissance and International Security* (Stanford, CA: Stanford University Press, 2013), pp. 177-200.

<sup>22</sup> Christopher M. Blanchard and Paul K. Kerr, *The United Arab Emirates Nuclear Program and Proposed U.S. Nuclear Cooperation* (Washington, DC: Congressional Research Service Report, December 10, 2015).

<sup>23</sup> “Report: UAE might seek right to enrich uranium,” *Al Jazeera*, October 16, 2015.



promise, while boosting the benefits of never pursuing ENR in the first place. If the UAE decided to pursue ENR technology, it would jeopardize an extremely valuable nuclear reactor project. With growing demand for electricity in the UAE, the government claims that the four Westinghouse nuclear energy reactors under construction by a South Korean consortium are the only way to meet its future energy needs. Abu Dhabi provided over \$10 billion USD equity to begin construction, but more importantly, enmeshed its nuclear program in a web of civil nuclear cooperation agreements with the United States, South Korea, and seven other countries that supply technology and services. The UAE's representative to the IAEA, Ambassador Hamad Al Kaabi, claimed that "early on in the program," these agreements were essential for the "transfer of technology and human resource development" from experienced nuclear countries, and continue to form the necessary basis for construction and eventual operation of the reactors.<sup>24</sup> A decision to renegotiate the terms of the U.S. 123 Agreement to permit enrichment would be a risky endeavor given the dependence of the reactor project on cooperation with international suppliers. As an astute diplomat, Ambassador al-Otaiba may have attempted to gain leverage with his remarks about enrichment. But his threat lacked credibility because the government had already bound itself against this course of action with the civil nuclear cooperation agreements.

Incentives are unlikely to succeed when an ally is already vested in enrichment or reprocessing technology. It is much more expensive for Washington to buy out an operational uranium fuel enrichment plant, for instance, than unrealized blueprints and distant aspirations. But even the most lucrative inducements may not be sufficient for buying out operational facilities because the development of nuclear technology follows what economists refer to as a

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<sup>24</sup> Quoted in Elisabeth Dyck and Ayhan Evrensel, "From Consideration to Construction: The United Arab Emirates' Journey to Nuclear Power: A Country Case Study," IAEA Department of Nuclear Energy, 3 February 2015. Available online at **Error! Main Document Only.** <https://www.iaea.org/newscenter/news/consideration-construction-united-arab-emirates-journey-nuclear-power>.

“path dependent” process: “Each step along a particular path produces consequences that increase the relative attractiveness of that path ... As such effects begin to accumulate, they generate a power cycle of self-reinforcing activity.”<sup>25</sup> Consider the dominance of light-water reactors over other technologies in the nuclear industry. Early adoption and heavy government support of the light water design gave the technology a huge head start in the commercial industry. Once the light-water reactor became entrenched, industry was unwilling to switch to other technologies that emerged later with superior economic and technical benefits.<sup>26</sup> Enrichment and reprocessing programs generate a similar type of process within a country over time. Once the initial decision to pursue enrichment or reprocessing becomes dominant and “locked-in,” the entrapped government cannot trade away these sensitive technologies, even if the leadership prefers to strike such a deal.<sup>27</sup>

The trajectory of Japan’s plutonium program is a paradigmatic case of path dependency in action. After the 2011 Fukushima Daiichi nuclear accident, the dramatic shuttering of nuclear reactor operations severely curtailed Japan’s ability to use plutonium, thereby eliminating the need to commission a new commercial reprocessing plant in Rokkasho. But local government and industry were vested in the operation of the Rokkasho reprocessing plant, so they forced Tokyo to stay the course despite the economic illogic and nuclear security concerns of producing excess plutonium.<sup>28</sup> Similar dynamics exist across the East Sea, where South Korea’s desire to commercialize an experimental form of reprocessing highlights the risk of path dependency

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<sup>25</sup> Paul Pierson, *Politics in Time: History, Institutions, and Social Analysis* (Princeton University Press, 2004), pp. 17-18.

<sup>26</sup> Robin Cowan, “Nuclear Power Reactors: A Study in Technological Lock-in,” *The Journal of Economic History*, Vol. 50, No. 3 (September 1990), pp. 541-567

<sup>27</sup> William Walker, *Nuclear Entrapment: THORP and the Politics of Commitment* (Institute for Public Policy Research, 1999).

<sup>28</sup> James M. Acton, *Wagging the Plutonium Dog: Japanese Domestic Politics and Its International Security Implications* (Washington, DC: Carnegie Endowment for International Peace, 2015).

setting in at the research and development stage.<sup>29</sup> As Japan and to a lesser degree South Korea underscore, governments with mature and path dependent nuclear programs may not be able to trade away or give up their quest for ENR technology.

U.S. officials considered buying out allies in the past as a complement to technology denial, but offers came at too late a stage of nuclear development to matter. During the formative years of Pakistan's nuclear program, for instance, the Ford and Carter administrations experimented with various proposals designed to lure the leadership in Islamabad away from plutonium reprocessing technology. In December 1976, Secretary of State Henry Kissinger tried to convince the Pakistanis to cancel a contract for a reprocessing capability by offering "a military package including A-7's, perhaps a reactor."<sup>30</sup> Senior State Department officials again recommended in March 1979 that the White House offer "an audacious buy-off" of Pakistan's reprocessing contract based on a massive package of conventional weapons and economic assistance "to stabilize Pakistan's position in South Asia."<sup>31</sup> This option was ultimately tabled when it subsequently became clear that Pakistan had also invested heavily in the uranium enrichment route, and was unlikely to trade away this capability.<sup>32</sup>

A package of incentives holds the best promise of ensuring that unrealized aspirations for uranium enrichment in Saudi Arabia never materialize. High-ranking Saudi officials have repeatedly expressed a desire to develop an enrichment program. In May, former Saudi Director of General Intelligence Prince Turki al-Faisal threatened to match Iran's nuclear program:

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<sup>29</sup> Author interviews with ROK government officials and analysts. Seoul, Republic of Korea. June and November 2015.

<sup>30</sup> U.S. Secretary of State, Memorandum of Conversation, Washington, December 17, 1976; FRUS, 1969–1976, Volume E–8, Document 239.

<sup>31</sup> U.S. Department of State, "A Strategy for Pakistan," Memorandum, 5 March 1979, National Security Archive Electronic Briefing Book No. 333.

<sup>32</sup> On the link between US conventional arms transfers and Pakistan's proliferation calculus during this time, see Lewis Dunn, "Some Reflections on the 'Dove's Dilemma,'" *International Organization*, Vol. 35, No. 1 (1981), p. 183.

“Whatever the Iranians have, we will have too.”<sup>33</sup> The Saudi ambassador to the United Kingdom, Prince Mohammed bin Nawwaf, underscored this threat in June, claiming, “all options are on the table” as the Kingdom confronted Iran.<sup>34</sup>

The threats were designed gain leverage over Washington. As Saudi officials prepared for a summit in Washington in May 2015, they demanded a formal “defence treaty with the United States pledging to defend them if they came under external attack.” Furthermore, the Saudis wanted advanced conventional weapon systems, such as the F-35 advanced fighter jet, to give them an even greater qualitative edge over the Iranians, despite a massive bilateral arms transfer from the United States in 2011 valued at \$60 billion. While President Obama reassured the Saudis that the American commitment to Gulf security was “ironclad,” he “stopped short of offering a formal defence pact,” and instead issued “a carefully worded pledge that was far less robust than the mutual defence treaty” that the Saudis wanted. Concrete deliverables accelerated military assistance plans to help the Kingdom buttress its local defenses against Iran.<sup>35</sup>

The White House ended up rebuffing the Saudi requests because the Kingdom lacked the technical means to follow through on the nuclear threat in the short term. Aside from several nuclear research centers, Saudi Arabia did not have the infrastructure to build a gas centrifuge program.<sup>36</sup> Some worried that the Saudis could get around their technical limitations by calling in a favor to Pakistan, since the Kingdom allegedly financed Islamabad’s nuclear weapons program. At the time, though, Pakistan faced strong disincentives to support Saudi proliferation.

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<sup>33</sup> David E. Sanger, “Saudi Arabia Promises to Match Iran in Nuclear Capability,” *The New York Times*, May 13, 2015.

<sup>34</sup> Nawaf Obaid, “Saudi Arabia is preparing itself in case Iran develops nuclear weapons,” *The Telegraph*, June 29, 2015.

<sup>35</sup> Julie H. Davis and David E. Sanger, “Obama Pledges More Military Aid to Reassure Persian Gulf Allies on Iran Deal,” *The New York Times*, May 14, 2015.

<sup>36</sup> For a good overview of Saudi Arabia’s indigenous nuclear capabilities, see Colin H. Kahl, Melissa G. Dalton, and Matthew Irvine, *Atomic Kingdom: If Iran Builds the Bomb, Will Saudi Arabia Be Next?* (Washington, DC: Center for New American Security, 2013).

Islamabad wanted to emulate India by taking steps to join the group of nuclear suppliers that pledged not to export sensitive nuclear technology to the Middle East. Whatever the true nature of the old Saudi-Pakistan connection, it did not help Riyadh jump-start an enrichment program in the summer of 2015, so U.S. officials saw little reason to put a big offer on the table.

But Pakistan's calculus may change in the years ahead, especially if the country fails to gain membership in the Nuclear Supplier Group. A former Pakistani official suggested in September 2015 that Islamabad should offer "civilian nuclear cooperation to developing countries, including Islamic countries [e.g., Saudi Arabia]," by setting up legal procurement channels outside of the NSG.<sup>37</sup> This is a much more nuanced and credible threat than the classic concern in Washington that Pakistan might secretly transfer nuclear weapons, fissile material, or sensitive technology to pay its debt to the Kingdom. Instead, Islamabad establishes itself as an above-board supplier of nuclear technology to countries that cannot purchase sensitive technology from NSG members. Given the nascent stage of nuclear technology in the Kingdom, U.S. officials therefore may have missed a prime chance to try to incentivize Saudi Arabia into firmly shutting the door on this alternative supply option.

### **The Practical Challenges of Nuclear Buyouts**

While a non-proliferation strategy predicated on incentives is the best option going forward, the approach does present several operational hurdles. The crux of the challenge is how to divine a country's future nuclear intentions at an early stage of development.<sup>38</sup> Rhetoric alone is a poor guide. In the absence of observable indicators, such as procurement patterns or research and development efforts, it is hard to know if an ally is serious about ENR, or just bluffing for

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<sup>37</sup> Munir Akram, "India-Pakistan: Hyphenated," *Dawn*, September 13, 2015.

<sup>38</sup> Michael Crawford, "Exploring the Maze: Counter-proliferation Intelligence," *Survival*, Vol. 53, No. 2 (2011), pp. 131-158.

leverage. Should a package of incentives be offered while the government appears to be assessing its nuclear options? Or is it more pragmatic to wait until the ally takes firm steps to develop sensitive nuclear technology? In the case of Saudi Arabia, it was not clear whether the public statements about enrichment reflected an official policy position, or if a few members of the Royal Family were trying to turn up the heat on Washington in the wake of the Iran nuclear deal. Rather than fulfil the politically unrealistic demands, U.S. officials appeared to decide it was better to wait and see where the Kingdom's civil nuclear program was actually headed.

Uncertainty over nuclear intent points toward a deeper challenge if an ally knows that the United States will buy out an ENR program at a nascent stage. A country with no real desire for uranium enrichment could just inaugurate a fuel enrichment plant, and then trade away this bargaining chip for concessions from Washington. The risk of making offers too early is that the United States ends up buying out non-existent ENR ambitions. Without real capabilities, however, the country does not have a strong hand to push for expensive incentives at the negotiation table. So long as the ally makes reasonable demands, a nuclear bluff creates a unique opening for the United States to purchase a durable promise to forgo ENR technology. If relatively low-cost offers can help achieve a high-reward non-proliferation objective, then the risk of bluffing is one that the United States can live with.

A shift towards non-proliferation incentives may create a marketplace for governments to sell the United States a bad nuclear deal. In such a scenario, a proliferator pretends to trade away its sensitive nuclear program, yet resumes its quest for ENR technology at a later time. This is more of a risk when dealing with adversaries, notably North Korea and Iran, but U.S. allies and partners such as Taiwan and Pakistan have also broken non-proliferation promises in the past.<sup>39</sup>

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<sup>39</sup> Jeffrey T. Richelson, *Spying on the Bomb: American Nuclear Intelligence from Nazi Germany to Iran and North Korea* (New York: W.W. Norton, 2007), pp. 236-401.

Even if an ally decides to break its promise, though, the U.S. still reaps two benefits. First, the deal will slow down the ally's quest for the bomb. Second, and more important, by breaking the non-proliferation promise, the ally reveals its true desire for nuclear weapons. This sort of information is critical, as there will be understandable resistance to punishing an ally without clear and definitive evidence of intent to pursue nuclear weapons.

Finally, some allies will reject even the most lucrative offers. Yet it is still worth trying to put incentives on the table to help discern an ally's root motives for sensitive nuclear technology as soon as possible. If an ally rejects a serious offer, then the United States will be in a better position to recalibrate its approach going forward with the knowledge that the country is determined to develop ENR technology.

### **Trading Waste for Gold Standards**

Given the practical challenges, there are valid policy reasons why the United States recently passed up an opportunity to buy out Saudi Arabia's expressed desire for uranium enrichment. At the time, it was hard to determine the true nature of nuclear intent in Riyadh. Without concrete evidence, senior U.S. officials may have been unwilling to link together the security and non-proliferation stovepipes within government. Furthermore, the political costs and regional security risks of fulfilling the Kingdom's requests for advanced conventional weapons, not to mention the formal defense treaty, were quite high. In order to provide Saudi Arabia with the latest offensive weapon systems, for instance, the White House needed Congress to waive legislation designed to ensure that Israel retains a qualitative military edge in the region. As a result, the United States was justifiably reluctant to offer security incentives to induce Saudi Arabia into foreclosing its future ENR options.

The problem is that Washington will find itself with less leverage in the years ahead to rebuff demands if Saudi Arabia develops nuclear energy capabilities. In the wake the July 2015 Iran nuclear agreement with the P5+1, Prince al-Faisal acknowledged, “we have no illusions about our [nuclear] capabilities ... so that’s why we began a very extensive training and skills acquisition program.” He went on to underscore that the 15-year sunset clause in the Iran deal was a key reason why “the Kingdom’s program for capacity building on the issue of nuclear energy is so vital and necessary and important.” By the time the constraints on Iran’s nuclear program expire, the Prince claimed, “we should be in full stride in terms of human capacity for our own development of peaceful uses of nuclear energy.”<sup>40</sup> While the United States is in a strong position now to entice the Kingdom into renouncing ENR technology, the trick is to identify a realistic package that U.S. officials can put on the table *before* the Saudis develop the kind of nuclear energy capacity espoused by Prince al-Faisal.

Military arms sales have long been used by the United States as a tool to dampen the proliferation incentives of insecure allies.<sup>41</sup> But the Saudis seem to be asking for a strengthened security reassurance that goes far beyond the existing arms transfers and various dialogues. It may not be possible or prudent to offer the Kingdom much more in terms of security support, but there is one inducement that may prove to be attractive if the Saudis are serious about civil nuclear energy: a complete package of nuclear fuel cycle services for nuclear reactor projects, including a guarantee to manage all spent fuel and nuclear waste. While such offers have long been considered, and the international community recently took laudable steps to provide an assured supply of nuclear fuel, the time is ripe to trade spent waste management for ironclad

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<sup>40</sup> 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*, Vol. 72, No. 1 (2016), pp. 19, 22.

<sup>41</sup> See Yang Bonny Lin, *Arms, Alliances, and the Bomb: Using Conventional Arms Transfers to Prevent Nuclear Proliferation* (PhD Dissertation, Yale University, 2012).



ENR restrictions. Washington and Seoul are already working together to find practical solutions for the urgent spent fuel problem in South Korea.<sup>42</sup> A breakthrough in this bilateral process could provide the basis for the United States to offer multinational spent nuclear fuel solutions as a reward to allies such as the UAE, and hopefully Saudi Arabia, who close the door on ENR technology. With commercial nuclear reactors under consideration in Jordan, Egypt, and Turkey, spent waste management could go a long way to shaping the trajectory of other nuclear energy programs in the Middle East, and possibly beyond.

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<sup>42</sup> Fred McGoldrick, "The New Peaceful Nuclear Cooperation Agreement Between South Korea and the United States," Korea Economic Institute of America, Special Studies Series No. 6, September 2015, p. 26.