

# Toward an International Norm against Proliferation of Enrichment and Reprocessing Capabilities

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## Abstract

The original drafters of the 1968 Nuclear Non-Proliferation Treaty (NPT) left it ambiguous whether states should have access to advanced fuel cycle capabilities such as uranium enrichment and plutonium reprocessing – the key processes that produce nuclear explosive material. Parties to the treaty that view enrichment and reprocessing (E&R) proliferation as counter to the NPT’s intent have addressed the treaty’s silence through other means. This article summarizes such measures, including incentives for states not to acquire E&R technology, punitive sanctions, and diplomatic pressure to halt, deter, or reverse possession, supply restrictions, control regimes, and enhanced non-proliferation safeguards. These actions are evidence that a collective of states do not view the propagation of advanced fuel cycle technologies as consistent with the NPT’s aim to prevent the spread of nuclear weapons or encourage their dismantlement. The article concludes that as a leader in creating and sustaining global norms, the United States should harness the majority’s opinion regarding E&R proliferation and encourage a broader interpretation that the NPT’s intent is contrary to spreading advanced fuel cycle capabilities. With prolonged effort, E&R acquisition and supply to additional states should rise to the level of a violation of an international norm.

## NPT Articles

The dispute over which rights of technology acquisition the NPT grants its 191 parties is, not surprisingly, older than the treaty itself.<sup>1</sup> It has been front and center during inter-governmental struggles to control supply of nuclear technology, and more recently, at NPT review conferences, where countries are split on strengthening their nonproliferation commitments. Partly as a result, NPT states parties were unable to agree on an action plan to strengthen the treaty at the last review conference in 2015.<sup>2</sup>

Proponents of greater restraint cite NPT Articles I and II as evidence that the treaty never intended to promote E&R proliferation.<sup>3</sup> Article I clearly prohibits nuclear weapon states (NWS) from transferring nuclear weapons directly or indirectly and specifies that they may not “in any way to assist, encourage, or induce any non-nuclear-weapon State to manufacture or otherwise

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1. Histories of NPT negotiations and compromises are available in: Henry Sokolski, Chapter 3, “What Does the History of the Nuclear Non-Proliferation Treaty Tell Us About Its Future?” in Sokolski, ed., *Reviewing the Nuclear Nonproliferation Treaty* (Washington, D.C.: Nonproliferation Policy Education Center, May 2010). ([http://www.npolicy.org/books/Reviewing\\_NPT/Full\\_Book.pdf](http://www.npolicy.org/books/Reviewing_NPT/Full_Book.pdf)); Dean Rust, Chapter 2, “How We’ve Come to View the NPT: Three Pillars,” in Sokolski, ed., *Nuclear Rules, Not Just Rights: The NPT Reexamined*, (Washington, D.C.: Nonproliferation Policy Education Center, February 2017). ([http://npolicy.org/books/Nuclear\\_Rules\\_Not\\_Just\\_Rights/Ch2\\_Rust.pdf](http://npolicy.org/books/Nuclear_Rules_Not_Just_Rights/Ch2_Rust.pdf))

2. The 2020 NPT review conference was postponed due to the COVID-19 pandemic. See also: David Albright and Andrea Stricker, “After the NPT Review Conference: Advancing the Non-Proliferation Pillar,” *Institute for Science and International Security*, July 15, 2010. (<https://isis-online.org/isis-reports/detail/after-the-2010-npt-review-conference-advancing-the-non-proliferation-pillar/23>)

3. Treaty on the Non-Proliferation of Nuclear Weapons, 1968. (<https://www.un.org/disarmament/wmd/nuclear/npt/text/>)

acquire nuclear weapons or other nuclear explosive devices, or control over such weapons or explosive devices.” Article II restricts non-nuclear weapon state (NNWS) signatories from receiving transfer of nuclear weapons directly or indirectly. The NNWS also commit “not to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices; and not to seek or receive any assistance in the manufacture of nuclear weapons or other nuclear explosive devices.”

Article III adds weight to states’ ability to acquire E&R and still comply with the NPT, however, specifying:

*...Safeguards required by this Article shall be implemented in a manner designed to comply with Article IV of this Treaty, and to avoid hampering the economic or technological development of the Parties or international co-operation in the field of peaceful nuclear activities, including the international exchange of nuclear material and equipment for the processing, use or production of nuclear material for peaceful purposes... ”*

Article IV either contravenes restrainter arguments or supports them, depending on one’s standpoint, by granting an “inalienable right of all the Parties to the Treaty to develop research, production and use of nuclear energy for peaceful purposes without discrimination,” and adds that all must occur “*in conformity with Articles I and II*” (emphasis added). Article IV stipulates, “All the Parties to the Treaty undertake to facilitate, and have the right to participate in, the fullest possible exchange of equipment, materials and scientific and technological information for the peaceful uses of nuclear energy.”

Law experts such as Eldon Greenberg assess that “the rights and obligations established under Article IV can’t be neatly disentangled from the prohibitions in Articles I and II of the Treaty. Indeed, Article IV contains express language linking the three prohibitions.”<sup>4</sup> He concludes, “In short, whatever the ‘inalienable right[s]’ enshrined in Article IV, they cannot be invoked to produce a result which, in the real world, entails unacceptable proliferation risks.”<sup>5</sup>

The United States has acknowledged that a straightforward reading of the NPT does not provide clarity, and therefore countries must make reasoned judgments about whether to supply proliferation-sensitive technology. In a 2005 arms control compliance report by the State Department and in corresponding Congressional testimony, for example, the department laid out several indicators that a state is violating Article II, or possibly undertaking the manufacture of nuclear weapons, and should not receive nuclear technology. A State Department official acknowledged that such deliberations naturally entail “judgments as to the purpose of a Party’s nuclear activities.”<sup>6</sup> Greenberg also argues, similarly, that certain conditions for supply must be

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4. *Testimony of Eldon Greenberg on Assessing “Rights” Under the Nuclear Non-Proliferation Treaty*, before the Subcommittee on International Terrorism and Nonproliferation of the House Committee on International Relations, March 2, 2006.

5. *Testimony of Eldon Greenberg*, March 2, 2006.

6. U.S. Department of State, “Adherence to and Compliance with Arms Control, Nonproliferation, and Disarmament Agreements and Commitments,” August 2005, explained by Christopher A. Ford in, “Iran, Nonproliferation, and the IAEA: A Legal History,” *Hudson Institute*, November 2012, pp. 21-22.

(<https://www.hudson.org/content/researchattachments/attachment/1077/ford--iraniaeapaper1112.pdf>)

met and “judgments...can and should be made on a case-by-case basis...”<sup>7</sup> Ambassador Christopher A. Ford also views “safeguardability,” or the ability to ensure against proliferation, as the supply approach that “reconciles the text of Article IV with the rest of the Treaty, with its negotiating record, and with longstanding international approaches to nuclear technology.”<sup>8</sup>

The easiest way to interpret the NPT, however, may be to imagine fictional outcomes at both extremes. Did the NPT aim to create close to 191 states with the ability to fabricate nuclear explosive material, leaving them very near to producing nuclear weapons? Further, did the NPT intend for most states to work on nuclear weaponization processes for atomic weapons, but stop short of assembling the weapons? Or would the preferable and intended outcome be that as few states as possible develop such capabilities and perform such work? States, by their own actions, have answered the question by tending toward the latter interpretation.

Moreover, states cannot rely on potentially flawed national intelligence assessments or judgments about whether to grant nuclear supply. They cannot predict what a state may do with E&R technology at some future point, or how it might evade International Atomic Energy Agency (IAEA) safeguards. Washington should instead work to gain more adherents to a global understanding that the NPT does not advocate the spread of E&R capabilities and that a halt to further supply supports both the aims of the treaty and international security objectives.

### **Status of E&R Proliferation**

The interpretation that the NPT does not intend to promote E&R proliferation is supported by the behavior of states since its signing. In fact, the actions of most states signify greater advocacy for restraining the spread of E&R, rather than the reverse.

Presently, E&R capabilities globally are scarce even in countries that possess nuclear reactors or carry out nuclear research. This is both owing to practical deterrents against developing E&R technology, as well as normative ones relating to proliferation concerns. Each of these deterrents presents opportunities to grow a broader norm toward ending E&R proliferation.

About 14 countries enrich uranium, and several of them do so via regional consortiums.<sup>9</sup> States that enrich uranium principally pursue methods of centrifugation or gaseous diffusion. A handful of countries have developed other forms of enrichment, such as aerodynamic enrichment and laser separation. Enrichment is expensive, material-intensive, and requires specialized expertise, including foreign assistance and knowledge.

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7. Eldon V.C. Greenberg, “The NPT and Plutonium: Application of NPT Prohibitions to ‘Civilian’ Nuclear Equipment, Technology and Materials Associated with Reprocessing and Plutonium Use,” *Nuclear Control Institute*, 1993.

8. Christopher Ford, “Nuclear Technology Rights and Wrongs: The NPT, Article IV, and Nonproliferation,” *Nonproliferation Policy Education Center*, June 1, 2009. (<http://npolicy.org/article.php?aid=351&rid=3>)

9. World Nuclear Association, “Uranium Enrichment,” Updated September 2020. (<https://www.world-nuclear.org/information-library/nuclear-fuel-cycle/conversion-enrichment-and-fabrication/uranium-enrichment.aspx#:~:text=Most%20of%20the%20500%20commercial%20nuclear%20power%20reactors,process%20based%20on%20laser%20excitation%20is%20under%20development>) The tally should also include North Korea.

Russia, Argentina, and the Urenco consortium commercially enrich to produce and sell fuel cycle products. China enriches for its nuclear reactors. Argentina, Brazil, France, Japan, and the United States also have small enrichment programs for nuclear fuel, research, or naval propulsion. China, India, North Korea, and Pakistan operate enrichment programs that may actively contribute to nuclear weapons production.<sup>10</sup>

The incidence of plutonium reprocessing is rarer. States that commercially reprocess plutonium include China, France, India, Japan, Russia, and the UK.<sup>11</sup> Nonproliferation expert Fred McGoldrick lists China, India, Israel, Pakistan, and North Korea as states that reprocess for nuclear weapons.<sup>12</sup> Along with China, the other four recognized NWS, the U.S., France, Russia, and the UK, also retain the ability to reprocess for atomic weapons. China and the UK may soon add to their nuclear weapons arsenals.<sup>13</sup>

States have tried to reduce the justification for other countries to develop the full fuel cycle by providing affordable and predictable access to nuclear reactor fuel. For example, in 2019, the IAEA inaugurated the world's first international nuclear fuel bank in Kazakhstan to allow countries to purchase low enriched uranium fuel.<sup>14</sup> Such initiatives can assist norm development against wider E&R propagation.

## Incentives and Disincentives

One incentive for states to forgo E&R development is the opportunity to conclude a bilateral nuclear cooperation agreement with the United States that formalizes their commitment not to enrich or reprocess – known colloquially as the “gold standard” of nonproliferation. The United States has utilized this approach to some success, where thus far two states – the United Arab Emirates (UAE) and Taiwan – have pledged not to develop E&R. Such agreements are concluded under section 123 of the U.S. Atomic Energy Act (AEA). The UAE's commitment runs through 2039 and Taiwan's is indefinite. Vietnam also committed in the preamble of its 123 agreement not to enrich or reprocess, and its accord runs at least through 2044.<sup>15</sup>

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10. Fred McGoldrick, “Limiting Transfers of Enrichment and Reprocessing Technology: Issues, Constraints, Options” *Harvard University, Belfer Center for Science and International Affairs, Project on Managing the Atom*, May 2011, p. 10.

([https://scholar.harvard.edu/files/matthew\\_bunn/files/limiting\\_transfers\\_of\\_enrichment\\_reprocessing\\_technology.pdf](https://scholar.harvard.edu/files/matthew_bunn/files/limiting_transfers_of_enrichment_reprocessing_technology.pdf))

11. World Nuclear Association, “Processing of Used Nuclear Fuel,” Updated December 2020. (<https://world-nuclear.org/information-library/nuclear-fuel-cycle/fuel-recycling/processing-of-used-nuclear-fuel.aspx>)

12. McGoldrick, “Limiting Transfers of Enrichment and Reprocessing Technology,” pp. 10-11.

13. Ryan Browne, “China is Aiming to Double the Size of its Nuclear Arsenal, Pentagon Report Says,” CNN, September 1, 2020. (<https://www.cnn.com/2020/09/01/politics/china-military-power-report/index.html>); “Integrated Review: UK to Lift Cap on Nuclear Stockpile,” BBC News, March 16, 2021. (<https://www.bbc.com/news/uk-56413920>)

14. Catherine Putz, “Low Enriched Uranium Fuel Bank Officially Operational in Kazakhstan,” *The Diplomat*, October 29, 2019. (<https://thediplomat.com/2019/10/low-enriched-uranium-bank-officially-operational-in-kazakhstan/>)

15. Paul K. Kerr and Mary Beth D. Nikitin, “Nuclear Cooperation with Other Countries: A Primer,” *Congressional Research Service*, Updated September 21, 2020. (<https://fas.org/sgp/crs/nuke/RS22937.pdf>)

States' desire for international stature and their incentive to promote broader anti-E&R regional commitments present opportunities for Washington and its partners to further develop a norm against E&R acquisition. In the case of the UAE, committing not to acquire E&R assisted Abu Dhabi in rehabilitating its nonproliferation image after functioning as a long-time hub of proliferant states' illicit procurement and financial activity. The UAE's stance also offers an important counterpoint to additional Middle Eastern states seeking enrichment and reprocessing to gain parity with Iran. Taiwan's decision enhances its stature as a responsible nonproliferation actor vis-à-vis China. While the U.S. Intelligence Community assesses that China plans to produce additional nuclear weapons, Taipei appears a reformed and restraint-favoring actor. Its anti-E&R commitment followed a clandestine nuclear weapons program and covert plutonium reprocessing effort, which U.S. pressure succeeded in closing down in the late 1980s.<sup>16</sup>

The U.S. AEA also empowers Washington to discourage the spread of E&R, requiring countries with which the U.S. shares nuclear technology to have Congressional approval for enrichment or reprocessing using U.S.-origin nuclear fuel and technologies. Washington is legally required to terminate nuclear cooperation if a state violates its nonproliferation commitments.<sup>17</sup> Other U.S. laws support the nonproliferation of sensitive technologies, such as the Nuclear Non-Proliferation Act of 1978 and the Nuclear Proliferation Prevention Act of 1994, the latter which "imposes economic and military assistance sanctions on countries supplying and receiving enrichment and reprocessing equipment, materials and technology."<sup>18</sup>

International disincentives for E&R acquisition are frequently more high profile than incentives. Iran, Iraq, Libya, and North Korea all sought nuclear weapons via secret enrichment or reprocessing programs, and the UN Security Council passed numerous resolutions demanding the suspension or dismantlement of those programs and imposed sanctions. The UN Security Council, therefore, plays a significant role in interpreting the NPT's silence on E&R by issuing explanatory resolutions about permissible activities, especially when states' activities appear geared toward weapons development.<sup>19</sup>

States have also employed unilateral and secondary sanctions, as well as trade restrictions, to deter states from moving forward with E&R programs. Israel has deterred E&R acquisition through kinetic action, destroying reactors in Iraq and Syria that would have produced plutonium for nuclear weapons, and sabotaging Iran's enrichment program.

Natural deterrents to states seeking home-grown or imported E&R include the technology's prohibitive expense and difficulty of mastery, as well as the fact that states can purchase reactor fuel readily and cheaply from established suppliers rather than fabricate their own. States must also acquire facilities from a state supplier and raw materials and components either from a state or on the black market, making covert proliferation difficult.

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16. David Albright and Andrea Stricker, *Taiwan's Former Nuclear Weapons Program: Nuclear Weapons On-Demand*, (Washington, D.C.: Institute for Science and International Security, 2018). (<https://isis-online.org/books/detail/taiwans-former-nuclear-weapons-program-nuclear-weapons-on-demand/15>)

17. Kerr and Nikitin, "Nuclear Cooperation with Other Countries: A Primer."

18. *Testimony of Eldon Greenberg*, March 2, 2006.

19. Orde Kittrie, "Averting Catastrophe: Why the Nuclear Nonproliferation Treaty is Losing its Deterrence Capacity and How to Restore It," *Michigan Journal of International Law*, Vol. 28, 2007, pp. 337-430. ([https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=996953](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=996953))

States' desire not to raise proliferation suspicions of their neighbors also disincentivizes them from acquiring E&R. States realize that developing advanced fuel cycle capabilities positions them closer to nuclear weapons and leaves their adversaries less secure and more prone to weighing their options. For example, since the exposure of Iran's covert enrichment and reprocessing programs in 2003, world powers failed to negotiate those programs' permanent termination. At least two countries, Saudi Arabia and Turkey, have stated publicly that they might be driven to match Tehran, and Riyadh may be developing uranium production facilities.<sup>20</sup>

The UAE, by taking the opposite approach and openly committing not to seek E&R, even if it acquires reactors for nuclear energy production, assures its neighbors that it will not participate in a dangerous regional fuel cycle race which could quickly turn to a nuclear arms race.<sup>21</sup> Similarly, although Egypt has considered nuclear weapons and refuses to undertake enhanced nonproliferation commitments, it has also spearheaded the creation of a Middle East zone free of nuclear weapons. Both countries provide precedents for Saudi Arabia and Turkey to emulate, although it remains to be seen if they will follow suit. If Tehran's enrichment program continues, along with unresolved nuclear weapons dimensions in Iran, Riyadh and Ankara may address their insecurity by seeking E&R.

The prevalence of disincentives for E&R development and incentives for restraint nevertheless underscores a preeminent international view that the NPT does not aim to spread advanced fuel cycle technology and most states do not interpret it to do so.

### **Supply Constraints and Enhanced Safeguards**

States have worked over decades to create technology control groups and regimes around the preponderant consensus that it is in the global interest to hinder additional states from acquiring E&R technologies. States have also sought strengthened IAEA safeguards to detect potential NPT violations.

Following the NPT's entry into force in 1970, for example, between 1971 and 1974, a group of 15 nuclear exporting states – not all NPT members at the time – established the Zangger Committee to reach common understandings on:

- (a) *the definition of what constituted 'equipment or material especially designed or prepared for the processing, use or production of special fissionable material' (as it was not defined anywhere in the Treaty);*

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20. David E. Sanger, "Saudi Arabia Promises to Match Iran in Nuclear Capability," *The New York Times*, May 13, 2015. (<https://www.nytimes.com/2015/05/14/world/middleeast/saudi-arabia-promises-to-match-iran-in-nuclear-capability.html>); "Erdogan Says its Unacceptable that Turkey Can't Have Nuclear Weapons," *Reuters*, September 4, 2019. (<https://www.reuters.com/article/us-turkey-nuclear-erdogan-idUSKCN1VP2QN>); Andrea Stricker and Behnam Ben Taleblu, "Secret Sites in the Desert: the Dangers of Saudi Arabia's Nuclear Hedging," *The National Interest*, September 4, 2020. (<https://nationalinterest.org/feature/secret-sites-desert-dangers-saudi-arabia%E2%80%99s-nuclear-hedging-168267>)

21. See, for example: "Statement of UAE Ambassador Yousef Al Otaiba on Barakah Plant Unit 1 Commercial Operations," April 6, 2021. (<https://www.uae-embassy.org/news-media/ambassador-yousef-al-otaiba-statement-barakah-plant-unit-1-commercial-operations>)

*(b) the conditions and procedures that would govern exports of such equipment or material in order to meet the obligations of article III, paragraph 2 of the NPT, on a basis of fair commercial competition.*<sup>22</sup>

The group agreed on conditions for exporting nuclear equipment and materials, which evolved into guidelines known as the “trigger list.” The trigger list includes specific direct- and dual-use materials and equipment that activate supply controls. The Zangger Committee currently has a membership of 39 NPT member states, which meet to discuss changes and additions to the trigger list.

The Zangger Committee trigger list was further formalized by a group of seven states that met from 1975 to 1978, the Nuclear Suppliers Group (NSG). NSG member states agreed to embrace the Zangger trigger list as the basis for controlling direct-use nuclear supply, including nuclear facilities, material, technology, and equipment.

In 1978, IAEA member states adopted the NSG’s Part I list, requiring IAEA safeguards for a state to receive such commodities.<sup>23</sup> The list includes specific conditions for transferring enrichment and reprocessing capabilities, for example, NPT membership, good nonproliferation standing with the IAEA and UN Security Council, an IAEA Additional Protocol in force, and legally binding commitments that a state will not enrich uranium to greater than 20 percent purity. NSG members also agreed to encourage other options over E&R, such as the state’s participation in a multinational arrangement to help it avoid needing direct access to the technology.<sup>24</sup> In 1992, the NSG agreed to additional guidelines to control transfers of dual-use materials, technology, and equipment, formalized in the NSG Part II list, which the IAEA also adopted. The NSG lists seek “to ensure that nuclear trade for peaceful purposes does not contribute to the proliferation of nuclear weapons or other nuclear explosive devices, and that international trade and cooperation in the nuclear field is not hindered unjustly in the process.”<sup>25</sup>

The NSG has grown to 48 members which meet regularly to discuss updates to the control lists and conditions for supply. Since the group operates by consensus, strengthening measures have represented hard-won victories. Even responsible states regarding nonproliferation often resist supply constraints affecting their commercial interests or their options to achieve parity with neighboring countries.<sup>26</sup>

In another norm-reinforcing measure, in 2004, the UN Security Council passed Resolution 1540 to support the non-transfer of dual-use commodities to non-state actors that could enable them to build weapons of mass destruction. Resolution 1540 also required states to establish national controls over sensitive technologies, equipment, and know-how.<sup>27</sup>

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22. Zangger Committee, “History.” (<http://www.zanggercommittee.org/history.html>)

23. Nuclear Suppliers Group, “About the NSG.” <https://www.nuclearsuppliersgroup.org/en/about-nsg>

24. “Guidelines for Nuclear Transfers: NSG Part I Guidelines,” INFCIRC/254/Rev. 14/Part 1.

(<https://www.iaea.org/sites/default/files/publications/documents/infcircs/1978/infcirc254r14p1.pdf>)

25. Nuclear Suppliers Group, “Guidelines.” <https://www.nuclearsuppliersgroup.org/en/guidelines>

26. McGoldrick, “Limiting Transfers of Enrichment and Reprocessing Technology,” pp. 19-24.

27. UN Security Council Resolution 1540, 2004,

([https://www.un.org/ga/search/view\\_doc.asp?symbol=S/RES/1540%20\(2004\)](https://www.un.org/ga/search/view_doc.asp?symbol=S/RES/1540%20(2004)))

States' efforts to strengthen IAEA safeguards over time also indicates a majority view toward concern about advanced fuel cycle activities. During the 1980s and 1990s, Iraq, North Korea, Libya, South Africa, and Taiwan covertly established or furthered nuclear weapons programs despite having comprehensive safeguards agreements (CSAs) with the IAEA, as required by the NPT.

From the early- to mid-1990s, in response, the IAEA Board of Governors formally acknowledged that the IAEA has not only an obligation to ascertain the "correctness" of states' CSA declarations, but also their "completeness."<sup>28</sup> In 1997, the Board authorized states to conclude a voluntary, supplementary agreement to the CSA, known as the Additional Protocol or AP.<sup>29</sup> The AP enables "the IAEA inspectorate to provide assurance about both declared and possible undeclared activities. Under the Protocol, the IAEA is granted expanded rights of access to information and sites" provided under the CSA.<sup>30</sup> To date, 136 of the IAEA's 172 member states and Euratom have an AP in force, reflecting a majority in favor of strengthened safeguards.<sup>31</sup>

The task for Washington and likeminded partners is to further enhance and propagate this common view that the NPT does not promote proliferation of E&R and translate it into a norm against further supply.

## **Building a Norm**

How does a policy goal become an international norm? According to international law experts, norms "express what is esteemed and valued and are means to realize valuable end states." The key is that "norms must be shared with other actors, and partly enforced by their sanctions."<sup>32</sup> A primary goal of the United States and its partners, then, as the "norm entrepreneurs" "is to define and/or establish specific standards of behavior with the expectation that other actors within the community follow them. They might also try to replace an old standard of behavior with a new one."<sup>33</sup> With time, "Treaties can [play] a significant role in the development of customary international law," or what follows norm creation.<sup>34</sup>

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28. David Fisher, *The History of the International Atomic Energy Agency: The First Forty Years* (Vienna: IAEA, 1997). ([https://www-pub.iaea.org/MTCD/publications/PDF/Pub1032\\_web.pdf](https://www-pub.iaea.org/MTCD/publications/PDF/Pub1032_web.pdf)); David Albright, Olli Heinonen, and Orde Kittrie, "Understanding the IAEA's Mandate in Iran: Avoiding Misinterpretations," *Institute for Science and International Security*, November 27, 2012. ([https://isis-online.org/uploads/isis-reports/documents/Misinterpreting\\_the\\_IAEA\\_27Nov2012.pdf](https://isis-online.org/uploads/isis-reports/documents/Misinterpreting_the_IAEA_27Nov2012.pdf))

29. IAEA, *Model Additional Protocol to the Agreement(s) Between State(s) and the International Atomic Energy Agency*, INFCIRC/540 (Corrected), September 1997. (<https://www.iaea.org/sites/default/files/infcirc540c.pdf>)

30. IAEA, "IAEA Safeguards Overview." (<https://www.iaea.org/publications/factsheets/iaea-safeguards-overview>)

31. IAEA, "Additional Protocol." (<https://www.iaea.org/topics/additional-protocol>)

32. Tore Nyhamar, "How Do Norms Work? A Theoretical and Empirical Analysis of African International Relations," *International Journal of Peace Studies*, Vol. 5, No. 2, Autumn/Winter 2000, ([https://www.gmu.edu/programs/icar/ijps/vol5\\_2/nyhamar.htm](https://www.gmu.edu/programs/icar/ijps/vol5_2/nyhamar.htm))

33. Martha Finnemore and Kathryn Sikkink, "International Norm Dynamics and Political Change," *International Organization*, Vol. 52, No. 4, Autumn 1998, pp. 887-917. ([https://home.gwu.edu/~finnemor/articles/1998\\_norms\\_io.pdf](https://home.gwu.edu/~finnemor/articles/1998_norms_io.pdf))

34. Rudolph Bernhardt, ed. *Encyclopedia of Public International Law* (Netherlands: North-Holland Elsevier, 2000), pp. 951-952.

How well developed is E&R restraint as a norm? Within a norm “life cycle,” according to international relations scholars Martha Finnemore and Kathryn Sikkink, the first stage, “norm emergence,” is already underway. States have recognized for decades that E&R proliferation is a threat to international security and have taken steps to prevent and deter it. The second stage may also be in progress, known as “a dynamic of imitation...as the norm leaders attempt to socialize other states to become norm followers.” The NSG, despite member states’ disagreements, provides one platform for socialization. A norm against E&R proliferation has not reached the third stage, “norm internalization,” where norms “acquire a taken-for-granted quality and are no longer a matter of broad public debate.”<sup>35</sup>

By implication, a norm against the spread of E&R capabilities can only reach the third stage, or fruition, after consistent action. Importantly, states must refrain from creating new and legally supported exemptions for E&R proliferation or they will continue to undermine norm development. Norm entrepreneurs must regularly coordinate actions to maintain progress on establishing the norm.

For an anti-E&R norm to emerge, states must take strengthening actions across many areas of incentives, disincentives, supply constraints, and safeguards. The U.S. and its partners must work through the UN, NSG, Resolution 1540 committee, and other fora, as well as unilaterally, to establish a global halt to further E&R supply. They must counter violations through pressured diplomacy and sanctions. States must seek to prevent the spread of new E&R capabilities, regardless of whether the technology seeker is a friend or an adversary.

### **Undermining Norm Creation**

The United States has undermined the potential for an anti-E&R norm by permitting exceptions to supply on at least two recent occasions. Where possible, as a norm entrepreneur, it should attempt to reverse those exceptions.

In 2008, the United States permitted India – a state outside the NPT that has nuclear weapons – to sign a 123 agreement allowing reprocessing and even the construction of two new reprocessing plants. The plants required IAEA safeguards and were to be used strictly for nuclear energy applications.<sup>36</sup> Yet, since India enriches and reprocesses for nuclear weapons, in effect, Washington allowed New Delhi to devote its existing resources entirely to nuclear weapons production, if it so chose. The U.S. also supported India receiving a waiver for NSG membership, where NPT adherence is a condition of membership. Since gaining admission to the NSG would have increased India’s ability to import nuclear technology, China blocked its entry.

The second major exception involved Iran. In 2015, the P5+1, or the United States, France, Germany, the UK, Russia, and China, concluded a deal with Tehran that permitted it to maintain

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35. Ibid.

36. *Agreement for Cooperation between the Government of the United States of America and the Government of India Concerning Peaceful Uses of Nuclear Energy (123 Agreement)*, Published August 3, 2007. (<https://2001-2009.state.gov/r/pa/prs/ps/2007/aug/90050.htm>)

its formerly covert enrichment program. This occurred despite between 2006 and 2010, the Security Council passed successive resolutions demanding Iran suspend its enrichment and reprocessing programs. The Iran nuclear deal, known as the Joint Comprehensive Plan of Action (JCPOA), and associated UN Security Council resolution 2231 superseded the prior resolutions and specified temporary restrictions on Iran's enrichment program. After 15 years, Iran may grow its program to industrial levels and has no restrictions on reprocessing.<sup>37</sup> It may also amass weapon-grade uranium. Other countries will be able to conduct nuclear trade with Iran after ten years. Notably, the U.S. left the JCPOA in 2018 under President Trump, who stated that Iran must abandon enrichment to receive sanctions relief. As of mid-2021, the Biden administration is seeking to re-enter the accord under its original terms.<sup>38</sup>

By comparison, the United States has not granted E&R rights in U.S. 123 agreements to South Korea or Japan, despite having close relations with those countries.<sup>39</sup> Japan has a pre-existing enrichment program but cannot use U.S.-origin material and equipment for this purpose. These close U.S. allies certainly observe Washington effectively granting India an expanded E&R program and concluding a deal with Iran for continued enrichment, despite the restraint Seoul and Tokyo have shown toward North Korea's possession of E&R technology and nuclear weapons.

Such discrepancies in U.S. policy undermine norm creation. To rectify these missteps, the United States could seek to renegotiate or cancel the U.S./India deal, but would have to do so in part legislatively. While this prospect is unlikely, at a minimum, the U.S. could announce that it will conclude no further 123 accords of this nature. Washington could also insist on a new negotiation with Iran that restores the principle of non-enrichment and reprocessing in return for unilateral and multilateral sanctions relief, as well as hold Iran accountable to full transparency with the IAEA over the military dimensions to its nuclear program. The U.S. would need to gain consensus of the other P5+1 countries to abandon the JCPOA and UNSCR 2231 and restore unity of response to Iran's provocative nuclear advances. Those goals represent no small diplomatic feat.

If the U.S. rejoins the Iran nuclear deal and agrees to lift sanctions in return for expiring restrictions on Iranian enrichment, by contrast, it must anticipate and counter E&R acquisition by Iran's neighbors. South Korea may seek E&R on its own if Washington reaches a limited nuclear rollback agreement with North Korea and abandons its long-standing principle of complete and verified denuclearization of the peninsula. While reversing these recent E&R exceptions may be arduous and painful, the costs of not doing so may be far worse in terms of proliferation in the Middle East and Northeast Asia.

## Conclusion

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37. *Joint Comprehensive Plan of Action*, Vienna, July 14, 2015. (<https://2009-2017.state.gov/e/eb/tfs/spi/iran/jcpoa/index.htm>)

38. Michael R. Gordon, "U.S. Lays Out Demands for New Iran Deal," *The Wall Street Journal*, May 21, 2018. (<https://www.wsj.com/articles/mike-pompeo-lays-out-next-steps-on-iran-1526909126>)

39. *Ibid.*, p. 7. Caveats are that the U.S. permitted Japan to send spent reactor fuel to Europe for reprocessing and has authorized a limited form of reprocessing cooperation which it does not view as sensitive. See: McGoldrick, "Limiting Transfers of Enrichment and Reprocessing Technology," pp. 9-10.

International norm building against E&R proliferation will entail consistent policy actions by a collective of states to solidify the broader global interpretation that such capabilities are counter to the NPT and threaten its nonproliferation aims. Measures taken since the NPT's signing support that most states desire greater restraint. This ongoing struggle will play out for years as adversaries, and even partner nations, seek advanced fuel cycle technologies and restraint-favoring nations attempt to stop them. States can help perpetuate an anti-E&R norm by winding down E&R for non-commercial purposes and publicly announcing their support for the norm. The United States must also limit any proliferation potential of new technology it sells abroad to avoid undercutting the norm's future viability.<sup>40</sup> The development of a norm will be negatively impacted if additional states proliferate advanced fuel cycle capabilities. It will also be weakened if the U.S. commits to the exceptions it made for India and Iran.

Some NNWS states will refuse to abide by an emerging E&R norm unless the NWS carry out further good-faith nuclear disarmament efforts, which NWS might undertake as part of their norm-building initiative.

States must look to the overall intent of the NPT to prevent proliferation – even if it trumps what they view as an inalienable right to sensitive technology acquisition. The triumph of this interpretation is not worth the outcome. All countries must do their part to control the spread of nuclear weapons technology and ensure that additional states are not positioned a short dash to the bomb.

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40. See, for example: Victor Gilinsky and Henry Sokolski, "Dangerous Decisions about Advanced Reactors Could Lead to New Threats," *The National Interest*, May 2, 2021. (<https://nationalinterest.org/feature/dangerous-decisions-about-advanced-nuclear-reactors-could-lead-new-threats-183934>)