

From the Iran Nuclear Deal to a Middle East Zone?

Lessons from the JCPOA for an ME WMD FZ

EDITED BY
Chen Zak & Farzan Sabet



MIDDLE EAST WEAPONS OF MASS
DESTRUCTION FREE ZONE SERIES



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Abbreviations and Acronyms

ABACC	Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials
AEOI	Atomic Energy Organisation of Iran
AP	Additional Protocol
CANWFZ	Central Asia Nuclear-Weapon-Free-Zone
CNS	Convention on Nuclear Safety
CBM	confidence building measure
CPPNM	Convention on the Physical Protection of Nuclear Material
CSA	comprehensive safeguards agreement
CTBT	Comprehensive Nuclear-Test-Ban Treaty
CWC	Chemical Weapons Convention
ENSREG	European Nuclear Safety Regulators Group
EU	European Union
Euratom	European Atomic Energy Community
HEU	High enriched uranium
IAEA	International Atomic Energy Agency
INRA	Iranian Nuclear Regulatory Authority
ITER	International Thermonuclear Experimental Reactor
JCPOA	Joint Comprehensive Plan of Action
JPOA	Joint Plan of Action
LEU	Low enriched uranium
LILW	Low and intermediate level radioactive waste
ME WMDFZ	Middle East Weapons of Mass Destruction Free Zone
NNWS	Non-nuclear-weapon state
NPP	Nuclear power plant
NPT	Treaty on the Non-Proliferation of Nuclear Weapons
NSG	Nuclear Suppliers Group
NWFZ	Nuclear-weapon-free zone
NWS	nuclear-weapon state
R&D	Research and development
SEANWFZ	Southeast Asian Nuclear-Weapon-Free-Zone
SESAME	International Centre for Synchrotron Light for Experimental Science and Applications in the Middle East
SNS	Spallation Neutron Source
TNRC	Tehran Nuclear Research Center
TPNW	Treaty on the Prohibition of Nuclear Weapons
WMD	weapons of mass destruction

About the Editors



FARZAN SABET is a Researcher in the Middle East Weapons of Mass Destruction Free Zone (ME WMDFZ) Project. He was previously a Postdoctoral Fellow at the Global Governance Centre at the Graduate Institute, Geneva, a Nuclear Security Predoctoral Fellow at the Centre for International Security and Cooperation at Stanford University, and a Visiting Fellow in the Department of Government, Georgetown University. Dr. Sabet is a historian who has conducted research and published on global regimes, Middle East politics, and U.S. foreign policy through the lenses of history, IR, sociology, and law. He holds a PhD and an M.A. in International History from the Graduate Institute and a B.A. in History and Political Science from McGill University.



CHEN ZAK is the Project Lead of the ME WMDFZ Project at the United Nations Institute for Disarmament Research. She also serves as the Director of the Middle East Nonproliferation Program at the James Martin Center for Nonproliferation Studies (CNS) at the Middlebury Institute for International Studies at Monterey. Dr. Zak is the founder of the Middle East Next Generation Arms Control Network (MENACS). She has held research positions at the Belfer Center for Science and International Affairs at Harvard University, as well as the Washington Institute for Near East Policy. Dr. Zak was an adviser to both the Jebesen Center for Counter-Terrorism at Tufts University, the Crown Center for Middle East Studies at Brandeis University, as well as an adjunct professor with the National Defense University. Prior to joining CNS, She worked at the Center for Strategic and International Studies (CSIS). Dr. Zak holds a PhD and MALD from Tufts University's Fletcher School of Law and Diplomacy.

About the Authors



ROBERT EINHORN is a Senior Fellow at the Brookings Institution. Between 2009 and 2013, he served as the Secretary of State's Special Advisor for Nonproliferation and Arms Control. Between 2001 and 2009, he directed the Proliferation Prevention Program at the Center for Strategic and International Studies. Before coming to CSIS, he was Assistant Secretary of State for Nonproliferation (1999-2001), Deputy Assistant Secretary of State for Political-Military Affairs (1992-1999), and a member of the State Department Policy Planning Staff (1986-1992). Between 1972 and 1986, he held various positions at the U.S. Arms Control and Disarmament Agency, including ACDA's representative to the strategic arms reduction talks with the Soviet Union.



DINA ESFANDIARY is a Fellow in the Middle East department of The Century Foundation (TCF). Prior to that, she was an International Security Program Research Fellow at the Harvard Kennedy School's Belfer Center for Science and International Affairs and an Adjunct Fellow in the Center for Strategic and International Studies' (CSIS) Middle East Program. Dr. Esfandiary previously also worked at the Centre for Science and Security Studies (CSSS) in the War Studies Department at King's College London from February 2015, and in the Non-Proliferation and Disarmament programme of the International Institute for Strategic Studies (IISS) in London from October 2009. She is the co-author of *Triple-Axis: Iran's Relations with Russia and China* (I.B Taurus, 2018), and *Living on the Edge: Iran and the Practice of Nuclear Hedging* (Palgrave Macmillan, 2016). Dr. Esfandiary holds a PhD in the War Studies department at King's College London and master's degrees from Kings College London and the Graduate Institute of International Studies in Geneva.



ANTON KHLOPKOV is the editor-in-chief and co-author of the *Nuclear Nonproliferation Encyclopedia* and author of the monograph *Iran's Nuclear Program in Russian-American Relations*. He is also the co-author of the monographs *Arms Control and Missile Proliferation in the Middle East*, and *At the Nuclear Threshold: The Lessons of North Korea and Iran for the Nuclear Non-Proliferation Regime*. Mr. Khlopkov leads CENESS projects to pursue Track II dialogue on pressing nuclear issues with experts from Iran and North Korea. He paid ten separate visits to Pyongyang in 2012-2020. Mr. Khlopkov's research interests include the nuclear nonproliferation regime and safe and secure development of nuclear energy.



GRÉGOIRE MALLARD is Professor in the Department of Anthropology and Sociology and Director of Research at the Graduate Institute of International and Development Studies (Geneva). After earning his PhD at Princeton University in 2008, Pr. Mallard was Assistant Professor of Sociology at Northwestern University until he joined the Institute. He is the author of *Gift Exchange: The Transnational History of a Political Idea* (Cambridge University Press 2019) and *Fallout: Nuclear Diplomacy in an Age of Global Fracture* (University of Chicago Press, 2014). He is also the co-editor of *Contractual Knowledge: One Hundred Years of Legal Experimentation in Global Markets* (Cambridge University Press 2016), and *Global Science and National Sovereignty: Studies in Historical Sociology of Science* (Routledge 2008). His other publications focus on prediction, the role of knowledge and ignorance in transnational lawmaking and the study of harmonisation as a social process. In 2016, he has been the recipient of an ERC starting grant (2017-2022) for his project titled *Bombs, Banks and Sanctions*.



ANDREAS PERSBO is the Research Director at the European Leadership Network. His research responsibilities at the Network covers the full spectrum of European security matters. Mr. Persbo specific interests are West-Russia relations, NATO, as well as ways to regulate and control the spread and use of weapons of mass destruction. Before joining the ELN, he served as the Executive Director of the Verification Research, Training and Information Centre (2009-2019), where he had previously served as a researcher and senior researcher (2004-2009) with a regional focus on Iran and South Asia.



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Federica Mogherini, High Representative of the Union for Foreign Affairs & Security Policy / Vice-President of the EC, with Javad Zarif, Iranian Foreign Minister, before the 2015 plenary session in Hotel Beau Rivage Palace in Lausanne during the talks of E5/EU+1.

Introduction

By Chen Zak, United Nations Institute for Disarmament Research and
Farzan Sabet, United Nations Institute for Disarmament Research

The 2015 Joint Comprehensive Plan of Action (JCPOA), also known as the Iran nuclear deal, is an important milestone in the efforts to address the international community's concerns about the nuclear programme of the Islamic Republic of Iran. While the ultimate fate of the JCPOA is unknown at the time of writing, it is a reference point for future nuclear agreements – as a model to emulate, a poster child for what to avoid, or (more likely) a mixture of both. While the agreement includes a provision stating it “should not be considered as setting precedents for any other state or for fundamental principles of international law”, learning from the JCPOA experience could prove invaluable.¹ This is especially the case for the broader approach needed to address proliferation in the region such as through the Middle East Weapons of Mass Destruction-Free Zone (ME WMDFZ, also known hereafter as the Zone).

The idea to establish an ME WMDFZ has been discussed in international forums since 1974. There have been two attempts at region-wide talks: The Arms Control and Regional Security (ACRS) Working Group in the 1990s and Glion/Geneva informal consultations in the 2010s. Meanwhile, international concern about Iran's nuclear programme first arose in 2003. A negotiated solution was first pursued by France, Germany, and the United Kingdom (E3) together with the European Union (EU) High Representative for Foreign Affairs and Security Policy. The JCPOA and Zone processes moved forward in parallel from around the time of the 2010 Review Conference of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT). After nearly 12 years of negotiations, the E3/EU together with China, the Russian Federation and the United States of America (E3/EU+3) reached the JCPOA with Iran by July 2015. Meanwhile, the 2015 NPT Review Conference failed to reach consensus on a final document in part due to the ME WMDFZ issue.² More recently, the United Nations General Assembly mandated in 2018 an annual conferences process to negotiate a treaty. However, an agreement has been elusive.

Although the ultimate fate of the JCPOA is unknown at the time of writing, it is a reference point for future nuclear agreements – as a model to emulate, a poster child for what to avoid, or (more likely) a mixture of both.

This essay series is a reflection on the 12-year negotiation history and the 5-year implementation experience of the JCPOA, analysing the lessons relevant to the ME WMDFZ. The essays focus on five central elements of the JCPOA and their relevance to the Zone: the negotiation process, structure, and format; nuclear fuel cycle activities and research; civil nuclear cooperation; nuclear monitoring, safeguards, and verification; and compliance and enforcement. The essays are authored by a diverse group of experts from the E3/EU+3 states and Iran. An invitation-only virtual event was held in October 2020 to solicit feedback on early drafts of the essays, featuring participants from JCPOA states and

1 Joint Comprehensive Plan of Action 2015, preambular paragraph xi.

2 Andrey Baklitskiy, “The 2015 NPT Review Conference and the Future of the Nonproliferation Regime”, Arms Control Today, July/August 2015, <https://www.armscontrol.org/act/2015-07/features/2015-npt-review-conference-future-nonproliferation-regime>.

broad representation of Middle East officials and experts. This introductory essay reflects on some of the important similarities and differences between the JCPOA and Zone processes as well as themes and lessons relevant to the Zone that appear across some of the essays.

Objectives and scope

The JCPOA and the ME WMDFZ differ vastly in their objectives and scope. The JCPOA's objectives included limiting Iran's ability to develop nuclear weapons by extending its breakout time – the time it would take for Iran to gather enough fissile material to build a weapon – to one year in exchange for sanctions relief and international civil nuclear cooperation. The objective of the Zone is to free the entire Middle East region (commonly defined as the 22 members of the League of Arab States plus Iran and Israel) from all weapons of mass destruction (WMD), and their delivery systems. The objective and scope of the ME WMDFZ are thus more ambitious. While the JCPOA imposed limitations on Iran's nuclear programme, the Zone is aimed at disarming and keeping the entire region free from nuclear, chemical, and biological weapons, and their delivery systems. It also encompasses many more negotiating states: 24 states in the Zone, compared to 7 participants in the JCPOA. Striking the right balance of objectives, scope and participants is among the foremost challenges of such efforts. The essay authors show how narrowing or broadening objectives, scope and participants for the JCPOA and Zone each entail their own distinct advantages and disadvantages.

In her essay on the JCPOA negotiation process, structure, and format, Dina Esfandiary notes that compartmentalisation of E3/EU+3–Iran nuclear negotiations was crucial. By focusing on the Iranian nuclear

programme and relief of associated sanctions, progress could be made in these talks despite the differences between the two sides in other areas. Applying this lesson to the ME WMDFZ, she states that “Compartmentalising discussions on the Zone will also be key to ensuring progress can be made, otherwise talks will be impeded by the tensions and disagreements that already plague the Middle East, and any potential additional sources of conflict.”³

Robert Einhorn in his essay on nuclear fuel cycle activities and research also discusses the challenge of finding the right balance between objectives and scope and modulating how narrow or broad they are. He points out that one lesson from the JCPOA for a Zone is that the WMD issues cannot be divorced from the regional political and security environment. Einhorn observes that “A relaxation of tensions, a modicum of mutual trust and transparency, and

constructive channels of engagement are required if states are to consider entering into an agreement that will affect their vital national interests.”⁴ Similarly, in his essay on nuclear monitoring, safeguards and verification, Andreas Persbo observes that “In today's political environment, states are unlikely to

While the JCPOA imposed limitations on Iran's nuclear program, the Zone is aimed at disarming and keeping the entire region free from nuclear, chemical, and biological weapons, and their delivery systems.

3 D. Esfandiary, “Negotiation Process, Structure, and Format”, From the Iran nuclear deal to a Middle East Zone? Lessons from the JCPOA for an ME WMDFZ, UNIDIR May 2021, <https://unidir.org/jcpoa>.

4 R. Einhorn, “Nuclear Fuel Cycle Activities and Research”, From the Iran nuclear deal to a Middle East Zone? Lessons from the JCPOA for an ME WMDFZ, UNIDIR May 2021, <https://unidir.org/jcpoa>.

make such concessions, even in principle. Hence, much political work remains to lay the foundations for a WMD-Free Zone in the Middle East.”⁵

Einhorn agrees that the gulf in the region remains wide, making it unrealistic to expect that an all-encompassing ME WMDFZ can be achieved without a structural amelioration of political and security conditions in the Middle East. He notes, however, that “Initial steps towards establishing an ME WMDFZ need not await the resolution of regional disputes and peaceful relations among states of the region.” He attributes the absence of concrete and meaningful progress toward an ME WMDFZ to the “all or nothing” approach that “has been used to oppose such potentially useful intermediate measures as a region-wide ban on nuclear weapon tests.” He recommends interim steps such as a regional ban on nuclear tests to facilitate progress on the Zone.

Compartmentalisation can also involve limiting the number of actors involved. Esfandiary notes that this had important benefits for the JCPOA but also downsides, which have been very consequential for the durability of the JCPOA. She argues that “The restricted number of participants was both a blessing and a curse.” It was useful to have “fewer cooks in the kitchen” and thus fewer potential spoilers. In fact, to facilitate the talks themselves and to address the most contentious issues, the United States and Iran established a parallel secret bilateral negotiation channel. Limiting participation in E3/EU+3–Iran nuclear negotiations to states with high legal-technical capacity was another factor that facilitated steady progress. Yet it was also an obstacle because successful implementation of the deal required acquiescence from states affected by Iranian policies that did not participate in the negotiations. Lack of buy-in and pressure from many of the United States’ allies in the region was arguably a factor in President Donald J. Trump’s decision to withdraw from the agreement.

In contrast to the seven JCPOA negotiating parties, in its current geographical delineation the Zone features 24 states in the region with varying degrees of technical capacity and interest in a WMDFZ. Limiting negotiations to few parties could prove to be a challenge. One of the lessons from the ACRS process – where states such as Iran, Iraq, the Syrian Arab Republic, Libya and Lebanon were either not invited or chose not to participate – was that all states, or at least those that pose a proliferation concern, should take part in the negotiations. At the same time, negotiating in smaller groups may serve as a productive tactic. This was considered, but rejected, by some Middle Eastern states during the Glion/ Geneva informal consultations. Others have suggested a subregional approach or negotiating in working groups to address specific issues. Farzan Sabet and Grégoire Mallard in their essay on compliance and enforcement suggest that the discrepancies in technical capabilities could be addressed through capacity building by technical international organisations like the International Atomic Energy Agency (IAEA) or the Organisation for the Prohibition of Chemical Weapons (OPCW). In this way, states with less capacity can better participate in negotiations and comply with any agreement that is concluded.⁶

In addition to compartmentalisation and limiting the number of actors, a third dimension related to the objectives and scope of the JCPOA is its temporal limits. The expiration of key JCPOA clauses made the

5 A. Persbo, “Monitoring, Safeguards, and Verification”, From the Iran nuclear deal to a Middle East Zone? Lessons from the JCPOA for an ME WMDFZ, UNIDIR, May 2021, <https://unidir.org/jcpoa>.

6 G. Mallard and F. Sabet, “Compliance and Enforcement”, From the Iran nuclear deal to a Middle East Zone? Lessons from the JCPOA for an ME WMDFZ, UNIDIR May 2021, <https://unidir.org/jcpoa>.

agreement, including the limitations on Iran's nuclear programme that go beyond its NPT obligations, more palatable to the Iranian government. Einhorn, however, believes that this feature should be avoided in the Zone context as temporal limits to its provisions "would undermine the attractiveness of a regional WMD-free zone arrangement, whose value heavily depends on assuring the parties that their neighbours will continue to be bound indefinitely".

Negotiation dynamics

One of the major distinctions between the JCPOA and Zone processes has been the vastly different power dynamics between their respective participant states. The JCPOA comprises six of the world's most powerful states (including five with nuclear weapons and United Nations Security Council vetoes) and the EU on the one hand versus Iran on the other, with clear asymmetries in their political, economic, and military capacities. Given the disparity in both power and the agreement's objectives, each side committed to different obligations. Iran accepted a range of restrictive measures on its nuclear programme, some of which expire over time, while the E3/EU+3 committed to sanctions lifting and peaceful nuclear cooperation. This disparity has been a defining feature of the E3/EU+3–Iran nuclear negotiations and the JCPOA but is largely absent from the ME WMDFZ context. While indeed different states in the region possess different general and WMD capabilities, under the Zone all states will undertake identical obligations. In fact, the stated objective of the Zone is ensuring that no state in the region possesses WMD capabilities.

The basic power disparity in the JCPOA, which was a factor in creating the political will and urgency to negotiate and reach an agreement, does not exist in the case of the Zone, whose prospective member states will have nominally equal status and obligations.

Einhorn, Esfandiary, and Mallard and Sabet acknowledge the importance of this basic power disparity in the JCPOA. It formed part of the intricate mix of carrots and sticks that created political will and urgency for the E3/EU+3 and Iran to negotiate, reach a compromise, and abide by it on an ongoing basis. The four authors recognise that such an incentive structure does not exist in the case of the Zone precisely because of its nature, with all members having nominally equal status and obligations. Einhorn stipulates that "their principal incentive for accepting restrictions on their own activities is to obtain the security benefits of ensuring that those restrictions would also be placed on the activities of their neighbours". He concludes on the sour but realistic note that one of the main lessons from the JCPOA negotiations – that major incentives or pressures are needed to convince states to accept limitations on existing or foreseen capabilities that they value – does not bode well for the goal of achieving an ME WMDFZ.

Another feature of the JCPOA that derived from differential power dynamics and is absent in the Zone context is comparable pressures. Esfandiary emphasizes that, in a Zone context, as things stand today in the region, no regional state can compel the other to compromise, but instead must offer compromises (with which they may not be wholly satisfied) to get them in return.

At key junctions during the E3/EU+3–Iran nuclear negotiations, the EU High Representative served as a mediator and facilitator. Esfandiary explains the importance of having a neutral third party serving in that position. For instance "It was particularly helpful when the EU provided text, which other partici-



NEW YORK, USA

Secretary-General Antonio Guterres addressing the first session of the Conference on the Establishment of a Middle East Zone Free of Nuclear Weapons and Other Weapons of Mass Destruction in 2019 at the United Nations Headquarters in New York

pants would then debate and rewrite before reaching an agreement. This was because a draft from the EU was seen as less political compared to other individual states since it was not an official party to the negotiations.” In the Zone context, due to the lack of direct diplomatic relations between certain states, there is a clear need for a “neutral” venue for regular meetings, managed by an agreed third party. This was attempted during ACRS, where the United States and Russia served as the co-chairs, as well in the context of the proposed Helsinki conference and the Glion/Geneva consultations, where Finland was tasked with the role of facilitator. Disagreements over the facilitator’s mandate and scope may complicate the negotiations even further. Deciding who will coordinate the negotiation – whether it is an external actor or a state from the region– and the coordinator’s mandate and authority will be a crucial factor in the Zone negotiations. It is noteworthy in this regard that the first session of the Conference on the Establishment of a Middle East Zone Free of Nuclear Weapons and Other Weapons of Mass Destruction adopted a decision that the presidency of the conference would originate from the participating regional states and rotate in alphabetical order.

Confidence-building measures

Several authors suggest a range of confidence-building measures (CBMs) derived from elements of the JCPOA that can be considered in a Zone context. Anton Khlopkov in his essay on civil nuclear cooperation underlines how the experience of engagement on nuclear safety issues with Iran in the JCPOA framework can be applied more generally to benefit the entire region. He notes, “Annex III of the JCPOA provides for the possibility of setting up a Nuclear Safety Centre. Should such a centre be established, it could also be used to foster closer regional cooperation. A regional Nuclear Safety Centre could be a confidence-building mechanism measure in the region.”⁷

7 A. Khlopkov, “Civil Nuclear Cooperation”, From the Iran nuclear deal to a Middle East Zone? Lessons from the JCPOA for an ME WMDFZ, UNIDIR May 2021, <https://unidir.org/jcpoa>.

The authors present future ME WMD-FZ negotiators with a varied menu of CBMs. However, the latter will have to choose the measures that best address areas where confidence is most sorely lacking or can help propel the Zone process forward, and that can also realistically be implemented.

Governance mechanisms

Another useful lesson to draw from the JCPOA relates to the governing body of the agreement. The Joint Commission, the body assigned by the JCPOA to oversee its implementation, has proved to be a venue in which all participants can meet despite the lack of diplomatic relations between some of them. In their discussion of setting up a body like the JCPOA Joint Commission for the Zone, Mallard and Sabet assess how such a body, with attributes like the JCPOA's Dispute-Resolution Mechanism (DRM), could be relevant in an ME WMD-FZ context. They note that, "it could become a regular forum for Middle Eastern

states to meet, share information and cooperate on WMD-related issues", allowing it to function as a kind of CBM. This could be a very useful mechanism once an agreement is reached. Persbo explores this theme in the context of monitoring, safeguards and verification, assessing that "The main advantages of setting up such a body are that it brings the parties closer together and transforms the underlying agreement from a rigid text into something that is sometimes referred to as 'a living instrument'."

A body, with attributes like the JCPOA's Dispute-Resolution Mechanism (DRM), could be relevant in an ME WMD-FZ context.

Several authors differ over the applicability for the Zone of a governance mechanism similar to the JCPOA's Procurement Channel. Einhorn identifies some merit in replicating the JCPOA Procurement Channel, which regulates Iranian nuclear imports, on a region-wide basis. While he acknowledges that Zone states would probably oppose this, he views it as a valuable means to ensure their ongoing compliance with the Zone's provisions. Khlopov is also sceptical about Middle Eastern states' willingness to adopt such a measure. He views the JCPOA Procurement Channel, which is supposed to remain in operation for 10 years, as being highly contingent on the unique circumstances of the Iran nuclear issue and E3/EU+3-Iran negotiations. He asserts that, "There is no apparent reason for other states in the region to accept restrictions on their rights and agree to the scaling up of the Procurement Channel mechanism to include the entire Middle East."

Prohibitions, capability caps and verification

The Iran nuclear deal contains several prohibitions, capability caps and verification provisions that could be relevant to the Middle East WMD-Free Zone. Persbo notes that Annex T of the JCPOA lists prohibited activities typically needed to "weaponise" nuclear material. He sees some benefit for a future Zone to refine a set of "activities generally prohibited", but he finds that even if Zone negotiators made progress on defining norms on such activities, "the issue of how to verify and monitor compliance with such norms would be fraught with difficulties".

Einhorn and Persbo both believe that Middle Eastern states should consider forgoing some of the more sensitive nuclear fuel cycle-related technologies like uranium enrichment or plutonium reprocessing. Yet both are very sceptical that these states will agree to adopt such prohibitions. Einhorn finds that a

key lesson of the JCPOA for an ME WMD FZ is that states will strongly resist prohibitions on fuel cycle capabilities that they possess, have made major national investments of time and resources in, and view as necessary to their national interests. They may also be loath to prohibit or strongly constrain capabilities that they have not acquired but hope to in the future. He concludes, “A corollary is that it may be easier to gain regional support for banning or severely constraining fuel cycle capabilities that none of the participants in the region already possess or regard as important to achieving national priorities.” With these realities in mind, both Einhorn and Persbo suggest that one possible area of agreement may be for Middle Eastern states to incorporate the JCPOA’s ban on plutonium reprocessing in a Zone. Persbo argues that, if the region’s states reject blanket bans, for example on fuel cycle technologies, then they should consider adopting varying degrees of capability caps. He recommends “discussing verifiable limitations on the level of production or the size of the nuclear enterprise”.

Persbo also remarks that, when contemplating the applicability of the JCPOA to a prospective ME WMD FZ, it is worth recalling that “hard cases make bad law”, pointing to the fact that the Iran nuclear deal’s provisions may be too context-specific to be useful in a Zone. Yet, he still thinks some of the JCPOA’s main philosophies could be applicable to it. He believes that “there are good reasons to embrace the [Additional Protocol] as the gold safeguards standard in the ME WMD FZ.

Enforcement tools

One of the major distinctions between the JCPOA and Zone processes, as noted above, has been the vastly different power relations between their respective participant states. This comes across quite prominently in the JCPOA’s enforcement framework. Mallard and Sabet contend that this inherent imbalance in the relationship between the E3/EU+3 and Iran enabled the creation of the JCPOA’s snapback provision – under which sanctions on Iran would be restored in case of any possible major non-performance by it – albeit on a temporary basis, since this provision is set to expire by 2025. They question the applicability of such a framework to an ME WMD FZ for three reasons: the relative equality between regional states; the fact that most are not under a stringent web of WMD-related sanctions; and the negative experience of sanctions for JCPOA participants.

Mallard and Sabet in fact argue that the JCPOA’s one-sided enforcement framework has undermined its longevity. They nonetheless propose different enforcement options for a Zone. One option is collective sanctions that would be imposed by Middle Eastern states in response to a violation of Zone provisions by a member state. These sanctions could be modulated according to the severity of the violation, ranging from diplomatic censure to a full-scale diplomatic and economic blockade in the worst-case scenario. Another option, which is not mutually exclusive to the former option and derives from the JCPOA as well as nuclear weapon-free zones (NWFZs) in other regions, would be to outsource enforcement to the United Nations Security Council, which could formulate a global response to a serious violation by a ME WMD FZ member state.

Conclusions

The JCPOA was the product of nearly 12 years of on-and-off negotiations from 2003 to 2015. The talks were prioritised by its participants from 2010 to 2015, including direct involvement at the senior political level by the E3/EU+3 and Iran, once the perceived acute risks of armed conflict and nuclear breakout became clear and pressure on Iran was ratcheted up. In contrast, the prospective member states of an ME WMDFZ face little imminent political or economic pressure to reach an agreement. While the Zone process has seen modest advances since 1974, it remains in its infancy, with little urgency and few

regional decision makers focused on it due to competing regional and internal crises. If the JCPOA survives when a Zone is negotiated, then it will serve as a model that is already in effect in the region and could be extended beyond Iran. Should the JCPOA expire or collapse prior to the establishment of an ME WMDFZ, then it could still provide valuable lessons and a novel toolkit regional states can pick and choose from to create a Zone.

Ultimately, the creation of a Middle East Weapons of Mass Destruction-Free Zone will require from the states of the region and their negotiators permissive regional security circumstances, political will, the right mix of incentives and disincentives, and creativity to make the near-five-decade old goal of a Zone a reality. Many of the specific elements of an ME WMDFZ treaty are likely to be decided by the conditions that prevail as it is being negotiated. At the same time,

Zone negotiators will have a rich reservoir of historical models to draw on, including the Euratom Treaty, the Brazilian–Argentine Agency for Accounting and Control of Nuclear Materials (ABACC), the various NWFZs in force today and, of course, the history of the ME WMDFZ itself. While regional conditions for creating a Zone remain complex and difficult, this series of essays adds to this rich repertoire the recent experience of the JCPOA from the Middle East itself, handing the region tools and experiences it can emulate, and highlighting pitfalls it may want to avoid.

The creation of a Zone will require permissive regional security circumstances, political will, the right mix of incentives and disincentives, and creativity to make this near-five-decade old goal a reality.



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Federica Mogherini High Representative of the Union for Foreign Affairs & Security Policy / Vice-President of the EC and Iran Foreign Minister Javad Zarif before the plenary session in Hotel Beau Rivage Palace in Lausanne during the talks of E5/EU+1 in 2015.

Negotiation Process, Structure, and Format

by Dina Esfandiary, The Century Foundation

The negotiations that led to the conclusion of the Joint Comprehensive Plan of Action (JCPOA) had a unique format, process and structure. It involved China, France, Germany, Russian Federation, United Kingdom, and the United States alongside the EU high representative for foreign affairs and security policy (E3/EU+3) and the Islamic Republic of Iran. A secret channel between the United States and Iran was later also used. There was also a decision to limit the issues covered in the negotiations, make the negotiations flexible and compartmentalise discussions, allowing for progress in the talks despite the fraught relationship of Iran with members of the E3/EU+3. All these factors had important implications for the success of the negotiations.

The JCPOA offers lessons for the negotiation structure, dynamics and format of the Middle East Weapons of Mass Destruction-Free Zone (ME WMDfZ). This essay discusses these lessons, while recognising the fundamental differences between the two processes.

The history of the nuclear programme of the Islamic Republic of Iran

The Iranian nuclear programme began under the rule of Shah Mohammad Reza Pahlavi in the 1950s in collaboration with international partners, most notably the United States under the Atoms for Peace programme.¹ The programme aimed to foster the development of peaceful nuclear programmes and to help the United States build relationships in the context of the Cold War. After the establishment of the Tehran Research Reactor in 1959, the United States agreed to supply it with small quantities of high enriched uranium (HEU) in 1967. The Shah also sought European involvement in his country's programme.² In 1968, Iran signed the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) and, in 1973, concluded its Safeguards Agreement with the International Atomic Energy Agency (IAEA).

The Iranian programme became a contentious issue after the Islamic Revolution of 1979 and the hostage crisis. The United States ceased its assistance, as did other states, including France and the Federal Republic of Germany. The United States exerted pressure on the IAEA and China to prevent Iran from producing the uranium hexafluoride (UF₆) that was used in uranium enrichment, and construction on its nuclear sites stopped. But the programme continued to develop through clandestine and undeclared

1 D. D. Eisenhower, President of the United States of America, Address to the 470th Plenary Meeting of the United Nations General Assembly, 8 December 1953, <https://www.iaea.org/about/history/atoms-for-peace-speech>.

2 O. Meier, "Iran and Foreign Enrichment: A Troubled Model", Arms Control Today, January 2006, <https://www.armscontrol.org/act/2006-01/iran-nuclear-briefs/iran-foreign-enrichment-troubled-model>.

activities, turning instead to other suppliers, undeclared activities, and rogue networks for parts and expertise.³

Fast forward to 2002, the National Council of Resistance of Iran, an exiled Iranian opposition group, presented evidence that Iran had secretly built two nuclear facilities: in Natanz, for uranium enrichment, and in Arak, to produce heavy water that could be used for making weapon-grade plutonium. In June 2003, the IAEA Director General, Mohamed ElBaradei, reported that Iran had not met its safeguards obligations but was in the process of addressing it. This included signing the modified Code 3.1, which requires countries to submit design information for new nuclear facilities to the IAEA as soon as the decision is made to construct, or authorize construction, of the facility.⁴ Despite various diplomatic attempts, which are examined in the next section, the two sides could not overcome their differences, and in 2006 the IAEA's Board of Governors called on Iran to suspend enrichment and reprocessing and referred the matter to the United Nations Security Council. This sparked long and arduous negotiations between the global powers and Iran to curb its nuclear activities.

Negotiations begin

While the IAEA deliberated, the foreign ministers of France, Germany and the United Kingdom (the E3) decided to begin negotiations with Iran by offering technical cooperation in exchange for an agreement to suspend uranium enrichment and implement the IAEA Additional Protocol. While Tehran cooperated with the IAEA, talks with the E3 began, culminating in the October 2003 Tehran Statement.⁵ This enshrined the suspension of Iranian enrichment activities in exchanged for technical cooperation as the basis of future agreements, although each side had a different perception of how long that suspension should last.

After Iran signed the Additional Protocol in 2004, IAEA inspections uncovered previously undeclared activities. This led to greater pressure to refer the case back to the United Nations Security Council. The November 2004 Paris Agreement outlined that the suspension of enrichment was a temporary confidence-building measure (CBM).⁶ Negotiations between Iran and the world powers continued for several years, punctuated by occasional offers. However, following the election of Mahmoud Ahmadinejad as president in 2005, Iranian negotiators rejected talks and resumed some of their activities, including boosting enrichment capacity.⁷ This led the IAEA Board of Governors to refer Iran to the Security Council in February 2006.

3 This work benefited from the A.Q. Khan network. See Dean Nelson, "A.Q. Khan Boasts of Helping Iran's Nuclear Programme", *The Telegraph*, September 10, 2009, <https://www.telegraph.co.uk/news/worldnews/asia/pakistan/6170145/A.Q.-Khan-boasts-of-helping-Irans-nuclear-programme.html>.

4 IAEA, Board of Governors, "Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran", Report by the Director General, GOV/2003/40, 6 June 2003, <https://www.iaea.org/sites/default/files/gov2003-40.pdf>.

5 "Full Text: Iran Declaration", BBC, 21 October 2003, http://news.bbc.co.uk/1/hi/world/middle_east/3211036.stm.

6 IAEA, "Communication Dated 26 November 2004 Received from the Permanent Representatives of France, Germany, the Islamic Republic of Iran and the United Kingdom Concerning the Agreement Signed in Paris on 15 November", Information Circular INFCIRC/637, 26 November 2004, <https://www.iaea.org/sites/default/files/publications/documents/infcircs/2004/infcirc637.pdf>.

7 Associated Press, "Iran President: We Won't Retreat 'One Iota'", Fox News, 14 April 2006, <https://www.foxnews.com/story/iran-president-we-wont-retreat-one-iota>.

On 23 December 2006, the Security Council adopted resolution 1737, imposing the first, but certainly not the last, United Nations sanctions on the Iranian nuclear programme.⁸ The next few years saw several attempts to reach compromise. These included the presentation of a “package for constructive negotiations” from the Iranian side in 2008;⁹ a Russian–United States fuel swap proposal in 2009;¹⁰ and an attempt to force a *fait accompli* on the world powers, when Ahmadinejad negotiated a separate fuel swap deal with Brazil and Turkey in 2010.¹¹ None worked. The United Nations Security Council adopted resolution 1929 in 2010, with further sanctions, and the United States and the European Union imposed several unilateral sanctions on the Iranian oil sector.¹² In 2012, the now expanded group of negotiating states – the E3/EU+3 – adopted the “phased” approach suggested years earlier by the Russian foreign minister.¹³ This increased the pace of negotiations, but with no resolution of the crisis in sight.

A new phase in talks

It was in this context that Oman began to host secret discussions between Iranian and United States officials in March 2013.¹⁴ On 14 June 2013, Hassan Rouhani, an experienced negotiator on the Iranian nuclear programme, was elected as Iranian president. He ran on a platform of economic reform, which required lifting the sanctions on Iran and was mandated to pursue the resolution of the nuclear crisis by Iran’s Supreme Leader. On the United States side, there was a renewed desire to end the crisis during the second term of Barack Obama as president.

As a result, the talks that followed in September 2013 were “very different in tone and . . . in . . . vision”, according to the United States Secretary of State, John Kerry, with several changes in personnel on the United States side as well.¹⁵ Shortly afterwards, presidents Obama and Rouhani spoke on the

The E3/EU+3 adopted the “phased” approach suggested years earlier by the Russian foreign minister. This increased the pace of negotiations, but did not resolve the differences among the negotiating parties.

8 Security Council, S/RES/1737, 2006, [http://undocs.org/S/RES/1737\(2006\)](http://undocs.org/S/RES/1737(2006)).

9 L. Rozen, “Iran’s Proposal for ‘Constructive Negotiations’”, Mother Jones, 20 May 2008, www.motherjones.com/politics/2008/05/irans-proposal-constructive-negotiations/.

10 P. Crail, “Iranian Response to LEU Fuel Deal Unclear”, Arms Control Today, November 2009, <https://www.armscontrol.org/act/2009-11/iranian-response-leu-fuel-deal-unclear>.

11 P. Crail, “Brazil, Turkey Broker Fuel Swap with Iran”, Arms Control Today, June 2010, <https://www.armscontrol.org/act/2010-06/brazil-turkey-broker-fuel-swap-iran>.

12 Security Council, S/RES/1929, 2010, [http://undocs.org/S/RES/1929\(2010\)](http://undocs.org/S/RES/1929(2010)).

13 A. Mohammed, “Russia Lays Out ‘Step-by-Step’ Approach on Iran”, Reuters, 13 July 2011, <https://www.reuters.com/article/us-iran-russia-usa/russia-lays-out-step-by-step-approach-on-iran-idUSTRE76C6Z620110713>.

14 Associated Press, “Secret US–Iran talks cleared way for historic nuclear deal”, The Telegraph, 24 November 2013, <https://www.telegraph.co.uk/news/worldnews/middleeast/iran/10471030/Secret-US-Iran-talks-cleared-way-for-historic-nuclear-deal.html>; ‘Secret Talks Set Stage for Iran Nuclear Deal’, BBC, 25 November 2013, <https://www.bbc.com/news/world-middle-east-25086236>; and A. Mohammed and P. Hafezi, “U.S., Iran Held Secret Talks on March to Nuclear Deal”, Reuters, 24 November 2013, <https://www.reuters.com/article/us-iran-nuclear-bilateral-idUSBRE9AN0FB20131124>.

15 A. Gearan, “Kerry, Iran’s Zarif Hold Unusual Private Meeting on Sidelines of Nuclear Talks”, Washington Post, 26 September 2013, https://www.washingtonpost.com/world/national-security/kerry-irans-zarif-hold-unusual-private-meeting-on-sidelines-of-nuclear-talks/2013/09/26/d2fddfac-2700-11e3-9372-92606241ae9c_story.html.

telephone – the first time the two states had had such a high-level exchange since the 1979 revolution.¹⁶ Iran presented a proposal that contained a broad framework for a comprehensive agreement and interim CBMs to be adopted in the short term.¹⁷ The negotiators met again, and, on 24 November 2013, they adopted the Joint Plan of Action (JPOA), a road map to a final comprehensive agreement.¹⁸

The JPOA encapsulated a reciprocal approach whereby Iran would suspend several activities related to its programme and the P5+1 would suspend certain sanctions, facilitate humanitarian trade, and cease efforts to reduce Iranian oil sales. Importantly, the JPOA provided needed momentum for continued talks to reach a final agreement. After two extensions of the JPOA, in April 2015, the negotiators concluded a “framework” agreement, which outlined the key parameters of a final deal. Finally, in July 2015 the E3/EU+3 and Iran agreed to the JCPOA, which outlined restrictions on the Iranian nuclear programme and detailed verification and implementation measures in exchange for sanctions relief and peaceful nuclear programme.¹⁹

The success of the final negotiations

THE PROCESS AND FORMAT

The final round of negotiations to the deal began shortly after the foreign ministers of the E3/EU+3 met in September 2013 in New York, after the election of Rouhani. Negotiations started again in October 2013 in Geneva, and they were initially quite formal. Negotiators convened in meeting rooms, at times in high-level plenaries, to read out prepared national statements. Each statement covered an area that needed to be discussed and involved experts from each side. Because each topic and each session was distinct and decided in advance, with little room for manoeuvre and flexibility in the proceedings, they were “disconnected from the realities of what the topics all required” according to one United States negotiator, referring to the interconnectedness of some of the issues covered in the negotiations.²⁰ Little actual negotiation occurred. State representatives were not able to hammer out compromises because there was no real dialogue. In other words, the formality of the process was not helpful in advancing the negotiations. Rather, it was just a requirement at the beginning to allow states to express their official positions, which laid the groundwork for the actual process of working out what could and could not be achieved.

As the negotiations progressed and participants moved past the stage of formality and the airing of grievances, they were able to slowly start making progress on the substance of a potential nuclear deal. This was in part due to the flexible approach that the negotiators adopted and became a hallmark of

16 J. Mason and L. Charbonneau, “Obama, Iran’s Rouhani Hold Historic Phone Call”, Reuters, 28 September 2013, <https://www.reuters.com/article/us-un-assembly-iran/obama-irans-rouhani-hold-historic-phone-call-idUSBRE-98Q16S20130928>.

17 K. Davenport, “Timeline of Nuclear Diplomacy with Iran”, Fact sheet, Arms Control Association, December 2020, <https://www.armscontrol.org/factsheets/Timeline-of-Nuclear-Diplomacy-With-Iran>.

18 “Joint Plan of Action (JPOA) Archive and Joint Comprehensive Plan of Action (JCPOA) Archive”, United States Department of the Treasury, <https://home.treasury.gov/policy-issues/financial-sanctions/sanctions-programs-and-country-information/iran-sanctions/joint-plan-of-action-jpoa-archive-and-joint-comprehensive-plan-of-action-jcpoa-archive>.

19 “Joint Comprehensive Plan of Action”, 14 July 2015, https://eeas.europa.eu/archives/docs/statements-eeas/docs/iran_agreement/iran_joint-comprehensive-plan-of-action_en.pdf.

20 Interview with United States negotiator, email, September 2020.

the negotiations as they progressed. Each issue area that had to be discussed was broached by the high-level political representatives of each state, but, importantly, the issues were then discussed by experts to make progress on technical issues. These issues were tackled simultaneously so that a “difficult” topic – one where finding a compromise was complicated – would not hold back discussions and progress in other areas. The only exception to this was the discussion on sanctions. The Iranian negotiators initially struggled to grasp the full extent of United States sanctions and the difficulty of lifting them. Explaining the complicated legal procedures for lifting unilateral United States sanctions, and how the Congress had a say and would be unlikely to support removal of sanctions, took time. This also slowed general progress on the deal for some time.²¹ At the end, the flexibility of the process meant that, at times, areas that presented greater complications did not always hold up the entire negotiations, although it was inevitable that sometimes they did. When this happened, the negotiators also showed flexibility in addressing each challenge and in moving from one topic to the next as the issue areas to cover became narrower and political pressure arose.

Another aspect of the format of the discussions that was helpful to their progress was the availability of experts and negotiators. Negotiators from all participants were generally all present in a common area where the talks were taking place and were available for the scheduling of various sets of meetings. This included bilateral meetings, meetings between specific states within the E3/EU+3 (e.g. between the United States and the Russian Federation) to discuss joint areas of concern or ideas, discussions between all experts or groups of experts, and meetings between political directors. The ready availability of those involved in the process meant that sudden changes in schedule could be accommodated or emergency discussions on a specific topic could be held if needed. In addition, it meant that, during times of inactivity, negotiators and experts from the different states would, first, spend more time with one another and become accustomed to each other’s styles and approaches, as well as gain familiarity on a personal basis, and second, importantly, have time to brainstorm new ideas and informally discuss others. One United States negotiator said, “If I had it to do over again and anyone gave me the power to set the process, we would have decamped to a place for a month and just stayed there all together, had some meetings and brainstormed in various different formats.”²²

The JCPOA negotiations also had drafting sessions to make tangible progress on the text as the talks progressed. Negotiators described it as useful when a state or a group of states would suggest a draft text, and this was then debated and agreed upon by all the negotiators. In other words, it was easier to make progress when there was already something on paper, than starting with a blank page. It was particularly helpful when the EU provided text, which other participants would then debate and rewrite before reaching an agreement. This was because an EU draft was seen as less political compared to other individual states since it was not an official party to the negotiations. This allowed the representatives of states party to the negotiations to be as brutal as required about a text if it did not reflect what they wanted. It also allowed negotiators to accept suggested text when it suited them because the suggestion came from the EU. The fact that the EU was viewed as more of an honest broker also meant that state representatives could accept the suggested text without having to ask for something in return, which a state such as Iran would have to do if the suggested text came from the United States, for instance, to give the appearance that the final text was a compromise. A Western JCPOA negotiator

21 Interview with United States negotiator, email, September 2020.

22 Interview with United States negotiator, email, September 2020.

reflected this when he said, “Things got worse when a nation [other than the EU] had to write because then it became not only a text matter, but also a negotiating point, with countries saying ‘I concede on this (meaningless) bit of wording only if I get X in return’”.²³

The JCPOA negotiations are a case study in the importance of seeing multiple perspectives. This allowed for some flexibility on the timing of discussions to allow for each negotiating team to confer with their capitals and brief them on the progress of the talks. The participants also understood the national contexts in which they each operated. It was evident that certain states faced greater difficulties with their domestic audiences than others, so it was important to have a degree of understanding of these realities. For the United States, it was important for the negotiators to regularly update the Congress and its regional partners on the progress in the talks, while in Iran, stakeholders such as the Office of the Supreme Leader had to be kept informed. This also meant that the parties to the negotiations had national reporting requirements that had to be met, even when they did not fully reflect the exact progress of the talks. For example, the Iranians needed to report that they had had hours of intense discussions on sanctions, which the negotiators did. The United States negotiators needed to say that they had raised missiles, which they did. In other words, some of the meetings were for posturing purposes, and there was a general understanding of this and flexibility to allow it to happen. These sessions also inevitably increased information sharing about other topics, and so revealed space for compromise or identified ignorance on certain areas that needed to be addressed. As such, despite appearing only useful in

allowing negotiators to report back to their capitals, these meetings still gave participants an opportunity to overcome some roadblocks and identify new areas for potential compromise.

Finally, the carrot-and-stick approach to the JCPOA negotiations – that is, the offer of rewards paired with the threat of punishment – was a useful one. Indeed, the E3/EU+3 rewarded Iranian compromise at each stage, while punishing (as much as possible) unwillingness to compromise. This created clear incentives for Iran to compromise, which was particularly useful when the compromise itself was difficult to make. When the negotiators reached the JPOA, Iran was provided with temporary sanctions relief in exchange for

the agreed suspensions in its nuclear programme. This demonstrated goodwill on both sides and a real drive to reach a final deal.

THE STRUCTURE OF THE TALKS

The structure of a negotiation refers to how it is designed, when and where it takes place, and who is involved. The JCPOA negotiations were kept deliberately restricted, both in participants and in substance. The negotiations that eventually led to a nuclear deal initially took place between Iran and the E3, and later with the remaining members of the E3/EU+3. The restricted number of participants was both a blessing and a curse. It was helpful in that it meant there were “fewer cooks in the kitchen” and, therefore, fewer spoilers. But it was also problematic because successful implementation of the deal required buy-in from not only the participants, but also from states affected by the policies of Iran, specifically its regional policies.

A process that ensures that dialogue on issues occurs with experts and officials simultaneously, will ensure progress on certain issue areas is not held back by other, more complicated issue areas.

23 Interview with Western negotiator, telephone, September 2020.



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NEW YORK, USA

Secretary-General Ban Ki-moon (centre right) meets with Jaakko Laajava (second from left), Under Secretary of State for Foreign and Security Policy of Finland and Facilitator for the 2012 Conference on the Establishment of a Middle East Zone Free of Nuclear Weapons and All Other Weapons of Mass Destruction.

While these regional policies were purposefully kept outside the JCPOA negotiations as they were separate from the nuclear file, in the minds of the leadership of many Arab States of the Persian Gulf, negotiations on just the nuclear issue failed to address their main concerns about the regional activities of Iran. To them, while the 2015 nuclear deal was useful in curbing the Iranian nuclear programme, which carried a number of security and environmental risks, it was secondary to their security concerns about Iran.²⁴ There were discussions over the inclusion of the Arab States of the Gulf in the negotiations in some way. But these states could not agree on the form their participation would take, or who would be their representative. While this was not the only reason why they were not ultimately included in the talks, it did play a role.²⁵ In contrast, Israel's main concern was the potential for Iran to develop a nuclear weapon, and it found the restraints agreed throughout the JCPOA unsatisfactory. The leadership of states such as Israel, Saudi Arabia, and the United Arab Emirates lobbied the United States, especially the administration of President Donald J. Trump, to end implementation of the deal. This meant that regional actors could act as spoilers in the process, especially after the negotiators reached a deal, although they were not the reason why the deal ultimately faltered.

The substance of the negotiations was also deliberately structured so that talks focused only on the Iranian nuclear programme. This compartmentalisation of the negotiations was useful because it ensured that progress on the nuclear file was not held back by disagreements on other dossiers, such as Iran's regional activities and its missile programme. Indeed, some linkage to certain regional topics would have been helpful to the Iranian side: the negotiations took part against the backdrop of the fight against the Islamic State group in Iraq and the Syrian Arab Republic. Since Iranian efforts to push back

24 Interviews with lawmakers, officials, experts and academics, Dubai, Abu Dhabi, Muscat, Doha and Kuwait City, 2014–17. For more on the environmental concerns sparked by Iran's nuclear programme for the United Arab Emirates, see D. Esfandiary, "Two Tremors in Two Weeks, and Many Questions for Iran", *The National*, 22 April 2013, <https://www.thenational.ae/two-tremors-in-two-weeks-and-many-questions-for-iran-1.324812>.

25 Interviews with lawmakers, officials, experts and academics, Dubai, Abu Dhabi, Muscat, Doha and Kuwait City, 2014–17.

the Islamic State in Iraq and Syria was in line with the policies of the United States and many of its allies, Iranian negotiators could have, as just one example, used this as a bargaining chip in the talks. But they did not. Like their E3/EU+3 counterparts, they wanted to ensure that the discussions on the nuclear issue took place irrespective of events and tensions elsewhere. This would ensure that the dialogue remained focused on one issue only and that progress could be made. Compartmentalisation also meant that the negotiations were as sheltered as they could be from the domestic opinions on the deal in each state. This was a key factor in ensuring that progress could be made without being derailed by spoilers from the capitals.

Finally, the JCPOA required a phased and gradual implementation. This means that implementation of one step outlined in the deal allows for implementation of the next step to occur. In other words, its “give-and-take” approach means that each successive implementation step builds on the accomplishment of the previous one. This was particularly useful given the lack of trust between the states in the talks and a valuable lesson learned for the ME WMDFZ.

Lessons learned

A few lessons applicable to the ME WMDFZ can be drawn from the process of reaching the Iran nuclear deal. The first is flexibility: the process of establishing dialogue, negotiations and reaching a final agreement must be flexible. This seems obvious, but it is worth highlighting. A successful process is not set in stone but allows for changes in course and consultations among the negotiating parties as well as between negotiators and their capitals. A process that ensures that dialogue on issues occurs with experts and officials simultaneously, will ensure progress on certain issue areas is not held back by other, more complicated issue areas.

Second, the availability of and understanding displayed by participants in the negotiations is important. As described above, the JCPOA negotiations were conducted over a relatively short period of time during which experts (i.e., scientific, technical and political-level experts) were available and in constant contact with one another. This will be key to ME WMDFZ negotiations too. But one problem with this is that several regional states do not currently have the expertise for such high-level, technical negotiations. It will be essential to develop this expertise and, importantly, to listen to these experts as they make recommendations to the political-level negotiators, who will be the ones that need to make compromises. In addition, participants in the dialogue must display an understanding of the contexts and constraints faced by their peers. The nuclear negotiations were successful because the United States negotiating team understood some of the difficulties the Iranians faced back home. This did not mean that they would have to give in to Iranian demands, but rather that they could sympathize with those difficulties and display flexibility in the negotiation process. It also meant that it was less difficult for Iranians to explain their domestic context and constraints to their peers from the E3/EU+3. This availability and understanding creates a flexible environment for those participating in talks, which fosters a greater willingness to reach a compromise, rather than a refusal to give in. It is also the aspect that is likely to be the trickiest for the discussions on an ME WMDFZ. While by virtue of proximity and similarities, states in the region display some understanding of the domestic difficulties faced by each other, it is either not enough or not reflected in the way they conduct their dialogue and negotiations. This is probably because displaying understanding and reaching compromises will be viewed as weakness.

Third, the compartmentalisation of the nuclear talks – that is, focusing solely on the Iranian nuclear programme – was key to ensuring progress would be made despite difficulties in other areas of relations between Iran and the E3/EU+3. Compartmentalising discussions on the Zone will also be key to ensuring progress can be made, otherwise talks will be impeded by the tensions and disagreements that already plague the Middle East, and any potential additional sources of conflict. However, some in the region criticized the JCPOA for being negotiated in isolation from the regional security context and without addressing their concerns regarding Iran. This contributed to the agreement being weakened once a new United States administration that opposed the deal came into power. While tensions and conflicts in the region will be a major impediment to an ME WMDFZ, they cannot be allowed to prevent a final agreement on the issues that the Zone is supposed to address. As a result, while discussions on regional tensions should also be conducted at the same time as those on limiting weapons of mass destruction (WMD) in the region, they should not prevent the reaching of a final agreement on an ME WMDFZ. Rather, a parallel process on regional security should be created, with a road map agreed to by the states concerned on how to make progress. But progress in those discussions should be independent of progress in talks on the Zone.

Fourth, the JCPOA process involved a mix of carrots and sticks – rewards and punishments – to ensure that compromise was reached. Both were needed to ensure that all parties could meet in the middle. Compromise in discussions on an ME WMDFZ must also be rewarded. Adopting “sticks” will be more challenging, however. This is because the states negotiating a Zone must all be treated equally. Neither side can compel others to compromise. Rather, all compromise must be reached by offering a compromise in return. This means that, while all parties will walk away from the talks a little disappointed, it can ensure a lasting agreement.

Finally, the constant interaction between the individual negotiators – political and technical experts or officials – especially once the initial formalities were completed, was key to the success of the JCPOA negotiators. This will also be key to ME WMDFZ talks. Individuals developed relationships with one another, naturally lessening and, in some cases, altogether removing barriers to dialogue. Becoming familiar and then friendly meant that proposals and ideas were not automatically viewed with suspicion. This would have been further fostered if the negotiators had been sent somewhere for an extended period, isolated from the world. While this is difficult to envisage, it would make the negotiating process smoother. According to one United States negotiator of the JCPOA, “Ideally, we would move somewhere for an extended period of time, so all the time is spent together.” This would allow for brainstorming sessions outside formal meetings and socializing among the negotiators. The same negotiator added, “What you also need then is a week or so of ‘home-time’ so that you can convey on-the-ground dynamics, but not so much that you get cold feet.” He added this was key because it would provide just the right amount of motivation for the negotiators: “You need a feeling of pressure, but not so much that you just harden.” The additional barrier to talks on the WMD-free zone is that some participants refuse to sit with one another and negotiate directly. This must be overcome because the refusal to talk only worsens the security context of all states.

There remains, however, one element that made the JCPOA possible but is sorely lacking in the context of the negotiations for an ME WMDFZ: political will and urgency. There was a sense of crisis in the context of the nuclear deal negotiations, which created and maintained the political will to move the process forward, despite several setbacks along the way. The same cannot be said currently of the ne-

gotiations for a Zone. There is no sense of urgency. In fact, there is little impetus for the creation of an ME WMDFZ from the states involved. There is no magic solution to foster the creation of this political will. As a result, the negotiations for the Zone are likely to be fraught with difficulties and conducted in a longer timeframe.

Conclusions

Reaching the deal on Iran's nuclear programme differs from reaching an agreement on a Middle East Weapons of Mass Destruction-Free Zone. In the former, the international community pursued a deal on one state's nuclear activities. In the latter, several states in the Middle East need to agree to a blanket ban on the existence, use and future possession of WMD in their region. While the morality of the ban is not in question, the ability to agree on it in a region fraught with deep-seated historical distrust and animosity

is. Reaching the JCPOA was a complicated and long process. Reaching an ME WMDFZ appears harder. It is for this very reason that it is critical to draw some lessons from the negotiations on the nuclear deal and to attempt to apply them to the dialogue on the Zone. Above all, flexibility of the process, compartmentalisation of the discussions, each side developing an understanding of the other and human relationships proved to be key to success.

One element that made the JCPOA possible but is sorely lacking in the context of the negotiations for an ME WMDFZ: political will and urgency.



TEHRAN, IRAN

*Iran atomic energy exhibition at Islamic
Revolution & Holy Defense Museum*

Nuclear Fuel Cycle Activities and Research

by Robert Einhorn, Brookings Institution

The Joint Comprehensive Plan of Action (JCPOA) – the 2015 nuclear deal between China, France, Germany, Russian Federation, United Kingdom, and the United States as well as the EU High Representative for Foreign Affairs and Security Policy (E3/EU+3) and Iran, contains a range of restrictions on the Iranian fuel cycle, reactor, and research and development (R&D) programmes that go well beyond the limits contained in the 1968 Treaty on the Non-Proliferation of Nuclear Weapons (NPT). These mostly unprecedented restrictions, together with the JCPOA's innovative monitoring, inspection, governance, compliance and enforcement arrangements, contribute to the effectiveness of the JCPOA in blocking Tehran's pathways to the acquisition of nuclear weapons, at least for as long as those provisions are in effect.

The future of the JCPOA is currently very much in doubt, with uncertainty over whether the United States, under the administration of President Joseph R. Biden, and Iran will manage to return to full compliance. But the JCPOA's provisions have been widely regarded as potentially applicable to future international arrangements to prevent the spread of nuclear weapon capabilities, including such regional measures as a Middle East Weapons of Mass Destruction-Free Zone (ME WMDFZ).

This essay addresses the applicability of the JCPOA's provisions governing Iran's fuel cycle, reactor and R&D programmes – and the lessons learned from the JCPOA experience – to the development of an agreement to establish an ME WMDFZ.

The importance of constraining enrichment and reprocessing capabilities

One of the shortcomings of the NPT is its failure to constrain enrichment or reprocessing, which are two dual-use “fuel cycle” capabilities that can be used to both produce fuel for civil nuclear energy programmes and the fissile material needed for nuclear weapons. Iran has claimed that its centrifuge enrichment programme and its heavy water-moderated research reactor (optimized to produce weapons-grade plutonium) were intended exclusively for peaceful purposes. However, the International Atomic Energy Agency (IAEA) has cast serious doubt on this claim, citing substantial evidence that Iran had engaged in activities related to the development of nuclear weapons.

Given concerns about Iran's misuse of fuel cycle facilities, the United States and at least some of its E3/EU+3 partners believed that, to prevent Iran from becoming a nuclear-armed state, it was not enough to stop it from actually fabricating nuclear weapons. It was also necessary to prevent it from having a latent (or “threshold”) nuclear weapons capability – that is, having the fissile material production infrastructure in place that would enable it, if it so decided, to break out of its commitments and produce enough high enriched uranium (HEU) or separated plutonium for a bomb in less time than it would take the interna-

tional community to intervene to block it. Ensuring a long “breakout time” was therefore a critical E3/EU+3 negotiating objective.

Of course, the best way to achieve a long breakout time would be to eliminate any Iranian infrastructure to produce weapons-usable fissile material by banning any enrichment or plutonium production and reprocessing facilities. In the negotiations, the United States and its partners called for the elimination of fuel cycle activities. But, while Iran was prepared essentially to abandon reprocessing and the plutonium route to a bomb, it was adamant about keeping its enrichment programme. It claimed that it needed an indigenous capability to produce enriched uranium to fuel its future nuclear power reactors because it could not depend on an unreliable international fuel market, which could cut off supplies of enriched fuel for political reasons.

The United States and its partners eventually concluded that “zero enrichment” was unachievable and that they would have to settle for limiting Iran’s centrifuge enrichment capability. And so Iranian fuel cycle capabilities, especially the enrichment programme, became the central focus of the JCPOA negotiations. The E3/EU+3 countries, led by the United States, pressed for the strictest and longest-lasting constraints. Iran pressed for maintaining as much of its enrichment capacity as possible, ensuring that the duration of constraints was as short as possible, and keeping open the option to build a large, “industrial-scale” enrichment programme when constraints expired.

The result was a series of compromises in which Iran, in exchange for the suspension and eventual elimination of nuclear-related sanctions imposed by the United States, the United Nations and the EU, agreed to major reductions in existing capabilities. This included a two-thirds reduction in the number of centrifuges used to enrich uranium and a 98 percent reduction in its inventory of low-enriched uranium (LEU). It also accepted tight limits on its fuel cycle, reactor and R&D programmes with various expiration dates ranging from 8 to 15 years.¹

The non-proliferation significance of the JCPOA’s fuel cycle and related provisions

The JCPOA’s restrictions on enrichment include strict limits on the number and types of centrifuges, on the enrichment level and inventory of LEU, and on R&D for advanced centrifuges. These provisions meant that, for most of the JCPOA’s first 15 years of operation, Iran would need at least one year to break out of its restrictions and produce enough HEU for a single nuclear weapon. However, the expiration or relaxation of key restrictions at years 8, 10 and 15 (the “sunset” provisions) meant that the one-year breakout time would begin to shorten after year 10 and that, by the time all restrictions on enrichment expired in year 15, Iran would be entitled, if it so decided, to build a large-scale enrichment infrastructure that would cut its theoretical breakout time to a matter of a few weeks.

In contrast to the JCPOA’s handling of enrichment – which allowed a restricted Iranian enrichment programme for 15 years – the agreement essentially shut down all activities related to the production

¹ See the Annex for a summary of key JCPOA provisions limiting Iranian enrichment and reprocessing capabilities, reactor programmes, and R&D plans.

of weapons-usable plutonium for at least 15 years. In addition to modifying the Arak reactor to curtail its plutonium production capability, the JCPOA banned new heavy water reactors and reprocessing-related activities for 15 years, and Iran stated its intention beyond 15 years to rely exclusively on light water reactors, forgo reprocessing and ship all plutonium-bearing spent fuel out of its territory. Even if it changed its mind and decided after 15 years to pursue a plutonium option, its lead time to a plutonium-based bomb – given its lack of facilities for, and experience in, reprocessing and the absence of reactors optimized for plutonium production – would be much longer than one year.

Much of the criticism of the JCPOA has been directed at the prospect that, with the sunset of key restrictions on enrichment, Iran could build a large-scale enrichment programme and have a very short breakout time. The JCPOA's effective monitoring provisions would be capable of detecting any Iranian breakout attempt in time to allow the international community to intervene to block it. However, the fact that the JCPOA did not permanently eliminate the threat of Iran becoming a nuclear-armed state reinforced the interest, especially in Saudi Arabia and perhaps other states of the region, in keeping their own nuclear weapons options open.²

Some lessons from the JCPOA

Several lessons from the JCPOA experience of addressing Iran's fuel cycle capabilities should be kept in mind when pursuing a Middle East zone free of all weapons of mass destruction (WMD). Some of these lessons may be conducive to achieving the Zone, while others may demonstrate the difficulties that lie ahead in pursuing it.

THE DIFFICULTY OF BANNING EXISTING, HIGHLY VALUED CAPABILITIES

Despite facing tremendous pressure from economic sanctions, Iran was unwilling to give up the enrichment programme that has been a source of national pride, a symbol of resistance to foreign coercion, and the key to keeping open a future nuclear weapons option. By the time serious negotiations got underway in 2013, Iran had already achieved a *fait accompli* – an extensive and operational enrichment capability.

In the JCPOA negotiations, the Iranians were only willing to accept enrichment restrictions of limited duration. Iran's leaders that favoured an agreement could make the argument to domestic audiences that time-limited constraints on enrichment were acceptable because Iranian nuclear scientists and engineers needed time to develop advanced centrifuges to replace the inefficient IR-1s. Thus, after using the time mandated by the temporary restrictions to develop a modern capability, they would be free to proceed towards their declared goal of an industrial-scale programme.

An important lesson for Middle East regional arrangements is that states will strongly resist giving up capabilities that already exist, that have been the focus of major national investments of time and resources, and that they regard as essential to their national interests.

2 In March 2018, Saudi Crown Prince Mohammad bin Salman said: "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." N. O'Donnell, "Saudi Arabia's Heir to the Throne Talks to 60 Minutes", CBS News, 19 March 2018, <https://www.cbsnews.com/news/saudi-crown-prince-talks-to-60-minutes/>.

In contrast, Iran was willing to give up its plutonium-related programme, including facilities that did not yet exist (e.g., additional heavy water reactors and reprocessing facilities) and activities that had not gone beyond the early stage of development (e.g., reprocessing R&D). Compared to enrichment, the plutonium programme was not seen by Iranian leaders as providing the most promising path to keeping the country's nuclear weapons ambitions alive, and they probably recognised that it would be harder to justify in terms of its declared civil nuclear plans.

An important lesson for Middle East regional arrangements, therefore, is that states will strongly resist giving up capabilities that already exist, that have been the focus of major national investments of time and resources, and that they regard as essential to their national interests. By extension, they may also be reluctant to prohibit or severely constrain capabilities they do not yet possess but hope in the future to acquire, whether for genuine civil nuclear energy reasons or to pursue a nuclear weapons capability. A corollary is that it may be easier to gain regional support for banning or severely constraining fuel cycle capabilities that none of the participants in the region already possess or regard as important to achieving national priorities.

THE NEED FOR POWERFUL PRESSURES AND INCENTIVES

The JCPOA was only achieved because major world powers led by the United States put tremendous economic and political pressure on Iran. The latter's main incentive to accept strict nuclear restrictions and intrusive monitoring measures was to get those pressures removed and end its political isolation.

The incentive structure in a multilateral negotiation on a WMD-free zone is very different. While participants from the region may be under some external and peer pressure to reach agreement, their principal incentive for accepting restrictions on their own activities is to obtain the security benefits of ensuring that those restrictions would also be placed on the activities of their neighbours. Their sovereign decisions to participate are unburdened by the kind of massive coercive pressures faced by Iran. Notably, for some Middle Eastern countries, the incentive to bind others may be less powerful than the desire to protect their own capabilities or future options.

Thus, a key takeaway from the JCPOA negotiations – that major pressures or incentives are required to induce states to accept limits on highly valued existing or future capabilities – does not auger well for achieving an ME WMD-free zone.

THE IMPORTANCE OF ADDRESSING THE REGIONAL SECURITY CONTEXT

Given the importance and urgency of addressing the expanding Iranian nuclear programme, it made sense for President Barack Obama to confine the JCPOA to the nuclear issue and to address its concerns with Iran's regional behaviour separately. But the perception that the administration was not doing enough to push back against Iran's regional behaviour contributed to strong opposition to the JCPOA from virtually all Republican members of the United States Congress, many Democrats, the subsequent administration of President Donald J. Trump, and several of the United States' partners in the region, including Israel, Saudi Arabia and the United Arab Emirates. If President Biden hopes to build domestic and regional support for returning to the JCPOA and negotiating a follow-on nuclear agreement, he will have to demonstrate that he is also effectively addressing the sources of insecurity and political discord in the region.

The lesson for pursuing an ME WMDFZ is that WMD issues cannot be divorced from the regional political and security environment. A relaxation of tensions, a modicum of mutual trust and transparency, and constructive channels of engagement are required if states are to consider entering into an agreement that will affect their vital national interests. While some recent steps to narrow the divide between Israel and Arab states have been encouraging, the gulf between Iran and its supporters and much of the remainder of the region remains wide. Initial steps towards establishing an ME WMDFZ need not await the resolution of regional disputes and peaceful relations among states of the region. But it is unrealistic to expect that such a Zone can be fully realized in the absence of a fundamental improvement in regional political and security conditions.

RESISTANCE TO BEING SINGLED OUT

Throughout the JCPOA negotiations, the Iranians objected to provisions – whether dealing with fuel cycle capabilities, verification arrangements or other aspects of the deal – that went beyond the requirements of the NPT, and especially provisions that no other state had been required to accept. Claiming that they had never pursued the development of nuclear weapons and that “the Iran nuclear issue” was a crisis manufactured by the United States and its allies, they argued that singling them out from other NPT parties for discriminatory treatment was unjustified.

Eventually, the Iranians accepted a wide range of provisions that no other state had ever accepted. But they did so largely because many of those provisions would expire in agreed time periods, after which, in their explanation, they would be treated like any other compliant NPT party. They publicly rationalized their acceptance of temporary, unprecedented measures as necessary to refute unwarranted accusations and to prove to the world the exclusively peaceful nature of their nuclear programme.

The “singling out” problem could also arise in pursuing an ME WMDFZ even though, to some extent, the problem is reduced because the multilateral nature of the Zone ensures that all regional participants will be bound by the same commitments. Nonetheless, it might be argued that the Middle East itself should not be singled out – that an ME WMDFZ should not contain commitments that go beyond the NPT or beyond what existing nuclear-free zone arrangements have adopted. Given the special circumstances of the Middle East – with a long record of regional conflicts, mutual mistrust and efforts to acquire WMD – a strong case can be made that the requirements of an ME WMDFZ should be more rigorous than other regional arrangements. Still, some states in the region – perhaps with questionable motives, such as the hope of preserving a latent nuclear weapons option – may use the singling-out argument to oppose such rigorous measures.

The feature of the JCPOA that made Iran more comfortable with being singled out – the eventual expiration of the “discriminatory” provisions – would undermine the attractiveness of a regional WMD-free zone arrangement, whose value heavily depends on assuring the parties that their neighbours will continue to be bound indefinitely. An alternative way to reduce the singling out of ME WMDFZ participants would be to promote the adoption of some of the JCPOA’s innovative measures not just in the Middle East but on a much broader, even global, basis. The more that such measures become worldwide non-proliferation standards (e.g., adherence to the IAEA Additional Protocol, prohibition of “weaponisation” activities not involving nuclear material), the easier it will become for ME WMDZ participants to adopt them. Indeed, although the JCPOA states that its provisions “should not be considered as setting precedents,” the broader international application of such provisions could significantly strengthen the global non-proliferation regime.

ALL KEY PLAYERS NEED TO BE INVOLVED

Between 2003 and 2005, the European trio of France, Germany and the United Kingdom (E3) engaged in negotiations with Iran over its nuclear programme. The talks made little progress, in part because the two sides were far apart on the central issue of the Iranian enrichment programme but also because the United States was not at the negotiating table. For Iran, the United States was the critical player: The latter controlled most of what the former needed, and it was the key to ending Iranian political isolation and getting the Iranian economy back on track. As long as the United States was not involved, negotiations would go nowhere. Eventually, the United States participated in the E3/EU+3 negotiations with Iran and, in 2013–2015, bilateral engagement between Tehran and Washington was largely responsible for conclusion of the JCPOA.

The lesson for the ME WMD-free zone is that all critical players of the region must be involved in developing the Zone agreement, and at the earliest possible stage.

The lesson for the ME WMD-free zone is that all critical players of the region must be involved in developing the Zone agreement, and at the earliest possible stage. While States of the region may hold meetings to prepare for the Zone without the participation of all key participants – as they are now doing annually under the auspices of the United Nations without the participation of Israel – such an approach cannot take the process very far and, depending on the procedural or substantive positions adopted at those meetings, risks prejudicing the later involvement of states that are not present. It is important to get buy-in from all key players at an early stage. That may mean settling for an agenda and small, early practical steps that can command broad support and wide participation.

THE APPLICABILITY OF THE JCPOA'S FUEL CYCLE PROVISIONS

Given that several states of the Middle East have in the past pursued nuclear weapons (Egypt, Iran, Iraq, Libya and Syria) or acquired them (Israel) and that a number of states in the region are currently embarking on civil nuclear programmes, non-proliferation experts have recommended that key features of the JCPOA be incorporated into an ME WMD-free zone.³ These features include several of the JCPOA's fuel cycle provisions that go beyond the requirements of the NPT or previous nuclear weapon-free zone agreements in other regions. Such recommendations are aimed both at strengthening the ME WMD-free zone and addressing Iran's resistance to being singled out as the only country to accept such provisions. The incorporation of any of the JCPOA's fuel cycle provisions would supplement provisions central to any regional WMD-free zone arrangement, including prohibitions on the production, testing, possession or deployment of nuclear weapons. In considering the applicability of JCPOA fuel cycle provisions, two key

3 “The Iran Nuclear Agreement: Could It Inform Future Nonproliferation and Disarmament?”, Policy Dialogue Brief, Stanley Foundation, October 2016, <https://stanleycenter.org/wp-content/uploads/2019/09/IranNuclearAgreementPDB117.pdf>; J. Carlson, “Nuclear verification in a Middle East WMD-Free Zone: Lessons from Past Verification Cases and Other Precedents,” UNIDIR, Geneva, 21 January 2021, <https://unidir.org/publication/nuclear-verification-middle-east-wmd-free-zone-lessons-past-verification-cases-and>; J. Carlson, “Iran and a New International Framework for Nuclear Energy,” Harvard Kennedy School, November 2016, <https://www.belfercenter.org/publication/iran-and-new-international-framework-nuclear-energy>; K. Davenport, D.G. Kimball and K. Reif, “Responsible Steps to Build on the Nonproliferation Value of the JCPOA”, Arms Control Association, 21 September 2015, <https://www.armscontrol.org/issue-briefs/2015-09/responsible-steps-build-nonproliferation-value-jcpoa>; M. Fitzpatrick, “Ten Ways to Build on the Iran Nuclear Deal”, International Institute for Strategic Studies, 30 September 2015, <http://www.iiss.org/en/politics%20and%20strategy/blogsection/2015-932e/september-dc7b/ten-ways-to-build-on-the-iran-nuclear-deal-abbe>; and D. Hannay and T.R. Pickering, “Trumping Proliferation: From a One-off Deal to a Global Standard”, European Leadership Network, 6 December 2016, <https://www.europeanleadershipnetwork.org/commentary/trumping-proliferation-from-a-one-off-deal-to-a-global-standard/>.

issues are: (1) whether the provisions increase the effectiveness of the ME WMDFZ as a non-proliferation tool; and (2) whether they could gain the support of states of the region.

THE APPLICABILITY OF THE JCPOA'S ENRICHMENT RESTRICTIONS

It is a debatable issue whether inclusion of JCPOA-type enrichment provisions would be an overall non-proliferation advantage or disadvantage for an ME WMDFZ. The case for inclusion is that allowing but restricting enrichment, while not as good from a non-proliferation perspective as banning enrichment, may realistically be the best attainable region-wide approach and would be preferable to not limiting enrichment at all. Moreover, if the provisions of an ME WMDFZ on enrichment were as restrictive as those in the JCPOA – in terms of enrichment level, LEU stocks, number and types of centrifuges, and centrifuge R&D – parties in the region that managed to acquire an enrichment capability could only build a small programme that would not allow them to move quickly to the production of HEU for nuclear weapons. Moreover, in light of the Nuclear Supplier Group's (NSG) constraints on the transfer of enrichment-related equipment and technology and the difficulty most states of the region would have in developing an enrichment programme indigenously, permitting enrichment in a Middle East zone would be unlikely, in practice, to result in the significant spread of enrichment capabilities in the region.

The case against adopting JCPOA-type provisions is that it would legitimise enrichment in the region and could provide a green light for countries to embark on enrichment programmes as a hedging strategy to keep a nuclear weapons option open. Even though highly restrictive provisions might only permit a small enrichment capacity, they would allow parties to acquire the basic infrastructure and expertise needed to ramp up their programmes and reduce breakout time should those restrictions cease to apply for whatever reason, including a party's withdrawal from the agreement. In addition, allowing enrichment might also make it easier for a party to persuade foreign suppliers to circumvent transfer restrictions and sell it enrichment equipment and technology. Moreover, while strong pressures on Iran resulted in tight JCPOA limits on its enrichment programme, the multilateral constraints that might result from the very different negotiating dynamics of an ME WMDFZ could be far less restrictive. Opponents of JCPOA-type restrictions might argue that, rather than legitimise enrichment, it would be better for an ME WMDFZ not to address enrichment at all and to rely instead on the NSG transfer restrictions, the technological limitations of most states of the region, and anti-fuel cycle pressures from outside the region to reduce prospects of the spread of enrichment capabilities in the Middle East.

If negotiators were to decide to include JCPOA-type enrichment restrictions in an ME WMDFZ treaty, they would also need to decide whether those restrictions should be of limited duration, as in the JCPOA, or permanent. From a non-proliferation perspective, permanent restrictions would be preferable. Uncertainty regarding what might follow the expiration of key limitations – and hedging policies anticipating the termination of key restrictions – would reduce the stabilising value of the agreement.

Whatever the merits from a non-proliferation perspective of incorporating JCPOA-type enrichment provisions in an ME WMDFZ, prospects for gaining broad support by parties in the Middle East for such provisions are uncertain at best.

As the only state in the region with significant enrichment infrastructure and plans to achieve an industrial-scale enrichment capacity, Iran might oppose any ME WMDFZ restrictions on enrichment – or, at a minimum, insist that any restrictions expire at a relatively early date. While the absence of restrictions



ABU DHABI, UNITED ARAB EMIRATES

Inside the safe start-up of Unit 1 at the Barakh Nuclear Power Plant, part of the UAE's first nuclear programme.

would permit its neighbours to pursue enrichment, Tehran might prioritise having its own unconstrained enrichment programme – and a latent nuclear weapons capability – over seeking to constrain regional rivals, especially if it believed technological limitations and extra-regional pressures would make it unlikely that its rivals would succeed in acquiring enrichment capability.

Saudi Arabia would probably accept whatever approach gave it the flexibility to match Iran's capability, whether no restrictions on enrichment or JCPOA-type restrictions. While it might see some value in a region-wide enrichment ban that, if faithfully implemented, would eliminate the Iranian enrichment infrastructure, it would know that the asymmetry between Saudi and Iranian enrichment knowledge and experience that would persist under a ban would give Iran a huge advantage if it eventually withdrew from or violated an ME WMDfz agreement. Saudi Arabia might therefore prefer the freedom to try to reduce that asymmetry to the uncertain prospect of relying on the Zone treaty to permanently eliminate the Iranian enrichment capability.

Some Middle Eastern countries with little interest in enrichment (e.g., the United Arab Emirates, which has formally renounced fuel cycle capabilities) might be prepared to go along with an enrichment ban in an ME WMDfz agreement in the hope of preventing latent nuclear weapons capabilities in the region. But others, including some with no plans or intention to pursue enrichment, may nonetheless object to any enrichment restrictions on ideological grounds – that non-nuclear weapon states parties to the NPT should not be required to give up any rights to the peaceful uses of nuclear energy.

For Israel, the fundamental issue is not whether an ME WMDfz should restrict enrichment; it is whether and under what regional conditions it should give up its nuclear weapons and join an ME WMDfz. If it is eventually prepared to do so, it could conceivably favour banning enrichment in a WMD-free zone arrangement, calculating that it was more important to prevent its neighbours from having an enrichment capability than to retain a small enrichment programme with little commercial or strategic value for Israel.

So, whether or not JCPOA-type restrictions on enrichment are seen as positive for non-proliferation, it is unlikely, given the probable differences in national perspectives, that ME WMDFZ negotiators could reach agreement on including them.

THE APPLICABILITY OF THE JCPOA'S PLUTONIUM-RELATED MEASURES

The non-proliferation value of incorporating the JCPOA's plutonium-related provisions in an ME WMDFZ is much less ambiguous. An ME WMDFZ's adoption of the JCPOA's near-total ban on plutonium-related activities would be a clear non-proliferation advantage.

Blocking the plutonium route to nuclear weapons in the Middle East would clearly be served by incorporating the JCPOA's 15-year prohibitions on acquiring heavy water reactors or engaging in spent fuel reprocessing; on the construction of facilities capable of reprocessing; and on reprocessing R&D. Moreover, given Iran's statements of intent to ship out of the country all of its spent fuel for all current and future power and research nuclear reactors, to refrain from reprocessing-related activities in the future, and to rely solely on light water power and research reactors in the future, it may be possible to make the non-proliferation benefits of restrictions on plutonium-related activities permanent.

On the question of whether it would be possible to gain wide regional support for such plutonium-related measures, there is a sharp contrast between enrichment and plutonium-related activities. On enrichment, an attempt to apply the JCPOA's measures to the region would be complicated by the desire of some Middle Eastern countries either to expand existing enrichment capabilities or to keep open the option to acquire them in the future. But there is little current interest in the region in pursuing plutonium-related activities, either for civil nuclear energy programmes (in which the economic benefits of spent-fuel reprocessing and plutonium recycling have been widely disproven) or for nuclear weapons programmes (because heavy water reactors are very difficult to hide, raise suspicions and are vulnerable to pre-emptive attack). Although several Middle Eastern countries previously harboured hopes of taking the plutonium path to nuclear weapons, that path is no longer seen as very promising, not least because of past military attacks on plutonium production reactors in Iraq and Syria. So, unless there are ideological objections to any constraints on "peaceful" nuclear activities, there is unlikely to be strong opposition on programmatic grounds to adopting the JCPOA's plutonium-related restrictions in an Zone and making them permanent.

Israel is the only country in the region with significant plutonium production and reprocessing capability. Its reprocessing facility, which is co-located with its heavy water reactor at the nuclear complex at Dimona, has produced plutonium for the country's nuclear weapon programme. Assuming Israel is eventually prepared to give up its nuclear weapons and join an ME WMDFZ, it would presumably have no objections to a comprehensive ban on plutonium-related activities since it has no civil nuclear energy need or strategic need for such activities and would see value in preventing other Middle Eastern states from pursuing a plutonium path to nuclear weapons.

OTHER MEASURES POTENTIALLY APPLICABLE TO AN ME WMDFZ

In addition to JCPOA provisions dealing specifically with enrichment or plutonium-related activities, a range of other measures related to the fuel cycle – some drawn from the JCPOA and others either based on de facto Iranian fuel cycle practices or suggested by non-governmental non-proliferation experts – might be considered for incorporation into an ME WMDFZ.

Procurement channel

The JCPOA, together with United Nations Security Council resolution 2231, created a “procurement channel.” This requires that Iranian purchases from abroad of equipment and materials needed for its permitted civil nuclear programme – specifically items on NSG lists for both nuclear and dual-use applications – be subject to review and approval in the JCPOA’s Joint Commission and the United Nations Security Council. The channel, scheduled to remain in effect for 10 years, was designed to guard against illicit nuclear-related imports, especially of fuel cycle-related items, that could contribute to a covert nuclear programme.

To help ensure compliance, it would be valuable for an ME WMDFZ to deal with nuclear-related imports. While zone participants would probably oppose a mechanism that, like the JCPOA procurement channel, gives others the right to review and approve their imports, they could be required to provide advanced notification and other information regarding their acquisitions of nuclear and dual-use items on the NSG control lists to other ME WMDFZ parties, the IAEA and a regional mechanism set up to help implement the zone agreement.

Fuel service assurances

The JCPOA states that “Iran plans to keep pace with the trend of international technological advancement in relying on light water for its future power and research reactors with enhanced international cooperation, including assurance of supply of necessary fuel.” Thus, the JCPOA does not obligate Iran to rely on foreign-supplied fuel, but it explicitly recognises the value of such arrangements. At least for now, Iran’s *de facto* practice is to rely on foreign fuel supplies. Under its contract with Iran, Russia is obligated to supply enriched fuel for the Russian-built Bushehr-1 power reactor for its first 10 years of operation. It is reportedly willing to extend that assurance for the life of that reactor as well as to provide lifetime assurances of supply for Bushehr-2 and -3, which are now being constructed. Moreover, the JCPOA enables the import of uranium enriched to 19.75 percent for the Tehran Research Reactor, a level that the JCPOA prohibits Iran from producing itself.

An ME WMDFZ could require its parties to rely exclusively on foreign-supplied fuel for foreign-supplied power reactors and to remove all spent reactor fuel from national territories (in keeping with Iran’s stated intention, discussed above). If accompanied by reliable assurances of enriched fuel supply and spent fuel take-back – whether from individual nuclear supplier governments, multilateral fuel service providers (regional or extra-regional), or the IAEA LEU Fuel Bank – such measures might be welcomed by Zone parties as reducing the fuel-supply uncertainties and spent-fuel management burdens of their civil nuclear programmes.

An ME WMDFZ obligation to rely on foreign enriched fuel for foreign-supplied power reactors would not prohibit its parties from also pursuing indigenous enrichment programmes (unless such a prohibition were agreed to by the parties, which, as discussed above, is very unlikely). In theory, it would therefore

not prevent parties from pursuing enrichment on the grounds that they eventually need to enrich fuel for domestically designed and built power reactors, although no state in the region has the capability or intention to produce such reactors for decades. Moreover, it would not prevent parties from pursuing small enrichment programmes capable of meeting the very limited enriched fuel requirements of research reactors – programmes such as Iran is entitled to have under the JCPOA or perhaps under a follow-on agreement based on the JCPOA.

But ME WMDFZ arrangements providing for the supply of reactor fuel and the removal of spent fuel would greatly reduce the incentives and practical need for parties genuinely interested in peaceful nuclear energy to pursue their own fuel cycle programmes. Indeed, the availability of such arrangements would raise questions about the intentions of parties that decided to go ahead with their own fuel cycle programmes despite the absence of any persuasive benign explanation for doing so.

Most ME WMDFZ participants might be expected to go along with such arrangements. But Iran has long stated that it intends to have the enrichment capability to produce its own enriched fuel for at least one Russian-supplied Bushehr reactor, claiming that it cannot afford indefinitely to depend on potentially unreliable foreign sources of supply. Saudi Arabia might also argue that, in light of what it claims to be its abundant uranium reserves, it would make economic sense for it to enrich uranium itself for reactors purchased from abroad. Others might make similar arguments. So, despite the apparent non-proliferation and programmatic advantages of obligating parties to rely on such fuel services, it may be difficult to gain the support of key states in the region.

Multilateral regional enrichment or other fuel cycle facilities

At least in theory, multilateral management and operation of enrichment or other fuel cycle facilities in the Middle East could avoid the proliferation risks associated with national facilities. They could also provide the transparency needed to assure participants that the facilities would not be diverted to weapons programmes. At the same time, they could help states in the region meet their requirements for enriched reactor fuels. Non-proliferation experts have suggested that, after the expiration of key JCPOA restrictions and transparency measures, Iran's enrichment programme could be multilateralized.⁴ An ME WMDFZ could conceivably play a role in creating a multilateral facility or facilities. But the non-proliferation benefits of establishing multilateral facilities in the Middle East would be uncertain.

The JCPOA makes no mention of multilateral fuel cycle arrangements. However, before the nuclear talks began making headway, Iranian officials sometimes expressed support for a regional enrichment facility based in Iran. The idea was never pursued in detail, but what the Iranians seemed to have in mind was either a multilateral facility in addition to their national enrichment facility or the use of their

The JCPOA was a very effective device for blocking Iran's pathways to nuclear weapons for an extended period of time, but not for resolving the issue once and for all. In contrast, an ME WMDFZ would be expected, like other such zones before it, to provide a permanent solution.

⁴ A. Glaser et al., "Building on the Iran Deal: Steps Toward a Middle Eastern Nuclear-Weapon-Free Zone", Arms Control Today, December 2015, <https://www.armscontrol.org/act/2015-12/features/building-iran-deal-steps-toward-middle-eastern-nuclear-weapon-free-zone>.

national facility, perhaps with a multilateral facade but little multilateral engagement or control over its operations, as the supplier of enriched uranium for regional parties.

Looking to the future, it is unlikely that Iran would permit enough foreign influence over its national enrichment programme to constrain its ability, if it so wished, to acquire a large-scale enrichment infrastructure. Moreover, other Middle Eastern states would probably be unwilling to rely for their fuel supplies on a facility over which Iran had physical control, regardless of its level of multilateral involvement. Moreover, Saudi Arabia, and perhaps other states in the region that wished to keep their nuclear weapons option open, could be expected to resist any multilateral arrangement – whether in Iran or a separate facility located elsewhere in the region – that would require them to renounce their right to acquire their own national enrichment programmes.

This is not to say that multilateral fuel cycle-related facilities have no place in an ME WMDFZ. It is possible to envision a range of useful services that a central facility could provide, such as helping parties to procure enriched uranium or reactor fuels or to deal with spent fuel storage or removal problems. But it is unlikely that such services would achieve the main goal of most proposals for multilateral facilities – reducing the prospect of national fuel cycle programmes.

Civil nuclear cooperation

Annex III of the JCPOA outlines a range of civil nuclear activities in which Iran and other JCPOA participants may wish to cooperate.⁵ In addition to cooperative projects mandated in the JCPOA to minimize the proliferation risks of specific Iranian programmes (the conversion of the Arak reactor to impede its production of weapons-grade plutonium and the conversion of the Fordow plant to produce stable isotopes), the annex discusses a wide range of activities. These include cooperation in nuclear science and technology, the design and construction of new light water power reactors and state-of-the-art light water research reactors, the design and fabrication of modern fuels, and nuclear safeguards, safety and security.

An ME WMDFZ could promote similar civil nuclear cooperation among regional parties and between regional parties and the IAEA and extra-regional states. It could set up a central mechanism to facilitate and coordinate such cooperation. The prospect of assistance in pursuing civil nuclear energy would provide an incentive for states of the region to join the Zone, just as Annex III was intended as an inducement for Iran to accept the JCPOA.⁶

Applicability to intermediate region-wide or subregional arrangements

In addition to their potential applicability to an ME WMDFZ agreement, the JCPOA's fuel cycle-related provisions might be applicable to intermediate region-wide or subregional arrangements designed as steps toward a permanent and all-inclusive zone in the Middle East.

⁵ “Civil Nuclear Cooperation”, Annex III of the JCPOA, July 2015, https://eeas.europa.eu/archives/docs/state-ments-eeas/docs/iran_agreement/annex_3_civil_nuclear_cooperation_en.pdf.

⁶ For more on civil nuclear cooperation in this essay series, see A. Khlopkov, “Civil Nuclear Cooperation”, From the Iran nuclear deal to a Middle East Zone? Lessons from the JCPOA for an ME WMDFZ, UNIDIR May 2021, <https://unidir.org/jcpoa>.

Some experts, for example, have suggested a region-wide ban on plutonium reprocessing as a possible intermediate step towards an ME WMDFZ. They argue that, given the age of the Dimona heavy water reactor and the likelihood that Israel has already produced enough plutonium to meet its deterrence requirements, Israel could afford to shut down the reactor and its co-located reprocessing facility. They maintain, moreover, that the shutdown could be verified without compromising Israel's security, including by off-site monitoring of the gaseous fission product krypton-85, which is released during reprocessing, and by "managed access" of inspectors at the Dimona site.¹ Israel, however, has shown no interest in shutting down Dimona and probably questions whether a shutdown could be monitored without revealing national security information.

When and if states of the region are prepared to conclude an ME WMDFZ agreement and Israel is willing to give up its nuclear weapons and join the Zone, a region-wide ban on plutonium-related activities could well become part of a Zone agreement. But until such time, a region-wide ban as an intermediate measure is unlikely to be feasible.

Instead, other intermediate measures could perhaps be pursued and adopted on a region-wide basis. For example, a ban on construction of additional heavy water reactors could be adopted, or a requirement to report to the IAEA and other regional states all imports of nuclear-related equipment and materials. Moreover, intermediate measures that might not be acceptable on a region-wide basis might be pursued on a subregional basis, such as a ban on plutonium-related activities in the Gulf region. It may be possible to develop a range of region-wide or subregional measures that would have real non-proliferation value, be consistent with the nuclear programmes and plans of their participants, and serve as stepping stones to an all-inclusive ME WMDFZ.

The main obstacle would be political: the "all or nothing" approach that maintains that such partial and intermediate steps would only delay and distract attention from efforts to achieve the goal of a full Zone treaty. This "all or nothing" approach has been used to oppose such potentially useful intermediate measures as a region-wide ban on nuclear weapon tests. It has contributed to the absence of concrete and meaningful progress toward an ME WMDFZ for over 25 years. It may be time to start looking seriously at partial and intermediate steps, drawing as appropriate on the fuel-cycle provisions of the JCPOA.

The JCPOA: a useful source but not a blueprint

The JCPOA was the product of unique circumstances: an Iranian state arrayed alone in negotiations against major world powers and under immense economic and political pressures but determined to preserve a nuclear programme it considered vital to its national interests. The result was a compromise in which Iran received relief from the nuclear sanctions devastating its economy in exchange for a variety of unprecedented nuclear restrictions, including on its fuel cycle programmes. While Iran was willing essentially to give up certain low-priority nuclear activities, it insisted that its enrichment programme

1 A. Glaser et al., "Building on the Iran Deal: Steps Toward a Middle Eastern Nuclear-Weapon-Free Zone", *Arms Control Today*, December 2015, <https://www.armscontrol.org/act/2015-12/features/building-iran-deal-steps-toward-middle-eastern-nuclear-weapon-free-zone>.

be permitted and was prepared to accept strict limits on that programme only if they expired at agreed intervals.

The process of developing an ME WMDFZ is very different. Its potential parties in the region are at very different stages of nuclear development and have very different ambitions for their nuclear programmes, with some states determined to retain or keep open the option to pursue nuclear weapons capabilities.

Nonetheless, while the JCPOA is not a blueprint for the ME WMDFZ, it contains a range of elements that could be adopted or suitably modified for the Zone and, as such, deserves careful study by those calling for the establishment of an ME WMDFZ.

Unlike the JCPOA, where strong pressures and the perceived urgency to reach agreement produced a deal within two years, the countries of the Middle East face little pressure to reach a deal, and the process has remained largely a political exercise for over 25 years. The parties have not yet had to come to grips with the specific requirements of a regional WMD-free zone arrangement.

Broad international support for the JCPOA and for many of its innovative features has understandably led to interest in the expert community in applying those features to the establishment of an ME WMDFZ. But it should not be surprising that the particular circumstances that produced the country-specific JCPOA and its many unique provisions would not provide a blueprint for establishing a regional arrangement. Moreover, the JCPOA was a very effective device for blocking Iran's pathways to nuclear weapons for an extended period

of time, but not for resolving the issue once and for all. In contrast, an ME WMDFZ would be expected, like other such zones before it, to provide a permanent solution. That difference probably ensures that some aspects of the JCPOA cannot simply be replicated in an ME WMDFZ.

Nonetheless, while the JCPOA is not a blueprint for the ME WMDFZ, it contains a range of elements – not just in the fuel-cycle area but also in the areas of monitoring, inspection, implementation and enforcement – that could be adopted or suitably modified for the Zone and, as such, deserves careful study by those calling for the establishment of an ME WMDFZ.

Annex: Summary of key JCPOA provisions limiting Iran's enrichment and reprocessing capabilities, reactor programmes, and research and development plans²

CONSTRAINTS ON ENRICHMENT PROGRAMME

- › Enrichment level capped at 3.67 percent uranium-235 for 15 years – a level suitable for fuelling light water nuclear power reactors but far below the roughly 90 percent used in nuclear weapons and below the near-20 percent that Iran previously produced.
- › Enrichment capacity limited to 5,060 IR-1 first-generation centrifuges operating at the Natanz enrichment plant for 10 years, with excess centrifuges and related infrastructure stored under IAEA

² For the full text of the JCPOA see “Joint Comprehensive Plan of Action”, 14 July 2015, https://eeas.europa.eu/archives/docs/statements-eeas/docs/iran_agreement/iran_joint-comprehensive-plan-of-action_en.pdf.

monitoring. Production of IR-1 centrifuges permitted only to replace damaged IR-1 machines.

- › Enrichment of uranium permitted only at one facility – the Natanz plant – for 15 years, with enrichment and the presence of nuclear material prohibited at the underground Fordow enrichment plant for that period. 1,044 IR-1 centrifuges permitted at Fordow only for stable isotope production.
- › Stocks of enriched uranium hexafluoride (UF₆) in Iran limited to 300 kilograms for 15 years – a level far below the amount which, if further enriched to weapons-grade, would be needed for a single nuclear weapon. Excess enriched uranium either down blended to natural uranium or exported.
- › Research on uranium enrichment technologies other than gas centrifuge enrichment (e.g., laser isotope separation) prohibited for 10 years.
- › Iran permitted to import fuel enriched to nearly 20 percent if needed to operate the Tehran Research Reactor.

CONSTRAINTS ON RESEARCH AND DEVELOPMENT FOR ADVANCED CENTRIFUGES

- › A commitment to abide by a “voluntary” plan for advanced centrifuge R&D that the Islamic Republic of Iran submitted to the IAEA and that was intended to remain in effect for 13 years.
- › Limited to four types of advanced centrifuges (IR-4, IR-5, IR-6, IR-8) for 10 years.
- › Testing of advanced centrifuges limited to single machines and very small cascades (up to 30 machines) for eight years, with restrictions on the size of cascades tested and on the manufacture of centrifuges relaxed over the next five years.
- › Requirement to carry out R&D operations in a manner that does not accumulate enriched uranium – by recombining enriched and depleted streams – for 10 years.

CONSTRAINTS ON THE PLUTONIUM FUEL CYCLE

- › Modification of the Arak heavy water reactor to render it incapable of producing significant quantities of weapons-grade plutonium, with a commitment to ship all spent fuel out of Iran for the lifetime of the reactor.
- › Prohibition on acquiring new heavy water reactors for 15 years, supplemented by an Iranian statement of intention to rely solely on light water power and research reactors in the future.
- › Prohibition on spent fuel reprocessing, the construction of facilities capable of reprocessing, and reprocessing R&D activities for 15 years, with a statement of Iranian intention not to pursue those activities in the future.
- › Heavy water stockpile limited to 130 and later 90 metric tons for 15 years, with excess to be shipped out of Iran.
- › An Iranian statement of intention to ship out of the country all spent fuel for all future and current power and research nuclear reactors.

CONSTRAINTS ON IMPORTS FOR PERMITTED FUEL-CYCLE (AND OTHER NUCLEAR) ACTIVITIES

- › Under the procurement channel established by the JCPOA and United Nations Security Council resolution 2231, all nuclear-related imports for Iran’s permitted civil nuclear programme must be approved by the JCPOA’s Joint Commission Procurement Channel Working Group and the United Nations Security Council for 10 years (when resolution 2231 terminates).



ARAK, IRAN

Technicians working at the Arak heavy water reactor's secondary circuit

Civil Nuclear Cooperation

by Anton Khlopkov¹, Center for Energy and Security Studies, Moscow

The Joint Comprehensive Plan of Action (JCPOA) was concluded to resolve the dispute over the Islamic Republic of Iran's nuclear programme. It was the result of diplomatic negotiations between China, France, Germany, the Russian Federation, United Kingdom, and the United States as well as the European Union (E3/EU+3) and Iran. The document was agreed and approved by the foreign ministers of these states in Vienna on 14 July 2015, with the participation of the EU High Representative for Foreign and Security Policy, who was granted a coordinating role under the agreement. The JCPOA combines various obligations and rights for the participant states. For example, Iran undertook a voluntary obligation to suspend or restrict several aspects of its nuclear programme, primarily those pertaining to uranium enrichment and plutonium separation. At the same time, the Iran nuclear deal reaffirmed Iran's right to pursue a peaceful nuclear programme under International Atomic Energy Agency (IAEA) safeguards.

Annex III of the JCPOA contains a list of potential areas of civil nuclear cooperation between Iran and international partners. It is an important element of the fine balance of interests of participant states to the agreement that has been central to the JCPOA. This essay takes a detailed look at Annex III, its implementation to date and possible lessons from that process in the context of efforts to establish a Middle East Weapons of Mass Destruction-Free Zone (ME WMDFFZ).

The JCPOA and civil nuclear cooperation with Iran: Annex III

Prior to the conclusion of the JCPOA, the Joint Plan of Action (JPOA), an interim agreement on the Iranian nuclear programme, was reached on 24 November 2013. It included a clause requiring that an eventual comprehensive solution would include “international civil nuclear cooperation, including among others, on acquiring modern light water power and research reactors and associated equipment, and the supply of modern nuclear fuel as well as agreed [research and development (R&D)] practices”.² Annex III of the JCPOA reflects the practical implementation of that clause.

The JCPOA states that its members will cooperate “in the field of peaceful uses of nuclear energy and engage in mutually determined civil nuclear cooperation projects. . . including through IAEA involvement”.³ The JCPOA further states that the E3/EU+3 and international participants will engage with Iran, including through the IAEA, in joint projects on technical cooperation “in the field of peaceful nuclear technology, including nuclear power plants, research reactors, fuel fabrication, agreed joint advanced

1 The author would like to thank CENESS Research Associate Vladislav Chernavskikh for his assistance in the preparation of this paper.

2 “Joint Plan of Action on Iran's Nuclear Program”, Geneva, 24 November 2013, <https://archive.nytimes.com/www.nytimes.com/interactive/2013/11/25/world/middleeast/iran-nuclear-deal-document.html>

3 Joint Comprehensive Plan of Action, Vienna, 14 July 2015. <https://www.europarl.europa.eu/cmsdata/122460/full-text-of-the-iran-nuclear-deal.pdf>, Preamble and General Provisions, paragraph xiii.

R&D such as fusion, establishment of a state-of-the-art regional nuclear medical centre, personnel training, nuclear safety and security, and environmental protection, as detailed in Annex III. They will take necessary measures, as appropriate, for the implementation of these projects.”⁴

Consisting of 10 pages, Annex III of the JCPOA details a menu of over 40 potential areas of peaceful nuclear energy cooperation with Iran, grouped into seven categories:

1. General;
2. Reactors, fuels and associated technologies, facilities and processes
3. R&D practices;
4. Nuclear safety, safeguards and security;
5. Nuclear medicine and radioisotopes, associated technologies, facilities and processes;
6. Waste management and facility decommissioning; and
7. Other projects.

The purpose of Annex III and the potential areas of civil nuclear cooperation it identifies is to balance the other parts of the JCPOA. It is meant to be a positive element of the JCPOA, especially compared to Annexes I and II, which focus mainly on restrictions (Annex I) and sanctions (Annex II) on the Iranian nuclear programme.

Like the JCPOA as a whole, Annex III reflects a balance of interests of its states parties. It details possibilities for cooperation in building light water power and research reactors; assistance to Iran in modernizing the research reactor in Arak (including assistance in the designing and fabrication of fuel for it); cooperation in strengthening nuclear safety and security at Iranian nuclear facilities; assistance to Iran in joining the relevant international conventions; and facilitating the reintegration of Iranian scientists with the international nuclear research community.

According to statements by Iranian officials, cooperation under Annex III and the development of contacts between the nuclear establishments and scientists of the countries involved is viewed in Tehran as serving two objectives. First, it is seen as a mechanism for enhancing international cooperation on various nuclear science and energy projects. Second, it is also seen as an instrument for rebuilding mutual confidence among the members of the JCPOA and as a way of increasing the transparency of the Iranian nuclear programme.⁵

For their part, senior EU officials have stated that international civil nuclear cooperation can make a major contribution to ensuring the responsible use of nuclear energy. The EU thus views the full implementa-

⁴ Ibid., paragraph 32.

⁵ A.A. Rezaei, Director General for International Affairs, Atomic Energy Organisation of Iran (AEOI), “JCPOA and Progress on Civil Nuclear Cooperation with Iran”, Remarks, Concurrent Session 3, Moscow Nonproliferation Conference 2017, 21 October 2017, http://ceness-russia.org/ceness/transcripts/6_The_2017_MNC_Transcript_JCPOA_Annex_AD.pdf.

tion of Annex III as an essential element for long-term sustainability of the JCPOA.⁶ EU representatives have also said that Annex III helps to get a better understanding of Iran's nuclear needs and gradually build confidence in the Iranian programme.⁷

In Russia, Annex III is also viewed in the context of economic opportunities by fostering a favourable climate for closer peaceful nuclear energy cooperation with Iran.⁸ The legal framework for such cooperation already existed in the form of two bilateral Iranian–Russian agreements: on cooperation in peaceful uses of nuclear energy and on building a nuclear power plant (NPP) in Iran. The latter document was signed on 25 August 1992; the two parties also signed a protocol to that agreement on 11 November 2014.⁹

International restrictions, including the United Nations Security Council sanctions against Iran, have never targeted the Bushehr NPP project, which is the central element of Iranian–Russian peaceful nuclear energy cooperation. Nevertheless, these sanctions, along with other factors including unilateral steps by the United States, have long posed additional complexities for the implementation of the project.¹⁰ For example, they have complicated the procedure for placing contracts for NPP components with third-country suppliers. There have also been several politically motivated refusals by foreign companies to participate in the Bushehr NPP project despite their earlier commitments. For some of the required equipment, frequently the general contractor managed to find a supplier only on a third attempt after two different vendors signed a contract but then pulled out of the project. The project has also faced difficulties with the transit of equipment and materials for the Bushehr NPP via third countries. For example, a set of thermal insulation equipment for the Bushehr-1 reactor spent over a month on the Azerbaijani–Iranian border waiting for the necessary clearances from the Azerbaijani authorities.¹¹ Annex III of the JCPOA was supposed to facilitate an equivalent of the green line at the customs clearance at airport arrival zones for cooperation on NPP projects with Iran.

Annex III of the JCPOA was supposed to facilitate an equivalent of the green line at the customs clearance at airport arrival zones for cooperation on NPP projects with Iran.

6 “EU-Iran High-Level Seminar on ‘International Nuclear Cooperation: Expectations and Responsibilities’ Takes Place”, European Commission, 27 February 2017, https://ec.europa.eu/energy/news/eu-iran-high-level-seminar-international-nuclear-cooperation-expectations-and-responsibilities_en; and Islamic Republic News Agency (IRNA), “Second EU–Iran Seminar on International Nuclear Cooperation Held in Isfahan”, Iran Watch, 23 November 2017. <https://www.iranwatch.org/library/governments/iran/islamic-republic-news-agency-irna/second-eu-iran-seminar-international-nuclear-cooperation-held-isfahan>.

7 “EU Briefing – United Nations Security Council: Joint Comprehensive Plan of Action (Iran)”, Iran Watch, 19 December 2019, <https://www.iranwatch.org/library/multilateral-organisations/european-union/eu-briefing-united-nations-security-council-joint-comprehensive-plan-action-iran>.

8 S. Ryabkov, Russian Deputy Foreign Minister, “The Iran Nuclear Deal: Russia’s Interests and Prospects for Implementation”, Workshop transcript, Center for Energy and Security Studies, 14 August 2015, http://ceness-russia.org/data/page/p1494_1.pdf, P. 8.

9 Protocol to the Agreement between the Government of the Russian Federation and Government of the Islamic Republic of Iran on Cooperation in the Construction of a Nuclear Power Plant in the Territory of Iran of August 25, 1992, https://www.iranwatch.org/sites/default/files/protocol_russia_iran_eng-08251992.pdf.

10 For more information on the history of the Bushehr-1 NPP project and challenges it faced, see: A. Khlopkov and A. Lutkova, “The Bushehr NPP: Why Did It Take So Long?”, Nuclear Club, no. 1, 2010, pp. 6–12, http://ceness-russia.org/data/doc/11-09-08-The_Bushehr_NPP_ENG.pdf.

11 Ibid.

Results of implementation of Annex III

Approximately 30 different projects and activities under the seven categories of international civil nuclear cooperation projects were initiated with Iran in accordance with the letter and spirit of Annex III of the JCPOA. (See Table 1 for the list of activities and projects based on open-source information.)

Prior to the adoption of the JCPOA, Iranian scientists were almost completely cut off from international scientific cooperation projects and exchanges. Iran's international civil nuclear cooperation was essentially limited to the Iranian–Russian Bushehr NPP project and nuclear medicine. That is why it would not be an exaggeration to say that as a result of the JCPOA there was a dramatic turnaround on this front in 2016–2018, with numerous contacts on peaceful uses of nuclear energy between Iranian representatives and their international counterparts. To illustrate this, Atomic Energy Organisation of Iran (AEOI) officials, speaking at the 2017 Moscow Nonproliferation Conference in October 2017, said the Iranian nuclear establishment had “entered a new era of international cooperation with the international partners”.¹² An analysis of Annex III projects and activities as of December 2020 highlights the following:

In over three-quarters of the projects listed in Table 1, Iran's international partners are Russia, the EU (including individual EU states) or the IAEA (through several technical cooperation projects). Several of the projects with Russia – such as the operation of the Bushehr-1 reactor, nuclear fuel supplies for that reactor, and the construction of the Bushehr-2 and -3 reactors – began before the conclusion of the JCPOA and, technically, did not result from its adoption, but are clearly being pursued in the spirit of Annex III.

Apart from the JCPOA participant states, several other states have also begun to pursue civil nuclear cooperation with Iran as a result of the JCPOA, including Czechia, Italy, Japan, Poland and Switzerland. Inclusivity and openness to participation of non-JCPOA states in relevant projects are important features of Annex III. It is especially worth highlighting efforts made by Japan, which in cooperation with the IAEA implemented several training projects for Iranian specialists on nuclear safety and safeguards.

A special case of increased contact between Iran and non-JCPOA states is Czechia. In 2000, after coming under pressure from the United States, it had passed a law that banned Czech companies from participating in the construction of the Bushehr-1 reactor. The law, which contained a legal ban on any supplies of equipment for the first Iranian NPP, was passed after the Czech company ZVZ-Milevsko resisted political pressure not to export ventilation equipment to Iran.¹³

The main topics of the cooperation projects and activities pursued by Iran and its foreign partners under Annex III is on exchanges with Iranian scientists, nuclear governance issues (especially concerning nuclear safety) and facilitation of Iranian accession to the relevant international conventions on peaceful nuclear energy use.

12 A.A. Rezaei, Director General for International Affairs, Atomic Energy Organisation of Iran (AEOI), “JCPOA and Progress on Civil Nuclear Cooperation with Iran”, Remarks, Concurrent Session 3, Moscow Nonproliferation Conference 2017, 21 October 2017, http://ceness-russia.org/ceness/transcripts/6_The_2017_MNC_Transcript_JCPOA_Annex_AD.pdf, p. 11.

13 Czech Law 99/2000, entered into force 25 April 2000. For more details, see: J. Novotny, “Bushehr Project: The Czech Exodus”, Nuclear Club, nos 3–4, 2019, pp. 10–12 (in Russian).

International cooperation in the area of nuclear power reactors – beyond the Bushehr NPP – is a top Iranian priority. However, only limited progress has been made, if any. First concrete at the Bushehr-2 reactor site was poured in November 2019.¹⁴ Iran has long shown interest in finding a foreign partner to build a second NPP based on a small or medium-power (100–360 megawatt) reactor at a new site. So far, it has been unable to find such a partner.¹⁵ Quick implementation of such a project is unlikely owing to the financial and political risks of building an NPP in Iran. But the near total lack of progress in this area in 2016–2018, and possible sabotage of this area of cooperation by key nuclear exporters, carries the long-term risk of reigniting an internal Iranian discussion about the wisdom of relying on the international market. It could encourage Tehran to look for alternative mechanisms and sources for acquiring such technologies.

Similarly, there has been little progress on Iranian international cooperation on research reactors. Tehran has long shown interest in updating its research infrastructure, including the modernisation and development of its nuclear energy research facilities, and especially in the construction of a new research reactor. The country's largest research reactor is a 5 MW facility at the Tehran Nuclear Research Centre (TNRC). It has been in operation for over 50 years (since 1967). Based on available information, its characteristics, as well as its overall condition, impose significant limitations on research programmes. In addition, only limited progress was made in 2016–2020 in implementing the modernisation project at the IR-40 reactor in Arak. It is therefore safe to say that, while some areas of international nuclear cooperation with Iran have seen a marked improvement since the adoption of the JCPOA, others have lagged behind. This imbalance can pose a risk for the sustainability of the JCPOA in the longer term.

On the other hand, cooperation in the framework of Annex III has not led to Iran's accession to the relevant conventions on peaceful nuclear energy uses and has brought limited progress in this area. As of March 2021, Iran remains outside the 1994 Convention on Nuclear Safety (CNS), the 1980 Convention on the Physical Protection of Nuclear Material (CPPNM) and the 1997 Vienna Convention on Civil Liability for Nuclear Damage. Among the states that operate nuclear power plants, Iran remains the only one that has not joined the CNS. For many years, Iranian experts have argued that Iran will join the convention in the event of a comprehensive settlement of the crisis over its nuclear programme, and that the main difficulties have to do with politics. Specifying those difficulties, they pointed out to the Iranian experience of implementing the Comprehensive Safeguards Agreement (CSA) with the IAEA. In the opinion of the Iranian leadership, Tehran was a victim of biased attitudes to its nuclear activities, which led to a deep international crisis over the Iranian nuclear programme. As of March 2021, there has been no discernible change for the better on this issue.

Of all these international conventions, the most visible progress since 2016 has been made on the 1997 Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management. A decision to join that convention was first approved by the Iranian Government and, in

14 “Russian Embassy Announces Details of the Bushehr-2 Project Launch Ceremony”, RIA Novosti, 10 November 2019, <https://ria.ru/20191110/1560776637.html> (in Russian).

15 A. Khlopkov (ed.), *Prospects for Nuclear Power in the Middle East: Russia's Interest*, Valdai Discussion Club Report, 2016, p. 37, <https://valdaiclub.com/files/9577/>.

July 2019, a motion to that effect received overwhelming support in the Majlis, the Iranian Parliament.¹⁶ However, as of March 2021, Iran had yet to complete the procedure of joining the Convention.

The most important thing to note is that, as of March 2021, most of the projects and activities involving Iranian representatives in the framework of implementing Annex III remain suspended because of the threat of unilateral United States sanctions following the US withdrawal from the JCPOA in May 2018. One of the rare exceptions is the Iranian–Russian cooperation at the Bushehr NPP. These projects are still ongoing. But as a result of unilateral United States actions, cooperation at Bushehr is facing additional hurdles that cannot derail these projects completely but can cause delays.

Possible lessons for a Middle East Weapons of Mass Destruction-Free Zone

Despite a notable revitalisation of international contacts with Iran on peaceful nuclear energy uses seen in 2016–2018, by March 2021, the results of the implementation of Annex III of the JCPOA were modest. In most areas, cooperation has retreated to pre-JCPOA levels since the withdrawal of the United States from the deal. In some cases, things have become even worse than before the adoption of the JCPOA, such as in the case of the Bushehr NPP. Despite this, the positive potential of Annex III should also be considered in the context of efforts to restore the JCPOA following United States President Joseph R.

Biden’s statements that he wants his country to re-join the Iranian nuclear deal. What lessons, if any, can we learn from the implementation of Annex III? And are any of those lessons relevant to the prospects for establishing an ME WMDFZ?

To begin, recall that the JCPOA and United Nations Security Council resolution 2231 contain special clauses stating that the measures outlined in the JCPOA do not set any precedent. That is also true for international civil nuclear cooperation projects.

At the same time, it is worth pointing out that the approach declared by the JCPOA states parties (but not actually implemented, as of March 2021) – namely, the idea of confidence building through civil nuclear cooperation – can be of interest in the context of efforts to build confidence between the

states in the Middle East. Recall that of all the “nuclear newcomer” states – meaning those that have only just embarked on nuclear power programmes – those in the Middle East are making the greatest progress. In September 2011, Iran became the first state in the region to launch a nuclear power plant. The United Arab Emirates launched the Barakah NPP – its first – in 2020. Turkey’s first NPP is under

It is worth pointing out that the approach declared by the JCPOA states parties – namely, the idea of confidence building through civil nuclear cooperation – can be of interest in the context of efforts to build confidence between the states in the Middle East.

¹⁶ Atomic Energy Organisation of Iran (AEOI), “Iran’s Accession Bill to the Joint Convention on Spent Fuel and Radiating Waste Management Ratified”, Iran Watch, 17 July 2019, <https://www.iranwatch.org/library/governments/iran/atomic-energy-organisation-iran-aeoi/irans-accession-bill-joint-convention-spent-fuel-radiating-waste-management-ratified>.

construction, and preparations for a similar project are well under way in Egypt. Both Saudi Arabia and Jordan have declared an interest in building nuclear power plants.¹⁷

It is worth recalling that Latin America provides a time-tested example of building trust in a region through comprehensive nuclear cooperation. A case in point is cooperation between Argentina and Brazil. In 1991, the two countries signed the Guadalajara Accord on the exclusively peaceful use of nuclear energy. As part of that accord, they set up the Brazilian–Argentine Agency for Accounting and Control of Nuclear Materials (ABACC) to run a joint nuclear material accounting and control system. Argentina, Brazil, the IAEA and ABACC have also signed a Quadripartite Safeguards Agreement. ABACC regularly inspects nuclear facilities in Argentina and Brazil, which serves as an effective instrument for building confidence and strengthening mutual understanding between countries in the same region whose relations have a complex history. ABACC also became the first nuclear integration mechanism in Argentine–Brazilian nuclear cooperation, which currently includes joint efforts related to the nuclear fuel cycle, including uranium enrichment.¹⁸ This experience provides a useful menu of possible nuclear cooperative efforts, which could be implemented bilaterally or multilaterally, to build trust in a region, including the Middle East.

Another good example of confidence building through nuclear cooperation is a nuclear science cooperation project in the Middle East itself: the Synchrotron-Light for Experimental Science and Applications in the Middle East (SESAME), which involves Egypt, Iran, Israel, Jordan, the State of Palestine, Turkey and a few other countries. A distinguishing feature of this particular initiative is that it involves a large number of states in the region, including those that do not have diplomatic relations and are generally hostile towards each other, while a few extra-regional countries (including all P5 states) are observers in the initiative.

The experience of nuclear weapon-free zones in other regions can also be used as a model in the establishment of an ME WMDFZ and in facilitating nuclear cooperation between states in the region in this context. The preamble of the 2006 Treaty on a Nuclear-Weapon-Free Zone in Central Asia reads that the zone “will constitute an important step toward. . . promoting cooperation in the peaceful uses of nuclear energy”. Article 7 of the Treaty, entitled “Use of Nuclear Energy for Peaceful Purposes”, also emphasizes that “no provision of this Treaty shall prejudice the rights of the Parties to use nuclear energy for peaceful purposes”. An interesting provision of the 1996 African Nuclear-Weapon-Free Zone Treaty (Pelindaba Treaty) is Article 11, which bans “any action aimed at an armed attack by conventional or other means against nuclear installations” in the zone.

Another productive approach used in Annex III of the JCPOA is its inclusivity and openness to states that are not JCPOA participants. That approach could be useful for the preparation of any eventual ar-

Related to the JCPOA experience in the broader Middle Eastern context is the idea of implementing non-proliferation projects, where possible, on a commercial footing. In this way, the projects would also enable the use of the scientific and technological capability of the region's states for advanced nuclear applications.

17 M. Ghazal, “Jordan to Replace Planned Nuclear Plant with Smaller, Cheaper Facility”, Jordan Times, 26 May 2018, <https://www.jordantimes.com/news/local/jordan-replace-planned-nuclear-plant-smaller-cheaper-facility>.

18 See, for example, “Brazil to export enriched uranium”, 21 June 2016, <https://www.world-nuclear-news.org/Articles/Brazil-to-export-enriched-uranium>.



ALLEN, JORDAN

The SESAME (Synchrotron-light for Experimental Science and Applications in the Middle East) Centre, is a “third-generation” synchrotron light source in Allan, Jordan, near Amman. The synchrotron facility is the Middle East’s first major international research centre for science applications.

rangements in the Middle East, if and when that process begins. It would make it possible to engage more international partners from outside the region that are not formally part of the deal but can make a positive contribution to its implementation. For example, states from outside the region can foster and support dialogue in the Middle East aimed at producing tangible agreements as well as general confidence building. States from outside the Middle East that are major nuclear suppliers could also play a role in the technological projects mentioned above, including the sharing of best practices in the safe and secure operation of nuclear facilities.

Among the prospective areas for regional cooperation in the Middle East are nuclear safety and nuclear emergency response. For many years, these issues have been regarded as priorities by the region’s states. In particular, the Arab states of the Persian Gulf region have been expressing concerns about the construction of nuclear power plants on coastal sites in Iran and the United Arab Emirates. Both the Bushehr reactor, which started operation in 2011, and the Barakah NPP, which started in 2020, are located on the coast of the Persian Gulf. Saudi Arabia also has plans to build an NPP on a coastal site. Eight states share the Persian Gulf coastline: Bahrain, Iraq, Iran, Kuwait, Oman, Qatar, Saudi Arabia and the UAE. Many of them depend heavily on it for their drinking water needs.

The existing experience of engagement on nuclear safety issues with Iran in the JCPOA framework can be used more broadly in the interests of the region. Annex III of the JCPOA provides for the possibility of setting up a Nuclear Safety Centre. Should such a centre be established, it could also be used to foster closer regional cooperation. A regional Nuclear Safety Centre could be a confidence building mechanism in the region.

As mentioned above, efforts in the Annex III framework also include facilitation of Iranian accession to the relevant international conventions on peaceful nuclear energy use. This could also be one of the objectives pursued as part of the efforts to establish an ME WMDFZ. For example, the 1995 Treaty on the Southeast Asia Nuclear Weapon Free-Zone (Bangkok Treaty) includes a commitment by the states parties “prior to embarking on its peaceful nuclear energy programme, to subject its programme to rigorous nuclear safety assessment conforming to guidelines and standards recommended by the IAEA” (Article 4). Article 6 of the Treaty also stipulates a commitment to join the 1986 Convention on Early Notification of a Nuclear Accident.

Also related to the JCPOA experience in the broader Middle Eastern context is the idea of implementing non-proliferation projects, where possible, on a commercial footing. In this way, the projects would also enable the use of the scientific and technological capability of the region’s states for advanced nuclear applications. Examples of commercial nuclear projects implemented in the spirit of Annex III include the export of 32 tonnes of Iranian heavy water (excess heavy water, which is beyond Iranian needs, as specified in the JCPOA) to the United States. The value of that deal was 8.6 million US dollars. The project was implemented in the context of Annex I to the JCPOA in order for the Iranian nuclear programme to comply with the terms of the JCPOA. It was also clearly in accordance with the spirit of Annex III. The United States ended its production of heavy water in 1981, and its national demand is met through imports. Of the 32 tonnes of heavy water imported from Iran, 6 tonnes were supplied for use at the Spallation Neutron Source (SNS), the world’s most powerful accelerator-driven machine for generating neutrons for research located at Oak Ridge National Laboratory, Tennessee. As a result, the project has demonstrated the possibility of using commercial approaches in the implementation of non-proliferation initiatives (since the removal of excess heavy water was one of the obligations undertaken by Iran under the terms of the deal) – but it also highlighted the possibility of Iran’s integration into advanced international nuclear science projects as a supplier of necessary materials.

Pursuing joint nuclear projects, activities and contacts – which is the core objective of Annex III of the JCPOA – would be an important element for building confidence between states in the region and increasing mutual transparency as part of the efforts to establish an ME WMDFZ.

The experience of establishing a special channel for procurement of nuclear and dual-use goods by Iran under relevant Nuclear Suppliers Group (NSG) lists is unlikely to be applicable in the context of the ME WMDFZ.¹⁹ The channel was set up under the JCPOA and is supposed to remain operational for 10 years. The Iranian situation in the context of the JCPOA talks was unique, and one of the factors that defined the nature of that situation was that Iran was in breach of its commitments to the IAEA under the CSA. There is no apparent reason for other states in the region to accept restrictions on their rights and agree to the scaling up of the Procurement Channel mechanism to include the entire Middle East. Indeed, the establishment of such a mechanism was never envisaged under nuclear weapon-free zones in other parts of the world.

19 For more details about the JCPOA Procurement Channel, see P. Izewicz, Assessing the JCPOA Procurement Channel, International Institute for Strategic Studies, March 2018, <https://www.iiss.org/blogs/analysis/2018/03/jcpoa-procurement-channel>.

Conclusions

The JCPOA is an excellent example of the importance of dialogue in international relations, of the great potential of multilateral diplomacy on nuclear non-proliferation, and of the important role of compromise by all the parties to the diplomatic process if there is political will to reach an agreement. The United States re-joining the JCPOA simultaneously with Iran returning to full compliance with the terms of the deal would help to reduce tensions and foster a more favourable climate for dialogue on establishing an ME WMDFZ. A return to implementation of Annex III projects would open additional opportunities for applying that experience in the region. Pursuing joint nuclear projects, activities and contacts – which is the core objective of Annex III of the JCPOA – would be an important element for building confidence between states in the region and increasing mutual transparency as part of the efforts to establish an ME WMDFZ. In the meantime, such measures should not be regarded as a major incentive for the region's states to join the Zone.

TABLE 2: Cooperation projects and joint activities in accordance with the principles of Annex III of the JCPOA*

Legend

CATEGORIES OF ANNEX III COOPERATION

- A. General
- B. Reactors, Fuels and Associated Technologies, Facilities and Processes
- C. Research and Development (R&D) Practices
- D. Nuclear Safety, Safeguards and Security
- E. Nuclear Medicine and Radioisotopes, Associated Technologies, Facilities and Processes
- F. Waste Management and Facility Decommissioning
- G. Other projects

CATEGORIES OF COUNTRIES

- JCPOA State
- Non-JCPOA State

PARTNER	CATEGORY	PROJECT	PROGRESS
United Kingdom, China, United States	B. Reactors, Fuels and Associated Technologies, Facilities and Processes	Arak modernisation project	Under the JCPOA, the United States and China led international support of the modernisation of the IR-40 research reactor at Arak. In 2018, the United States withdrew from the JCPOA and the United Kingdom became co-chair (jointly with China) of the related Working Group. In 2020, the United States ended the sanctions waiver for the project, and it has essentially ground to a halt because of the threat of US sanctions.
China	C. Research and Development (R&D) Practices	Seminar on bilateral cooperation in peaceful use of nuclear energy	This seminar was held in April 2018. During the event, Chinese scientists shared the latest achievements in the development of new power reactors and their safety features. Iranian experts spoke about their experience of designing small- and medium-size reactors. The meeting involved representatives of the E3/EU+3 states and the IAEA. The agenda of the seminar also included Iranian specialists visiting Chinese nuclear facilities, including the Hualong One project, China's third-generation nuclear power reactor, in Fujian Province, south-east China.
Czechia	A. General	Memorandum of understanding on peaceful nuclear cooperation	In December 2016, a memorandum of understanding on peaceful nuclear cooperation between the Atomic Energy Organisation of Iran and the Czech Nuclear Research Institute was signed. On the same trip, the Iranian delegation visited SKODA JS Company, a manufacturer of nuclear power plant equipment.
EU**	A. General	Series of EU-Iran high-level seminars on international nuclear cooperation	A series of three seminars were held (in 2017–2018) to discuss the general parameters and potential cooperation projects in peaceful nuclear energy use. The following projects were planned at the third seminar in 2018: <ul style="list-style-type: none"> › Workshops on nuclear legislation and reporting under the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management › Iran's participation in conferences held by key European nuclear actors › Sharing experience and methodology of conducting NPP stress tests › Broadening R&D cooperation › Joint project on radioactivity measurement capabilities › Additional package of projects funded through the European Instrument for Nuclear Safety Cooperation

PARTNER	CATEGORY	PROJECT	PROGRESS
EU**	C. Research and Development (R&D) Practices	Road map on nuclear R&D cooperation	<p>This road map was agreed at the second high-level workshop in 2017. It includes:</p> <ul style="list-style-type: none"> › Scientific conferences, seminars and visits by Iranian scientists to EU nuclear facilities and laboratories of the EU Joint Research Centre › Science cooperation in the framework of the EU's Horizon 2020 programme for research and innovation and the Euratom research and training programme › International conferences held by key European nuclear stakeholders › Iranian specialists were invited to attend the launch of the EU's Strategic Agenda on Medical, Industrial and Research Applications of nuclear and radiation technology (SAMIRA) project, which focuses on non-energy applications of nuclear technologies › Summer schools on nuclear and radiation safety involving European scientists and experts, held at the AEOI
	D. Nuclear Safety, Safeguards and Security	Nuclear safety co-operation under the European Instrument for Nuclear Safety Cooperation	<p>The project agreement was signed in 2017. It includes:</p> <ul style="list-style-type: none"> › Supporting the Iranian Nuclear Regulatory Authority (INRA) › Preparing a feasibility study for the Nuclear Safety Centre in Iran › Conducting stress tests at the Bushehr NPP and analysis of their results
		Supporting the Iranian Nuclear Regulatory Authority (INRA)	<ul style="list-style-type: none"> › Joint review of the Iranian nuclear regulatory system to strengthen the technical capacity and capability of INRA › Support for the development of the Iranian nuclear legislative and regulatory framework and harmonizing it with international standards, including through accession to such international mechanisms as the Convention on Nuclear Safety › Facilitating Iran's accession to such international agreements as the Convention on Nuclear Safety and the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management. › Joint workshops on civilian nuclear liability, training projects and experience-sharing opportunities for Iranian nuclear regulatory specialists › Iranian specialists were involved in the biennial conference held by the EU's European Nuclear Safety Regulators Group (ENSREG) › Iranian specialists were also involved in an expert assessment of a stress test of a reactor under construction
France	C. Research and Development (R&D) Practices	International Thermo-nuclear Experimental Reactor (ITER)	In 2016, an agreement was reached with France on cooperation in the framework of the ITER project. In 2017, the process of Iran joining that project was blocked by the United States.
Germany	D. Nuclear Safety, Safeguards and Security	Memorandum on cooperation between the INRA and GRS	Signed in February 2018. The German company GRS and INRA agreed on technical cooperation in nuclear safety, including personnel training and sharing best practice.
IAEA	C. Research and Development (R&D) Practices	IRA0008. Promoting and Developing Ion Beam Analytical Techniques and Archaeological Dating	This technical cooperation project was approved in 2018. Its goal is to contribute to Iran's sustainable national development through state-of-the-art accelerator-based nuclear analytical techniques for addressing the socio-economic, health, environmental and scientific requirements of the country.

PARTNER	CATEGORY	PROJECT	PROGRESS
IAEA	D. Nuclear Safety, Safeguards and Security	IRA9024. Strengthening Regulatory Competence and Enhancing the Effectiveness of the National Nuclear and Radiation Safety Regime	This technical cooperation project was approved in 2016. Its goal is to further enhance the regulatory skills and technical capability of INRA and to improve its regulatory processes in accordance with IAEA safety standards and international best practices.
		IRA2013. Enhancing the Level of Operational Safety and Reliability of the Bushehr Nuclear Power Plant-1	This technical cooperation project was approved in 2016. Its goal is to enhance the owner's capabilities towards the safe and reliable operation and maintenance of the Bushehr-1 reactor.
		IRA2014. Increasing the Nuclear Power Production and Development Company's Capability in Planning and Implementing Activities Related to Design, Construction and Commissioning of Two New Nuclear Power Plant Units with the Emphasis on Safety	This technical cooperation project was approved in 2018. Its goal is to upgrade and improve the required skills and effectiveness in the capabilities of Iran's Nuclear Power Production and Development (NPPD) company for implementation of the two new light water NPPs at Bushehr with an emphasis on safety.
	E. Nuclear Medicine and Radioisotopes, Associated Technologies, Facilities and Processes	IRA6011. Promoting Cancer Treatment Quality Using Radiation Through the Development of Radiotherapy Products and Strengthening Quality Assurance in Radiotherapy Procedures.	This technical cooperation project was approved in 2018. Its goal is to enhance Iranian national capacity in production of radiotherapy products and proper usage of the related therapeutic techniques to meet the local demand.
	F. Waste Management and Facility Decommissioning	IRA9023. Strengthening Owner's Capabilities in the Safe Operation of TALMESI Radioactive Waste Disposal Facility	This technical cooperation project was approved in 2016. Its goal is to advise and assist in the safe operation of the TALMESI disposal facility for low- and intermediate-level radioactive waste.
Italy	C. Research and Development (R&D) Practices	Agreement on cooperation with Elettra Laboratory	The cooperation agreement between Elettra Sincrotrone Trieste S.C.p.A. (Elettra), the Research Centre in AREA Science Park, and the Institute for Research in Fundamental Sciences (IPM Teheran) of Iran was signed in May 2016. It includes: <ul style="list-style-type: none"> › Training Iranian personnel at an Elettra synchrotron facility › Joint design of some elements of a synchrotron facility. These elements will be tested at an Elettra facility and supplied to Iran for the Iranian Light Source Facility (ILSF) synchrotron
	D. Nuclear Safety, Safeguards and Security	International workshop "International cooperation to strengthen nuclear safety, nuclear security, safeguards and non-proliferation"	The two-day workshop in October 2017 was held in cooperation with the European Commission's Joint Research Centre, the Italian President's office, the Ministry of Foreign Affairs, and the Ministry for Research and Science. The head of the AEOL also visited Italy's National Institute for Nuclear Physics (INFN) and the National Centre for Oncological Radiotherapy (CNAO).
Japan	D. Nuclear Safety, Safeguards and Security	IAEA safeguards and nuclear safety training programmes	Japan delivers IAEA safeguards and nuclear safety training programmes for Iranian scientists. In 2018, the parties reaffirmed their intention to continue their cooperation.
Poland	A. General	Negotiations on nuclear cooperation	An AEOL delegation visited Warsaw in May 2016. Iran and Poland discussed opportunities for cooperation in the areas of nuclear science, radiopharmaceuticals, nuclear safety and nuclear medicine.

PARTNER	CATEGORY	PROJECT	PROGRESS
Russian Federation	B. Reactors, Fuels and Associated Technologies, Facilities and Processes	Construction and maintenance of the Bushehr NPP***	In 2018, Russia started to work on the Bushehr-2 and -3 reactor projects. First concrete at the Bushehr-2 reactor site was poured in November 2019. ROSATOM also continues to provide maintenance services for the Bushehr-1 reactor and to supply it with fuel.
	B. Reactors, Fuels and Associated Technologies, Facilities and Processes	International workshop “25 Years of Cooperation between Russia and Iran in Peaceful Uses of Nuclear Energy: New Prospects under the Joint Comprehensive Plan of Action, Annex III”	This workshop was held in October 2017. The participants exchanged their views on the role of the JCPOA in ensuring Iran’s predictable and sustainable civil nuclear cooperation with Russia and other countries, including in the areas specified in the JCPOA’s Annex III. The workshop brought together representatives of all the JCPOA member states, the EU and the IAEA. As part of the workshop agenda, Iranian experts and other participants visited the ROSATOM Technical Academy and the Russian Research Institute of Radiology and Agricultural Ecology, located in Obninsk (Kaluga Region, Russia), where the world’s first NPP was launched in 1954.
	C. Research and Development (R&D) Practices	Conversion of the Fordow Fuel Enrichment Plant	Under the JCPOA, Russia was involved in conversion of the Fordow Fuel Enrichment Plant to the production of stable isotopes. In 2019, the project was suspended because, in response to the withdrawal of the United States from the JCPOA, Iran introduced uranium hexafluoride into the centrifuge cascades situated in the same wing of the facility as the two cascades that were to be repurposed for the production of stable isotopes. Resuming the project in that original place will only be possible after cleaning up of the facility.
	D. Nuclear Safety, Safeguards and Security	Supporting the Iranian Nuclear Regulatory Authority (INRA)	In May 2017, an INRA delegation visited the Russian nuclear regulator Rostekhnadzor to learn about Russian nuclear regulatory experience. In 2018, the parties agreed to expand their cooperation in nuclear and radioactive material supervision, safety regulation for nuclear research facilities, and safety during nuclear material transportation. In October 2018 a joint international workshop on best practice exchange, co-organized by Rostekhnadzor and INRA, was held in Moscow and was attended by representatives of other JCPOA member States.
		Training Bushehr NPP personnel	<ul style="list-style-type: none"> › In July–August 2016, the ROSATOM Technical Academy delivered a 3-week training programme for top managers of the Bushehr NPP › The WANO Moscow Centre held several technical support missions at the Bushehr NPP in 2016, 2017, 2018 and 2019 › In 2016 and 2017, the WANO Moscow Centre facilitated two visits by Bushehr NPP specialists to the Kalinin NPP. Iranian experts had an opportunity to learn about maintenance and repair practices (including fuel reloads) at the Kalinin NPP and about the work of the control room teams › In 2018, the All-Russian Research Institute for Nuclear Power Plants Operation (VNIIAES) began a project to modernize a full-scale simulator facility at the Bushehr NPP › In 2018, the WANO Moscow Centre’s Regional Crisis Centre took part in emergency prevention and response drills held at the Bushehr NPP
		Mission in support of the Nuclear Power Production and Development Company (NPPD)	<ul style="list-style-type: none"> › In 2017, the WANO Moscow Centre conducted a risk-management technical support mission at the NPPD › In 2018, the WANO Moscow Centre conducted a corporate communication process technical support mission at the NPPD › In 2019, the WANO Moscow Centre conducted an operational decision-making technical support mission.
	E. Nuclear Medicine and Radioisotopes, Associated Technologies, Facilities and Processes	Agreement on establishing a network of radiation processing centres	In 2018, Rusatom Healthcare (the ROSATOM integrator in the field of radiation technologies in medicine and industry) and Shar Patro Iranian signed an agreement to build a network of irradiation centres in Iran. The parties reached an agreement on joint implementation of a project to establish a network of radiation processing centres in Iran. These centres, based on electron beam accelerator and gamma-ray technology, will provide commercial sterilisation services to the pharmaceutical, cosmetic, medical and food industries.

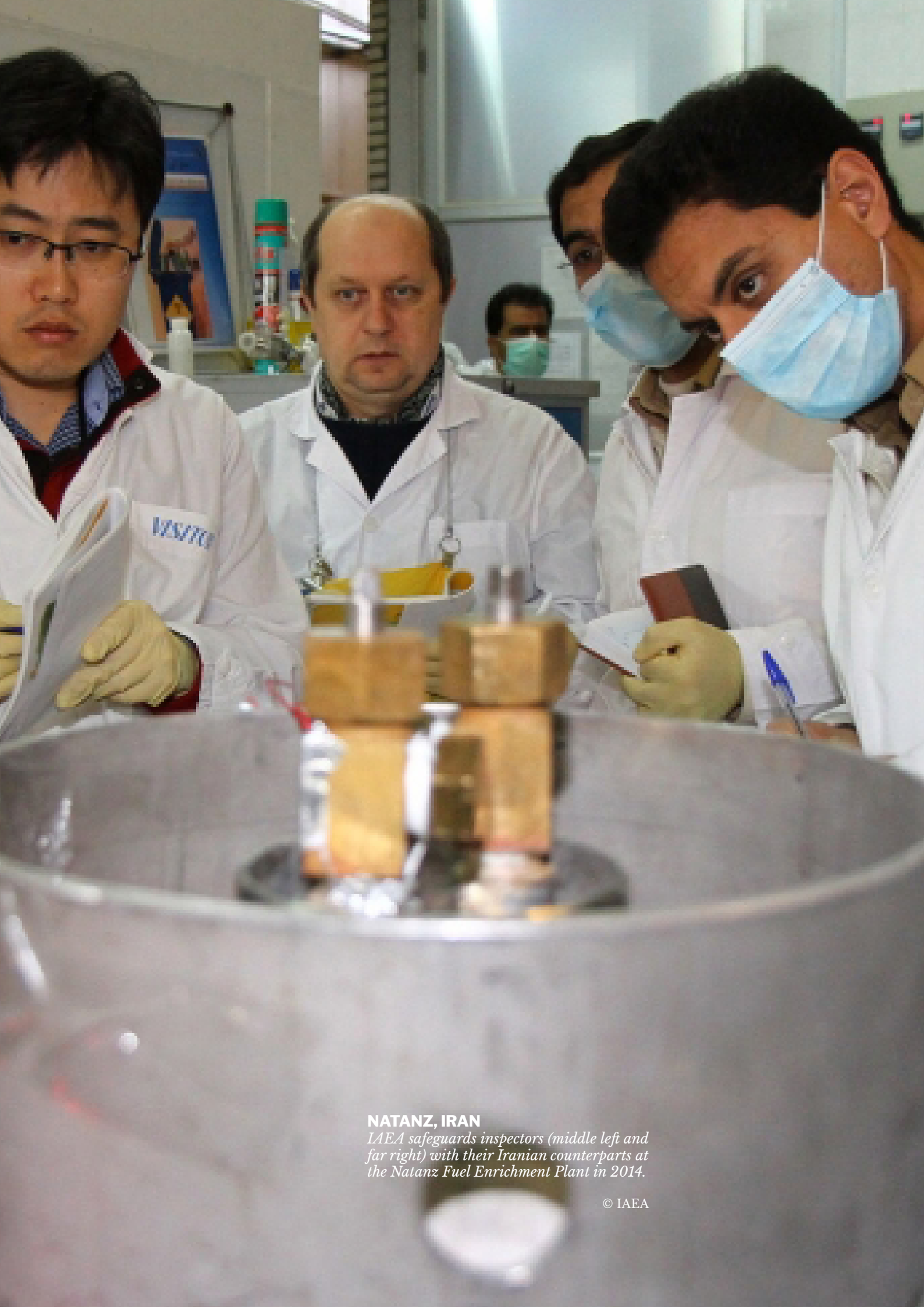
PARTNER	CATEGORY	PROJECT	PROGRESS
Switzerland	D. Nuclear Safety, Safeguards and Security	Memorandum of understanding on nuclear safety cooperation	The memorandum was signed in September 2016. Cooperation includes exchange visits to nuclear facilities, workshops, and sharing experience between Iranian specialists and representatives of the Swiss Federal Inspectorate for Nuclear Safety (ENSI) in such areas as management systems, safety culture and measures undertaken at Swiss NPPs following the accident at the Fukushima NPP.
United States	G. Other projects	Purchasing surplus heavy water from Iran****	<p>In 2016, Iran and the United States Department of Energy signed an 8.6 million dollar contract under which the Department of Energy was to buy 32 tonnes of heavy water from Iran.</p> <ul style="list-style-type: none"> › Of that amount, 6 tonnes was supplied to the Oak Ridge National Laboratory for use in research projects, such as the Spallation Neutron Source (SNS), the most powerful accelerator-driven neutron source in the world › 26 tonnes were to be shared between private-sector nuclear companies

* The participants in some of the projects and activities listed might categorize those projects differently from the author of this essay.

** The total value of EU peaceful nuclear energy cooperation with Iran in 2020 was estimated at 17 million euros.

*** Cooperation in the Bushehr NPP framework began even before the adoption of the JCPOA and, formally, it is not a result of the JCPOA – but it is pursued in the spirit of Annex III.

**** The project should be considered mainly in the context of cooperation in bringing the Iranian nuclear programme into compliance with the terms of the JCPOA, which means in the context of Annex I (Section C) of the JCPOA



NATANZ, IRAN

IAEA safeguards inspectors (middle left and far right) with their Iranian counterparts at the Natanz Fuel Enrichment Plant in 2014.

Monitoring, Safeguards, and Verification

by Andreas Persbo, European Leadership Network

The Joint Comprehensive Plan of Action (JCPOA), the nuclear deal concluded with the Islamic Republic of Iran in 2015, includes a range of verification and safeguards mechanisms. International monitoring of Iran's nuclear programme under the JCPOA consists of three levels: the Comprehensive Safeguards Agreement (CSA) with the IAEA, which Iran implements as part of its Treaty on the Non-Proliferation of Nuclear Weapons (NPT) membership and is in force so long as Iran remains party to the treaty; the Additional Protocol (AP) to the CSA, which Iran provisionally implements under the JCPOA; and additional unique verification measures under the JCPOA. Depending on the specific JCPOA verification measure, they remain in effect for 10 to 25 years. The IAEA's mandate with respect to the JCPOA primarily entails monitoring and verification of the voluntary nuclear-related measures. This essay analyses the specific verification and safeguards components of the JCPOA and discusses their potential application to a future Middle East Weapons of Mass Destruction-Free Zone (ME WMDFZ).

The relevance of the JCPOA

PROSPECTS FOR NEAR-TERM NEGOTIATIONS

An ME WMDFZ will almost certainly not be negotiated and agreed to within the next decade, during which time most JCPOA restrictions will lapse. For now, the necessary regional security conditions do not appear to be present, there is relatively low adherence among states in the Middle East to international agreements on the non-proliferation of weapons of mass destruction (WMD), and there are several ongoing concerns regarding the compliance of a number of states in the region to those agreements.¹ For instance, the Syrian Arab Republic has almost certainly not declared all of its chemical weapon stockpiles and is, moreover, still under investigation over its attempt to clandestinely build a nuclear reactor.² Iran's nuclear programme remains a cause for concern for many of its neighbours. While it remains peaceful according to the International Atomic Energy Agency (IAEA), it also serves to increase Iran's latent nuclear capabilities. Other regional powers, such as Saudi Arabia, are developing nuclear programmes. Finally, against this backdrop, there is Israel's undeclared and unacknowledged nuclear weapon programme. Israel would be unwilling to put its nuclear arsenal on the negotiating table unless it judged that it could do so securely. Nuclear aspirations among its regional rivals would not be conducive to this.

1 See, for example, regional safeguards coverage, as contrasted with other regions, in IAEA, "Status List: Conclusion of Safeguards Agreements, Additional Protocols and Small Quantities Protocols", 31 December 2020, <https://www.iaea.org/sites/default/files/20/01/sg-agreements-comprehensive-status.pdf>.

2 On the ongoing work of the Organisation for the Prohibition of Chemical Weapons (OPCW) in Syria, see OPCW "Syria and the OPCW", <https://www.opcw.org/media-centre/featured-topics/syria-and-opcw>. For the IAEA's ongoing work, see IAEA, "IAEA and Syria", <https://www.iaea.org/newscenter/focus/syria>.

Hence, it is unlikely that a comprehensive regional solution would be reached within the next decade—or even within two decades—that would nullify the dynamics outlined above. A WMD-Free Zone can only come about after a period of extensive groundwork. However, the conditions for such a Zone in the Middle East would suffer even further should the JCPOA falter in the coming years. Successfully implementing the JCPOA would lead to a better relationship between Iran, its neighbours and world powers, and this would, in turn, make it easier to start Zone discussions.³

RELEVANCE FOR LONG-TERM NEGOTIATIONS

The JCPOA clearly states that it “should not be considered as setting precedents for any other state or for fundamental principles of international law”.⁴ But this language does not prevent future agreements drawing inspiration and lessons from the deal and its implementation. The future negotiators of an ME WMD-FZ are free to copy or adapt it, and so are other actors, such as the IAEA. Potentially, the JCPOA and Zone could co-exist, should the latter enter into force before the former expires. If so, Iran would need to implement both agreements at the same time. In that case, Iran would likely insist other countries come up to its level of commitments in the JCPOA.

Successfully implementing the JCPOA would lead to a better relationship between Iran, its neighbours and world powers, and this would, in turn, make it easier to start Zone discussions.

While future negotiators can use the Iran nuclear deal’s language, it is less clear whether they should do this. The degree to which JCPOA rights and commitments ought to be preserved and built on for future non-proliferation and disarmament agreements remains debated. Much of its language is *sui generis* and will not find easy application elsewhere. However, some elements of the agreement would have benefits, in the broadest sense, for the language of a future Zone treaty. Moreover, for Iran, some elements of the nuclear deal are not subject to any sunset clause. For example, Iranian obligations under Section T, relating to the development of nuclear explosive devices, are in force in perpetuity. This is the type of obligation that Iran would argue should be written into the future agreement, seeking application for all.

THE PRINCIPLE OF ESTABLISHING A CAPABILITY CAP

A central idea underpinning the JCPOA is the application of a “capability cap”. The agreement sets out clear lines that participants cannot cross, expressed in several ways. With respect to Iran’s capability to produce weapon-usable uranium, Iran committed to keeping installed uranium gas centrifuges below a defined number, not to produce uranium in quantities exceeding defined limits and not to construct new facilities able to enrich uranium within a defined timeline. Regarding its ability to produce plutonium, Iran committed not to construct specific types of reactors and agreed on a time-bound ban on reprocessing spent nuclear fuel. JCPOA negotiators used the technical term “breakout time” when deciding what measures to cap and for how long.⁵ The term “breakout time” is understood as being the time required

3 The JCPOA notes that the parties “anticipate that full implementation of this JCPOA will positively contribute to regional and international peace and security”. See “Joint Comprehensive Plan of Action”, 14 July 2015, https://eeas.europa.eu/archives/docs/statements-eeas/docs/iran_agreement/iran_joint-comprehensive-plan-of-action_en.pdf, preface.

4 Joint Comprehensive Plan of Action, paragraph xi.

5 K. Davenport and J. Masterson, “The Limits of Breakout Estimates in Assessing Iran’s Nuclear Program”, Issue brief, Arms Control Association, 4 August 2020, <https://www.armscontrol.org/issue-briefs/2020-08/limits-breakout-estimates-assessing-irans-nuclear-program>.

for a country – in this case, Iran – to amass enough fissile material for one nuclear explosive device. As discussed below, this term is not entirely unproblematic.

Similar capability caps might become a feature of a future ME WMDFZ. For instance, it could be worthwhile banning or severely limiting the use of certain fuel cycle technologies, such as uranium enrichment or the extraction of plutonium from spent nuclear fuel. A blanket ban on these technologies would sever any nuclear material pathways to the development of a nuclear explosive device. A state cannot construct a nuclear weapon if it does not have access to nuclear material.⁶ Compliance with a blanket ban is also easier to ascertain: if proscribed facilities are found in the territory of a state or under its control, it would be non-compliant. It could not justify the presence of these sites by, for example, pointing to its peaceful uses.

By agreeing to curtail its capability to produce nuclear material, a state participating in the Zone would hope to transmit a “safety notice” to other governments within and outside the Zone. Undeniably, a good-faith implementation of curtailment of capabilities would keep latent nuclear capabilities in the region at low levels. However, a curtailment regime would also mean that states intending not to comply with the ban could achieve an immediate military advantage by developing nuclear capabilities in secret. The Middle East has historically had low levels of adherence to arms control agreements, and there is more than one instance of a state engaging in a strategy of deliberate non-compliance with an agreement it has entered into.

ESTABLISHING APPROPRIATE LEVELS OF VERIFICATION AND MONITORING

The JCPOA largely rests on the verification rights and obligations contained in Iran’s Comprehensive Safeguards Agreement (CSA) with the IAEA and its Additional Protocol (AP). Most of the verification and monitoring under the JCPOA rests on these safeguards authorities, and the JCPOA adds some monitoring elements, such as:

- › Verifying the cap on the total number of deployed centrifuges
- › Allowing for closer monitoring of uranium enrichment levels (with the introduction of some new technologies)
- › Monitoring of centrifuge manufacturing
- › Monitoring of Iran’s broader uranium isotope separation production and research and development (R&D) activities in accordance with an R&D plan
- › Advancing the starting point of inspections to earlier in the fuel cycle (see further below).

Indeed, another aspect of the JCPOA is the idea of a “transparency surge” to underpin the capability cap. In Iran’s case, this surge is demonstrated by increased sharing of information on the front end of the nuclear fuel cycle, enhanced monitoring of enrichment activities, and a framework for clarification and inspection. However, most verification and monitoring activities in Iran rest on already established instruments: its CSA and AP. Comprehensive safeguards require material accountancy, as well as associated monitoring and verification, on most aspects of the nuclear fuel cycle. However, it has the limitation that accountancy starts at uranium conversion facilities, where materials are deemed to

⁶ R. Einhorn, “Nuclear Fuel Cycle Activities and Research”, From the Iran nuclear deal to a Middle East Zone? Lessons from the JCPOA for an ME WMDFZ, UNIDIR May 2021, <https://unidir.org/jcpoa>.

become usable, and then follows the material through the fuel cycle. The starting point of safeguard under the CSA is when such material leaves the plant or the process stage in which it has been produced.⁷ The AP extends safeguards reporting to the front end of the nuclear fuel cycle. However, it does not add accountancy measures to this part of the cycle. The JCPOA adds additional language to this by stipulating that Iran should furnish the Agency “with all necessary information such that the IAEA will be able to verify the production of the uranium ore concentrate” and inventories.⁸

The AP significantly expands the state’s reporting requirements. It also includes several enhancements to the IAEA’s access rights, such as shorter notice periods, access to more buildings on a site, and a more substantial obligation to furnish visas to inspectors. All of this significantly enhances the IAEA’s ability to reach a “broader conclusion”, namely that “all nuclear material [in the state] remained in peaceful activities” (as oppose to the more limited conclusion that IAEA draws *based on a CSA alone* which is that “all **declared** nuclear material remained in peaceful activities”). The IAEA draws a ‘broader conclusion’ only after the state has concluded an AP to its CSA and the IAEA finds no indications of diversion of declared nuclear material and no indications of undeclared nuclear material or activities in the State.

The broader conclusion comprises two parts:

1. The Agency must find that nuclear material placed under safeguards has not been diverted
2. The Agency must find there are no undeclared nuclear materials or activities in the state as a whole.

The IAEA can only reach the second conclusion when all activities under the AP have been completed, the state has answered all relevant questions posed to it, and there is no longer any indication that constitutes a safeguards concern in the Agency’s judgement.⁹ How long this takes depends on the circumstances, including past activities and the size of the fuel cycle. In some cases, it took over a decade.¹⁰ This is relevant to the ME WMDFZ because states in the region would probably only sign up to a Zone agreement if it can assure that all nuclear material in all states party are accounted for. Any other safeguards regime that does not include the AP as a minimum would fail to give this assurance. What is more, even after a broader conclusion is reached, the work does not stop. The Agency continuously evaluates the entirety of the state’s nuclear programme. In so doing, it may have to reassess its earlier results if new information is acquired. Ongoing evaluation is vital for the IAEA’s ability to certify the absence of undeclared nuclear material regularly. An integral part of this process is for the inspected

7 IAEA, “The Structure and Content of Agreements between the Agency and States Required in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons”, INFCIRC/153, June 1972, <https://www.iaea.org/sites/default/files/publications/documents/infcircs/1972/infcirc153.pdf>, paragraph 34(a); and J. Carlson, “Defining the Safeguards Mission”, in Addressing Verification Challenges, IAEA, 2010, https://www-pub.iaea.org/MTCD/publications/PDF/P1298/P1298_Book.pdf, p. 92.

8 Joint Comprehensive Plan of Action, Annex I, https://eeas.europa.eu/sites/default/files/annex_1_nuclear_related_commitments_en.pdf, paragraphs 68–69.

9 Ibid., p. 100.

10 It took the IAEA thirteen years to issue South Africa a broader conclusion and although Iraq brought into force an AP to its CSA in 2012, the IAEA has not drawn yet a broader conclusion for Iraq. The JCPOA’s transition day, when remaining sanctions are to be lifted, is 8 years after “adoption day” or when the IAEA draws a broader conclusion, “whichever is earlier”. This would indicate the JCPOA drafters assessed that the broader conclusion could, in Iran’s case, be drawn within those 8 years. Joint Comprehensive Plan of Action, paragraph iv. Western sources have previously indicated the process could last much longer than that. See M. Hibbs, “Arriving at an IAEA Broader Conclusion for Iran”, Carnegie Endowment for International Peace, 22 September 2016, <https://carnegie-ieendowment.org/2016/09/22/arriving-at-iaea-broader-conclusion-for-iran-pub-64665>.

state to address any need for clarification and to answer and resolve any questions and inconsistencies. It has now been more than two decades since the first state adopted the Additional Protocol, and its in-depth declaration requirements and more robust inspection rules have proven effective. The central role that the AP plays in the JCPOA is a case in point. Several states have called for the combination of a CSA and the AP to be the new safeguards standard, with the ultimate aim of making it a prerequisite for the supply of nuclear fuel. Without the AP in place, a state acting in bad faith can move close to the nuclear weapon threshold with little fear of detection, by legally developing the necessary fuel cycle capacity and simultaneously conducting clandestine research on weaponisation. Hence, there are good reasons to embrace the AP as the gold safeguards standard in an ME WMDFFZ.¹¹ Moreover, the AP also introduced new tools, such as Wide-Area Environmental Sampling (WAES), although this has never been implemented in practice.¹² The Zone might be an opportunity to implement and build broader acceptance for a WAES regime.

Examining past and present nuclear activities

It is tempting to point to Israel, Syria and Iran and argue that the Middle East is a hotbed of WMD programmes, and that this presents new challenges. This is not the case. Several countries have, at some point, pursued nuclear weapons, only to abandon their ambitions later on. For instance, South Africa possessed nuclear weapons until 1991. Sweden had a weapon programme, abandoned in stages throughout the 1960s and early 1970s. Both countries had to endure long scrutiny of their past in the context of safeguards implementation. In Sweden's case, questions regarding the status of its R3 heavy water reactor, as well as revelations of weapon R&D in the 1950s and 1960s, necessitated a series of reports delivered over six years to the IAEA under the country's initial declaration under the protocol.¹³ For South Africa, President F.W. De Klerk's revelations in 1993 that his country had possessed a nuclear deterrent prompted it to give "full access to facilities and records of facilities".¹⁴ It is possible to learn some lessons from these experiences.

In the Middle East, it is widely accepted that Israel has a nuclear weapon programme. Iran is suspected of having had an active nuclear weapon programme until about 2004, never publicly acknowledged. It is presently subjected to increased scrutiny under the JCPOA. Should Israel sign on to a ME WMDFFZ as a non-nuclear weapon state, it will also be subject to the scrutiny required to help certify that all nuclear material under its jurisdiction and control are in peaceful activities.

11 J. Carlson, Nuclear Verification in a Middle East WMD-Free Zone: Lessons from Past Verification Cases and Other Precedents, UNIDIR, 21 January 2021, <https://doi.org/10.37559/WMDFFZ/21/NV/01>, p. 60.

12 IAEA, "Model Protocol Additional to the Agreement(s) between State(s) and the International Atomic Energy Agency for the Application of Safeguards", INFCIRC/540, September 1997, <https://www.iaea.org/sites/default/files/infcirc540.pdf>, Article 9.

13 The R3 reactor was shut down in 1974. However, an article in the Washington Post in the mid-1990s prompted additional enquiries by the IAEA. Its work was not completed until the end of the 1990s. See S. Coll, "Neutral Sweden Quietly Keeps Nuclear Option Open", Washington Post, 25 November 1994, <https://www.washingtonpost.com/archive/politics/1994/11/25/neutral-sweden-quietly-keeps-nuclear-option-open/754e8f39-b158-4ec5-812c-63592ac1889d/>; and also T. Jonter, Sweden and the Bomb: The Swedish Plans to Acquire Nuclear Weapons, 1945–1972, Swedish Nuclear Power Inspectorate (SKI) Report no. 01:33, September 2001, <https://www.stralsakerhetsmyndigheten.se/en/publications/reports/non-proliferation/2001/200133/>.

14 F.W. De Klerk, South African President, "Nuclear Non-Proliferation Treaty", Speech to a Joint Session of Parliament, 24 March 1993, <https://digitalarchive.wilsoncenter.org/document/116789>, p. 5.

As noted above, a country's past nuclear activities are relevant for contemporary safeguards implementation. It is not possible to achieve the objective of safeguards if there are uncertainties as to whether all nuclear material or all nuclear activities have been declared.¹⁵ If there have been nuclear explosive devices in a country and that country accepts safeguards, then the material used in the devices would need to be accounted for. Moreover, all facilities involved in the production of material for these weapons would need to be declared and opened for inspection. There is no other way in which the international inspectorate can get assurance that everything that should be declared has been declared.

The point here is not for a country to "come clean" or to "admit guilt". For safeguards purposes, what the country once used the material for is entirely irrelevant. The only objective is to ensure that material is not returned to military use, and that no facilities produce undeclared new material. IAEA experience with the JCPOA of resolving Iran's past suspected nuclear weapon-related activities highlights this. The IAEA will not be able to reach a broader conclusion for Iran until the matter of "possible military dimensions" has been laid to rest.¹⁶

However, there should be no falling into the trap of assuming that all these dimensions need to be thoroughly examined. They only need to be examined to the extent required for the IAEA to judge that no matters of safeguards concern remain. For instance, the IAEA spent some time examining the "programme management structure" of Iran's alleged weapon programme. From a safeguards perspective, such examinations are important so that an absence or discontinuation of activities can be confirmed. If there is no activity, there is a reduced or no likelihood of undeclared nuclear material. Likewise, the Agency has enquired about equipment such as "high speed cameras" that could be used in nuclear explosives testing. Again, illicit activities are likely to involve undeclared nuclear material, and it is that "nexus linking the activity to nuclear material" (as IAEA Director General Mohamed ElBaradei put it) that the Agency is focusing on.¹⁷

Should Israel join a future ME WMDFFZ, the expectation would be for it, as for Iran under the JCPOA, to declare production at Dimona and associated facilities, declare any centrifuge enrichment programme, and supply data on past production. Like Iran, Israel would not need to be explicit in stating that infrastructure and material was once used in nuclear weapons. However, it would need to furnish adequate answers to the IAEA's questions, so some satisfaction could be reached that all nuclear materials had been declared. Most importantly, the past is not something states can address only once and refuse to address again. Under the implementation of the CSA and its AP, should information come to light giving rise to concerns that not all facilities or material have been declared, the Agency will continue its investi

15 IAEA, "The Structure and Content of Agreements between the Agency and States Required in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons", INFCIRC/153, June 1972, <https://www.iaea.org/sites/default/files/publications/documents/infcircs/1972/infcirc153.pdf>, paragraphs 28–30.

16 "Possible military dimensions" is a term coined by the IAEA to capture activities conducted by Iran relevant to the development of a nuclear explosive device. See, for instance, IAEA, Board of Governors, "Final Assessment on Past and Present Outstanding Issues regarding Iran's Nuclear Programme", Report by the Director General, GOV/2015/68, 2 December 2015, <https://www.iaea.org/sites/default/files/gov-2015-68.pdf>.

17 M. ElBaradei, "Nuclear Non-Proliferation and Arms Control: Are We Making Progress?", IAEA; 7 November 2005, <https://www.iaea.org/newscenter/statements/nuclear-non-proliferation-and-arms-control-are-we-making-progress>.

gation. A case in point is Libya, for which in 2019 the IAEA could not draw a broader conclusion, despite having done so in previous years.¹⁸

The concept of “breakout time”

Throughout the 16 year-long monitoring of Iran’s nuclear fuel cycle activities, it has been popular to use the term “breakout time”. This term has no specific meaning in international law but is widely understood to be the time required for a country to accumulate enough material for one nuclear explosive device. Of course, accumulating material for one device is not the same as actually having a device. Additional time is required to shape and cast the material into the required geometry and then to arrange the firing, fusing and safety mechanisms. Some of these activities can take place in parallel to the acquisition of fissile materials but further time is still needed to ensure that the device is militarily useful – that it can be delivered to target.

The concept underlying the term “breakout time”, despite its ambiguity, might be of some use in the context of an ME WMD/FZ. “Nuclear latency” might be expressed as a function of the ability to produce nuclear material in the required quantities and within desired timescales. The more material a state can produce, and the faster it can produce it, the higher its “latency”.

So, in general, breakout time is a good indicator of “nuclear latency”. For instance, where a state already possesses nuclear material in required quantities, conversion can be measured in days. The IAEA has produced two different benchmark tables that are useful when discussing this. The first is “conversion time”, or “the time required to convert different forms of nuclear material to the metallic components of a nuclear explosive device” (see Table 1).¹⁹

TABLE 1. *Estimated material conversion times for finished plutonium and uranium metal components²⁰*

BEGINNING MATERIAL FORM	CONVERSION TIME
Pu, high enriched uranium (HEU) or ²³³ U metal	Order of days (7–10)
PuO ₂ , Pu(NO ₃) ₄ or other pure Pu compounds; HEU or ²³³ U oxide or other pure U compounds; mixed oxide (MOX) or other non-irradiated pure mixtures containing Pu, U (²³³ U + ²³⁵ U ≥ 20%); Pu, HEU and/or ²³³ U in scrap or other miscellaneous impure compounds	Order of weeks (1–3)
Pu, HEU or ²³³ U in irradiated fuel	Order of months (1–3)
U containing <20% ²³⁵ U and ²³³ U; Th	Order of months (3–12)

18 IAEA, Board of Governors, “Safeguards Implementation Report for 2019”, Report by the Director General, GOV/2020/9, <https://armscontrollaw.files.wordpress.com/2020/05/sir-2019.pdf>, footnote 41.

19 IAEA, IAEA Safeguards Glossary, 2001 edn, June 2002, https://www.iaea.org/sites/default/files/iaea_safeguards_glossary.pdf, p. 22.

20 Reproduced from IAEA, IAEA Safeguards Glossary, 2001 edn, June 2002, https://www.iaea.org/sites/default/files/iaea_safeguards_glossary.pdf, p. 22.

The other useful concept is “significant quantity”, “the approximate amount of nuclear material for which the possibility of manufacturing a nuclear explosive device cannot be excluded”. At present, it is 8 kilograms of Pu; 8 kg of ²³³U; and 25 kg of ²³⁵U (where ²³⁵U ≥ 20%).²¹

In Iran’s case, negotiations seem to have been guided by a desire to keep Iran about a year away from accumulating one significant quantity of nuclear material. The obligations introduced under the JCPOA are all designed to keep Iran at that timeframe. The breakout time is then estimated by making fuel cycle calculations. This method is imprecise, as is any calculation that is dependent on an array of parameters.²² The calculation will never be precise unless full access is given to the nuclear fuel cycle. However, such calculations can give a rough idea of the latent power residing in a state’s fuel cycle.

For the JCPOA, the idea underpinning breakout calculations was clearly to give its participants time to respond to a sudden Iranian build-up of fissionable material or a withdrawal from the JCPOA or the NPT. Verification arrangements put in place on top of the capability cap are designed to detect any movement towards a significant quantity in time to mount an effective response. As former Ambassador Paul Nitze put it, in 1992 in a different context, these are to “deny the other side the benefit of the violation”.²³

The breakout time concept has some uses in thinking about the magnitude of nuclear latency that is tolerable when designing an ME WMDFZ. The magnitude of latency can be expressed as a function of how many significant quantities of material a state can produce in a given amount of time, and how quickly it can convert this material into the metallic components of a nuclear device.

The outcome, however, would be similar to the types of constraint already discussed under the JCPOA: restrictions on certain types of fuel cycle facility and activity (principally enrichment and reprocessing) or on quantities of nuclear materials. If the Zone treaty has a general verification assumption that no state should be able to produce a nuclear weapon within, for example, two years, it sets natural constraints on the parties’ fuel cycle choices.

Breakout time measures the capability to produce enough material for an explosive device within a certain period. Verification and monitoring regimes do not judge the intent of governments: this task falls on national intelligence agencies, and can often only be expressed as a balance of probabilities and threat perceptions.²⁴ Hence, breakout time distils highly complex relationships into a single number; while this is eye-catching, it can also be misinterpreted as it does not take into account intent, which could accelerate or slow down the timeline.

21 Ibid., p. 23.

22 In reactor operations, for instance, burn-up time is a factor. For centrifuges, the “separative work unit” of the machine needs to be known, but also the feed and tails settings.

23 US Senate, Foreign Relations Committee, “The START Treaty”, Executive Report no. 102-53, 1992, p. 27.

24 For instance, Japan and Brazil stand closer on the nuclear threshold than most other countries. Yet, on balance of probabilities, the majority of states appear to consider them as low to no risk of nuclear breakout. A breakout calculus, however, would say that both countries stand “a matter of weeks” away from a usable device. See, for instance, M.R. Rublee, “The Nuclear Threshold States: Challenges and Opportunities Posed by Brazil and Japan”, *Nonproliferation Review*, vol 17, no 1, March 2010, <https://doi.org/10.1080/10736700903484660>.

Broader questions relating to weaponisation

The NPT prohibits non-nuclear-weapon states from the “manufacture [of] nuclear weapons or other nuclear explosive devices” (Article II). From time to time, the legal literature tries to establish what the precise meaning of the word “manufacture” might be.²⁵ This essay refrains from entering this debate, beyond highlighting that there is disagreement over precisely what activities are prohibited and what the terms “nuclear weapons” and “nuclear explosive devices” mean. These have implications for when verification should start for activities considered to be related to weaponisation. The question is if an ME WMDfZ could strive to supply further definition to this, whether the JCPOA can offer some guidance, and if such a definition is required or even desirable.

The only legally binding (although now defunct) definition of a “nuclear weapon” can be found in the 1954 Modified Brussels Treaty, which obliged West Germany to refrain from their development. This treaty defines “atomic weapons” as “any weapon which contains, or is designed to contain or utilise, nuclear fuel or radioactive isotopes and which, by explosion or other uncontrolled nuclear transformation of the nuclear fuel, or by radioactivity of the nuclear fuel or radioactive isotopes, is capable of mass destruction, mass injury or mass poisoning”. It also states that “any part, device, assembly or material especially designed for, or primarily useful in [such weapons] shall be deemed to be an atomic weapon”.²⁶ John Carlson brings forward one definition of “manufacture” (or “weaponisation”): he argues that weaponisation “is shorthand for the range of activities, in addition to the acquisition of fissile material, necessary for the manufacture of a nuclear weapon or nuclear explosive device”.²⁷

Even if Zone negotiators could make inroads into defining prohibited weaponisation related-activities, the issue of how to verify and monitor compliance would be fraught with difficulties. Not even the JCPOA attempted to introduce monitoring or inspection measures designed to detect the weaponisation of material.

The JCPOA casts some light on activities that would typically be necessary to “weaponise” nuclear material. For instance, “R&D on plutonium or uranium (or their alloys) metallurgy” is highlighted in Annex I.²⁸ So is “casting, forming, or machining plutonium or uranium metal”. Section T of Annex I highlights a few additional activities, namely:

- › The use of computer models to simulate nuclear explosive devices
- › The use of multi-point explosive detonation systems suitable for nuclear explosive devices

25 See, for instance, C.A. Ford, “Nuclear Technology Rights and Wrongs: The Nuclear Non-Proliferation Treaty, Article IV, and Nonproliferation”, in H. Sokolski (ed), *Reviewing the Nonproliferation Treaty*, Strategic Studies Institute, United States Army War College, May 2010, http://www.npolicy.org/books/Reviewing_NPT/Ch11_Ford.pdf, p. 316; and D.H. Joyner, *International Law and the Proliferation of Weapons of Mass Destruction*, 2009, <https://www.cambridge.org/core/journals/netherlands-international-law-review/article/abs/dh-joyner-international-law-and-the-proliferation-of-weapons-of-mass-destruction-oxford-university-press-oxford2009-xii-378-pp-uk-60-isbn-9780199204908/0A1AFA808A66BB87850A5F28E8DDADD8>, p. 17.

26 Modified Brussels Treaty, 23 October 1954, https://www.cvce.eu/en/obj/modified_brussels_treaty_paris_23_october_1954-en-7d182408-0ff6-432e-b793-0d1065e8e695.html, Protocol III, Annex II, Article I.

27 J. Carlson, “Defining the Safeguards Mission”, in *Addressing Verification Challenges*, IAEA, 2010, https://www-pub.iaea.org/MTCD/publications/PDF/P1298/P1298_Book.pdf, p. 89.

28 Joint Comprehensive Plan of Action, Annex I, paragraph 24.



VIENNA, AUSTRIA

Participants at an IAEA Forum on Experience of Possible Relevance to the Creation of a Nuclear-Weapon-Free Zone in the Middle East in 2011.

- › The use of explosive diagnostic systems (streak cameras, framing cameras and flash x-ray cameras) suitable for the development of a nuclear explosive device
- › The use of explosively driven neutron sources or specialized materials for explosively driven neutron sources.

Undeniably, the design, development, fabrication, acquisition or use of the technologies mentioned above are part of the “range of activities”, as Carlson put it, “necessary for the manufacture of a nuclear weapon”. Furthermore, an explosively driven neutron source could be viewed as a device “primarily useful in” a nuclear weapon, to use terminology from the Modified Brussels Treaty.

The above points to ways in which a “nuclear weapon” could be defined. The JCPOA itself offers no such definition, but rather a list of prohibited activities typically necessary to “weaponise” nuclear material. There could, perhaps, be some benefit in investing further thought in this area to distil a set of “activities generally prohibited”. However, even if negotiators of an ME WMD FZ could make inroads into defining norms on such prohibited activities, the issue of how to verify and monitor compliance with those activities would be fraught with difficulties. It is important to recognise that not even the JCPOA attempted to introduce monitoring or inspection measures designed to detect the weaponisation of material. Instead, it focuses on enhancing material accountancy and the monitoring of sites. The JCPOA does introduce an inspection process beyond CSA and AP safeguards, providing access to suspicious sites, but some experts have expressed doubt about its utility to address the challenge of verification of weaponisation activities.²⁹

29 Joint Comprehensive Plan of Action, Annex I, paragraphs 75–76. See also D.E. Sanger and M.R. Gordon, “Future Risks of an Iran Nuclear Deal”, New York Times, 23 August 2015, <https://www.nytimes.com/2015/08/24/world/middleeast/in-pushing-for-the-iran-nuclear-deal-obamas-rationale-shows-flaws.html>; and Institute for Science and International Security, “Verification of the Joint Comprehensive Plan of Action”, 28 July 2015, https://isis-online.org/uploads/isis-reports/documents/Verification_of_Iran_JCPOA_Final.pdf.

Even if diplomats could agree on language for an inspection clause, it is unlikely to be sufficient by itself. As Carlson has submitted, “It is most unlikely that inspectors will catch a State red-handed, for example, by finding a nuclear weapon or nuclear material in the form of nuclear weapon components. It is more likely that a State facing exposure in such an obvious way would deny access, preferring to argue whether lack of cooperation constitutes non-compliance, and to be able to maintain some ambiguity about its actions.”³⁰

The above are all arguments supporting the retainment of the existing safeguards instruments including the option to conduct “special inspections” as outlined in the model CSA.³¹ The “access” language in Section Q of the JCPOA, which is an elaboration of the CSA, could also be used.³²

The JCPOA Joint Commission

The JCPOA contains provisions on a Joint Commission, which comprises Iran and the other JCPOA participants: China, France, Germany, the Russian Federation, the United Kingdom, the United States, and the European Union (EU). It was established to “monitor the implementation” of the JCPOA, as well as “address issues arising from the implementation” of the agreement.³³ The composition and function of the Joint Commission are further detailed in Annex IV of the JCPOA.³⁴

The Joint Commission is an essential part of the JCPOA. It is not, however, a novelty in arms control agreements. The idea of using a consultative committee to facilitate the effective implementation of treaty obligations has been used before in international arms control law.³⁵ The purpose of such bodies is to give practical guidance on the operation and interpretation of a constituting agreement. The main advantages of setting up such a body are that it brings the parties closer together and transforms the underlying agreement from a rigid text into something that is sometimes referred to as “a living instrument”.

The underlying idea is that a state is more likely to engage constructively with a mechanism that facilitates its active involvement and allows it some control over the process, implementation, and resolution of dis

30 J. Carlson, “Defining the Safeguards Mission”, in *Addressing Verification Challenges*, IAEA, 2010, https://www-pub.iaea.org/MTCD/publications/PDF/P1298/P1298_Book.pdf, p. 92.

31 IAEA, “The Structure and Content of Agreements between the Agency and States Required in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons”, INFCIRC/153, June 1972, <https://www.iaea.org/sites/default/files/publications/documents/infcircs/1972/infcirc153.pdf>, paragraph 73.

32 Joint Comprehensive Plan of Action, paragraphs 74–78. John Carlson argues in a recent paper for UNIDIR that the elaboration of measures applying to potentially weaponisation-related activities may be required. See J. Carlson, *Nuclear Verification in a Middle East WMD-Free Zone: Lessons from Past Verification Cases and Other Precedents*, UNIDIR, 21 January 2021, <https://doi.org/10.37559/WMDfz/21/NV/01>, p. 60.

33 Joint Comprehensive Plan of Action, paragraph ix.

34 Joint Comprehensive Plan of Action, Annex IV, <https://2009-2017.state.gov/documents/organization/245323.pdf>.

35 See, for instance, the South Pacific Nuclear Free Zone Treaty (Treaty of Rarotonga), 6 August 1985, https://media.nti.org/documents/treaty_of_rarotonga.pdf, Articles 10 and 11; and Soviet–United States Treaty on the Limitation of Anti-Ballistic Missile Systems (ABM Treaty), 26 May 1972, <https://2009-2017.state.gov/t/avc/trty/101888.htm#text>, Article 13.

agreements. The act of meeting regularly to iron out practical implementation questions also, in theory, should enhance all states' confidence in the process itself.³⁶

The performance of the Joint Commission in regard to the JCPOA has been hard to assess as it was implemented for only a short time before the withdrawal of the United States, in 2018. When both the E3 (France, Germany and the United Kingdom) and Iran triggered the Dispute Resolution Mechanism in the Joint Commission in 2020, it went nowhere in both cases. However, it is reasonable to assume that a fair amount of coordination between Iran and the remaining participants in the JCPOA is carried out in this body and that it has helped to preserve communication, address more minor disagreements, and show as much of a united front as was possible after the United States withdrew.

A governing body along the lines of the JCPOA Joint Commission could be of relevance for the ME WMD-FZ. Each state would need to engage with all of its obligations under a Zone in good faith. A Joint Commission could help facilitate discussions on verification and monitoring challenges where a state party is denying, limiting or obfuscating inspection efforts. While the reason for such obfuscation could be that the state genuinely has something to hide, it could be because it is trying to squeeze out concessions elsewhere. In those situations, a confidence-building mechanism such as a Joint Commission could play a genuinely constructive role.

Conclusions

When thinking about the applicability of the JCPOA to a prospective Middle East WMD-Free Zone, it is worth remembering that “hard cases make bad law”. Iran’s nuclear programme has been a very hard case over nearly two decades. The JCPOA was designed to address specific concerns related to this case, not to set precedents for the future. Despite this, there is an argument for preserving some of the central philosophies of the JCPOA for the future. Several stand out.

When thinking about the applicability of the JCPOA to a prospective Middle East WMD-Free Zone, it is worth remembering that “hard cases make bad law”.

The first is that each state should declare all the nuclear materials within its jurisdiction and control, and that the verification regime adopted should be able to verify this declaration. Second, states ought to accept an increase in transparency, with the CSA and its Additional Protocol as the minimum baseline. It is possible to think of additional elements of monitoring that go beyond that, including enhanced inspection protocols, but the additional utility of introducing such elements deserves further study. The third is that states ought to accept

some degree of capability cap. States should consider foregoing some of the more sensitive technologies within the nuclear fuel cycle. A blanket ban on uranium enrichment and uranium reprocessing has been proposed and is worthy of consideration. Should this not be acceptable, it is worthwhile discussing verifiable limitations on the level of production or the size of the nuclear enterprise. Fourth, states should explicitly commit not to develop nuclear weapons. It would be mostly symbolic, as if the other recommendations would be adopted it is not possible to develop nuclear explosives without access to

36 For more on compliance and enforcement in this essay series, see G. Mallard and F. Sabet, “Compliance and Enforcement”, From the Iran nuclear deal to a Middle East Zone? Lessons from the JCPOA for an ME WMD-FZ, UNIDIR May 2021, <https://unidir.org/jcpoa>.

nuclear material (which is what the previous recommendations seek to address). Yet, in today's Middle East political environment, states are unlikely to make such concessions, even in principle. Hence, much political work remains to lay the foundations for a Middle East WMD-Free Zone.



NEW YORK, USA
The UN Security Council debates Iran's nuclear programme on 12 December 2018.

Compliance and Enforcement

by Grégoire Mallard, Graduate Institute of International and Development Studies, Geneva¹
and Farzan Sabet, United Nations Institute for Disarmament Research

This essay addresses several aspects related to the compliance and enforcement framework of the Joint Comprehensive Plan of Action (JCPOA) and its lessons for a Middle East WMD-Free Zone (ME WMDFZ): Who makes compliance and enforcement decisions under the JCPOA? Specifically, who decides when a participant in the Iran nuclear deal is in non-compliance with the terms of the agreement, and how is this decision made? What are the mechanisms in the deal to enforce compliance, and how well have these worked to date? Finally, what lessons does the JCPOA experience provide for negotiation and implementation of an ME WMDFZ?

The essay answers these questions in four sections. The first section gives a brief overview of the governance structure of the JCPOA, with a focus on its compliance and enforcement framework. The next section looks at the Dispute Resolution Mechanism (DRM), the principal structure established to resolve disputes between JCPOA participants when claims of non-compliance occur. The essay then examines in the third section the sanctions snapback provision, which is the main means of enforcing an Iranian return to compliance. A fourth section reflects on the lessons we can draw from the roughly five years of operation of the JCPOA's compliance and enforcement framework for a future ME WMDFZ.

JCPOA governance and its compliance and enforcement framework

WHAT IS COMPLIANCE AND ENFORCEMENT?

The JCPOA is based on a simple bargain: in exchange for the lifting of sanctions imposed by the United Nations Security Council, the United States of America and the European Union (EU) on the nuclear programme of the Islamic Republic of Iran, the latter committed to dismantle important parts of its nuclear programme and to significantly reduce its stockpiles of enriched uranium. These stockpiles had caused concern about the nature of Iran's nuclear programme among some in the international community. Iran also agreed to take a series of restrictive measures affecting its ability to conduct dual-use nuclear fuel cycle activities and research (namely on enrichment and reprocessing) and accepted strong inspection obligations for lengths of time varying from 5 to 15 years and, in some cases, indefinitely.² The compliance and enforcement framework of the JCPOA was one of the most meticulously negotiated elements in the nuclear talks between China, France, Germany, the Russian Federation, the United Kingdom and the United States with the EU High Representative for Foreign Affairs and Security Policy (the E3/EU+3)

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2 The JCPOA's nuclear fuel cycle elements and their lessons for a Middle East WMD-Free Zone are examined in R. Einhorn, "Nuclear Fuel Cycle Activities and Research", From the Iran nuclear deal to a Middle East Zone? Lessons from the JCPOA for an ME WMDFZ, UNIDIR May 2021, <https://unidir.org/jcpoa>.

and Iran. While the JCPOA was adopted as a political agreement and not a treaty (although it was incorporated into international law through Security Council resolution 2231³), it nonetheless emulates some aspects of weapons of mass destruction (WMD) treaties, albeit in the unique circumstances of the Iranian nuclear issue.

A state meeting its obligations under a WMD treaty is said to be “in compliance”. This refers to both primary obligations or first-order treaty rules—such as the prohibition in the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) against the acquisition of nuclear weapons by non-nuclear weapon states—and secondary ones—such as the requirement to provide specific information to the International Atomic Energy Agency (IAEA) within a set time frame. WMD treaties not only elaborate the rights and obligations of the states parties, but also provide mechanisms to obtain information, resolve disputes and enforce compliance. In case of “non-compliance”, the actions that the state parties of a treaty, or in some cases the international community, take to ensure or re-establish compliance is known as “enforcement”. This can vary from positive (“soft”) inducements (e.g. providing technical assistance to states working towards compliance), to “intermediate” measures (e.g. naming and shaming those whose compliance is in question), to “hard” ones, including suspension of rights and sanctions.⁴

As some scholars of international law and WMD treaties have noted, the concepts of compliance and enforcement are closely related and can overlap. For example, allowing IAEA officials onto a state’s territory to inspect nuclear facilities, as required by a comprehensive safeguards agreement (CSA), is part of that state’s compliance with its NPT obligations. However, in case of suspected non-compliance, the IAEA can also be asked to implement verification measures to assist in enforcing the terms of the NPT.⁵

JCPOA GOVERNANCE

The JCPOA negotiators created an intricate governance structure involving the Joint Commission (JC), the DRM, the United Nations Security Council, the IAEA and even non-participant states. The main governing body of the JCPOA is the Joint Commission, comprised of the representatives of the E3/EU+3 and Iran – which together comprise the JCPOA participants. The EU High Representative for Foreign Affairs and Security Policy serves as the JC coordinator. The body is responsible for facilitating implementation of the deal. It meets quarterly or at any time upon a request submitted to the coordinator by any JCPOA participant. Decisions are generally made by consensus. Some issues are decided by a majority vote. Each participant has one vote and the number of votes required varies depending on the issue.⁶

3 Stefan Talmon, “Germany Finally Comes Clean about the Legal Status of the JCPOA: No More Than Soft Law”, German Practice in International Law (GPIL), 24 March 2020, <https://gpil.jura.uni-bonn.de/2020/03/germany-finally-comes-clean-about-the-legal-status-of-the-jcpoa-no-more-than-soft-law/>. If the JCPOA was initially “no more than soft law”, its insertion in United Nations Security Council resolution 2231 under Chapter VII of the United Nations Charter gave it force of “hard law”.

4 Treasa Dunworth, Compliance and Enforcement in WMD-Related Treaties, WMD Compliance and Enforcement Series no. 1, UNIDIR, 2019, <https://doi.org/10.37559/WMD/19/WMDCE1>.

5 Ibid.

6 For example, subparagraph 4.4 of Annex IV states that “Matters before the Joint Commission pursuant to Section Q of Annex I [establishing the process for accessing suspected Iranian nuclear facilities] are to be decided by consensus or by affirmative vote of five JCPOA participants”, with no requirement for a quorum.

The JC's specific governance functions found in Annex IV of the JCPOA touch on virtually every aspect of the implementation of the Iran nuclear deal. These functions include, but are not limited to, the review and approval of the final design for the modernized heavy water research reactor under Section B of Annex I; review and consultation to address issues arising from the implementation of sanctions lifting in the JCPOA and its Annex II; review of any issue that a JCPOA participant believes constitutes non-performance by another participant of its commitments under the deal, according to the process outlined in the deal, with a view to resolving the issue; adopting or modifying procedures to govern its activities; and consulting and providing guidance on other implementation matters that may arise under the JCPOA.

The JC was given the authority to establish working groups to oversee day-to-day implementation in specific areas, as deemed appropriate by the JCPOA participants. To date, working groups have been established on procurement, transparency, Arak modernisation and implementation of sanctions lifting, among others.⁷ Some working groups have co-chairs (e.g. the one on Arak modernisation), while others are chaired by the EU coordinator.

While the Joint Commission is the central implementation organ of the JCPOA, its work is closely linked to the functions of the United Nations Security Council, the IAEA and, to some degree, non-participant third party states. For example, the Security Council can trigger the “hard” enforcement instrument for dealing with Iranian non-compliance: the sanctions snapback provision (see section 3).

The IAEA is responsible for verifying and monitoring Iran's implementation of the nuclear deal. It does this in a myriad of ways, including by providing technical cooperation to Iran to ensure that it has the capacity to comply with its obligations under the JCPOA; undertaking monitoring, safeguards, and verification activities to confirm the country is in compliance with these obligations; and advising the JC to review proposals related to items, material, equipment, goods and technology intended to be used in nuclear activities under the JCPOA.⁸ The IAEA can also formally and informally generate pressure through verification and monitoring of Iran's deal implementation, including by ‘naming and shaming’ in its Director General's media activities, the Agency's formal reports, and the Board of Governor's ability to refer Iran to the Security Council.

While the Joint Commission is the central implementation organ of the JCPOA, its work is closely linked to the functions of the United Nations Security Council, the IAEA and, to some degree, non-participant third party states.

In addition to dispute resolution (see below), the DRM can also have a “naming and shaming” function by identifying any participant perceived as being out of compliance with the deal. This opens the path to the snapback of sanctions on Iran.

While compliance decisions and referral of a state (namely Iran) for non-compliance are in the hands of JCPOA participants, non-participant states also play a role. They help ensure that Iran is in compliance with

7 The procurement channel, in part overseen by the Procurement Working Group, is examined in A. Khlopkov, “Civil Nuclear Cooperation”, From the Iran nuclear deal to a Middle East Zone? Lessons from the JCPOA for an ME WMDfz, UNIDIR May 2021, <https://unidir.org/jcpoa>.

8 The safeguards verification and monitoring elements of the JCPOA, and their lessons for an ME WMDfz, are examined by by A. Persbo, “Monitoring, Safeguards, and Verification”, From the Iran nuclear deal to a Middle East Zone? Lessons from the JCPOA for an ME WMDfz, UNIDIR, May 2021, <https://unidir.org/jcpoa>.

the deal by providing information about exported items, materials, equipment, goods, and technology in order to verify their end use inside Iran.⁹

The Dispute Resolution Mechanism

The principal instrument in the Iran nuclear deal for managing disputes, particularly those perceived as arising from non-compliance by a JCPOA participant with its commitments under the deal, is the Dispute Resolution Mechanism.¹⁰ The DRM can be triggered by any participant. It acts first and foremost as a tool for deliberation and consultation that allows for the airing of misunderstandings, suspicions, and disagreements. The aim is to prevent immediate referrals to the United Nations Security Council, which could cause escalation and counteractions that might eventually lead to a breakdown of the agreement. Disputes originate in the JC. The DRM starts once a non-compliance concern has been raised. The JC then has 15 days to address the dispute to the satisfaction of all the JCPOA participants. It can extend this consultation period indefinitely by consensus. At the end of this period, if any participant state is unsatisfied that the issue has been adequately resolved, then it can escalate the dispute to the level of foreign ministers or to an Advisory Board. The ministerial-level review lasts another 15 days, but this period can also be extended indefinitely by consensus. The Advisory Board, composed of three members, is required to produce a non-binding opinion by the end of this same 15-day period.¹¹ If the issue remains unresolved following this 30-day process, the JC can take another 5 days to consider the opinion of the Advisory Board. If the dispute still remains unresolved, and the complaining participant “deems the issue to constitute significant non-performance”, it could treat the issue as grounds to wholly or partly cease carrying out its commitments under the JCPOA or “notify the UN Security Council that it believes the issue constitutes significant non-performance”.¹²

The DRM was arguably conceived mainly to deal with possible Iranian non-compliance. It is noteworthy that the United States never attempted to trigger the DRM while it was still a participant. At the time of writing, the United States does not sit on the JC following its decision to cease participation in the nuclear deal on 8 May 2018.

On 14 January 2020, France, Germany, and the United Kingdom (the E3) collectively triggered the DRM. After having threatened action for months, they sought to send a strong message to Iran that the diplomatic path was the only way forward. This followed Iran’s decision to adopt a “maximum

9 The JCPOA requires states exporting items to Iran that are included on the Nuclear Suppliers Group (NSG) dual-use list (INFCIRC/254/Rev.9/Part 2, or the most recent version of this document) to follow the procedure laid out under Section 6 of Annex IV.

10 Security Council, S/RES/2231, 2015, [https://undocs.org/S/RES/2231\(2015\)](https://undocs.org/S/RES/2231(2015)).

11 Analyses of the DRM differ on the composition and main function of the Advisory Board. This was not discussed in depth by JCPOA negotiators or the Joint Commission, but it was assumed that each side to a dispute would select one candidate, and that the third would be mutually agreed upon. One publication assumes that the third member of the Advisory Board would be independent and “presumably a national of non-JCPOA signatory”. See A. Berger, “Explaining UN ‘Snapback’ in the Iran Deal”, Commentary, Royal United Services Institute (RUSI), 16 July 2015, <https://rusi.org/commentary/explaining-un-snapback-iran-deal-0>. On the main function of the Advisory Board, another analysis claims that “it was anticipated that the Advisory Board would investigate technical matters”. See S. Hickey, “A Quick Guide to the JCPOA Dispute Resolution Mechanism”, Center for Arms Control and Non-Proliferation, 22 January 2020, <https://armscontrolcenter.org/a-quick-guide-to-the-jcpoa-dispute-resolution-mechanism/>.

12 Security Council, S/RES/2231, 2015, [https://undocs.org/S/RES/2231\(2015\)](https://undocs.org/S/RES/2231(2015)).

resistance” strategy in May 2019 in response to the “maximum pressure” policy of the United States. Iran had initially opted for a “strategic patience” approach in the hopes of retaining some sanctions relief from the remaining participants in the deal in response to the withdrawal from the agreement by United States President Donald J. Trump.¹³ Iranian “maximum resistance” entailed reduction of compliance with the nuclear restrictions of the JCPOA, among other actions. Iran presumably chose this strategy to build leverage for future negotiations with the United States by generating pressure on the United States, the other JCPOA participants and some Middle Eastern states. It also signalled Iran’s frustration at those other participants for not providing the means to realize the economic benefits of the JCPOA.

Under the agreement there is a distinct process for Iran to address any activity it believes is preventing the full implementation of sanctions lifting. It first has the option to consult the relevant JCPOA participant with no set deadline. If they fail to resolve the issue Iran can take it to the Working Group on Implementation of Sanctions Lifting where the participants will consult and review with the aim of resolving it within 30 working days. The lack of a resolution following this period would then permit any participant to escalate the issue to the JC. In the absence of a resolution to an Iranian complaint, and following a JC decision, the agreement authorizes Iran to reduce its compliance with the JCPOA. The agreement does not specify whether this can be done unilaterally or whether it requires Joint Commission authorisation or some other form of authorisation.

Iran triggered the DRM in July 2020.¹⁴ This was due to Iranian disappointment about the E3’s ability to deliver sanctions relief following the withdrawal of the United States. Mohammad Javad Zarif, the Iranian foreign minister, has claimed that Iran triggered the DRM six times, the first time immediately follow the departure of the United States from the deal. Whether this in fact happened and whether it was acknowledged by the Joint Commission are disputed.¹⁵

While it is difficult to assess the efficacy of the DRM since much of the activity of the Joint Commission remains confidential, it is clear that each side seems to have used the DRM to signal dissatisfaction to the other. It has been applied in a more political manner than was intended. However, in order to avoid further damaging the JCPOA, neither side appears to have proceeded very far in the DRM process.¹⁶ Furthermore, once the United States withdrew, there was disagreement among the remaining participants over whether operating procedures could function as they were or had to be revised since a key player was no longer in the deal. Finally, attempts by the remaining participants to collectively address

13 F. Sabet, “A Fraught Road Ahead for the JCPOA?”, UNIDIR, 20 August 2020, <https://unidir.org/commentary/fraught-road-ahead-jcpoa>.

14 European External Action Service, “JCPOA: Statement by the High Representative Josep Borrell as Coordinator of the Joint Commission of the Joint Comprehensive Plan of Action on the Dispute Resolution Mechanism”, 17 July 2020, https://eeas.europa.eu/headquarters/headquarters-homepage/83095/jcpoa-statement-high-representative-josep-borrell-coordinator-joint-commission-joint_en; and L. Cook, “EU says Iran has Triggered Nuclear Deal Dispute Mechanism”, Associated Press, 4 July 2020, <https://apnews.com/article/9e1ac61d0918b930c-42da69d349df6ec>.

15 “Iran Triggered Nuclear Deal’s Dispute Resolution Mechanism Six Times – Top Diplomat”, TASS, 4 July 2020, <https://tass.com/world/1174845>.

16 According to one report, “In each instance [of DRM use by Iran and the E3, respectively], the EU high representative, who coordinates the JCPOA parties through a Joint Commission, extended the timeline and in so doing essentially limited the claims to mutual expressions of dissatisfaction.” See “The Iran Nuclear Deal at Five: A Revival?”, Middle East Report no. 220, International Crisis Group, 2021, <https://www.crisisgroup.org/middle-east-north-africa/gulf-and-arabian-peninsula/iran/220-iran-nuclear-deal-five-revival>, p. 3.

the sanctions issue outside the DRM have not fared better.¹⁷ This is illustrated by Iran’s gradual reduction of its compliance with the JCPOA since May 2019 without seeking approval through the DRM. Optimistically speaking, the mechanism nonetheless may have provided a methodology and a cooling-off period to prevent the dispute between Iran and the E3/EU from becoming a bigger crisis.

The sanctions snapback provision

As noted above, if a dispute remains unresolved at the end of the DRM process, and the complaining participant “deems the issue to constitute significant non-performance”, it has the option to treat the issue as grounds to wholly or partly cease carrying out its commitments under the JCPOA. This is a first line measure a participant can take to enforce the JCPOA.

The logic behind the snapback was based on the E3/EU+3’s assumption that the threat of sanctions – and the prospect of their lifting – would be a potent deterrent as well as enforcement mechanism for any nuclear deal with Iran.

The Iran nuclear deal’s sanctions snapback provision is supposed to be the enforcement measure of last resort. In case of perceived significant Iranian non-performance of its commitments, and once the DRM process has been exhausted, the snapback can be activated by a JCPOA participant to reimpose previously suspended United Nations Security Council sanctions on Iran (and accompanying unilateral sanctions by United Nations Member States).

The snapback provision has its basis in an effort by the United States to move the Iran nuclear issue to the Security Council in 2006. While Iran has been under unilateral sanctions on-and-off since 1979, the web of multilateral sanctions put in place against it between 2006 and 2011 was in many ways unprecedented in the breadth and scope of the economic pain and diplomatic isolation they imposed. The logic behind the snapback was based on the E3/EU+3’s assumption that the threat of sanctions – and the prospect of their

lifting – would be a potent deterrent as well as enforcement mechanism for any nuclear deal with Iran.

The mechanics work as follows:

If the issue still has not been resolved [within the DRM] to the satisfaction of the complaining participant, and if the complaining participant deems the issue to constitute significant non-performance, then that participant could treat the unresolved issue as grounds to cease performing its commitments under this JCPOA in whole or in part and/or notify the UN Security Council that it believes the issue constitutes significant non-performance.

Upon receipt of the notification from the complaining participant . . . including a description of the good-faith efforts the participant made to exhaust the dispute resolution process specified in this JCPOA, the UN Security Council, in accordance with its procedures, shall vote on a resolution to continue the sanctions lifting.¹⁸

17 G. Mallard, F. Sabet and J. Sun, “The Humanitarian Gap in the Global Sanctions Regime: Assessing Causes, Effects, and Solutions”, *Global Governance*, vol. 26, no. 1 (April 2020), pp. 121–153, <https://doi.org/10.1163/19426720-02601003>.

18 Security Council, S/RES/2231, 2015, [https://undocs.org/S/RES/2231\(2015\)](https://undocs.org/S/RES/2231(2015)), paragraphs 36–37.



VIENNA, AUSTRIA

Delegates attend a meeting of the Joint Commission of the Joint Comprehensive Plan of Action (JCPOA) on July 28, 2019.

If the resolution has not been adopted within 30 days of notification, then the provisions of the old Security Council resolutions would be reimposed, unless the Security Council decides otherwise. According to the same paragraph 37 of United Nations Security Council resolution 2231, “In such event, these provisions would not apply with retroactive effect to contracts signed between any party and Iran or Iranian individuals and entities prior to the date of application, provided that the activities contemplated under and execution of such contracts are consistent with this JCPOA and the previous and current UN Security Council resolutions.” Thus, while resolution 2231 rendered obsolete the nuclear-related sanctions imposed on Iran in 2006–2011, it simultaneously re consolidated them under the snapback provision. Should Iran engage in significant non-performance of its commitments under the nuclear deal, any JCPOA participant could trigger the snapback provision, restoring these resolutions. In some cases, it would also trigger the snapback of unilateral sanctions by individual United Nations Member States.¹⁹ Should Iran, however, abide by its commitments under the JCPOA between 2015 and 2025, then the United Nations’ restrictive measures on Iran would expire over time: the arms embargo in October 2020; ballistic missiles restrictions in 2023; and the snapback itself in 2025.

It is important to note that the snapback is an enforcement mechanism of the JCPOA over which the JCPOA itself has no enforcement powers. As with most other WMD treaties, these powers reside with the United Nations Security Council. But in the case of the JCPOA, there is a unique overlap between the membership of the E3/EU+3 and the P5—the five permanent members of the Security Council, which each hold a veto.

With this background in mind, the entire snapback mechanism was premised on an inherently unequal relationship between the JCPOA participants: the E3/EU+3, on one hand and Iran on the other. It also assumed that serious non-compliance would not come from the E3/EU+3 and, as a result, the JCPOA

¹⁹ J. Killick et al., “E3 Triggers Iran Nuclear Deal Dispute Settlement Mechanism (While EU Sanctions Lifting Continues for Now)”, Alert, White & Case, 16 January 2020, <https://www.whitecase.com/publications/alert/e3-triggers-iran-nuclear-deal-dispute-settlement-mechanism-while-eu-sanctions>.

enforcement measure was focused on response to Iranian non-compliance. This complex machinery was designed to prevent P5 veto-holders in the Security Council sympathetic to Iran – namely Russia and China – from blocking the reimposition of sanctions should Iran have been found in non-compliance with its JCPOA commitments by deal participants.

Many of the JCPOA framers assumed that neither the United States nor the E3 would be likely to unilaterally reinstate sanctions on Iran if the Security Council did not provide them with a mandate to do so. This would hypothetically only happen if Iran failed to fulfil its commitments under the nuclear deal in a serious way. Furthermore, after the Security Council passed resolution 2231 in 2015, the JCPOA was enshrined into international law. This assuaged fears held by some in the United States that, even if a future administration was tempted to ignore the sanctions-lifting measures under the JCPOA, it would be less likely to challenge a legally binding Security Council resolution without an explicit Security Council vote to overrule resolution 2231. Despite the negotiators' best intention, the history since the adoption of the JCPOA brings several lessons to mind, speaking to both its efficacy and limits.

The first lesson, demonstrating efficacy, relates to the period after President Trump's withdrawal from the JCPOA in May 2018. This is when Iran entered the "maximum resistance" phase of its response to the United States' withdrawal and "maximum pressure" campaign. In this period, it is plausible that the possibility of the E3/EU, Russia or China still using the snapback mechanism restrained Iran from taking stronger steps to reduce compliance with its nuclear commitments under the JCPOA than it did. If activated through the proper channels, snapback would return Iran to its pre-JCPOA level of international isolation, without granting it any possibility to convince a friendly P5 state like Russia or China to use their veto power to block sanctions. The Iranian government seems to prefer that the sanctions snapback provision expire in 2025 without being triggered. During the period of tension surrounding the highly contested attempt by the United States to trigger snapback in 2020, some Iranian officials threatened withdrawal from the nuclear deal and even the NPT if this happened, underscoring the seriousness with which they viewed the mechanism.²⁰ The restraining effect of snapback may have been strengthened by the E3 decision to trigger the DRM in January 2020, and consultations between the E3 and the United States during the summer of 2020 around the question of snapback. This is a counterfactual scenario, which we cannot confirm without access to the deliberations of Iranian decision makers, but nonetheless is a compelling one.

This argument in favour of the efficacy of snapback is counterbalanced by at least two major design flaws in the compliance and enforcement framework of the JCPOA. As stated above, the Iran nuclear deal appears not to have planned for the possibility of serious non-performance by a JCPOA participant other than Iran. It is possible that such a possibility was simply not contemplated by the framers. A complementary explanation may be that the world powers were simply unwilling to even consider collectively submitting themselves to any real enforcement mechanism when they did not have to. The reality of international politics is that, while a Global South state like Iran can, under the right set of circumstances, be pressured to accept a temporary enforcement mechanism like snapback, such states are not really in a position to demand reciprocity from the world powers. Whatever the reason for this discrepancy,

²⁰ F. Sabet, "A Fraught Road Ahead for the JCPOA?", UNIDIR, 20 August 2020, <https://unidir.org/commentary/fraught-road-ahead-jcpoa>.

the lack of enforcement mechanisms applicable to all states participating in the agreement became an Achilles heel in the Iran nuclear deal's compliance and enforcement framework.

When the Trump administration ceased participation in the Iran nuclear deal in May 2018, it chose not to trigger the DRM or snapback. Instead, the United States unilaterally launched its “maximum pressure” campaign. Later, however, as the October 2020 expiration date for the United Nations arms embargo on Iran approached, the United States asserted a continuing right to trigger snapback, while forgoing the DRM. It argued that, despite withdrawing from the Iran nuclear deal, it retained an inalienable right to trigger snapback as a named “JCPOA participant” in Security Council resolution 2231. The remaining participants and most members of the of the Security Council strongly rejected the United States’ claim to have a right to trigger snapback. This was in part because of an international legal principle that prevents states from enjoying the benefits of a treaty from which they have withdrawn.²¹ Thus, the result of the United States’ attempt to trigger snapback in August 2020 was two parallel universes: one in which, according to the United States and a small handful of allies, the conditions for snapback had been met; and one in which, according to much of the rest of the world, they had not. After several months, the new United States administration of president Joseph R. Biden reversed its predecessor’s claims.²²

This has had at least one major knock-on effect to date and may have a second one in the future. The lack of an enforcement mechanism within Security Council resolution 2231 or the JCPOA for significant non-performance by a E3/EU+3 participant has meant that Iran’s only way to respond to this precise scenario lies outside the framework of the deal. Had the E3/EU, China and Russia been able to deliver the benefits of sanctions relief in the deal to Iran – for example, through the E3’s Instrument in Support of Trade Exchanges (INSTEX) or blocking statute²³ – Iranian nuclear escalation, may have been avoided altogether. However, the Trump administration’s unilateral reimposition of sanctions, and the significant economic damage it has inflicted on Iran – going as far as to dissuade private companies of other states and even governments from doing business with Iran – incentivizes Iranian non-compliance to build leverage. This undermines the very purpose of the deal and possibly creates the conditions for more dangerous escalation on both sides. As a result, Iran has taken significant but largely reversible steps outside of the deal in terms of its nuclear commitments. A possible future knock-on effect of this design asymmetry and flaw is that other states, reflecting on the Iranian experience, may be more reluctant to agree to such enforcement mechanisms, even on a temporary basis, in similarly structured WMD treaties and agreements.

There is at least one more critique to be made of the snapback provision of the JCPOA. The text of Security Council resolution 2231 contains some indication that snapback was intended as a last resort for Iranian non-compliance. It notes in the same paragraph that “Iran has stated that if sanctions are

21 M. Nichols, “Russia, China Build Case at U.N. to Protect Iran from U.S. Sanctions Threat”, Reuters, 9 June 2020, <https://www.reuters.com/article/us-usa-iran-russia-china-idUSKBN23G2YR>.

22 M. Nichols, “U.S. Rescinds Trump White House Claim that All U.N. Sanctions Had Been Reimposed on Iran”, Reuters, 18 February 2021, <https://www.reuters.com/article/us-iran-nuclear-un-idUSKBN2A12Y9>.

23 INSTEX is an E3-backed special-purpose vehicle (SPV) officially established on 31 January 2019 to facilitate non-US dollar and non-SWIFT transactions between the EU and Iran, thereby avoiding entanglement with US sanctions. The EU blocking statute was formulated to protect EU operators from the extraterritorial application of third country laws, specifically US sanctions in the case of JCPOA implementation. See G. Mallard, F. Sabet and J. Sun, “The Humanitarian Gap in the Global Sanctions Regime: Assessing Causes, Effects, and Solutions”, *Global Governance*, vol. 26, no. 1 (April 2020), pp. 121–153, <https://doi.org/10.1163/19426720-02601003>.

reinstated in whole or in part, Iran will treat that as grounds to cease performing its commitments under this JCPOA in whole or in part.”²⁴ The E3/EU, Russia and China therefore have to carefully assess whether the perceived Iranian non-compliance in a dispute is worse than the prospect that Iran will cease performing all of its commitments under the JCPOA. Thus, a very high threshold must be met before it is worthwhile for a participant to trigger snapback. This opens a wide space below this threshold for non-compliance that may have little to no consequences. The architects of a future ME WMDFZ may want to consider the inclusion of enforcement tools falling at increments below this high threshold.

Lessons from the JCPOA’s compliance and enforcement framework for an ME WMDFZ

Based on the above discussion, at least four main lessons for a WMD-Free Zone in the Middle East can be drawn from the JCPOA’s compliance and enforcement framework. The lessons are limited by the basic distinction between the JCPOA and the Zone, which must be kept in mind throughout: the nature of the relationship between actors noted above. The JCPOA is an – inherently unequal – agreement between the world powers and Iran, whereas the ME WMDFZ treaty would be an agreement between state parties that are from the same region and would presumably enter the agreement on an equal footing. This distinction between the JCPOA and the Zone has slightly different implications for each of the lessons explored below.

A JOINT COMMISSION-LIKE BODY

The establishment of a Joint Commission-like governing body could be an important feature of an ME WMDFZ. There are analogous bodies in existing nuclear weapon-free zones. Such a body could facilitate implementation of and dispute resolution in any future Zone. It could become a regular forum for Middle Eastern states to meet, share information and cooperate on implementation of the Zone. An ME WMDFZ joint commission, by its very nature, could also serve as a confidence-building measure (CBM).

A DISPUTE-RESOLUTION MECHANISM

States of the Middle East may want to borrow some of the design elements of the JCPOA’s DRM to resolve disputes over compliance with treaty obligations, albeit tailored to the specific dynamics and issues between the region’s states. States party to a dispute can first be required to make a good-faith effort to resolve a dispute bilaterally within a set time period. Failing a resolution at this level, a DRM for the WMDFZ could then transfer the dispute to specialized working groups to see if a technical or another kind of resolution is possible. Again, in the absence of a resolution of the dispute, a complaining state party could escalate the dispute to the main decision-making body of the joint commission, setting aside a certain period to find a resolution. If the dispute persists, then the complainant could then escalate to the foreign minister-level or an advisory board (which, like the JCPOA board, could feature an independent member), again setting aside a certain period to find a resolution. From here, and as the final stage of the Zone’s DRM, states of the region could vote to refer the dispute to the relevant technical international organisation (e.g. the IAEA) for a compliance determination.

24 Security Council, S/RES/2231, 2015, [https://undocs.org/S/RES/2231\(2015\)](https://undocs.org/S/RES/2231(2015)).

The decision-making process of a WMDFZ joint commission in general and for a DRM in particular is likely to be contentious. Some Middle Eastern states may want decisions to be by consensus (in the case of a complaint, only among members states other than the state that is the target of the complaint), but this would be likely to make some aspects of general decision-making and the DRM unworkable. Other states may opt for a majority vote, whether it is just over half or a larger qualified majority. Among the existing regional authorities with jurisdiction on nuclear activities, EURATOM provides the most ambitious model of dispute resolution: litigation of disputes by a regional court (e.g. the Court of Justice of the EU, whose decisions are directly enforceable within member states of the EU).²⁵ The geo-strategic situation in the Middle East may not allow for the adoption of such a model at the outset but (as in the case of Europe) it could be adopted over time as regional circumstances improve.

DELEGATION OF VERIFICATION AND MONITORING

This naturally leads to the third issue: who should verify and monitor ongoing compliance with the provisions of an ME WMDFZ and make compliance determinations. This is where the compliance and enforcement framework of a Zone should diverge from the JCPOA in some key respects. Given the dearth of trust between many Middle Eastern states, as well as limited legal and technical capacities, technical international organisations like the IAEA, the Comprehensive Nuclear-Test-Ban Treaty Organisation (CTBTO) and the Organisation for the Prohibition of Chemical Weapons (OPCW) could potentially be delegated the role of verifying and monitoring a Zone treaty. This could have at least three elements: legal-technical capacity building to make sure all states in the region are able to comply; implementing a WMD safeguards verification and monitoring system for the ME WMDFZ (bespoke or otherwise); and reporting to the joint commission. Unlike the JCPOA the compliance determination for the purpose of a DRM should arguably not be done by states in the region, but as is in other NWFZs, by the technical international organisations, whose decisions are more likely to be considered objective and legitimate and less likely to be politicized. Some may object to this arrangement and prefer a wholly regional technical organisation to verify and monitor compliance, with member states or the Zone's JC making compliance determinations. Assigning this role to existing technical international organisations appears more technically and politically realistic at the time of writing, but some kind of hybrid model may be possible.

In contrast to the JCPOA, which largely incorporated only one kind of enforcement measure, namely the sanctions snapback provision that was very politically sensitive and could be used only in extreme cases, Zone enforcement sanctions could run along a gamut based on the severity of the non-compliance in question.

ENFORCEMENT AT THE REGIONAL AND INTERNATIONAL LEVELS

Once a technical international organisation makes a compliance determination, enforcement action could be taken either at the regional level by the ME WMDFZ joint commission, at the international level by the United Nations Security Council, or both. The principal enforcement instrument that comes to mind based on the experience of the JCPOA are sanctions. The JCPOA experience with sanctions has arguably been negative for Iran and problematic for the E3/EU+3, China, and Russia. Furthermore, several current and former officials as well as experts from the region and beyond have denied the utility

25 G. Mallard, "A Treaty Establishing a Community of Atomic Energy in the Middle East: A Proposal with Comments", Background paper, Robert Schuman Centre for Advanced Studies, 2010, <https://gregoiremallard.com/my-projects/international-law-and-the-nuclear-trade/5>.

of sanctions or a “carrot and stick” approach for a Zone, instead arguing that the region’s states should focus on positive inducements.²⁶ But, in the words of Richard Holbrook, the late United States foreign policy veteran: “What else fills in the gap between pounding your breast and indulging in empty rhetoric and going to war besides economic sanctions?”²⁷ Sanctions are thus likely to remain one of the principal tools of international statecraft that balance cost and effect to generate pressure and enforcement action. Given the Middle East’s history of WMD proliferation, the states of the region may want to have a strong, sanctions-based enforcement mechanism in an ME WMDFZ.

The decision to take regional level enforcement action could be made by a Zone joint commission after a technical international organisation has made a non-compliance determination towards a state in the region. However, unlike the JCPOA, where any participant state could make a compliance determination on the path to enforcement action, this decision should be reached collectively by a joint commission, either by consensus or a qualified majority. If and when regional circumstances allow for a regional court, such a court could be given a limited jurisdiction on WMD matters, where claims could be aired and/or appealed, should some aspects of the ME WMDFZ be modelled after EURATOM. Additionally, and in contrast to the JCPOA, which largely incorporated only one kind of enforcement measure, namely the sanctions snapback provision that was very politically sensitive and could be used only in extreme cases, Zone enforcement sanctions could run along a gamut based on the severity of the non-compliance in question. This could range from the largely symbolic that ‘name and shame’, to targeted sanctions on proliferation-related activities, to more potent ones that impose a total trade embargo on the non-compliant state. The types of sanctions at the disposal of Middle Eastern states would depend on the state of political, economic and security relations between them at the time an ME WMDFZ is negotiated. For example, economic sanctions may not be a very effective enforcement tool if the level of economic ties between the states is negligible. Still, we would expect that the creation of the Zone would be decided as part of a larger regional process that is at least partly intended to increase economic exchanges, among other forms of normalisation and regionalisation.

Alternatively, or in addition to a regional ME WMDFZ enforcement mechanism, Middle Eastern states could elect to have an international enforcement mechanism. For example, the United Nations Security Council could act as an external guarantor of a Zone in some fashion. A Zone joint commission or technical international organisation, having made a non-compliance determination, could send it to the Security Council for enforcement action. The latter would then be empowered to act along a spectrum based on the severity of the non-compliance. United Nations Member States, among them the United States and European states, could link the relief of any existing WMD sanctions programmes on states in the region they have at the time to compliance with an ME WMDFZ treaty as an inducement. Existing United Nations, United States and EU WMD-related sanctions in the Middle East are currently mainly against Iran and the Syrian Arab Republic. Of course, the P5 could have a range of reasons – namely strong diplomatic, economic and security ties to a member state of the ME WMDFZ that is the subject of a complaint – to veto Security Council action on a referral from the Zone joint commission or technical

26 This position was expressed by several regional experts in a UNIDIR event entitled From The Iran Nuclear Deal To A Middle East Zone? Lessons From The JCPOA For The ME WMDFZ, held under the Chatham House Rule.

27 D. Rieff, “Were Sanctions Right?”, New York Times Magazine, 27 July 2003, <https://www.nytimes.com/2003/07/27/magazine/were-sanctions-right.html>.

international organisation. It will thus ultimately be up to the region's states to decide how best to enforce compliance with Zone treaty obligations.

Another potential problem with such an enforcement mechanism would be making sanctions-lifting credible, as some regional states could have doubts based on the Iranian experience. While the Security Council, the United States and the European states have become adept at imposing sanctions, lifting them, and making sure that former target states receive the economic benefits of sanctions relief is a different matter altogether. Once sanctions are instituted, they can be very difficult (and states reluctant to) lift them, and even harder to make the lifting have effect by convincing private sector actors to delist previously listed entities or jurisdictions marked as “high risk”.²⁸ This is due to stringent finance legislation to counter money laundering, terrorist financing and proliferation that have placed a heavy burden on the compliance departments of institutions managing global trade and finance. Thus, for the Zone negotiators to consider sanctions relief as a realistic and credible inducement, it is likely that a new sanctions lifting machinery needs to be put in place at the international, national, and local levels (e.g. the New York Department of Financial Services) before trust in the credibility of sanctions lifting commitments by the Security Council, the United States and the EU, to implement their part of an agreement can be restored, especially within the private sector. In the same vein, regional states will be sceptical about sanctions relief as an inducement as state-led sanctions relief does not always result in the expected economic benefits by a target state. As such, private actors, which today are ambivalent about the notion of sanctions relief and participation in economic activity in formerly sanctioned jurisdictions given the experience of the JCPOA, need to be better incorporated into the process that leads up to the creation and implementation of any future relief mechanisms including in the context of a Zone. As with any possible future JCPOA talks, there should ideally be multi-stakeholder negotiations.

Lastly, hope may also come from the civil society sector, and member states of the Treaty on the Prohibition of Nuclear Weapons (TPNW), which privilege the reliance and non-state actors in the monitoring of disarmament obligations. In contrast to the JCPOA, the TPNW resulted from a multi-stakeholder dialogue that involved the private and civil society sectors, and in this regard, it holds the promise of involving the concerns of the private sector. It also contains interesting provisions that emulate the criminalisation of private sector involvement in WMD acquisitions, making it problematic for private actors to engage in “assistance” to nuclear weapons development. Private sector actors (either global banks or private industry) that are likely to commit such crimes are those with financial ties to P5 military-industrial complexes and non-NPT nuclear weapon states. If fully enforced at the member-state level among TPNW state signatories, this provision may be interpreted in a way that the entry into force of the TPNW may mean banks located in its member-states may be prevented from selling shares of (or providing other services to) big military-industrial conglomerates like Lockheed Martin, BAE, or Matra, as well as Middle Eastern entities active in the nuclear weapons field. Exclusion from the markets

28 A state can be the target of multiple kinds of sanctions (WMD proliferation, terrorism, human rights, etc.), such that even if one or more of the sanctions are lifted, others remains in place, thereby perpetuating their economic effect. Domestic politics, namely the need of sanctions relief to be approved by a legislation body, partisan conflict, and the activism of special interest groups, can also impede sanctions lifting. The private sector, for its part, can have a range of reasons to prohibit or limit its relationship with previously sanctioned jurisdictions even after sanctions are lifted. In general private companies are risk-averse and will be slow to forge business relations with a country that was under sanctions. G. Mallard and A. Hanson. 2021. “Embedded Extra-Territoriality: US Judicial Litigation and the Global Banking Surveillance of Digital Money Flows.” In *Handbook on Unilateral and Extraterritorial Sanctions*, edited by Charlotte Beaucillon. London: Edward Elgar.

of Austria, Mexico, or New Zealand, three signatories of the Treaty that have ratified it, may not be as dissuasive for the private sector as market exclusion from the United States, but as more states add their signatures, then a real move toward nuclear divesting could begin by a global mobilisation in favour of the abolition of WMDs, not only in the Middle East, but everywhere.

The JCPOA's Joint Commission, Dispute Resolution Mechanism and even its problematic sanctions snapback provision could feasibly inform, in one form or another, an effectively governed Zone with a robust compliance and enforcement system.

As the preceding discussion in this sub-section makes clear, the sanctions experience of the JCPOA, at least in its current form, does not lend itself well to replication in a ME WMDFZ. However, their use over the last few decades has inexorably accelerated and they remain one of the few available instruments between diplomacy and force to enforce vitally important WMD agreements and treaties. Sanctions have shown their propensity to become more potent, but also reform - for example as demonstrated by the shift to targeted sanctions in the late-1990s and early-2000s - and thus may have a place in the enforcement of a future Zone.

Conclusions

The compliance and enforcement framework of the Joint Comprehensive Plan of Action has many valuable lessons for future negotiations on a Middle East WMD-Free Zone and a possible treaty. The JCPOA's Joint Commission, Dispute Resolution Mechanism and even its problematic sanctions snapback provision could feasibly inform, in one form or another, an effectively governed Zone with a robust compliance and enforcement system. The real challenge will be in finding political will, consensus, and ways to implement these lessons in a realistic manner in the context of possible future ME WMDFZ negotiations or even a treaty. While some old barriers between states in the Middle East are coming down, the region remains deeply polarized. A spirit of regionalism will be needed if the states of the Middle East are to agree to be collectively governed in such a manner, not to mention the perception that this will enhance both their individual and collective security.

From the Iran Nuclear Deal to a Middle East Zone?

Lessons from the JCPOA for an ME WMDFZ

The Joint Comprehensive Plan of Action (JCPOA) explicitly states that it “should not be considered as setting precedents for any other state or for fundamental principles of international law.” However, its unique negotiations process, provisions, and implementation created an important set of tools that could provide valuable insights and lessons for a Middle East Weapons of Mass Destruction Free Zone (ME WMDFZ). Understanding these tools in a regional context based on the JCPOA experience could provide ME WMDFZ negotiators and researchers important additional tools, ideas, and lessons learned on the road toward negotiating a Zone treaty. This series explores lessons from the JCPOA for the ME WMDFZ through essays focusing on five key themes, including the Iran nuclear deal’s negotiating process, structure and format; nuclear fuel cycle activities and research; nuclear cooperation; safeguards and verification; and compliance and enforcement.



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