

Decoding the Iran Nuclear Deal

Key questions, points of divergence, pros and cons, pending legislation, and essential facts.



HARVARD Kennedy School

BELFER CENTER

FOR SCIENCE AND INTERNATIONAL AFFAIRS

April 2015



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1. Introduction

On April 2, 2015, the EU (on behalf of the P5+1 countries) and Iran announced agreement on “key parameters” for a comprehensive nuclear deal with Iran. The EU-Iran Joint Statement is buttressed by unilateral fact sheets issued by the U.S. and Iran, which provide further details of the framework accord. Not surprisingly, differences have emerged between the U.S. and Iranian versions of the deal. These differences reflect both political spin and remaining issues that have not been resolved. In the next phase of this process, the negotiators will seek to finalize a comprehensive agreement by June 30, 2015.

To assist Members of Congress and others to evaluate the emerging deal, the Belfer Center for Science and International Affairs at the Harvard Kennedy School has prepared this Policy Brief summarizing key facts, core concepts, and major arguments for and against the emerging deal. Amidst the sound and fury of claim and counter-claim, the purpose of this Policy Brief is not to advocate support for or opposition to the deal, but rather to provide an objective, nonpartisan summary to inform Members of Congress and others in coming to their own conclusions. The team of experts who prepared this report includes Democrats, Republicans, independents, and internationals, who have many disagreements among themselves, but who agree that this Brief presents the essentials objectively. Since the negotiations are ongoing and the debate is intensifying, we invite readers who disagree with our presentation or who have additional questions or points to send their comments to us at iran_matters@hks.harvard.edu. If suitable, we will post these contributions with attribution on our website *Iran Matters*.

Nuclear Restrictions and Time Frame

Uranium route	Plutonium route	Duration
<ul style="list-style-type: none"> No enrichment above 3.67% (low-enriched uranium) Stockpile of low-enriched uranium reduced to 300 kg No other enrichment facilities Fordow: 1,044 centrifuges installed (not enriching) 	<ul style="list-style-type: none"> No construction of additional heavy water reactors Ship out unused heavy water 	15 years
<ul style="list-style-type: none"> Natanz: 5,060 centrifuges enriching Roughly one year breakout No enrichment using advanced centrifuges (some R&D permitted) 		10 years
	<ul style="list-style-type: none"> No reprocessing of spent fuel All spent fuel from Arak shipped out of country for lifetime of reactor 	Permanent
	<ul style="list-style-type: none"> Destruction or removal of Arak core 	

Monitoring and Verification Provisions According to the U.S. Fact Sheet

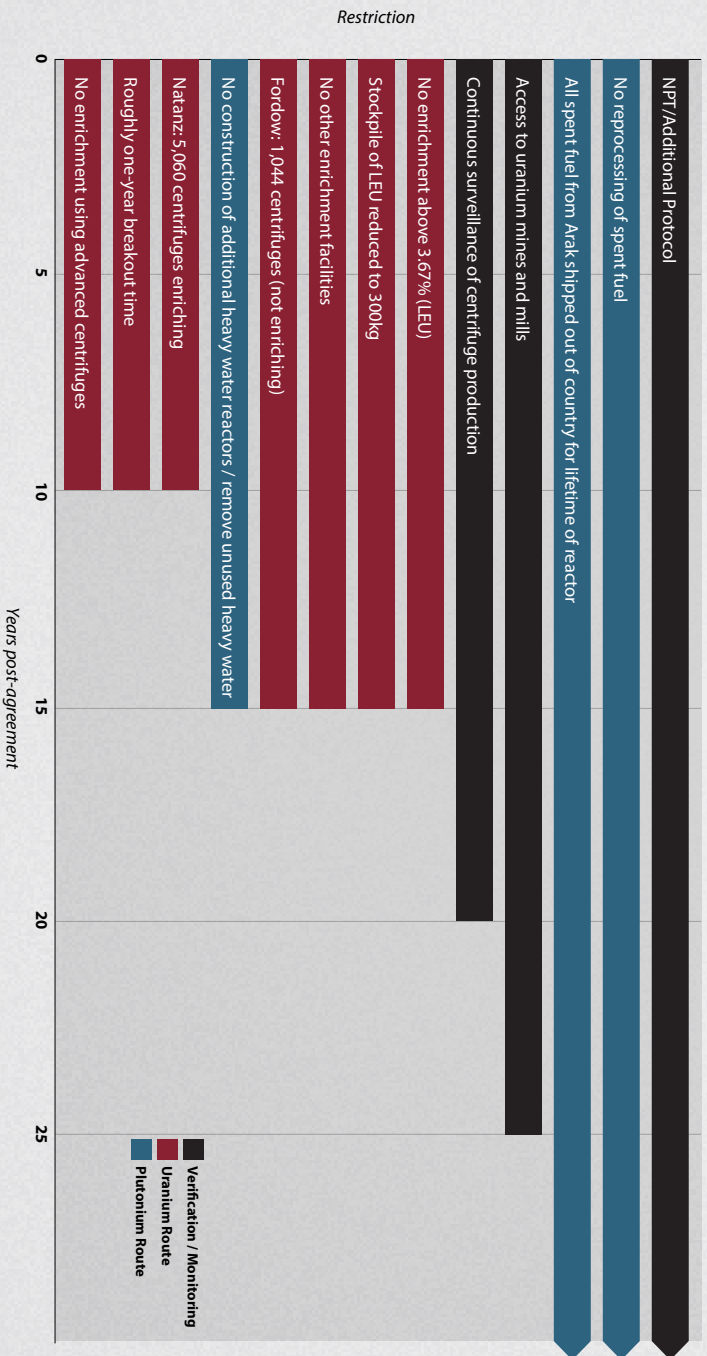
IAEA granted:	Iran agrees:
"Regular access" to all nuclear facilities	To implement Additional Protocol and Modified Code 3.1
Monitoring of nuclear-related purchases from abroad through "dedicated procurement channel"	To "implement an agreed set of measures to address" possible military dimensions
Access to uranium mines and continuous surveillance of uranium mills for 25 years	
"Continuous surveillance" of centrifuge production and storage facilities for 20 years	
Access "to investigate suspicious sites or allegations of covert" nuclear facilities	

Differences Before/After Apr. 2015 Accord

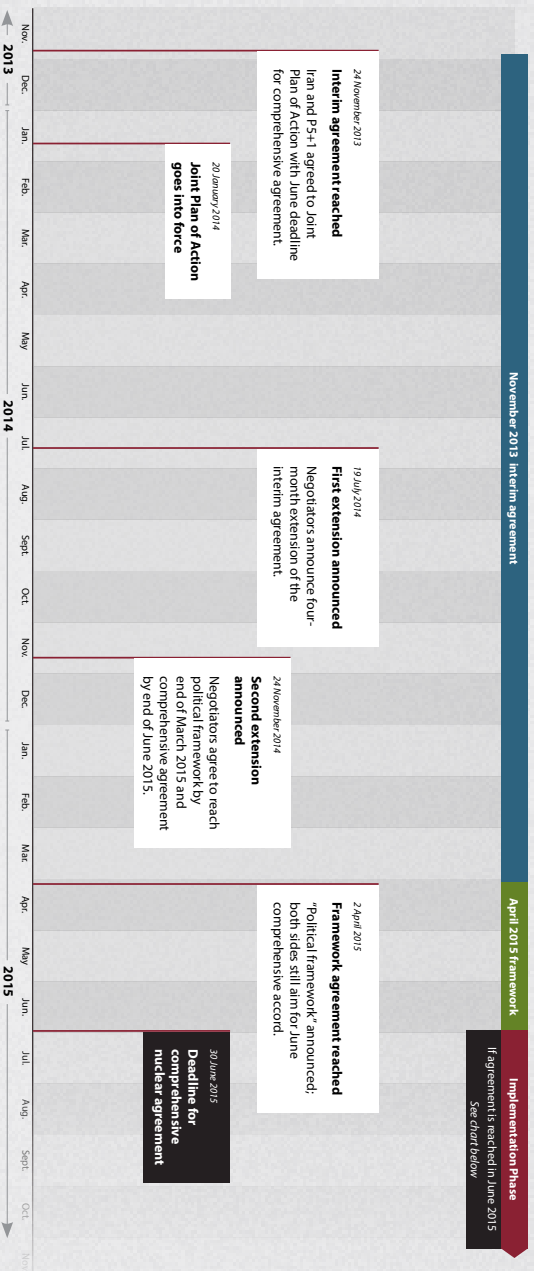
	Before	After
Uranium route		
First generation centrifuges installed	18,472	6,104
Advanced centrifuges installed	1,008	0
Breakout time*	1-2 months	1 year
Research & development of new centrifuge technology	Unconstrained	Constrained
Stockpile of low-enriched uranium in UF₆	7,154 kg	300 kg
Stockpile of 20% enriched uranium in UF₆	196 kg	0 kg
Plutonium route		
Arak reactor	Under construction to produce 1-2 bombs-worth of plutonium annually	Core dismantled and reactor reconfigured to produce less plutonium

*Defined as time required to produce 25 kg of 90% enriched uranium.

Proposed Timeline of Implementation



Negotiations Timeline, Sept. 2013 – Present



2. Documents of the Framework Accord

2.1 *Text of EU-Iran Joint Statement* (April 2, 2015)

Joint Statement by EU High Representative Federica Mogherini and Iranian Foreign Minister Javad Zarif

Switzerland

We, the EU High Representative and the Foreign Minister of the I. R. of Iran, together with the Foreign Ministers of the E3+3 (China, France, Germany, the Russian Federation, the United Kingdom and the United States), met from 26 March to 2nd April 2015 in Switzerland. As agreed in November 2013, we gathered here to find solutions towards reaching a comprehensive resolution that will ensure the exclusively peaceful nature of the Iranian nuclear programme and the comprehensive lifting of all sanctions.

Today, we have taken a decisive step: we have reached solutions on key parameters of a Joint Comprehensive Plan of Action (JCPOA). The political determination, the good will and the hard work of all parties made it possible. Let us thank all delegations for their tireless dedication.

This is a crucial decision laying the agreed basis for the final text of the JCPOA. We can now restart drafting the text and annexes of the JCPOA, guided by the solutions developed in these days.

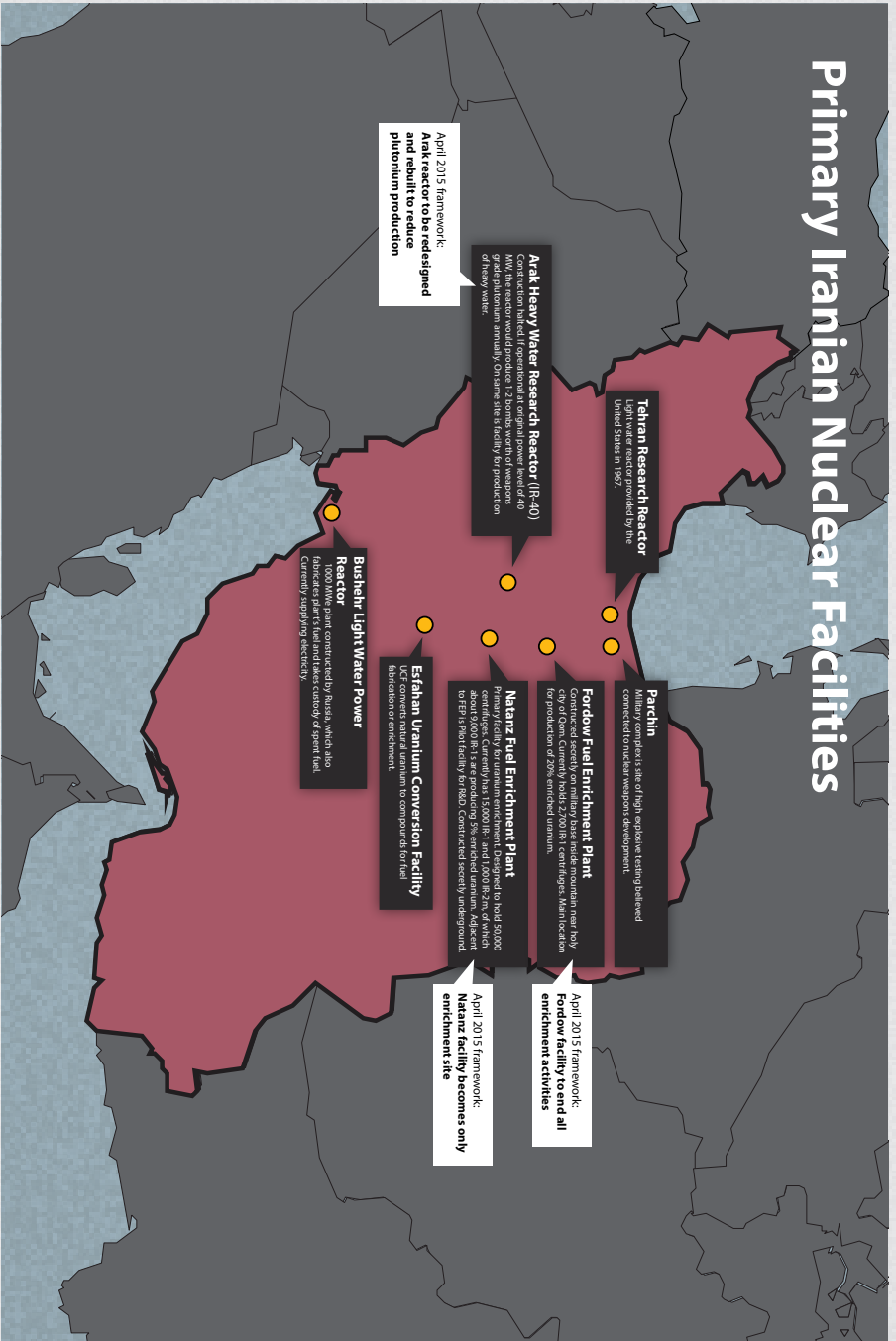
As Iran pursues a peaceful nuclear programme, Iran's enrichment capacity, enrichment level and stockpile will be limited for specified durations, and there will be no other enrichment facility than Natanz. Iran's research and development on centrifuges will be carried out on a scope and schedule that has been mutually agreed.

Fordow will be converted from an enrichment site into a nuclear, physics and technology centre. International collaboration will be encouraged in agreed areas of research. There will not be any fissile material at Fordow. An international joint venture will assist Iran in redesigning and rebuilding a modernized Heavy Water Research Reactor in Arak that will not produce weapons grade plutonium. There will be no reprocessing and the spent fuel will be exported. A set of measures have been agreed to monitor the provisions of the JCPOA including implementation of the modified Code 3.1 and provisional application of the Additional Protocol. The International Atomic Energy Agency (IAEA) will be permitted the use of modern technologies and will have enhanced access through agreed procedures, including to clarify past and present issues. Iran will take part in international cooperation in the field of civilian nuclear energy which can include supply of power and research reactors. Another important area of cooperation will be in the field of nuclear safety and security. The EU will terminate the implementation of all nuclear-related economic and financial sanctions and the US will cease the application of all nuclear-related secondary economic and financial sanctions, simultaneously with the IAEA-verified implementation by Iran of its key nuclear commitments.

A new UN Security Council Resolution will endorse the JCPOA, terminate all previous nuclear-related resolutions and incorporate certain restrictive measures for a mutually agreed period of time.

We will now work to write the text of a Joint Comprehensive Plan of Action including its technical details in the coming weeks and months at the political and experts levels. We are committed to complete our efforts by June 30th. We would like to thank the Swiss government for its generous support in hosting these negotiations.

Primary Iranian Nuclear Facilities



2.2 ***Text of U.S. Fact Sheet***

“Parameters for a Joint Comprehensive Plan of Action Regarding the Islamic Republic of Iran’s Nuclear Program”

April 2, 2015

Below are the key parameters of a Joint Comprehensive Plan of Action (JCPOA) regarding the Islamic Republic of Iran’s nuclear program that were decided in Lausanne, Switzerland. These elements form the foundation upon which the final text of the JCPOA will be written between now and June 30, and reflect the significant progress that has been made in discussions between the P5+1, the European Union, and Iran. Important implementation details are still subject to negotiation, and nothing is agreed until everything is agreed. We will work to conclude the JCPOA based on these parameters over the coming months.

Enrichment

- Iran has agreed to reduce by approximately two-thirds its installed centrifuges. Iran will go from having about 19,000 installed today to 6,104 installed under the deal, with only 5,060 of these enriching uranium for 10 years. All 6,104 centrifuges will be IR-1s, Iran’s first-generation centrifuge.
- Iran has agreed to not enrich uranium over 3.67 percent for at least 15 years.
- Iran has agreed to reduce its current stockpile of about 10,000 kg of low-enriched uranium (LEU) to 300 kg of 3.67 percent LEU for 15 years.
- All excess centrifuges and enrichment infrastructure will be

placed in IAEA monitored storage and will be used only as replacements for operating centrifuges and equipment.

- Iran has agreed to not build any new facilities for the purpose of enriching uranium for 15 years.
- Iran's breakout timeline – the time that it would take for Iran to acquire enough fissile material for one weapon – is currently assessed to be 2 to 3 months. That timeline will be extended to at least one year, for a duration of at least ten years, under this framework.

Iran will convert its facility at Fordow so that it is no longer used to enrich uranium

- Iran has agreed to not enrich uranium at its Fordow facility for at least 15 years.
- Iran has agreed to convert its Fordow facility so that it is used for peaceful purposes only – into a nuclear, physics, technology, research center.
- Iran has agreed to not conduct research and development associated with uranium enrichment at Fordow for 15 years.
- Iran will not have any fissile material at Fordow for 15 years.
- Almost two-thirds of Fordow's centrifuges and infrastructure will be removed. The remaining centrifuges will not enrich uranium. All centrifuges and related infrastructure will be placed under IAEA monitoring.

Iran will only enrich uranium at the Natanz facility, with only 5,060 IR-1 first-generation centrifuges for ten years

- Iran has agreed to only enrich uranium using its first generation (IR-1 models) centrifuges at Natanz for ten years, removing its more advanced centrifuges.
- Iran will remove the 1,000 IR-2M centrifuges currently installed at Natanz and place them in IAEA monitored storage for ten years.
- Iran will not use its IR-2, IR-4, IR-5, IR-6, or IR-8 models to produce enriched uranium for at least ten years. Iran will engage in limited research and development with its advanced centrifuges, according to a schedule and parameters which have been agreed to by the P5+1.
- For ten years, enrichment and enrichment research and development will be limited to ensure a breakout timeline of at least 1 year. Beyond 10 years, Iran will abide by its enrichment and enrichment R&D plan submitted to the IAEA, and pursuant to the JCPOA, under the Additional Protocol resulting in certain limitations on enrichment capacity.

Inspections and Transparency

- The IAEA will have regular access to all of Iran's nuclear facilities, including to Iran's enrichment facility at Natanz and its former enrichment facility at Fordow, and including the use of the most up-to-date, modern monitoring technologies.
- Inspectors will have access to the supply chain that supports Iran's nuclear program. The new transparency and

inspections mechanisms will closely monitor materials and/or components to prevent diversion to a secret program.

- Inspectors will have access to uranium mines and continuous surveillance at uranium mills, where Iran produces yellowcake, for 25 years.
- Inspectors will have continuous surveillance of Iran's centrifuge rotors and bellows production and storage facilities for 20 years. Iran's centrifuge manufacturing base will be frozen and under continuous surveillance.
- All centrifuges and enrichment infrastructure removed from Fordow and Natanz will be placed under continuous monitoring by the IAEA.
- A dedicated procurement channel for Iran's nuclear program will be established to monitor and approve, on a case by case basis, the supply, sale, or transfer to Iran of certain nuclear-related and dual use materials and technology – an additional transparency measure.
- Iran has agreed to implement the Additional Protocol of the IAEA, providing the IAEA much greater access and information regarding Iran's nuclear program, including both declared and undeclared facilities.
- Iran will be required to grant access to the IAEA to investigate suspicious sites or allegations of a covert enrichment facility, conversion facility, centrifuge production facility, or yellowcake production facility anywhere in the country.
- Iran has agreed to implement Modified Code 3.1 requiring early notification of construction of new facilities.
- Iran will implement an agreed set of measures to address the IAEA's concerns regarding the Possible Military Dimensions (PMD) of its program.

Reactors and Reprocessing

- Iran has agreed to redesign and rebuild a heavy water research reactor in Arak, based on a design that is agreed to by the P5+1, which will not produce weapons grade plutonium, and which will support peaceful nuclear research and radioisotope production.
- The original core of the reactor, which would have enabled the production of significant quantities of weapons-grade plutonium, will be destroyed or removed from the country.
- Iran will ship all of its spent fuel from the reactor out of the country for the reactor's lifetime.
- Iran has committed indefinitely to not conduct reprocessing or reprocessing research and development on spent nuclear fuel.
- Iran will not accumulate heavy water in excess of the needs of the modified Arak reactor, and will sell any remaining heavy water on the international market for 15 years.
- Iran will not build any additional heavy water reactors for 15 years.

Sanctions

- Iran will receive sanctions relief, if it verifiably abides by its commitments.
- U.S. and E.U. nuclear-related sanctions will be suspended after the IAEA has verified that Iran has taken all of its key nuclear-related steps. If at any time Iran fails to fulfill its commitments, these sanctions will snap back into place.
- The architecture of U.S. nuclear-related sanctions on Iran will be retained for much of the duration of the deal and

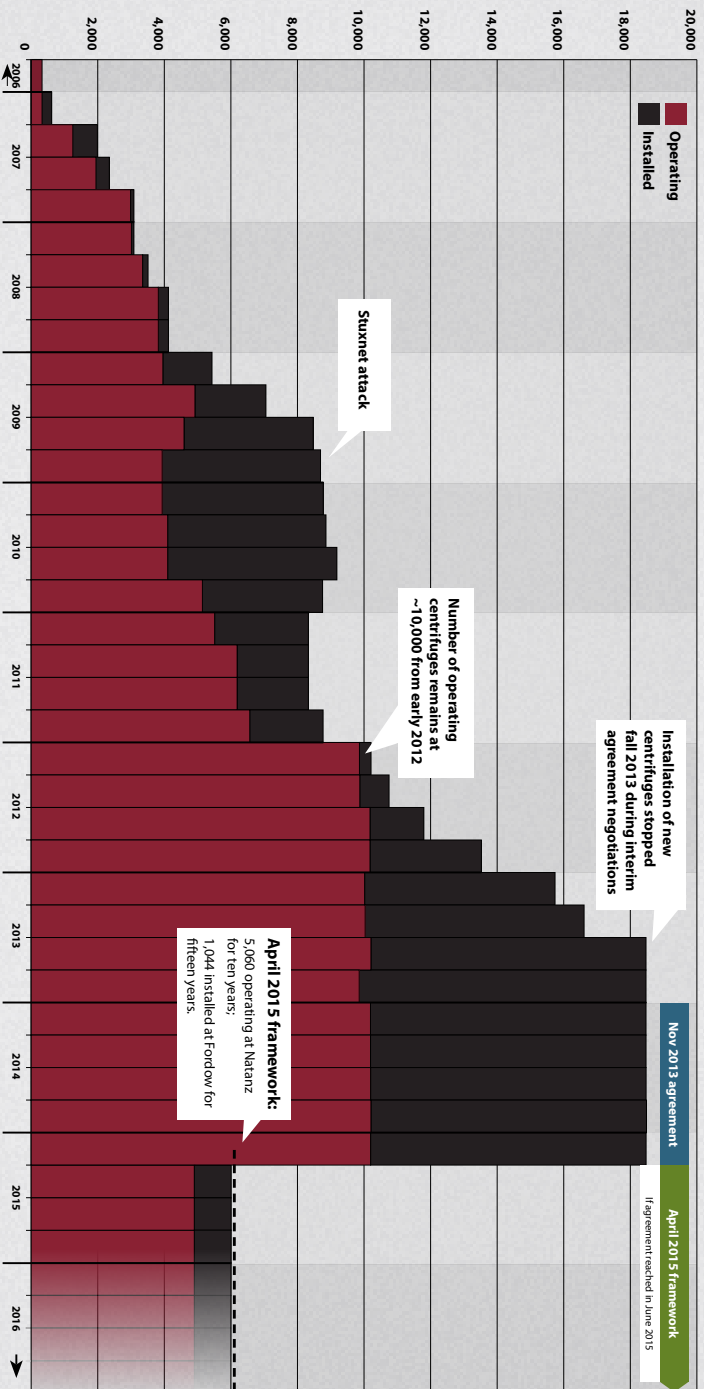
allow for snap-back of sanctions in the event of significant non-performance.

- All past UN Security Council resolutions on the Iran nuclear issue will be lifted simultaneous with the completion, by Iran, of nuclear-related actions addressing all key concerns (enrichment, Fordow, Arak, PMD, and transparency).
- However, core provisions in the UN Security Council resolutions – those that deal with transfers of sensitive technologies and activities – will be re-established by a new UN Security Council resolution that will endorse the JCPOA and urge its full implementation. It will also create the procurement channel mentioned above, which will serve as a key transparency measure. Important restrictions on conventional arms and ballistic missiles, as well as provisions that allow for related cargo inspections and asset freezes, will also be incorporated by this new resolution.
- A dispute resolution process will be specified, which enables any JCPOA participant, to seek to resolve disagreements about the performance of JCPOA commitments.
- If an issue of significant non-performance cannot be resolved through that process, then all previous UN sanctions could be re-imposed.
- U.S. sanctions on Iran for terrorism, human rights abuses, and ballistic missiles will remain in place under the deal.

Phasing

- For ten years, Iran will limit domestic enrichment capacity and research and development – ensuring a breakout timeline of at least one year. Beyond that, Iran will be bound by its longer-term enrichment and enrichment research and development plan it shared with the P5+1.
- For fifteen years, Iran will limit additional elements of its program. For instance, Iran will not build new enrichment facilities or heavy water reactors and will limit its stockpile of enriched uranium and accept enhanced transparency procedures.
- Important inspections and transparency measures will continue well beyond 15 years. Iran's adherence to the Additional Protocol of the IAEA is permanent, including its significant access and transparency obligations. The robust inspections of Iran's uranium supply chain will last for 25 years.
- Even after the period of the most stringent limitations on Iran's nuclear program, Iran will remain a party to the Nuclear Non-Proliferation Treaty (NPT), which prohibits Iran's development or acquisition of nuclear weapons and requires IAEA safeguards on its nuclear program.

IR-1 Centrifuges at Natanz and Fordow, 2007-present



2.3 Text of Iran Summary

Following the announcement of the framework of the nuclear agreement, the Iranian Foreign Ministry issued its own “fact sheet,” titled the “Summary of the Package of Joint Solutions for Reaching a Comprehensive Plan of Joint Action,” in Farsi. The translation is provided below by Payam Mohseni, Director of Harvard Belfer Center’s Iran Project. (Note: Bolded text reflects emphasis in original statement).

“Summary of the Package of Joint Solutions for Reaching a Comprehensive Plan of Joint Action”

The Islamic Republic of Iran and the countries in the P5+1, including China, Russia, France, the United States, England, and Germany, in the city of Lausanne, Switzerland, reached a package of solutions necessary to attain a Comprehensive Plan of Joint Action according to the framework of the elements contained within the 24 November 2013 Joint Plan of Action following a long process of complex and extensive negotiations with technical, legal, and political dimensions. **The package containing these solutions is not legally binding and will only provide a conceptual guide for calibrating and assessing a Comprehensive Plan of Joint Action. On these grounds, the drafting of a Comprehensive Plan of Joint Action based on these solutions will begin in the near future.**

The Continuation of the Nuclear Program including Enrichment

According to the framework of existing solutions, none of the nuclear facilities or related activities will be stopped, shut down,

or suspended, and Iran's nuclear activities in all of its facilities including Natanz, Fordow, Isfahan, and Arak will continue.

These comprehensive solutions will guarantee the continuation of the enrichment program inside the country, and, based on this, the Islamic Republic of Iran will have the ability to continue its industrial production of nuclear fuel for providing the fuel for its nuclear reactors in accordance with the Comprehensive Plan of Joint Action.

According to the reached solutions, **the timeframe of the Comprehensive Plan of Joint Action regarding Iran's enrichment program will be 10 years.** During this period, more than 5,000 centrifuge machines will continue producing enriched material at the 3.67 percent level at Natanz. Additional machines to this number and related infrastructure will be used to replace machines that have been damaged during this time and will be collected and stored under the supervision of the IAEA. Also, Iran will be able to use the existing enriched stockpile for producing a nuclear fuel center and/or exporting it to international markets in exchange for uranium.

According to the reached solutions, Iran will continue its research and development on advanced machines and will continue the initiation and completion phases of the research and development process of IR-4, IR-5, IR-6, and IR-8 centrifuges during the 10 year period of the Comprehensive Plan of Joint Action.

Fordow Facilities

According to the reached solutions, the Fordow nuclear facilities will be converted to an advanced nuclear and physics research center. More than 1,000 centrifuge machines and all related infrastructure in Fordow will be preserved and maintained, out of which two centrifuge cascades will be in operation. In addition, in cooperation with some of the countries of the P5+1, half of the Fordow facilities will be dedicated to advanced nuclear research and the production of stable isotopes that have important applications in industry, agriculture, and medicine.

Arak Heavy Water Research Reactor

In accordance with the existing solutions, **the Arak heavy water research reactor will remain** and will be enhanced and updated with re-modifications. In the redesigning of the reactor, in addition to decreasing the amount of plutonium production, the efficiency of the Arak reactor will be increased significantly. The re-modification of the Arak reactor will be undertaken in a designated timeframe and will be initiated in the form of a joint international project under the management of Iran, after which the construction will begin immediately in the framework of a comprehensive timeframe. The production of fuel for the Arak reactor and the granting of an international nuclear fuel license are among the issues that will be undertaken with international cooperation. On the other hand, the factory for the production of heavy water will continue to function as it has in the past.

Additional Protocol

Iran will implement the Additional Protocol on a voluntary and temporary basis for the sake of transparency and confidence building, and, in continuation, the approval process of the Protocol will be ratified within a specified timeframe under the mandate of the President and the Islamic Consultative Assembly.

Removal of Sanctions

According to the reached solutions, after the implementation of the Comprehensive Plan of Joint Action, all of the UN Security Council resolutions will be revoked, and all of the multilateral economic and financial sanctions of the EU and the unilateral ones of the US including financial, banking, insurance, investment, and all related services, including oil, gas, petrochemicals, and automobile industries will be immediately revoked. In addition, nuclear-related sanctions against real and legal individuals, entities, and public and private institutions, including the Central Bank, other financial and banking institutions, SWIFT, shipping and aviation industries of the Islamic Republic of Iran, oil tanker companies, will be immediately removed. Also, the P5+1 member countries are committed to restraining from imposing new nuclear-related sanctions.

International Cooperation

International nuclear cooperation with the Islamic Republic of Iran, including with members of the P5+1, will be possible and enhanced in the fields of constructing nuclear power plants, research reactors, nuclear fusion, stable isotopes, nuclear safety, nuclear medicine and agriculture, etc. According to the

Comprehensive Plan of Joint Action, Iran will also be provided access to the global market and the international trade, finance, technical knowledge and energy sectors.

Schedule for Implementing the Comprehensive Plan of Joint Action

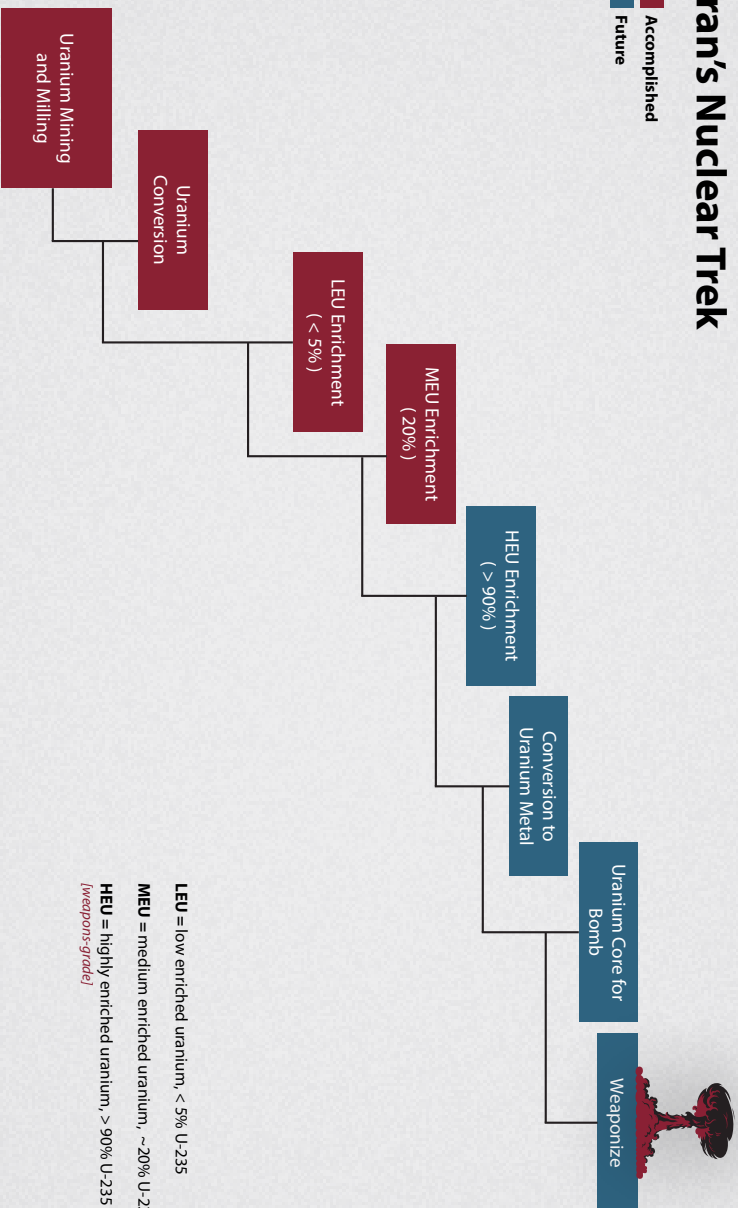
At the end of this stage of negotiations, the drafting of the Comprehensive Joint Plan of Action will begin in the near future until the timeframe of 10 Tir (July 1). With the finalization of the text, the Comprehensive Plan of Joint Action will be adopted as a resolution by the UN Security Council. For the Comprehensive Joint Plan of Action to be binding and executable for all UN member states, this resolution will be approved under Article 41 of Chapter Seven of the UN Charter like the previous resolutions against Iran so that these previous resolutions can be annulled.

The parties to the Comprehensive Plan of Joint Action will need a timeframe for preparatory work for the implementation of the Comprehensive Plan of Joint Action once the resolution is approved by the Security Council. After the preparatory phase, and at the same time as the start of Iran's nuclear-related implementation work, all of the sanctions will be automatically annulled on a single specified day.

In the framework of the reached solutions, violations from the mutually agreed accords contained in the Comprehensive Plan of Joint Action by any one country will have predetermined mechanisms of response.

Iran's Nuclear Trek

■ Accomplished
■ Future



2.4 Comparing U.S. and Iranian positions from the fact sheets and public statements

Issue: Sanctions	
<p>Joint EU/P5+1 – Iran Statement: <i>“The EU will terminate the implementation of all nuclear-related economic and financial sanctions and the US will cease the application of all nuclear-related secondary economic and financial sanctions, simultaneously with the IAEA-verified implementation by Iran of its key nuclear commitments. A new UN Security Council Resolution will endorse the JCPOA, terminate all previous nuclear-related resolutions and incorporate certain restrictive measures for a mutually agreed period of time.”</i></p>	
U.S. position:	Iran position:
<p>Fact sheet: “U.S. and E.U. nuclear-related sanctions will be suspended after the IAEA has verified that Iran has taken all of its key nuclear-related steps. If at any time Iran fails to fulfill its commitments, these sanctions will snap back into place.”</p>	<p>Summary: “After the implementation of the Comprehensive Plan of Joint Action, all of the UN Security Council resolutions will be revoked, and all of the multilateral economic and financial sanctions of the EU and the unilateral ones of the US including financial, banking, insurance, investment, and all related services, including oil, gas, petrochemicals, and automobile industries will be immediately revoked. In addition, nuclear-related sanctions against real and legal individuals, entities, and public and private institutions, including the Central Bank, other financial and banking institutions, SWIFT, shipping and aviation industries of the Islamic Republic of Iran, oil tanker companies, will be immediately removed. Also, the P5+1 member countries are committed to restraining from imposing new nuclear-related sanctions.”</p> <p>Deputy Foreign Minister Araqchi: <i>“The use of the word ‘suspension’ in the recent fact sheet by Americans is a mistake and called for our objections. But the fact sheet is not our basis [in the nuclear deal] and the important text is the text of the final agreement.”</i> (Interview, 4/4)</p>

Issue: Sanctions

(Continued)

U.S. position:

President Obama: “In return for Iran’s actions, the international community has agreed to provide Iran with relief from certain sanctions -- our own sanctions, and international sanctions imposed by the United Nations Security Council. This relief will be phased as Iran takes steps to adhere to the deal.” (Rose Garden statement, 4/2)

President Obama: “The basic framework calls for Iran to take the steps that it needs to around Fordow and the centrifuges and so forth. At that point, then the UN sanctions are suspended.” (New York Times interview, 4/5)

Secretary Kerry: “It’s really a matter of anywhere from probably six months to a year or so that it will take to begin to comply with all of the nuclear steps that need to be taken in order to then begin into the phasing. Those steps have to happen first.” (Press Conference, 4/2)

Iran position:

President Rouhani: “On the basis of this framework, all sanctions in financial, economic and banking sectors as well as all (UN Security Council) sanctions resolutions against Iran will be canceled on the very first day of the implementation of the deal, and new cooperation in both nuclear and other sectors will start with the world on the same day.” (Speech, 4/4)

Deputy Foreign Minister Araqchi: “The sanctions are planned to be lifted in the first stage of the final step.” (Interview, 4/4)

Supreme Leader Khamenei: “All sanctions should be removed when the deal is signed. If the sanctions removal depends on other processes, then why did we start the negotiations?” (Speech, 4/9)

Issue: Natanz

Joint EU/P5+1 – Iran Statement: *“Iran’s enrichment capacity, enrichment level and stockpile will be limited for specified durations, and there will be no other enrichment facility than Natanz.”*

U.S. position:	Iran position:
<p>Fact sheet: “Iran has agreed to reduce by approximately two-thirds its installed centrifuges. Iran will go from having about 19,000 installed today to 6,104 installed under the deal, with only 5,060 of these enriching uranium for 10 years. All 6,104 centrifuges will be IR-1s, Iran’s first-generation centrifuge. Iran has agreed to not enrich uranium over 3.67 percent for at least 15 years.”</p>	<p>Summary: “The timeframe of the Comprehensive Plan of Joint Action regarding Iran’s enrichment program will be 10 years. During this period, more than 5,000 centrifuge machines will continue producing enriched material at the 3.67 percent level at Natanz.”</p>
<p>Fact sheet: “Iran has agreed to reduce its current stockpile of about 10,000 kg of low-enriched uranium (LEU) to 300 kg of 3.67 percent LEU for 15 years.”</p> <p>Secretary Kerry: “The stockpile is going to have to be diluted or sold in the international marketplace, and that is agreed upon at this point in time.” (Press Conference, 4/2)</p>	<p>Summary: “Iran will be able to use the existing enriched stockpile for producing a nuclear fuel center and/or its export to international markets in exchange for uranium.”</p>
<p>Fact sheet: “Iran will not use its IR-2, IR-4, IR-5, IR-6, or IR-8 models to produce enriched uranium for at least ten years. Iran will engage in limited research and development with its advanced centrifuges.”</p>	<p>Summary: “Iran will continue its research and development on advanced machines and will continue the initiation and completion phases of the research and development process of IR-4, IR-5, IR-6, and IR-8 centrifuges.”</p>
<p>Fact sheet: “Iran has agreed to not build any new facilities for the purpose of enriching uranium for 15 years.”</p>	<p>Summary: “None of the nuclear facilities or related activities will be stopped, shut down, or suspended, and Iran’s nuclear activities in all of its facilities including Natanz, Fordow, Isfahan, and Arak will continue.”</p>
<p>Fact sheet: “Iran will remove the 1,000 IR-2M centrifuges currently installed at Natanz and place them in IAEA monitored storage for ten years.”</p>	

Issue: Natanz

(Continued)

U.S. position:	Iran position:
Fact sheet: "All excess centrifuges and enrichment infrastructure will be placed in IAEA monitored storage and will be used only as replacements for operating centrifuges and equipment."	Summary: "Additional machines to this number and related infrastructure will be used to replace machines that have been damaged during this time and will be collected and stored under the supervision of the IAEA."
Fact sheet: "Iran's breakout timeline – the time that it would take for Iran to acquire enough fissile material for one weapon – is currently assessed to be 2 to 3 months. That timeline will be extended to at least one year, for a duration of at least ten years, under this framework."	

Issue: Fordow

Joint EU/P5+1 – Iran Statement: *“Fordow will be converted from an enrichment site into a nuclear, physics and technology centre. International collaboration will be encouraged in agreed areas of research. There will not be any fissile material at Fordow.”*

U.S. position:	Iran position:
Fact sheet: “Iran has agreed to convert its Fordow facility so that it is used for peaceful purposes only – into a nuclear, physics, technology, research center.”	Summary: “The Fordow nuclear facilities will be converted to an advanced nuclear and physics research center.”
Fact sheet: “Almost two-thirds of Fordow’s centrifuges and infrastructure will be removed. The remaining centrifuges will not enrich uranium. All centrifuges and related infrastructure will be placed under IAEA monitoring.”	Summary: “More than 1,000 centrifuge machines and all related infrastructure in Fordow will be preserved and maintained, out of which two centrifuge cascades will be in operation.”
	Summary: “In addition, in cooperation with some of the countries of the P5+1, half of the Fordow facilities will be dedicated to advanced nuclear research and the production of stable isotopes that have important applications in industry, agriculture, and medicine.”
Fact sheet: “Iran has agreed to not conduct research and development associated with uranium enrichment at Fordow for 15 years.”	
Fact sheet: “Iran will not have any fissile material at Fordow for 15 years.”	

Issue: Arak Heavy Water Research Reactor

Joint EU/P5+1 – Iran Statement: *“An international joint venture will assist Iran in redesigning and rebuilding a modernized Heavy Water Research Reactor in Arak that will not produce weapons grade plutonium. There will be no reprocessing and the spent fuel will be exported.”*

U.S. position:	Iran position:
<p>Fact sheet: “Iran has agreed to redesign and rebuild a heavy water research reactor in Arak, based on a design that is agreed to by the P5+1, which will not produce weapons grade plutonium, and which will support peaceful nuclear research and radioisotope production.”</p>	<p>Summary: “The Arak heavy water research reactor will remain and will be enhanced and updated with re-modifications. In the redesigning of the reactor, in addition to decreasing the amount of plutonium production, the efficiency of the Arak reactor will be increased significantly.”</p> <p>Summary: “The production of fuel for the Arak reactor and the granting of an international nuclear fuel license are among the issues that will be undertaken with international cooperation.”</p>
<p>Fact sheet: “The original core of the reactor, which would have enabled the production of significant quantities of weapons-grade plutonium, will be destroyed or removed from the country.”</p>	
<p>Fact sheet: “Iran will ship all of its spent fuel from the reactor out of the country for the reactor’s lifetime.”</p>	
<p>Fact sheet: “Iran has committed indefinitely to not conduct reprocessing or reprocessing research and development on spent nuclear fuel.”</p>	
<p>Fact sheet: “Iran will not accumulate heavy water in excess of the needs of the modified Arak reactor, and will sell any remaining heavy water on the international market for 15 years.”</p>	<p>Summary: “The factory for the production of heavy water will continue to function as it has in the past.”</p>
<p>Fact sheet: “Iran will not build any additional heavy water reactors for 15 years.”</p>	

Issue: Inspections

Joint EU/P5+1 – Iran Statement: “A set of measures have been agreed to monitor the provisions of the JCPOA including implementation of the modified Code 3.1 and provisional application of the Additional Protocol. The International Atomic Energy Agency (IAEA) will be permitted the use of modern technologies and will have enhanced access through agreed procedures, including to clarify past and present issues.”

U.S. position:	Iran position:
<p>Fact sheet: “The IAEA will have regular access to all of Iran’s nuclear facilities, including to Iran’s enrichment facility at Natanz and its former enrichment facility at Fordow, and including the use of the most up-to-date, modern monitoring technologies.”</p>	
<p>President Obama: “International inspectors will have unprecedented access not only to Iranian nuclear facilities, but to the entire supply chain that supports Iran’s nuclear program -- from uranium mills that provide the raw materials, to the centrifuge production and storage facilities that support the program.” (Rose Garden statement, 4/2)</p>	<p>Supreme Leader Khamenei: “Any inspections and surveillance systems should be limited to conventional mechanisms.” (Speech, 4/9)</p>
<p>Fact sheet: “Iran has agreed to implement the Additional Protocol of the IAEA.”</p>	<p>Summary: “Iran will implement the Additional Protocol on a voluntary and temporary basis for the sake of transparency and confidence building, and, in continuation, the approval process of the Protocol will be ratified within a specified timeframe under the mandate of the President and the Islamic Consultative Assembly.”</p>
<p>Fact sheet: “Iran will be required to grant access to the IAEA to investigate suspicious sites or allegations of a covert enrichment facility, conversion facility, centrifuge production facility, or yellowcake production facility anywhere in the country.”</p>	

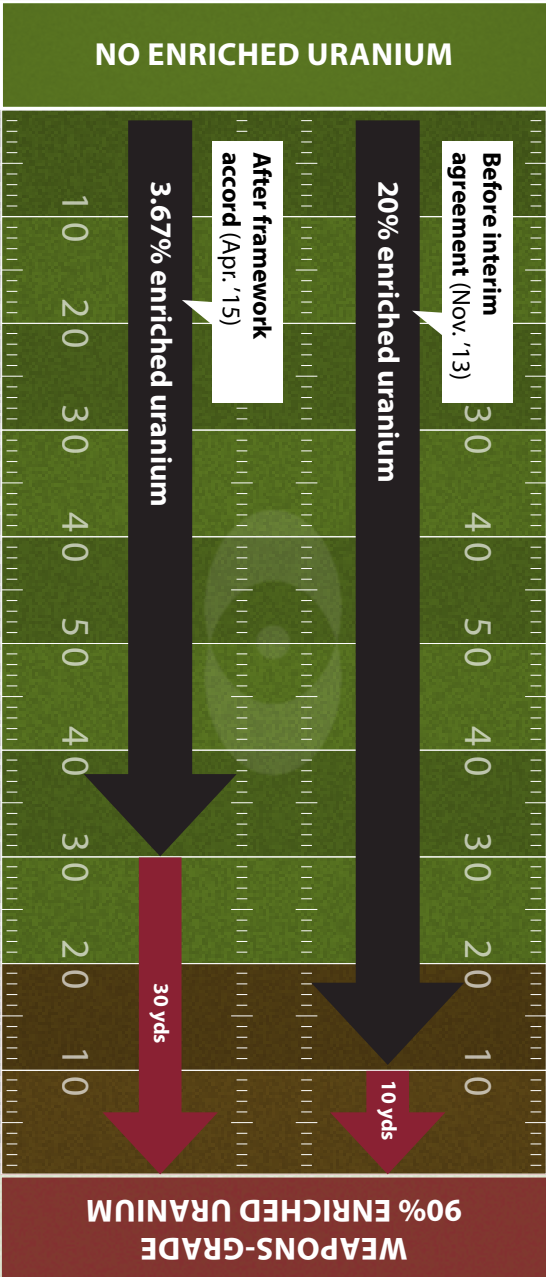
Issue: Inspections	
<i>(Continued)</i>	
U.S. position:	Iran position:
<p>Fact sheet: "Iran has agreed to implement Modified Code 3.1."</p>	
<p>Fact sheet: "Iran will implement an agreed set of measures to address the IAEA's concerns regarding the Possible Military Dimensions (PMD) of its program."</p> <p>President Obama: "If Iran cheats, the world will know it. If we see something suspicious, we will inspect it. Iran's past efforts to weaponize its program will be addressed. With this deal, Iran will face more inspections than any other country in the world." (Rose Garden Statement, 4/2)</p>	<p>Supreme Leader Khamenei: "The country's military officials are not permitted at all to allow the foreigners to cross these boundaries or stop the country's defensive development under the pretext of supervision and inspection." (Speech, 4/9)</p>

Issue: International Cooperation	
<p>Joint EU/P5+1 – Iran Statement: "Iran will take part in international cooperation in the field of civilian nuclear energy which can include supply of power and research reactors. Another important area of cooperation will be in the field of nuclear safety and security."</p>	
U.S. position:	Iran position:
<p>Fact sheet: "A dedicated procurement channel for Iran's nuclear program will be established to monitor and approve, on a case by case basis, the supply, sale, or transfer to Iran of certain nuclear-related and dual use materials and technology – an additional transparency measure."</p>	<p>Summary: "International nuclear cooperation with the Islamic Republic of Iran, including with members of the P5+1, will be possible and enhanced in the fields of constructing nuclear power plants, research reactors, nuclear fusion, stable isotopes, nuclear safety, nuclear medicine and agriculture, etc... According to the Comprehensive Plan of Joint Action, Iran will also be provided access to the global market and the international trade, finance, technical knowledge and energy sectors."</p>

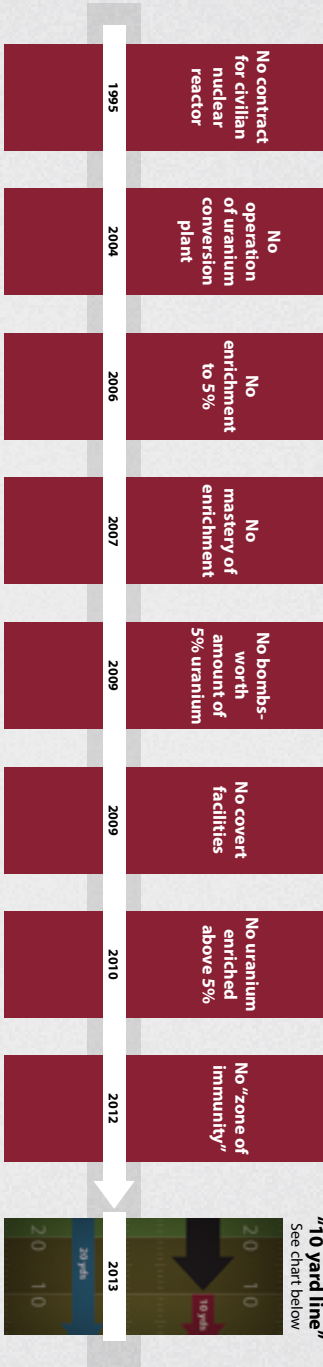
With 20% enriched uranium...

Iran was only 10 yards from a nuclear "touchdown;"

Under the framework accord, Iran's enrichment is capped at 3.67%, moving them out of the "red zone."



Retired "Red Lines"



3. Key Questions and Answers

To illustrate arguments for and against the framework agreement, we have provided competing responses to the most important questions. Our intent is not to judge which response is right or wrong, but to show the strongest cases supporting and opposing the framework.

3.1 *Is the framework nuclear agreement with Iran a good deal?*

Pro framework:

Yes, it will reduce the risk of Iran getting a bomb better than any of the realistic alternatives. Iran has agreed to physical limits on its ability to produce weapons-grade materials that will assure a break-out timeline of roughly a year for the next 10 years, as well as additional restraints and verification measures to monitor compliance and detect cheating. If the U.S. rejects the deal and returns to sanctions, Iran is certain to return to what it was doing before the interim agreement: installing additional centrifuges, enriching uranium, increasing its stockpile of enriched material, developing more advanced centrifuges, and completing the Arak heavy water reactor. The agreement does not solve the problem, but it reduces the risk for now and buys substantial time to resolve the threat in the future.

Con framework:

No, the parameters do not prevent Iran from getting nuclear weapons over the long term. Iran is allowed to retain too much nuclear infrastructure and the restrictions do not last long enough. The limits on Iran's enrichment program taper off after 10 years and are completely removed after 15 years. If it is unacceptable for Iran to have a large scale enrichment program now, why would it be permissible a decade or so from now? How could the U.S. have any confidence that the nature of the Iranian regime and its interest in acquiring nuclear weapons—which goes back 30 years—will change in 10 years? In addition, the verification provisions are not strong enough, especially provisions requiring Iran to fully account for past weaponization activities.

3.2 *The agreement requires Iran to reduce and restrain its enrichment program to extend breakout time from 2-3 months to about a year. Is that sufficient?*

Pro framework:

Yes. Under the agreement, Iran must reduce the number of operating centrifuges and its stockpile of low-enriched feed material over ten years so it would take at least a year to produce enough highly enriched uranium for a single nuclear device. That – along with enhanced monitoring that would detect break out within days or weeks – makes it very unlikely that Iran would try to “break out” at these declared facilities because the risk of detection and military action to destroy the facilities is too great. Without the agreement, Iran can currently produce

enough weapons-grade uranium for a single device at its existing enrichment facilities in two to three months. Moreover, without the agreement, Iran could bring on line thousands of additional centrifuges, accumulate many more tons of low-enriched uranium and rebuild its stocks of 20% uranium – to the point at which it could achieve a breakout option of a few weeks. That might be faster than the international inspectors could detect and the international community could react.

Con framework:

No, even if breakout is detected, the international community might not be able to reach agreement quickly enough to stop Iran. A greater cushion is needed. Moreover, these calculations apply only to Iran's known facilities, but most experts believe that a far more likely path to nuclear weapons would be use of secret facilities. That is why verification provisions—including understanding past weapons work, accounting of current centrifuge inventories, imposing tight restrictions on procurement of nuclear materials and equipment, and ensuring access to suspect sites—are so important. Under the tentative agreement, these extra verification provisions are not permanent, meaning that it will be easier for Iran to construct secret nuclear facilities in the future, once physical restraints have been lifted.

3.3 *Under the agreement, all of the physical limits on Iran's enrichment program will be lifted after 15 years. Why not insist on a longer duration or limits based on Iran's behavior?*

Pro framework:

Realistically, Iran would not agree to limits in perpetuity or limits subject to a decision of the UN Security Council about Iran's future behavior. The 15 year time frame is long enough to test whether Iran is serious about giving up its effort to develop nuclear weapons. Assuming that the agreement holds for the next 15 years, changes may take place in the Iranian government or Iran's relations with the U.S. and other countries in the region. At that time, the president will then face a choice whether to accept an expansion of Iran's enrichment program or to oppose it if he or she believes that Iran is still seeking to develop nuclear weapons.

Con framework:

Iranian President Rouhani boasted that when he was Iran's nuclear negotiator, he bought time for the program with temporary restrictions: "While we were talking with the Europeans in Tehran, we were installing equipment in parts of the facility in Isfahan [the Iranian plant that converts solid uranium to gas for use in enrichment centrifuges], but we still had a long way to go to complete the project. In fact, by creating a calm environment, we were able to complete the work on Isfahan." In 10-15 years, Iran will be free of sanctions and free to build as many centrifuges as it wants. The administration has traded sanctions relief for temporary restrictions.

3.4 *Why should the U.S. expect Iran to comply with the deal? How will America know if Tehran cheats?*

Pro framework:

The agreement is based on verification, not trust. According to the U.S. fact sheet, Iran has agreed to accept the IAEA's Additional Protocol as well as several even more intrusive monitoring and inspection measures that will provide high confidence that Iran is not making bomb material at its declared nuclear facilities and will significantly strengthen the ability of inspectors to detect clandestine facilities. Of course, no verification measures are perfect. In the end, good intelligence is the most important tool for detecting secret activities, but intelligence and enhanced inspections will complement each other, making it less likely that Iran will take the risk of pursuing secret activities and more likely that the U.S. will catch Iran if it tries.

Con framework:

Iran has a dismal record of compliance with its international obligations. Almost ten years ago, the IAEA Board of Governors found that Iran had violated its safeguards agreement on multiple occasions over an extended period of time. Because the deal does not force Iran to address fully past nuclear weapons activities, there is no reliable baseline for verifying future work. In addition, many of the strongest verification measures in the tentative deal fade away after 20 years, which will leave Iran in a stronger position to cheat.

3.5 ***Does the agreement adequately support the IAEA investigation into Iran’s past weaponization program—the “possible military dimensions”?***

Pro framework:

Yes, the issue is not *whether* Iran should resolve the PMD issue to the satisfaction of the IAEA, but *when*. The IAEA investigation is essential to understand what weaponization activities Iran conducted in the past and therefore provide a baseline for monitoring activities in the future to help ensure that Iran does not resume secret efforts to develop a bomb. Instead of demanding that Iran resolve PMD as a pre-condition, the U.S. should accept Iran beginning to cooperate with the IAEA as the agreement is being implemented, as long as UN sanctions are not removed until the PMD issue is fully resolved.

Con framework:

For years, the IAEA has requested that Tehran disclose what it has done on twelve sets of activities that only make sense as part of a nuclear weapons program, such as clandestine nuclear material acquisition, detonator development, and integration of a nuclear system into a missile warhead. The IAEA needs to understand Iran’s past activities to verify that they do not recur in the future. However, if Tehran was unwilling to address the issue before the deal, when sanctions were in place, why would it do so after a deal, as sanctions are being reduced?

3.6 If the agreement permits Iran to have a domestic enrichment program, will other countries in the region want their own equivalents?

Pro framework:

In the absence of an agreement—with Iran’s enrichment program expanding without limits—the pressure on other countries in the Middle East to develop their own nuclear option would be even greater. Nonetheless, some other countries in the region will try to emulate Iran’s enrichment program that is permitted under the agreement. However, as a practical matter, none of the other countries in the region can establish an enrichment program without extensive foreign assistance, just as Iran’s enrichment program is based on an infusion of technology from Pakistan. Fortunately, none of the established nuclear suppliers will sell fuel cycle technology to the Middle East, so the U.S. will have to watch closely to ensure that North Korea, Pakistan or black marketers do not secretly transfer enrichment technology to the region.

Con framework:

The United States has long sought to stem the spread of uranium enrichment technology. If Washington is willing to accept Iranian possession of this key capability, it will be very difficult to discourage other countries, such as Saudi Arabia or South Korea, from also pursuing it.

3.7 *Aside from its nuclear program, Iran is still developing ballistic missiles, supporting terrorism, and calling for the destruction of Israel. Why should the U.S. accept a deal that doesn't address those issues?*

Pro framework:

These negotiations are focused on stopping Iran from getting nuclear weapons. Whether or not the negotiations succeed, Iran will continue to pose threats in the region, but the Iranian threat will be easier to manage if Iran doesn't have nuclear weapons. If an agreement is completed, the U.S. needs to pursue a broader strategy aimed at defending its allies and friends in the region from Iran's threats.

Con framework:

An agreement that doesn't address these other issues, such as Iran's ballistic missile program and support for terrorism, will make the overall Iranian threat even worse. As sanctions are lifted, the Iranian regime will have more resources to invest in a military build up and expand its influence in the region. Moreover, once an agreement is in place, the U.S. and the other P5+1 countries will be more reluctant to challenge Iran's destabilizing behavior in the region for fear of jeopardizing the nuclear deal.

3.8 *If this deal is not a “good deal,” why not walk away and ratchet up sanctions to compel Iran to accept a better deal?*

Pro framework:

The agreement involves a gamble, but walking away at this point would be a much bigger gamble. With the other P5+1 countries supporting the political framework, the U.S. would be hard-pressed to convince the others to return to intensified sanctions. Even if the U.S. could get others on board, there is no certainty that Washington can increase economic pressure on Supreme Leader Khamenei and the hardliners in Iran to the point that they are forced to come back to the table and accept tougher terms. In the meantime, Tehran will resume nuclear activities currently frozen under the interim agreement and probably expand its program. Iran could bring additional centrifuges on line, increase its stockpile of low-enriched uranium, and resume construction of the 40MW Arak heavy water research reactor. Most concerning, Iran could rebuild its stockpile of 20% enriched uranium and even begin production of 60% or 90% enriched uranium under the pretext of peaceful uses. These steps would bring Iran much closer to a credible breakout option and increase the risk of a preemptive military attack by Israel or the United States.

Con framework:

Rather than accept this bad deal, the U.S. should press for a better deal. America should insist on deeper reductions in Iran's existing nuclear capabilities, a longer duration, and more

intrusive inspections. If Iran rejects these demands, the U.S. should rally international support to intensify international sanctions on Iran. Given low oil prices and a weak market, Washington is in a strong position to reduce Iran's oil exports and coerce Tehran to accept more favorable terms for a deal. It may take time for additional sanctions to work, but that is better than accepting a deal that gives away too much.

3.9 *Is a credible military threat by the U.S. and /or Israel required to maximize the likelihood that Iran complies with the terms of the agreement?*

No.

The impact of economic sanctions has led Iran to negotiate and accept terms for an agreement most experts thought unachievable. National intelligence programs and international inspections increase the likelihood that significant violations of a comprehensive agreement will be detected. The threat that the sanctions regime would be reinstated and indeed strengthened if Iran violated an agreement should suffice to ensure compliance.

Yes.

What has prevented Iran from building a bomb - or constructing a secret pathway to a bomb - is the combination of their judgment about the likelihood of being detected and the risk of provoking a military attack against Iran's nuclear facilities. Thus, if a comprehensive agreement is reached, intensified U.S. and other national intelligence efforts and international inspections,

as well as feasible, credible military options for intervening, are the best way to minimize the risk that Iran cheats in a way that has any significance.

3.10 If Iran decides to “break out” toward a nuclear weapon, should the U.S. resort to military action?

No.

The U.S. opposed the Soviet Union’s acquisition of nuclear weapons and considered a preemptive attack to prevent it but decided that the cost of war was not worth the benefits. Instead, Washington found ways to deter Soviet use of nuclear weapons and contain the Soviet Union until it collapsed. When the U.S. has tried and failed to prevent other states from acquiring nuclear weapons, such as China, Pakistan, and North Korea, presidents chose deterrence and containment rather than war. While Iran’s acquisition of nuclear weapons would pose a major failure for U.S. policy and a serious threat to our interests, Washington could successfully deter use against the U.S. and our allies in the region.

Yes.

The threat to U.S. national and international security if Iran gets the bomb justifies the use of military force. The U.S. has the military means to destroy or heavily damage Iran’s nuclear infrastructure and seriously set back the program, probably for several years. However, bombing is risky. It could lead to a broader conflict. Moreover, bombing won’t solve the problem. Iran is likely to rebuild the program at secret sites with a

stronger determination to acquire nuclear weapons. And, Iran could withdraw from the NPT, leaving the U.S. without international inspections to monitor Iran's nuclear program. Therefore, we should not resort to military action unless all other effective alternatives have been exhausted.

3.11 We had an agreement like this with North Korea but it got nuclear weapons anyway. Why should this be any different?

Pro framework:

The United States has had this type of disarmament agreement with several hostile regimes, including North Korea, Libya, and Syria. The broad agreement with Libya and chemical weapons agreement with Syria resulted in effective disarmament. The 1994 agreement with North Korea failed, when North Korea pursued a covert enrichment program in violation of the agreement. Of course, the U.S. doesn't know whether the agreement with Iran will be successful or not. But—compared to the North Korean case—Washington has three advantages. First, it has always had a much stronger intelligence capability against Iran and therefore more ability to catch Tehran cheating before it could get close to the bomb. Second, Iran is much more susceptible to international economic and political sanctions and its government is much more influenced by domestic political pressure. Third, the U.S. has more credible military options against Iran and therefore more ability to deter and, if necessary, take action if Iran tries to cheat or renege on the agreement.

Con framework:

The difference between the Libyan and North Korean agreements is instructive. The North Korea deal was highly transactional, not based on a strategic decision by Pyongyang to give up its nuclear weapons ambitions. It later described its position as “freeze for benefits.” On the other hand, while Qaddafi clearly sought a lifting of sanctions, he was denied substantial benefits until disarmament was completed. The Iran deal is much closer to the North Korea model, with little or no evidence that Iran has made a strategic decision to forego nuclear ambitions; indeed, it has fought hard and successfully in the negotiations to preserve as much capability as possible.

3.12 If the P5+1 are able to conclude a comprehensive nuclear agreement with Iran that is fully implemented, will they be justified in declaring victory in preventing Iran from acquiring nuclear weapons?

Yes.

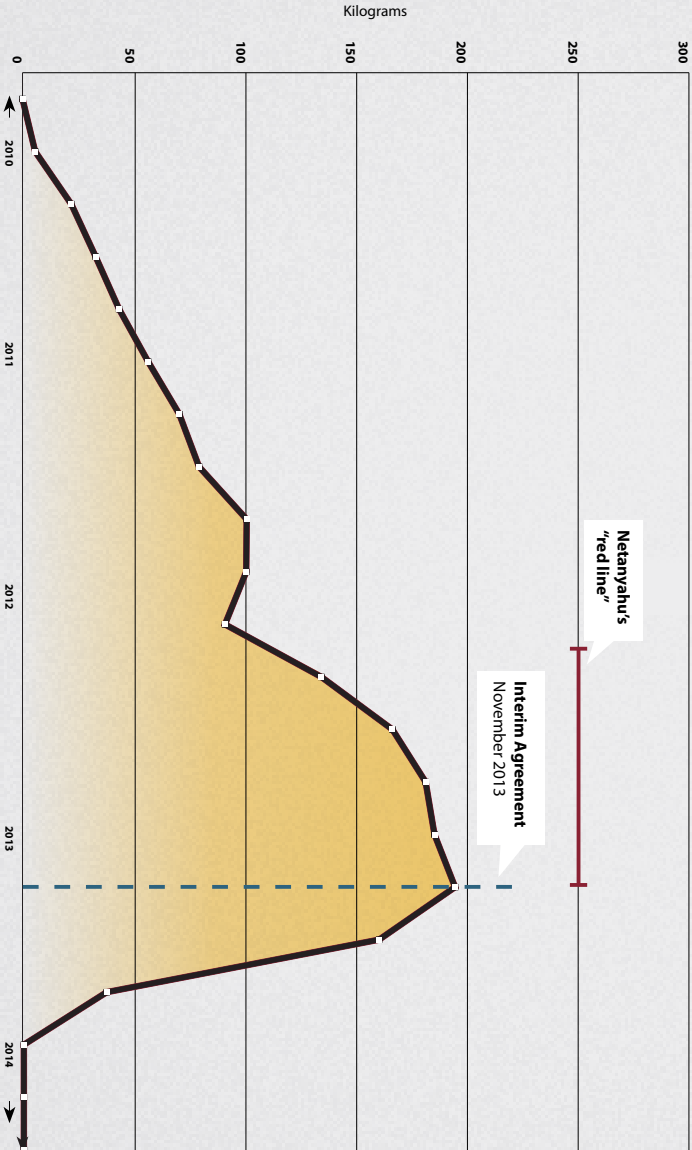
If the Supreme Leader accepts an agreement with the U.S. and the other members of the P5+1 – that is endorsed by the United National Security Council - Iran will be so firmly committed that it is very likely to comply for the period of the agreement. Over time, the benefits of an agreement will build a constituency in Iran who will oppose any nuclear backsliding that would jeopardize those benefits. Finally, the agreement could help foster political reform inside Iran and a more moderate foreign

policy that will undercut the arguments of those Iranian factions who advocate acquisition of nuclear weapons.

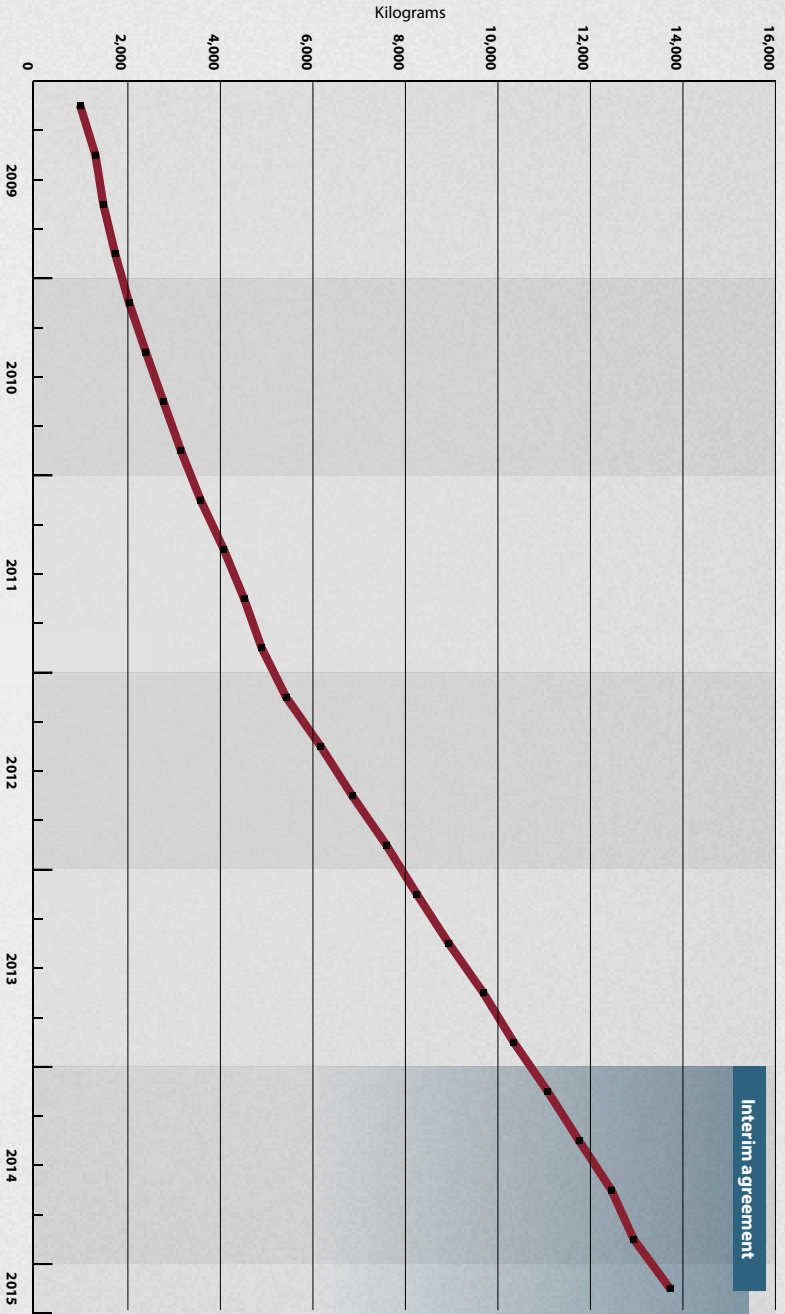
No.

Iran's ambitions to acquire nuclear weapons are deeply rooted in its strategic calculations and geopolitics. A nuclear agreement does not represent a strategic shift away from nuclear weapons, only a tactical decision to postpone those ambitions in order to get relief from international sanctions. Thus, even with an agreement in place, constant vigilance in monitoring, enhanced national intelligence, and maintaining a credible military option will be necessary for the foreseeable future.

Stockpile of 20% enriched uranium (UF₆)



Cumulative LEU Production at Natanz Fuel Enrichment Plant, 2009-present



4. Essential Facts and Concepts

The U.S. government has identified four possible pathways for Iran to acquire a nuclear weapon: two overt uranium pathways (at Natanz and Fordow); the overt plutonium pathway (at Arak); and a covert pathway. A fifth possibility is that Iran could purchase nuclear weapons or weapons grade materials from abroad.

4.1 ***What is the status of the Framework Accord? Why are there substantive discrepancies between the U.S. and Iranian descriptions of the terms of the deal?***

The two sides could not agree on a detailed document describing the “Political Framework” for a comprehensive agreement. Instead, they agreed to issue a short EU-Iranian Joint Statement on the general “parameters” of a comprehensive agreement. In addition, the U.S. and Iran agreed to issue their own unilateral statements containing what each side considers the essential details of the Political Framework. Under these circumstances, competing and even contradictory claims should be expected. In order to sell the deal to domestic skeptics and opponents, both the U.S. and Iranian governments are accentuating the positive elements and obscuring the negative features of the deal. Similarly, critics of the emerging deal have an interest in highlighting differences to undermine support for a final agreement. Finally, the differing versions and contrasting public statements by U.S. and Iranian officials reflect underlying issues that have

not been resolved, such as the timing and trigger for sanctions relief and the scope and mechanism for challenge inspections. In short, the Political Framework represents an important step towards a comprehensive agreement, but much hard bargaining lies ahead.

4.2 *What is the status of Iran's uranium enrichment program?*

Iran has mastered the technology and know-how to build and operate centrifuges to enrich uranium, the most meaningful hurdle on the path to producing enough nuclear material for a weapon. To date, Iran has installed 19,000 centrifuges at its declared facilities (Natanz and Fordow) and produced enough low enriched uranium for 6-7 bombs (after further enrichment).

Iran's enrichment program began in secret thirty years ago when it acquired centrifuge technology and a playbook for uranium enrichment from Pakistani nuclear scientist A.Q. Khan. Iran's enrichment program was exposed in 2002, when an opposition group revealed that Iran was constructing a large enrichment plant at Natanz. When IAEA inspectors gained access to Natanz in February 2003, it had 164 first generation (IR-1) centrifuges. After the American attack on Iran's neighbor and arch-enemy Iraq, Iran reached an agreement with the UK, France and Germany in October 2003 to freeze uranium enrichment and activities related to heavy water reactors. But following the election of President Mahmoud Ahmadinejad in 2005, Iran broke off the negotiations and expanded its enrichment capacity. The UNSC responded with a series of resolutions requiring Iran to suspend enrichment and reprocessing related activities until

“confidence” was restored in the peaceful nature of Iran’s nuclear program. By 2008, it had more than 4,000 centrifuges. In 2009, the U.S. and its European allies exposed Iran’s construction of another secret underground enrichment plant at Fordow, a facility built inside a mountain. Months later, Iran began enriching uranium to 20%, closer to the level necessary for a bomb.

By the time of the interim agreement in November 2013 (known as the Joint Plan of Action, or JPOA), Iran had installed about 18,500 IR-1 centrifuges at Natanz and Fordow, of which about 10,000 were enriching uranium. In addition, Iran had installed an additional 1,000 more-advanced IR-2m centrifuges at Natanz. As a result of this enrichment activity, Iran had accumulated 6-7 bombs worth of low enriched uranium (7,000 kg) and 195 kg of nearly 20% enriched uranium remaining in the form of UF₆.

Under the terms of the interim agreement, Iran froze installation of additional centrifuges at Natanz and Fordow and the production rate of LEU. Low-enriched uranium above the cap established by the JPOA has been converted to oxide, a form necessary for fuel fabrication and unusable for further enrichment unless re-converted to UF₆ form. Iran also eliminated all of its stockpile of 20% enriched uranium UF₆ either through down-blending to low-enriched uranium or converting to 20% enriched oxide. The 20% enriched oxide would require re-conversion to UF₆ to be used for further enrichment. Under the JPOA, Iran has also limited research and development of more advanced centrifuge models.

4.3 What is the status of Iran's plutonium production program?

In 2004, Iran began construction of a 40 Megawatt-thermal heavy-water moderated research reactor at Arak, based mainly on design assistance it received from Russian entities. The reactor was slated to be completed in early 2014, but has suffered delays and Iran halted most construction of the reactor under the terms of the JPOA. Once operational, the IR-40 would be capable of producing 8-10 kg of plutonium per year, enough for 1-2 nuclear weapons. However, in order to utilize the plutonium for a weapon, Iran would still have to build a reprocessing plant to be able to separate plutonium from spent fuel.

4.4 What is the status of Iran's nuclear weaponization program?

Iran acquired nuclear weapons design and fabrication information from Pakistan by the early 1990s. By the late 1990s, Iran instituted a dedicated program to design nuclear weapons, including a nuclear warhead for the Shahab-3 intermediate range ballistic missile. According to U.S. intelligence, Supreme Leader Ayatollah Ali Khamenei suspended this nuclear weaponization program in 2003, although some research related to nuclear weapons development may have continued. Iran has repeatedly stonewalled the IAEA's investigation into what the IAEA calls the "possible military dimensions" of Iran's nuclear program.

4.5 What is “breakout” and what is “sneak out”?

Breakout time refers to how long it would take for Iran to produce enough weapons grade enriched uranium for a single nuclear device (defined as 25kg of 90% enriched uranium) at its declared enrichment facilities. Breakout time is determined by the number and type of centrifuges, the arrangement of centrifuges into groups or cascades, and the size of the stockpile of low-enriched uranium. Breakout time is an estimate based on assumptions and calculations, such as centrifuge performance and the efficiency of the centrifuge cascades in a particular configuration. Actual breakout time could be longer or shorter. Moreover, breakout time only refers to the time required to produce the necessary fissile material for a nuclear device, not the time required to manufacture the device itself, much less a warhead suitable for missile delivery. Breakout time is a useful concept for measuring Iran’s enrichment capacity, but it does not represent the most likely scenario for Iran to seek nuclear weapons since international inspectors could quickly detect Iran’s efforts to produce weapons grade uranium, which could trigger military attack or other international action. To avoid that risk, it is much more likely that Iran would try to “sneak out” by building a secret enrichment facility, so that it could produce weapons grade uranium without detection. Therefore, a robust verification and monitoring system to help detect covert facilities is an essential element of any nuclear agreement.

4.6 ***What is a “nuclear threshold state”?***

This is a suggestive term, but has no accepted definition. If by a nuclear threshold state one means a country that has mastered the basic technologies to build nuclear weapons without outside assistance, then Iran has been a threshold state since 2007-8. As the US Intelligence Community assesses, most recently in February: “Iran does not face any insurmountable technical barriers to producing a nuclear weapon, making Iran’s political will the central issue.” However, if “threshold state” means that the country physically possesses fissile material directly usable in nuclear weapons – such as Japan, South Africa, or Germany – then Iran is not yet a threshold state.

5. Pending Legislation

Lawmakers have proposed three bills related to the Iranian nuclear program in recent months: Corker-Menendez, Kirk-Menendez and Boxer. The White House has threatened to veto both the Corker-Menendez and the Kirk-Menendez bills.

Corker-Menendez: The Iran Nuclear Agreement Review Act of 2015 (S. 615) requires the President to give Congress an opportunity to review and weigh in on any nuclear agreement. After reaching an agreement, the President must submit the text of an agreement to Congress and wait for 60 days before relaxing any sanctions, allowing Congress to hold hearings. Then, Congress can pass a joint resolution either approving or rejecting the agreement. If Congress passes a joint resolution of disapproval, the President can veto the resolution of disapproval and implement the agreement, unless Congress overrides the President's veto with a two-thirds majority in both houses. If Congress passes a joint resolution of approval, or passes no resolution, sanctions relief can proceed. The bill also requires the President to submit routine reports documenting Iran's compliance with the agreement and allows for expedited consideration of new sanctions if Iran cheats.

Kirk-Menendez: The Nuclear Weapon Free Iran Act of 2015 (S. 269) implements a staggered set of escalating sanctions against Iran if negotiations fail to produce an agreement by the June 30 deadline. Sanctions are implemented on a pre-determined schedule, such that the US implements new sanctions every month that elapses without a deal. Sanctions target petroleum products, oil sales, senior government officials, foreign currency

transactions and Iranian industries, including shipbuilding, automotive and mining. The President is authorized to waive these new sanctions on a month-by-month basis if doing so is “in the national security interest of the United States.”

Boxer: The Iran Congressional Oversight Act of 2015 (S. 669) requires the President to report every 90 days whether Iran has complied with a nuclear agreement. If the President determines that Iran has cheated on the agreement, the bill allows for expedited Congressional consideration of sanctions on Iran.

6. Key Terms

The following key terms and definitions are excerpted from “**Nuclear Iran: A Glossary**,” co-published by the Belfer Center and The Washington Institute for Near East Policy and available at <http://belfercenter.org/IranNuclearGlossary>.

Cascade: Arrangement of groups of centrifuges to produce successively higher concentrations of U-235. Each stage enriches the product of the previous step further before being sent to the next stage. Similarly, the “tails” from each stage are returned to the previous stage for further processing. Since the enrichment factor of a single centrifuge is generally below 1.2, more than a dozen stages are required to produce 3.5 percent enriched uranium. To produce 90 percent enriched uranium more than 65 stages are required, which are split for process control reasons into several units. In a scheme to produce weapons-grade enriched uranium, passed to Libya in the 1990s by businessmen associated with the Pakistani scientist A.Q. Khan, a 164-centrifuge cascade enriches uranium from 0.7 percent to 3.5 percent. Then another 164-machine cascade enriches the material from 3.5 to 20 percent, a 114-machine cascade enriches from 20 to 60 percent, and a final 64-machine cascade enriches from 60 to 90 percent.

Enrichment: The process of increasing the amount of the fissile isotope U-235 within nuclear material. Natural uranium contains only 0.7 percent U-235, but enrichment can increase it to 3–5 percent (the level used for nuclear reactors) or over 90 percent (used in atomic bombs). Enriching is a progressively easier process—for example, if the aim is to produce 90 percent

enriched uranium, reaching the 5-percent level requires some 75 percent of the work. And by the time 20 percent enrichment is reached—a level Iran currently achieves—90 percent of the work has been completed.

Reactor: A device where a controlled fission chain reaction can be sustained. The reactor has a specially constructed steel vessel containing nuclear fuel, usually uranium. Depending on the design, the reactor can use uranium that is either in its natural state or enriched to contain various percentages of the fissile isotope U-235—for example, 3–5 percent (as in some power reactors), 20 percent (as in a research reactor), or much higher levels (as needed to power a nuclear submarine or aircraft carrier).

Reprocessing: Chemical separation of nuclear material from fission products. Usually refers to obtaining plutonium from irradiated uranium fuel rods. The most common reprocessing process is PUREX.

Separative work unit (SWU): A way of measuring the efficiency of different centrifuge designs, relating to both the amount of material processed and the degree of enrichment achieved. SWU describes the annual enrichment output of a centrifuge, which is given either as SWU UF_6 /year or SWU uranium/year. A typical 1,300 megawatt light-water reactor requires 25 tons of 3.75-percent-enriched fuel annually. To produce this fuel from 210 tons of natural uranium, an enrichment effort of 120,000 SWU is needed.

Significant quantity: The approximate minimum quantity of nuclear material required for the manufacture of a nuclear explosive device. Significant quantities take into account unavoidable losses due to conversion and manufacturing processes and should not be confused with critical masses. The IAEA has defined 25 kg of U-235 for high-enriched uranium ($U-235 \geq 20\%$), 75 kg U-235 for low-enriched uranium ($U-235 < 20\%$), or 8 kg of Pu-239 or U-233 as a “significant quantity.” Some outside experts argue that an aspiring nuclear weapons state could construct a simple fission weapon with as little as 3 kg of weapons-grade plutonium, or between 2 and 7 kg of HEU. (U-233 is a fissile isotope but has only been used experimentally in reactors, and not as a nuclear explosive.)

For more, visit
Iran Matters

the Belfer Center's online source for
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