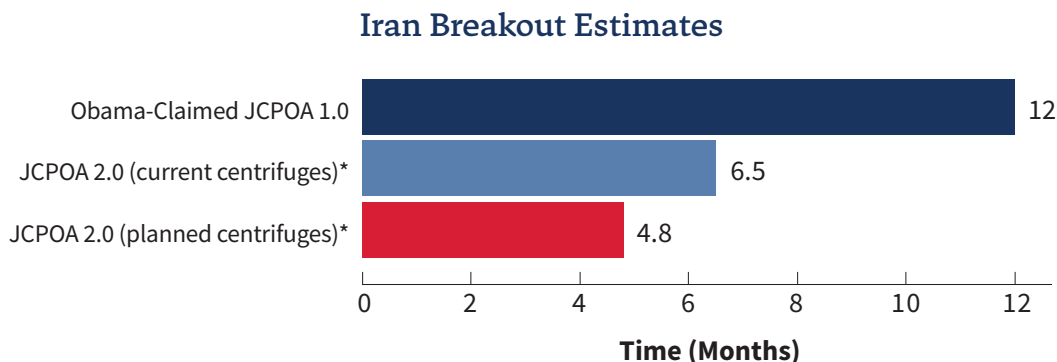


# Iran’s Short Breakout Time Under JCPOA 2.0

Blaise Misztal  
Vice President for Policy

Jonathan Ruhe  
Director of Foreign Policy

With the United States and Iran closing in on a return to the JCPOA nuclear agreement, the revived deal will likely fail to restore what its Obama-era predecessors claimed as the JCPOA’s primary benefit – putting Iran at least a year away from being able to enrich a bomb’s worth of fissile material. Indeed, if the restored deal keeps the same terms as the original by permitting Tehran to store its advanced centrifuges, **we estimate breakout time would be 4.8-6.5 months until early 2026**, at which point the JCPOA permits Iran to steadily shrink these timeframes further. Unless the Biden administration insists Iran ship out or destroy its advanced centrifuges, any new deal will delay Iran’s nuclear program only half as much for half as long as the original deal – far from “putting Iran in a box,” as the administration claims it wants.



\*Assuming Iran stores excess centrifuges as per JCPOA 1.0.

## What Happened?

- With American diplomats [saying](#) the United States and Iran are in [final stages](#) of nuclear talks, the Biden administration now reportedly expects whatever deal is reached will leave Iran with the capacity to enrich one bomb’s worth of fissile material (“breakout time”) [far more quickly](#) than the unofficial one-year window created by the original 2015 deal.

## Why Is It Important?

- President Obama [touted the benefits](#) of the 2015 Joint Comprehensive Plan of Action (JCPOA) as “purchasing for 13, 14, 15 years assurances that the breakout is at least a year... And we have those assurances for at least well over a decade.” But a return to the JCPOA’s original terms now would not achieve the same effect:
  - » If the Biden administration reenters the JCPOA, Iran’s breakout time could be between **6.5 and 4.8 months** – but only for four years, after which this timeframe would steadily shrink further, to an estimated three months or less when the deal expires in 2030.
  - » Rather than putting Iran’s nuclear program “[in a box](#),” as the administration keeps repeating as its goal, a new deal will be twice as bad as the original JCPOA, delaying Iran’s nuclear program by only half as much, and for only half as long.
- [The dangers](#) of an Iranian dash to a bomb grow as breakout time – the time needed to produce at least 20 kilograms (kg) of 90 percent enriched uranium, the minimum needed for a nuclear weapon – shrinks.
  - » Breakout time depends on four factors: 1) enriched uranium stockpile, 2) enrichment level of that stockpile, and the 3) quantity and 4) efficiency of available centrifuges.
  - » Breakout times below two months could challenge the ability of the United States and its partners to detect, and effectively respond to, any Iranian attempt to sprint for a bomb.
  - » The JCPOA raised Iran’s breakout time, at least temporarily, from as little as two months in 2015 to, as the Obama administration claimed, one year by [restricting](#) each of these four factors, specifically:
    - Capping enriched uranium stocks at 300 kg of 3.67 percent enriched uranium; and
    - Limiting operational centrifuges to 5,060 first-generation IR-1 machines.
  - » Yet the deal also contains significant [concessions](#) that will enable Iran to quickly rebuild and expand its enrichment program in coming years, including:
    - For the duration, allowing all deployed centrifuges in excess of 5,060 IR-1s to be stored in Iranian nuclear facilities, rather than destroyed or shipped out;
    - Starting [in 2024](#), allowing Iran to build, but not fully assemble, 400 highly-advanced centrifuges (200 each of IR-6 and IR-8) annually;
    - Starting [in 2026](#), allowing Iran to build 400 fully-assembled IR-6 and IR-8 centrifuges (200 of each) annually, and allowing it to replace operational IR-1 centrifuges with more efficient IR-2m and IR-4 machines; and
    - Starting [in 2030](#), allowing Iran to use unlimited numbers of centrifuges to amass unlimited stockpiles of enriched uranium at any level(s) of enrichment it chooses.

- Thus, any attempt to return to [exactly the same terms](#) as the original JCPOA, particularly those regarding centrifuges, would permit Iran to store – and thus quickly redeploy – the advanced centrifuges it has developed and operated since leaving the deal in 2019.
  - » Under a renewed JCPOA, Iran would place in storage roughly 700 of its more than 5,700 IR-1 machines currently operating, as well as 500 installed but non-operational IR-1s.
  - » It also would have to mothball all of its roughly 1,850 advanced centrifuges (IR-2m, IR-4 and IR-6) that are [actively enriching](#).
    - The IR-2m, IR-4 and IR-6 are [estimated](#) to be 4.1, 3.7 and 5.8 times more productive, respectively, than the IR-1.

## JCPOA 2.0 with Iran’s Current Operational Centrifuge Fleet

Type	Current Infrastructure			Under Feb. 2022 JCPOA 2.0		
	Operational	Installed	IR-1 Equiv.	Operational	Stored	Stored IR-1 Equiv.
IR-1	5,766	506	6,272	≤ 5,060	≥ 1,212	≥ 1,212
IR-2m	1,024	0	4,198	0	1,024	4,198
IR-4	502	0	1,857	0	502	1,857
IR-6	330	0	1,914	0	330	1,914
<b>Total</b>	<b>7,622</b>	<b>506</b>	<b>14,241</b>	<b>≤ 5,060</b>	<b>≥ 3,068</b>	<b>≥ 9,181</b>

- With its advanced centrifuges in storage and available to reinstall, should Iran decide to sprint for a bomb, a restored JCPOA could leave Tehran with an estimated breakout time of **6.5 months** – almost half of what President Obama touted as the deal’s major benefit.
  - » Unlike when the JCPOA first went into effect in 2015-16, today Iran has gained invaluable, irreversible know-how from developing and operating these advanced machines since it left the deal – all of which would help expedite any future breakout.
  - » Moreover, because these advanced centrifuges are so much more efficient, it is simpler and faster for Iran to reinstall them than to put in place the number of IR-1 centrifuges necessary to achieve the same overall enrichment capacity.

### Iran Breakout Estimate Under Feb. ‘22 JCPOA 2.0

Step	Time (weeks)
Remove infrastructure from storage and reinstall	3
Produce ~590 kg 3.67 percent	15
Reconfigure centrifuge cascades	2
Produce ~140 kg 20 percent	4.7
Produce ~28 kg 90 percent	1.5
<b>Total</b>	<b>6.5 months</b>

- Iran also is in the process of deploying additional centrifuges – if it completes its stated [expansion plans](#) before a deal is finalized, breakout time under a renewed JCPOA would fall to an estimated **4.8 months**.
  - » Little currently is known about Iran’s timeframe for deploying these centrifuges, given its months-long [obstruction](#) of IAEA inspectors at its main Karaj production plant after a suspected covert attack caused significant damage in June 2021.

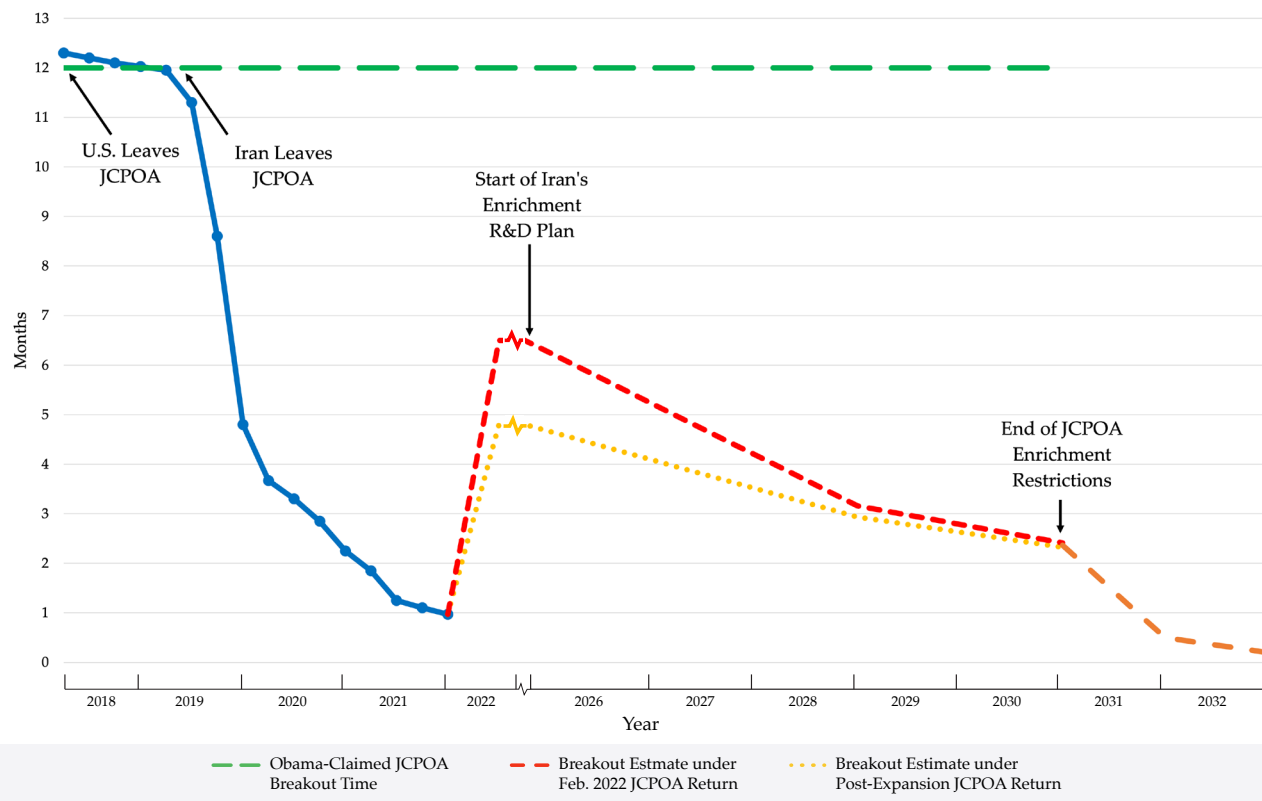
## JCPOA 2.0 with Iran’s Future Expanded Centrifuge Fleet

Type	Proj. Future Operational		Under Future JCPOA 2.0		
	Number	IR-1 Equiv.	Operational	Stored	Stored IR-1 Equiv.
IR-1	7,116	7,116	≤ 5,060	≥ 2,056	≥ 2,056
IR-2m	1,024	4,198	0	1,024	4,198
IR-4	1,196	4,425	0	1,196	4,425
IR-6	660	3,828	0	660	3,828
<b>Total</b>	<b>9,996</b>	<b>19,567</b>	<b>≤ 5,060</b>	<b>≥ 4,936</b>	<b>≥ 14,507</b>

- Furthermore, both of these breakout estimates would [begin decreasing](#) after January 2026, as per Iran’s centrifuge research and development (R&D) plan, agreed privately on the sidelines of the original JCPOA, which permits Iran to steadily expand its enrichment capacity over at least the following three years.

## Iran Breakout Estimate Under Future JCPOA 2.0

Step	Time (weeks)
Remove infrastructure from storage and reinstall	3
Produce ~590 kg 3.67 percent	10
Reconfigure centrifuge cascades	2
Produce ~140 kg 20 percent	3.2
Produce ~28 kg 90 percent	1
<b>Total</b>	<b>4.8 months</b>



## What Should the United States Do Next?

- The Biden administration should urgently, and finally, accept that its [oft-repeated](#) concern – that Iran’s nuclear advances threaten to make the JCPOA obsolete – already is a reality, and that an actual “[return](#)” to the parameters of the original deal is [not possible](#).
  - » Moreover, one of the Obama administration’s main selling points – that Iran’s increased breakout window would last for at least a decade – already is more than half-expired.
- Accordingly, rather than permit Iranian diplomats to continue calling the shots in Vienna, dragging out talks and increasing their leverage by continuing to expand their nuclear program, the administration should convey clearly it will leave talks by its informal but public deadline at the [end of February](#), deal or no deal.
  - » As part of these final negotiations, the administration should insist Iran destroy or ship out, not merely store, its advanced centrifuges under a renewed nuclear agreement.
- Regardless of what comes out of Vienna, the United States also urgently must strengthen the [viability](#) of alternatives to diplomacy to deter or deny any potential Iranian breakout.