

## Why America's Obsession With Iran's Centrifuges Could Give Tehran the Bomb

Written by John Hallam

Tuesday, 24 February 2015 15:30 -

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<http://www.defenseone.com/ideas/2015/02/why-our-obsession-irans-centrifuges-could-give-them-bomb/105660/?oref=d-river>

February 19, 2015 By Joseph Cirincione

The fixation with Iran's machines diverts us from the real threat.

Over the past two years, dozens of politicians and prognosticators have drawn various redlines that Iran should not cross lest it be "a screwdriver turn away from having a nuclear weapon," as Sen. Bob Corker, R-Tenn., said last week.

#### Author

Joe Cirincione is president of Ploughshares Fund and the author of *Nuclear Nightmares: Securing the World Before It Is Too Late*. [Full Bio](#)

Mostly they focus on centrifuges, the water-heater-sized machines used to enrich uranium. You can understand why. Centrifuges are part of the elaborate process used to turn uranium ore into the metal core of atomic bombs. They are perhaps the most quantifiable part of the process. They are discrete objects that can be numbered.

And that is what we do. We count things. It is one of the first skills we teach our children. It helps us put a little order in the universe. How many kids in the classroom? How many votes to elect a president? How many stars in the sky?

We can easily count centrifuges. Anyone with a computer can come up with an estimate of how many centrifuges Iran needs to make the material for a bomb. Just search Google for "Iranian centrifuges." The very first hit is an article produced by the publication Iran Watch that "estimates how soon Iran could fuel a nuclear weapon."

By using the approximately 9,000 first generation centrifuges operating at its Natanz Fuel Enrichment Plant, Iran could theoretically produce enough weapon-grade uranium to fuel a single nuclear warhead in about 1.7 months.

There you go. To limit Iran's weapon potential, cut the number of centrifuges. No more than 10,000 say some. No more than 4,000 say

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others. Between 3,000 and 4,000 say still others. Even 1,000 could be too many, claims Ollie Heinonen, a Harvard University expert.

It is a simple metric for success. And it is wrong.

There are, in fact, many ways to limit Iran's ability to make a nuclear weapon. Centrifuges are just one factor in the equation.

### How a Fuel Becomes a Bomb

There are multiple, industrial steps in the enrichment process, including mining the uranium ore, purifying it into a powder known as yellow cake, mixing that powder into a gas and then spinning that gas in centrifuges.

The centrifuges increase the ratio of the fissile isotope, Uranium-235, from the natural ratio of less than 1 atom in 100 to about 5 in 100, or 5 percent enriched uranium. At about that concentration, the U-235 atoms are close enough together that they can sustain a chain reaction.

You can stop the process there, turn that gas into powder again, process the powder into fuel pellets, form the pellets into rods, insert the rods into a reactor and use the heat from the fission to turn water into steam that spins turbines, generating electricity. About 20 percent of the electricity in the United States is produced in exactly that way.

The problem is that the same centrifuges that enrich uranium for fuel can also enrich the uranium for the core of a bomb. With some reconfiguration, the same centrifuges can keep going to 70 or 90 percent U-235, or weapons-grade. At that concentration, it only takes about 50 pounds of the material to ensure that a single neutron hitting a single atom will trigger an uncontrollable chain reaction, unleashing in a microsecond enough energy to destroy a city. That is why centrifuges are so important.

Most countries that have nuclear power reactors do not have centrifuges. They buy their fuel from the handful of countries that make it, including the U.S., Canada, Russia and European consortium known as URENCO. Russia, which is constructing Iran's power reactors, is happy to sell Iran the fuel and dispose of it when it is spent. But Iran says it wants to make its own fuel to ensure a steady supply. The question is: do you trust them? Clearly, we do not.

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The deal now being negotiated between Iran and the six countries known as the P5+1 (the U.S., Great Britain, France, Russia, China and Germany) will reportedly cap the number of centrifuges Iran is allowed to keep. Israeli officials appear to have leaked to the press confidential information provided them by the U.S. that places the number at around 6,500 to 7,000 centrifuges. This would be a sharp drop from the 20,000 machines Iran now has. But that is still too many for Israeli Prime Minister Benjamin Netanyahu, who is demanding zero centrifuges.

(Related: [Iran Sanctions Showdown Is Drawing New Battlelines in Congress](#))

Zero is a fantasy, and you can blame President George W. Bush's administration for that. It may have been possible to convince Iran to dismantle all its centrifuges when it had only a few dozen in 2003 and first offered to talk to the U.S.. Or in 2005, when it had a few hundred and was in talks with the European Union. But the Bush administration spurned any deal. "We don't negotiate with evil," said Vice President Dick Cheney, "We defeat it." As a result, the talks collapsed and Iran went from zero centrifuges installed at the beginning of the Bush administration to about 6,000 at the end.

There is not a political leader in Iran today that could agree to completely dismantle its nuclear fuel complex. But some, including Iranian President Hassan Rouhani, seem ready to sharply limit it. The key to a solid deal is to couple limits on the number of centrifuges with other limits that prevent Iran from quickly building a bomb should it break the deal.

### Break Out

The easiest way to do this is to limit the quality and amount of uranium gas that Iran has to feed into the centrifuges. Netanyahu, with his famous cartoon bomb at the United Nations in 2012, warned that Iran was near his redline because it would soon have enough 20 percent enriched uranium gas to feed back into the centrifuges and produce enough highly-enriched uranium, or HEU, for a bomb. Some experts warned in early 2013, "We estimate that Iran, on its current trajectory, will by mid-2014 be able to dash to fissile material in one to two weeks unless its production of 20 percent-enriched uranium is curtailed."

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Netanyahu's bomb. Iran has eliminated its stockpile of 20 percent uranium gas and has stopped making any more.

But it still has over 8,000 kilograms of uranium gas enriched up to 5 percent purity. If Iran were to feed that gas back into its operating centrifuges, it would theoretically take between 2 to 4 months to refine it into enough HEU gas needed to make the core for one weapon.

A solid deal would greatly reduce the amount of uranium gas Iran is allowed to keep on hand. It would also prevent Iran from replacing its current, inefficient model of centrifuges with newer designs, limit the production capabilities of the existing cascades and put in place tough, new inspection regimes that could detect any cheating. Experts at the Arms Control Association estimate that:

By reducing Iran's current operating enrichment capacity by half, combined with a significant reduction in the size of Iran's low enriched-uranium stocks and conversion to more proliferation-resistant oxide form (or removal to a third country), the time it would take Iran to produce enough weapons-grade enriched-uranium gas for one nuclear weapon would grow to nine to 12 months.

The goal of such limits, as former State Department official and Iran negotiator Robert Einhorn explains, is to ensure that:

...the timeframe between the initiation of breakout and the production of enough weapons-grade uranium for one or more weapons is as long as possible; and that once breakout is detected, the international community will have the will, the capability, and the time to take effective action, including the use of military force, to prevent the acquisition of enough fissile material for a nuclear weapon.

So, how much time? This is something else we can count. In general, critics of the negotiations have insisted that there be at least 6 to 12 months time.

Do we really need a year to respond?

Mark Fitzpatrick, non-proliferation director at the International Institute for Strategic Studies says no:

"The breakout factor is not the all-consuming issue in London that it seems to be in Washington. In the negotiations, the British go along with the other members of the E3+3 on the timeline calculations, but are realistic about the human factors and operational troubles that Iran would experience if it tried to produce 90 percent HEU. Given

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In other words, estimates of breakout times measured in months or weeks assume that everything goes right and nothing goes wrong – a condition that rarely exists in the real world. Many, many things have gone wrong in the Iranian program over the decades; nuclear research began over 60 years ago during the time of the Shah.

Even in the worst case, Iran would just have the material for one bomb. It could take an additional 6 months to a year to turn that material into an actual weapon. But it would still have just one weapon. No country has ever “broken out” with only one weapon, raising serious doubts about this entire scenario.

There is no practical difference between a deal that provides for a six-month breakout period and one that provides for 12 months. Mark Fitzpatrick, non-proliferation director at the International Institute for Strategic Studies

Former CIA analyst Paul Pillar criticizes “the fixation” on breakout times. “The difference between, say, six months and a year is meaningless,” he says, “when any conceivable response, including military attack as well as enactment of the most debilitating possible sanctions, could be accomplished within a couple of weeks.”

Could we actually detect and act on a break out in that short a time? Currently, inspectors from the International Atomic Energy Agency, or IAEA, are allowed daily access to Iran's enrichment facilities, thanks to the interim agreement. Inspection procedures will certainly intensify under any final deal.

With inspectors, cameras, seals, inventory controls, tracking of scientists, monitoring of production from the time uranium is taken as an ore from the mines to when it is stored as a gas in cylinders, any move to switch from producing low- to high-enriched uranium would likely be detected within a day or two. It would take another day or two to report this to the IAEA, a few days for the board to convene and pass a resolution, then another few days for the UN Security Council to engage. Total time could indeed be a couple of weeks.

But the global response is just one of the factors deterring Iran from violating a final deal. If Iran were caught cheating, “U.S. bombers could be overhead to stop it within 24 hours,” says Fitzpatrick, “This is a strong deterrent against such a breakout option. So there is no

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### The Real Threat

It is not break out that should worry us. It's the break down. It appears that Netanyahu is trying to engineer a collapse of the talks. He is pushing the Senate to adopt new sanctions on Iran that the head of Israeli intelligence said would be “like throwing a grenade into the process.” The idea, according to some supporters of this plan, is to cause a crisis in the negotiations, so that the deal now being discussed would collapse and talks would resume some time later, presumably with Iran in a weaker position.

Some don't want any deal at all. “The end of these negotiations isn't an unintended consequence of congressional action,” admitted Sen. Tom Cotton, R-Ark. “It is very much an intended consequence — a feature, not a bug.”

The break down of the talks at this stage would lead to the worst of all possible worlds. It would repeat the flawed strategy of the Bush administration. Rather than increasing pressure on Iran, it would decrease it. The U.S. would be seen as the reason for the collapse. Global support for the international sanctions regime would wither. Restraints on Iran's commerce would dwindle and its oil sales and revenues climb. The interim deal would be dissolved and Iran, freed of restraints, could increase its production capabilities without limit.

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Iran could increase its supply of enriched uranium and bring on-line more and newer centrifuges. It could move ahead full speed on a plutonium production reactor that provides another pathway to a bomb. And, without inspectors in the country, it might build new secret facilities, opening up yet another pathway. Its theoretical break out time would go from the current 2 or three months to two or three weeks.

In short, as Ilan Goldenberg and Robert Kaplan point out, the United States would be forced “to choose between two terrible options both of which are much costlier than the status quo — pursuing military action against Iran or accepting a nuclear-armed Iran.”

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Whatever uncertainties a negotiated agreement may bring would still be far more manageable than the uncontrollable consequences of a new war in the Middle East and an unconstrained Iran.

<http://www.manilatimes.net/kerry-zarif-to-meet-for-nuclear-talks/164883/>

Kerry, Zarif to meet for nuclear talks

February 22, 2015 9:09 pm

GENEVA: United States Secretary of State John Kerry arrives in Geneva on Sunday for renewed talks with his Iranian counterpart on Tehran's nuclear program, after warning "significant gaps" remain as a key deadline approaches.

World powers are trying to strike a deal with Iran that would prevent Tehran from developing a nuclear bomb in return for an easing of punishing international economic sanctions.

Kerry is set to sit down for two days of talks with Iranian Foreign Minister Mohammad Javad Zarif, whose country denies its nuclear program has military objectives.

The US top diplomat on Saturday warned that major differences remained between the two sides.

"There are still significant gaps, there is still a distance to travel," Kerry told a press conference at the US embassy in London.

There is a heightened sense of urgency to move forward as the clock ticks down towards a March 31 deadline to agree on a political framework for the deal.

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"President [Barack] Obama has no inclination whatsoever to extend these talks beyond the period that has been set out," Kerry said.

US and Iranian diplomats have been meeting in Geneva since Friday, and senior negotiators from the so-called P5+1 group of Britain, China, France, Russia, the United States and Germany were also expected to meet on Sunday to help drive the talks forward.

Kerry stressed on Saturday that there was "absolutely no divergence whatsoever in what we believe is necessary for Iran to prove that its nuclear program is going to be peaceful."

"The P5+1 remains united on the subject of Iran," he said.

As a sign that efforts were stepping up a notch, US Energy Secretary Ernest Moniz flew in to snow-covered Geneva on Saturday to take part in the talks for the first time.

Ali Akbar Salehi, the director of the Iranian Atomic Energy Organization, was also participating in the negotiations.

The two officials and their delegations spent five hours at the negotiating table on Saturday, Iranian media reported.

Observers said Moniz and Salehi's participation was a promising sign that a deal could be within reach.

Kelsey Davenport, head of the Nonproliferation Policy Arms Control Association in Washington, pointed out in an email to Agence France-Presse that Moniz with his technical expertise would "be a key validator when a deal is concluded."

And Salehi, who plays a similar role, would "likely be instrumental in selling the agreement in Tehran," he added.

But Kerry played down any suggestion that their participation meant the talks were on the verge of a breakthrough.

"I would not read into it any indication whatsoever," he said, adding that Moniz was present because of the "technical" nature of the talks.

Salehi arrived early on Saturday with Zarif and Hossein Fereydoun, the brother and special aid to Iranian President Hassan Rouhani, to help coordinate the talks, Iranian media reported.

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<http://www.theatlantic.com/international/archive/2015/02/americas-damaging-obsession-with-irans-centrifuges/385687/>

### America's Damaging Obsession With Iran's Centrifuges

And how it could result in Tehran getting the bomb

Joseph Cirincione Feb 20 2015, 10:43 AM ET

An official from Iran's Atomic Energy Organization standing in front of uranium-enriching centrifuges. (Caren Firouz/Reuters)

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Mostly they focus on centrifuges, the water-heater-sized machines used to enrich uranium. You can understand why. Centrifuges are part of the elaborate process used to turn uranium ore into the metal core of atomic bombs. They are perhaps the most quantifiable part of the process. They are discrete objects that can be numbered.

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The centrifuges increase the ratio of the fissile isotope, Uranium-235, from the natural ratio of less than 1 atom in 100 to about 5 in 100, or 5 percent enriched uranium. At about that concentration, the U-235 atoms are close enough together that they can sustain a chain reaction.

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Even in the worst case, Iran would just have the material for one bomb. It could take an additional 6 months to a year to turn that material into an actual weapon. But it would still have just one weapon. No country has ever “broken out” with only one weapon, raising serious doubts about this entire scenario.

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<http://thebulletin.org/how-does-religion-really-influence-iranian-nuclear-policy7820#.VOk6qzkYLz8.twitter>

How does religion really influence Iranian nuclear policy?

Ariane Tabatabai

Tabatabai\_Ariane.jpg

Ariane Tabatabai

Ariane Tabatabai is a visiting assistant professor in the Security Studies Program at the School of Foreign Service, Georgetown...

One of the most enduring myths about post-revolutionary Iran is that the country's policies, including those on nuclear matters, are shaped by its leadership's obsession with martyrdom and Messianic ideals. Many observers, especially in the arms control community, base their analyses on this notion, and it leads to some harrowing conclusions. If, after all, a country's stance is basically suicidal, there's no telling what it would do with a nuclear weapon. A careful and more nuanced look at the role of religion in Iranian decision-making, though, debunks the idea that martyrdom rules in Tehran, and gives a much more realistic basis for understanding the regime's behavior.

To be sure, there are reasons why some analysts see the Iranian government as driven by martyrdom. The idea originated with the 1980-1988 Iran-Iraq War, which helped shape the Iranian psyche and the image of the Islamic Republic in the world. During the war, Iran famously launched a series of "human wave attacks," sending untrained and unprepared men (and occasionally boys) to the front, sometimes

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through minefields, to clear the way for the trained forces. This tactic went hand-in-hand with the notion of martyrdom, with members of this ill-equipped vanguard promised a place in paradise if they gave their lives for God and country. Mental images of young boys wearing plastic "keys to paradise" around their necks and running across minefields have haunted the war's observers, and though whether such keys actually existed remains controversial, the picture lingers and contributes to perceptions of Iran.

Much later, former President Mahmoud Ahmadinejad probably encouraged the notion of martyrdom's importance in politics with rhetoric deemed bizarre. For instance, in 2005 he said that some delegates at the United Nations General Assembly had seen a "halo" around his head. During his 2005-2013 presidency, Iranians joked that Ahmadinejad would always put out an extra plate at his table for the "Mahdi."

Shia Muslims believe that the Mahdi, born in the ninth century and also known as the Hidden Imam or the Twelfth Imam, is the Prophet Mohammed's last legitimate successor. They believe that he has gone into occultation—the state of being blocked from view—but will eventually return, much as Christians believe that Jesus Christ will return some day. According to Shia belief, the Hidden Imam will reappear along with Christ and together they will restore peace and justice, saving the world from the chaos into which it would otherwise descend.

The notions of martyrdom and "Mahdism" have led many to extrapolate that the Iranian leadership's actions are governed by an inherent suicidal tendency and a willingness to cause chaos, even if it's self-destructive, in order to facilitate the Mahdi's return. But if one goes beyond the revolutionary rhetoric and examines the Islamic Republic's actions, one realizes that more often than not, Tehran is driven by national or regime interests, rather than pure ideology and belief. In fact, Iran's rulers often use ideology as a means, and do not see it as an end. It's true that the regime sometimes makes decisions that seem irrational to outside observers. But this is not generally due to religious belief but rather to the fact that the regime's interests and the national interest do not align—for example, Iran and Israel have many common strategic interests, yet Tehran has adopted anti-Israeli rhetoric and policies since the 1979 revolution. This stance may not serve national interests, but it certainly advances the Islamic Republic's interest in a strong, external-enemy narrative.

The phantom fatwa. None of this is to say that Islam does not play any role in security decision-making in Iran. Most followers of the

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country's nuclear affairs are aware of the famous fatwa reportedly issued by Iran's Supreme Leader Ayatollah Khamenei prohibiting nuclear weapons. But this fatwa, or religious edict, has become a puzzle.

In order to issue a fatwa, a religious figure must be deemed an authority in Islamic jurisprudence. (This is why to most Islamic scholars, fatwas issued by Al Qaeda leadership in support of the use of nuclear weapons are void of any legitimacy.) But a fatwa does not have to be written. It can be spoken if it meets certain requirements, such as having been witnessed. In this particular case, Khamenei does not appear to have written the fatwa, but it has been communicated to the International Atomic Energy Agency (IAEA) and repeated a number of times by Khamenei himself, as well as by other government officials. It is unclear whether the fatwa covers only the "use" of these weapons, or their "production and stockpiling" too, as Khamenei has been quoted saying both.

Some scholars and policy makers believe the Khamenei nuclear-weapons fatwa to be bogus because it is not written, and therefore irrelevant. Others believe it to be all-important. Neither side has seen a fatwa, and it has not been published on Khamenei's otherwise extremely comprehensive website.

Adding further ambiguity to the fatwa's status is the fact that such rulings can be overturned, allowing the faith to change and adapt to the times. The founder of the Islamic Republic, the Ayatollah Khomeini, famously overturned a number of fatwas. Even this possibility of reversal, though, does not necessarily make pursuit of an Iranian Bomb more likely, because while there is no religious constraint on canceling a fatwa, the geopolitical cost of overriding this one would be high. Iran has promoted the fatwa in various forums for more than a decade and it is finally being recognized and referred to by world leaders. In a way, by leading a public relations campaign promoting the edict, Tehran has constrained its ability to overturn it.

Nuclear weapons in Shia jurisprudence. Virtually absent from the debate is the fact that Shia scholars who have spoken on nuclear weapons show consensus. Few Grand Ayatollahs have discussed the issue, but those who have present arguments similar to Khamenei's, regardless of personal political stance. Hence, whether they support the Islamic Republic or oppose it, and whether or not they believe that politics and religion should be intertwined (many Iranian Shia clerics say they should not), they believe weapons of mass destruction to be against the faith. What is unclear, however, is the scope of this prohibition. Clerics tend to be generalists, trained to cover all possible matters

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from which foot to enter the bathroom with (left!) to the use of technology in warfare. This means that the legal debate is neither elaborate nor nuanced.

But the basic principles underlying the Supreme Leader and the other clerics' rulings are very close to those in international law. In Shia jurisprudence, like in international humanitarian law, there must be a distinction between combatants and non-combatants. Non-combatants, typically defined as women, children, the elderly, and those mentally unfit to fight, are not to be targeted. Hence, using poison in bodies of water and burning trees is not allowed. The environment too must be protected. These are among the key notions shaping Shia thinking on indiscriminate warfare.

Does it matter what the faith says? A dissident Iranian Shia cleric, Mohsen Kadivar, points out that when Saddam Hussein's missiles targeted Iranian cities during the Iran-Iraq war, officials asked Khomeini for permission to retaliate in kind. At first he refused, hewing to the Shia ban on indiscriminate warfare. Eventually, though, he allowed similar attacks to be carried out. There are similar examples in which Iran has acted rationally with little or no regard to religious doctrine or sectarianism. Consider Tehran's relations with two neighbors to its northwest, Azerbaijan and Armenia. Armenia is a Christian country, with good ties to Tehran, while Azerbaijan, a Shia-majority state, has had complicated relations with Iran. In Iranians' view, Azerbaijan tries to arouse their own Azeri population's separatism and enables some Israeli actions that target Iran. Tehran's policies are not driven by sectarianism and ideology here, but rather by national interests.

The role of religion in post-revolutionary Iranian politics is complex and often misunderstood in the West. It seems clear, though, that the regime follows its practical interests. When ideology serves these interests, it is put forward as a rationale; otherwise, it takes a backseat. Observers who continue to argue that the regime wishes to hasten the return of the Mahdi, and that Iran will therefore withdraw from the Nuclear Non-Proliferation Treaty and develop nuclear weapons, are contradicted by the facts. In actuality, Tehran highlights that it is party to a number of international treaties, and that its program has been in strict compliance with its international obligations. Whether or not this is the case is a different story, but a suicidal regime wouldn't bother preserving appearances. The regime has not reversed the fatwa or withdrawn from the NPT—precisely because those would be suicidal moves. It is to the government's advantage to be seen as unlikely to pursue a nuclear weapon, so it cites Khamenei's fatwa. But the regime puts forward no religious rationale for the fact

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that 35 years after the US embassy hostage crisis, with the backing of the Supreme Leader, it is negotiating with what the revolutionaries then called the "Great Satan." It would not be doing so if it did not believe it was acting in its own real-world interest.