



Iran and Nuclear Weapons Production

Background

Iran's nuclear program has for decades generated widespread concern that Tehran is pursuing nuclear weapons. According to past U.S. intelligence assessments, Tehran has the capacity to produce nuclear weapons at some point but has halted its nuclear weapons program and has not mastered all of the necessary technologies for building such weapons. The extent to which June 2025 and February 2026 Israeli and U.S. airstrikes affected Iran's ability to produce nuclear weapons is unclear.

Since the early 2000s, Tehran's construction of gas centrifuge uranium enrichment facilities has been the main source of proliferation concern. Gas centrifuges enrich uranium by spinning uranium hexafluoride (UF₆) gas at high speeds to increase the concentration of the uranium-235 (u-235) isotope. Such centrifuges can produce both low-enriched uranium (LEU), which can be used in nuclear power reactors, and highly enriched uranium (HEU), which is one of the two types of fissile material used in nuclear weapons. Tehran has asserted that its enrichment program is only meant to produce fuel for peaceful nuclear reactors.

The 2015 Joint Comprehensive Plan of Action (JCPOA) requires Iran to implement various restrictions on its nuclear program, as well as to accept specific monitoring and reporting requirements. Then-President Donald Trump announced in May 2018 that the United States was ending U.S. participation in the JCPOA. Over time, Iran subsequently stopped implementing many of its JCPOA obligations and also scaled back JCPOA-required International Atomic Energy Agency (IAEA) monitoring. Beginning in July 2019, the IAEA verified that some of Iran's nuclear activities were exceeding JCPOA-mandated limits. Tehran's subsequent expansion of the country's enrichment program has decreased the amount of time needed for Iran to produce enough weapons-grade HEU for a nuclear weapon—an action frequently termed “breakout.”

According to official U.S. assessments, Iran halted its nuclear weapons program in late 2003. This program's goal, according to U.S. officials and the IAEA, was to develop an implosion-style nuclear weapon for Iran's Shahab-3 ballistic missile. A 2025 public U.S. intelligence assessment stated that “Iran is not building a nuclear weapon” and that the now-former Supreme Leader had “not reauthorized the nuclear weapons program he suspended in 2003.” IAEA Director General Rafael Grossi stated on March 4, 2026, that the agency “never had information indicating that there was a structured systematic [Iranian] program to build or to construct a nuclear weapon.”

The U.S. government assessed prior to the JCPOA that Iran had not mastered all of the necessary technologies for building a nuclear weapon. However, Tehran may now be conducting work on such technologies. The 2024 U.S. Intelligence Community Annual Threat Assessment

published by the Office of the Director of National Intelligence (ODNI) observed that “Iran is not currently undertaking the key nuclear weapons-development activities necessary to produce a testable nuclear device.” But this phrase is absent from 2024 and 2025 ODNI assessments of Tehran's nuclear program.

The JCPOA-mandated restrictions on Iran's nuclear program, as well as the agreement's Iran-specific monitoring and reporting requirements, both supplement Tehran's obligations pursuant to the government's comprehensive IAEA safeguards agreement. Such agreements empower the agency to detect the diversion of nuclear material from peaceful purposes, as well as to detect undeclared nuclear activities and material. These agreements also require governments to declare their entire inventory of certain nuclear materials, as well as related facilities. Safeguards include agency inspections and monitoring of declared nuclear facilities.

Prior and subsequent to the JCPOA's January 2016 implementation, IAEA and U.S. officials expressed confidence in the ability of both the IAEA and the U.S. intelligence community to detect an Iranian breakout attempt using either Tehran's IAEA-monitored facilities or clandestine facilities. More recently, an ODNI spokesperson indicated that the U.S. intelligence community is capable of detecting Iranian efforts to build a nuclear weapon, according to an August 9, 2024, press report.

Estimated Nuclear Weapons Development Timelines

U.S. estimates concerning Iranian nuclear weapon development account for the time necessary to produce a sufficient amount of weapons-grade HEU and also complete the remaining steps necessary for an implosion-style nuclear device suitable for explosive testing.

Such a device, according to the Office of Technology Assessment, uses “a shell of chemical high-explosive surrounding the nuclear material ... to rapidly and uniformly compress the nuclear material to form a supercritical mass” necessary for a sustained nuclear chain reaction.

Fissile Material Production

The time needed to produce enough weapons-grade HEU for a nuclear weapon is a function of a nuclear program's enrichment capacity, as well as the mass and u-235 content of the UF₆ stockpile fed into the enrichment process. LEU used in nuclear power reactors typically contains less than 5% u-235; research reactor fuel can be made using enriched uranium containing 20% u-235; HEU used in nuclear weapons typically contains about 90% u-235.

The JCPOA mandates restrictions on Iran's declared enrichment capacity and requires that Iran's enriched uranium stockpile must not exceed 300 kilograms (kg) of

UF6 containing 3.67% u-235 “or the equivalent in other chemical forms.”

The aforementioned JCPOA restrictions constrained Iran’s nuclear program so that Tehran, using its declared enrichment facilities, would, for at least 10 years, have needed a minimum of 1 year to produce enough weapons-grade HEU for one nuclear weapon. This timeline would have begun to decrease after JCPOA restrictions on Iran’s enrichment capacity, as well as the mass and u-235 content of the UF6 stockpile, began to expire; the agreement scheduled these expirations to begin in January 2026.

Before the aforementioned June 2025 strikes on Iran, Tehran’s number of installed centrifuges, the mass and u-235 concentration of Tehran’s enriched uranium stockpile, and number of enrichment locations exceeded JCPOA-mandated limits. Iran was also conducting JCPOA-prohibited research and development, as well as centrifuge manufacturing and installation.

A November 2024 ODNI report explained that Iran’s fissile material stockpile would, if further enriched, have been sufficient for “more than a dozen nuclear weapons.” The U.S. government estimated that Iran would have needed as little as one week to produce enough weapons-grade HEU for one nuclear weapon, according to a State Department official in March 2022. The Defense Intelligence Agency assessed in May 2025 that Iran would have needed “probably less than one week” to produce this amount of HEU.

If Tehran had resumed implementing its JCPOA obligations, this fissile material production timeline would have increased but would have been less than one year, according to State Department officials. This estimate reflected Iran’s accumulation of knowledge gained by operating more sophisticated centrifuges. Former National Intelligence Council official Eric Brewer noted in an October 2021 publication that, absent this experience, Iran would probably have used less efficient centrifuges for a breakout attempt.

The extent to which the aforementioned strikes impacted Iran’s enrichment program is unclear; the IAEA withdrew inspectors from Iran in June 2025, and agency inspectors have not been able to inspect the attacked Iranian nuclear facilities. Director of National Intelligence Tulsi Gabbard testified on March 18, 2026, that Iran has not resumed enriching uranium; Reza Najafi, Iranian Ambassador to the IAEA, repeated this claim on April 2.

According to Grossi, Tehran’s enriched uranium stockpile remains in the country. The IAEA estimates that this stockpile includes 184.1 kg of UF6 containing up to 20% u-235 and 440.9 kg of UF6 containing up to 60% u-235. The latter two categories of UF6 are of particular concern because relatively little additional effort is necessary to produce weapons-grade HEU using UF6 containing these amounts of u-235. Iran’s Foreign Minister Seyed Abbas Araghchi stated on March 15 that the country’s enriched uranium is “under the rubble” created by the June 2025 attacks on Iran’s enrichment facilities. Iran has “no plan” to recover this material, he added.

Weaponization

At the time when the JCPOA negotiations concluded, the U.S. intelligence community assessed that Iran would have needed one year to complete the necessary steps, not including fissile material production, for producing a nuclear weapon. This estimate assumed that Iran could complete fissile material production and weaponization in parallel. Iran, therefore, would have needed about one year to produce a nuclear weapon.

Until recently, the U.S. intelligence community assessed that Iran had not resumed work on its weaponization research. A State Department official told CRS in an April 2022 email that Iran would have needed approximately one year to complete the necessary weaponization steps. This timeline took “into consideration assessed knowledge gaps” and reflected the intelligence community’s “view of Iran’s fastest reasonable path to overcome them,” the official added. The current assessed public timeline is unclear. Then-Chairman of the Joint Chiefs of Staff Mark Milley testified in March 2023 that Iran would need “several months to produce an actual nuclear weapon,” but he did not explain the assumptions underlying this estimate.

IAEA reports indicate that Iran does not yet have a viable nuclear weapon design or a suitable explosive detonation system. Tehran may also lack sufficient experience in producing uranium metal; weapons-grade HEU metal for use in a nuclear weapon is first “cast and machined into suitable components for a nuclear core.”

Discussion

The one-year fissile-material breakout estimate assumes that Iran would use its declared nuclear facilities to produce fissile material for a weapon. But the breakout concept does not accurately measure Tehran’s nuclear weapons capability. The U.S. government long assessed that Iran is more likely to use covert, rather than declared, facilities to produce the requisite fissile material; whether this is still the U.S. assessment is unclear. Neither the U.S. government nor the IAEA have publicly described any evidence that Iran is conducting covert fissile material production nuclear activities.

During JCPOA negotiations, the breakout timeline was an unclassified proxy measure of Iranian nuclear weapons capabilities. A State Department official described the breakout “concept” in a September 2021 email to CRS as “a useful metric to help quantify” U.S. negotiating goals and as “a useful analytic framework to structure the negotiation of technical measures related to enrichment.” The timeline was also “helpful in explaining the deal and selling it politically,” the official noted, adding that the timeline became “an important political yardstick” for evaluating the agreement’s merits. Jon Wolfsthal, a National Security Council official during the Obama Administration, wrote in February 2022 that the one-year breakout goal was meant to provide enough time “to generate an international response to any Iranian move to build weapons.”

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IF12106

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