



Country Analysis Brief: Iran

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Overview

Table 1. Iran's energy overview, 2022

	Petroleum and other liquids	Natural gas	Coal	Nuclear	Hydro	Other renewables	Total
Primary energy consumption (quads) ^a	4.2	9.1	<0.1	0.1		0.1	13.5
Primary energy consumption (percentage)	31.1%	67.6%	0.4%	0.5%		0.4%	100.0%
Primary energy production (quads) ^a	7.6	9.8	<0.1	0.1		0.1	17.6
Primary energy production (percentage)	43.4%	55.7%	0.3%	0.4%		0.3%	100.0%
Electricity generation (terawatthours)	29.1	307.4	--	6.0	15.9	1.4	360.7
Electricity generation (percentage)	8.1%	85.2%	--	1.7%	4.4%	0.4%	100.0%

Data source: U.S. Energy Information Administration, International Energy Statistics

Note: Quads=quadrillion British thermal units; -- signifies not applicable; *electricity generation* includes less than 1 terawatthour of other gases.

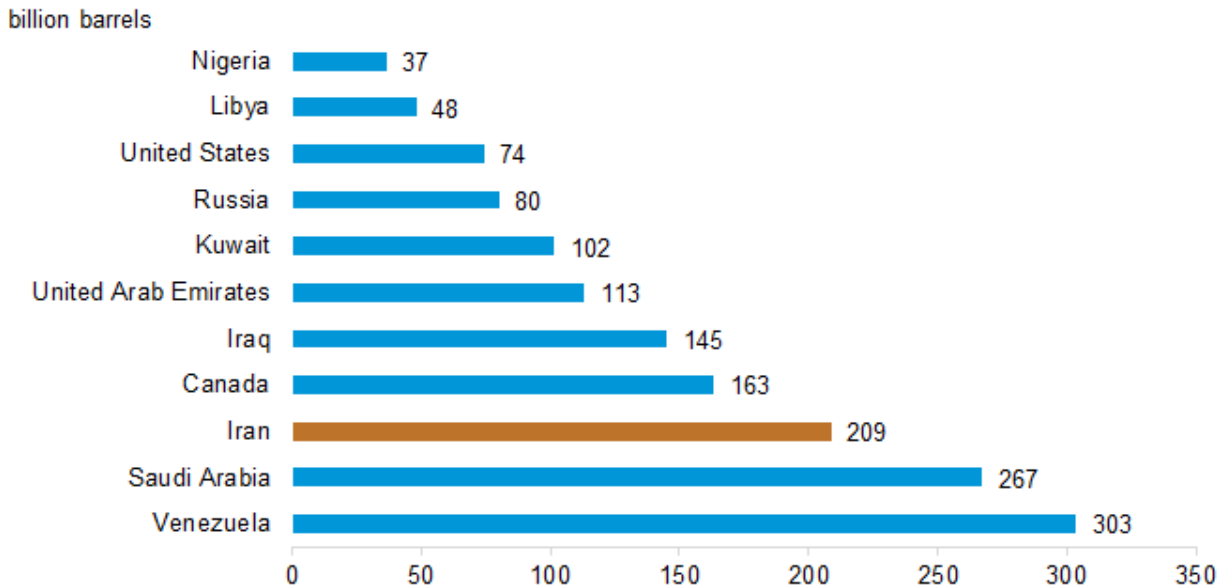
^a Hydropower and other renewables are combined, and hydropower accounts for the majority.

- Iran was the fourth-largest crude oil producer in OPEC in 2023 and the third-largest dry natural gas producer in the world in 2022.¹ It holds some of the world's largest deposits of proved oil and natural gas reserves, ranking as the world's third-largest oil and second-largest natural gas reserve holder in 2023. At the end of 2023, Iran accounted for 24% of oil reserves in the Middle East and 12% in the world (Figure 1).² Despite its abundant reserves, Iran's total liquids production is limited because the oil sector has been subject to underinvestment and international sanctions for several years.
- Although Iran is a member of OPEC, it is exempt from the production cuts under the OPEC+ agreement because its crude oil production is constrained as a result of sanctions. Despite these sanctions, Iran increased shipments of crude oil, primarily to China, in 2022 and 2023. Iran raised crude oil output by about 1 million barrels per day (b/d) from 2020 to 2023 as its exports to China grew by almost 870 million b/d during this time.³ In response, the United States expanded sanctions in April 2024 to cover ports, vessels, and refineries involved in the purchase of Iran's oil. These new sanctions allow for 180-day waivers if sanctions interfere with U.S. national security.⁴ If all oil sanctions were lifted, Iran's crude oil production could return to full capacity, which we assess at 3.8 million b/d.
- Iran's economy is relatively diversified compared with many other Middle Eastern countries, but petroleum and other liquids exports are a significant source of government revenue.⁵ In 2023, we estimate that Iran's oil companies earned about \$53 billion in net oil export revenues, similar to 2022 revenues and up from around \$37 billion in 2021. Total export revenues grew in 2022 due to rising global oil prices and increasing total petroleum liquid exports from Iran.⁶ In contrast, although Iran's oil exports rose at a faster pace in 2023 than in 2022, international oil prices fell, which resulted in flat oil export revenues. Our revenue estimates do not account for

varying discounts that Iran places on its official selling prices and likely lowered overall oil revenues in 2023.⁷ Iran’s currency crisis that ensued after the re-imposition of sanctions in 2018 has put financial constraints on Iran’s energy companies and has slowed the progress of and even led to cancellation of certain projects over the past several years.⁸

- Iran’s economy consumed an estimated 13.5 quadrillion British thermal units (quads) of primary energy in 2022 (Table 1), making it the highest energy consumer in the Middle East. Natural gas and oil accounted for almost all of Iran’s total primary energy consumption, and hydropower, coal, nuclear, and non-hydropower renewables accounted for the remaining shares (Figure 2).⁹

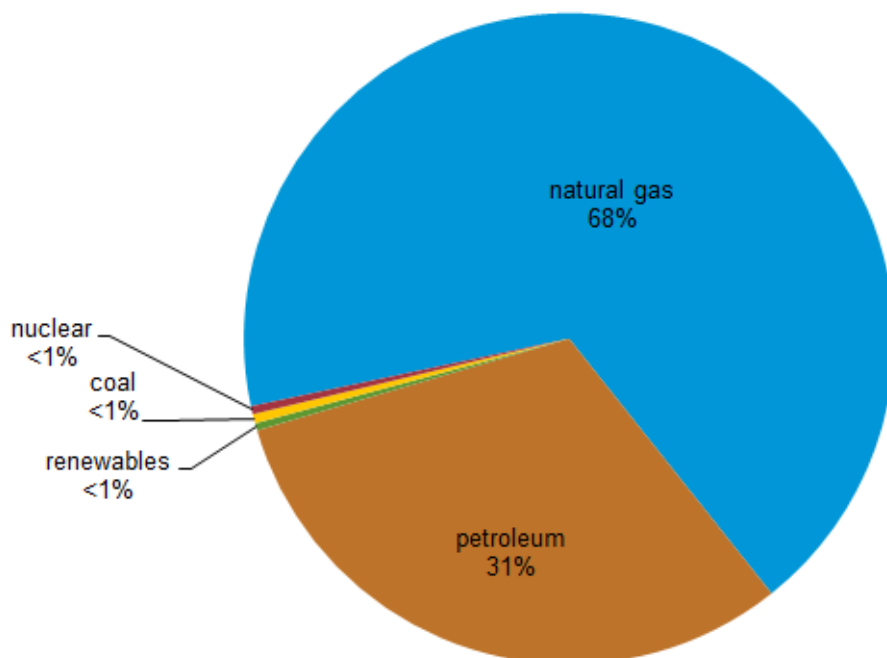
Figure 1. Largest proved reserve holders of oil, 2024



Data source: *Oil & Gas Journal*, December 2023

Note: Oil reserves include crude oil, condensates, natural gas liquids, and oil sands.

Figure 2. Iran's total primary energy consumption, share by fuel, 2022



Data source: U.S. Energy Information Administration, International Energy Statistics
 Note: Chart does not include traditional biomass and waste, such as burning firewood and waste.

Petroleum and Other Liquids

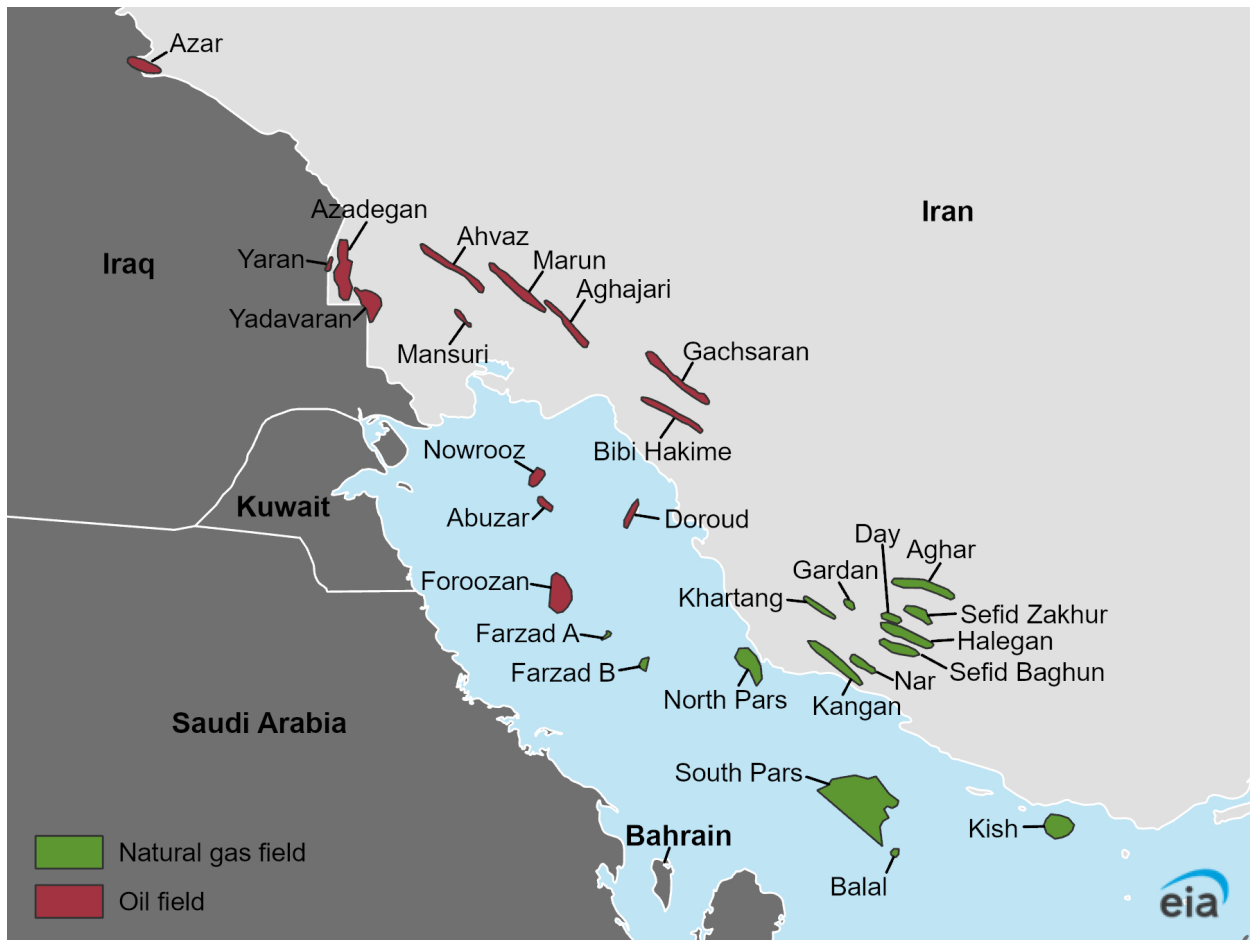
- Total petroleum and other liquids production in Iran rose from a recent annual low of less than 3.0 million b/d in 2020 to an average of 4.0 million b/d in 2023. Of this 4.0 million b/d, almost 2.9 million b/d was crude oil, and the remainder was condensate and hydrocarbon gas liquids. Iran's crude oil exports and production have declined since the United States announced in May 2018 that it would withdraw from the Joint Comprehensive Plan of Action (JCPOA) and reinstate sanctions targeting Iran's oil exports (Figure 4). In 2023, Iran increased crude oil production by about 915,000 b/d from 2020 after global oil demand recovered from the effects of the COVID-19 pandemic and China began to import more discounted crude oil from Iran.¹⁰ We assess that Iran's crude oil production could increase to 3.8 million b/d within six months after the sanctions have been lifted.
- Iran plans to sustain production capacity at fields with high decline rates through development of new wells and redevelopment of existing wells.¹¹ The lack of foreign investment during the past few years due to sanctions prompted Iran to turn to local companies to develop its oil projects. However, local firms are limited in the capital and technology they need to maintain production at mature fields, and projects awarded contracts in 2019 and beyond have progressed very slowly.¹² Between 2019 and 2022, Iran awarded several contracts to domestic companies to add about 550,000 b/d of crude oil production capacity from existing fields located in the country's southwestern region.¹³ Iran intends to develop the West Karun oil fields located along the border with

Iraq (including Azadegan, Yadavaran, and Yaran), but these projects have made limited progress over the past several years. In March 2024, Iran's national oil company (NIOC) awarded more contracts to local energy companies to increase oil production capacity at six oil fields along the border with Iraq, including one of Iran's largest fields, Azadegan.¹⁴

- Iranian energy firm Pasargad Energy Development Company began production from two new oil fields located in the West Karun oil region in March 2024—Jufair and Sepehr. Iran estimates that current production from the fields is 50,000 b/d, and production capacity will reach 110,000 b/d, with no specific deadline.¹⁵
- In 2022, Iran signed a preliminary agreement with Russia, in part, to help finance and develop its oil and natural gas sectors. This agreement must overcome several challenges related to negotiating details and implementing projects.¹⁶
- Iran was the 10th-largest oil consumer in the world and the second largest in the Middle East after Saudi Arabia in 2023.¹⁷ After Iran's oil consumption returned to pre-COVID pandemic levels in 2021, it reached a record high of 2.2 million b/d in 2023 (Figure 4) because of significantly subsidized gasoline prices and higher vehicle sales that boosted gasoline demand and because of growing petrochemical production that uses petroleum products and natural gas as feedstocks. Use of petroleum and petroleum products will likely face competition from natural gas, particularly in the electric power, residential, and commercial sectors, during the next several years, especially if exports of petroleum and petroleum products continue to increase.¹⁸
- As of the beginning of 2024, Iran's total crude oil distillation capacity was an estimated 2.1 million b/d, and its condensate splitter capacity was 0.6 million b/d. The Persian Gulf Star condensate refinery, which processes condensates from Iran's South Pars natural gas field and is Iran's largest condensate refinery, came online in phases from 2017 through 2020 and has a crude oil processing capacity of 420,000 b/d.¹⁹ More processing capacity to produce lighter petroleum products, such as gasoline and diesel, allowed Iran to substantially increase its gasoline output to meet its rising demand in the transportation sector. Despite this growing processing capacity, Iran still relies on gasoline imports due to the country's increasing oil demand and largely outdated and inefficient refineries that produce mostly lower-valued fuel oil.²⁰
- Although Iran has proposed several refinery projects that are in various stages of planning and development to replace some of its older units, international sanctions on Iran have hindered some of the investment needed to complete these facilities within the next few years.²¹ Despite sanctions, Iran has made some progress in increasing its refining capacity to help boost production of middle distillates, such as gasoline and diesel fuel. Iran added a 210,000-b/d crude oil distillation unit to its existing Abadan refinery in March 2023 to be able to eventually replace one of the older units and alleviate some of the demand for lighter oil products. Operations will continue at the old unit at Abadan while sanctions remain in place. Upcoming projects under construction are another 120,000-b/d unit of Persian Gulf Star and the 60,000-b/d South Adish condensate refinery. Iran's oil ministry expects these facilities to fully come online by 2027, although parts of the refineries could be operational by late 2025.²² At its Isfahan refinery, Iran intends to revive a 45,000-b/d retired secondary unit as a crude oil distillation unit in 2024.²³
- Although Iran's total oil-loading capacity for exports (more than 8.0 million b/d)²⁴ is significantly higher than its oil production capacity, Iran is building the Jask oil export

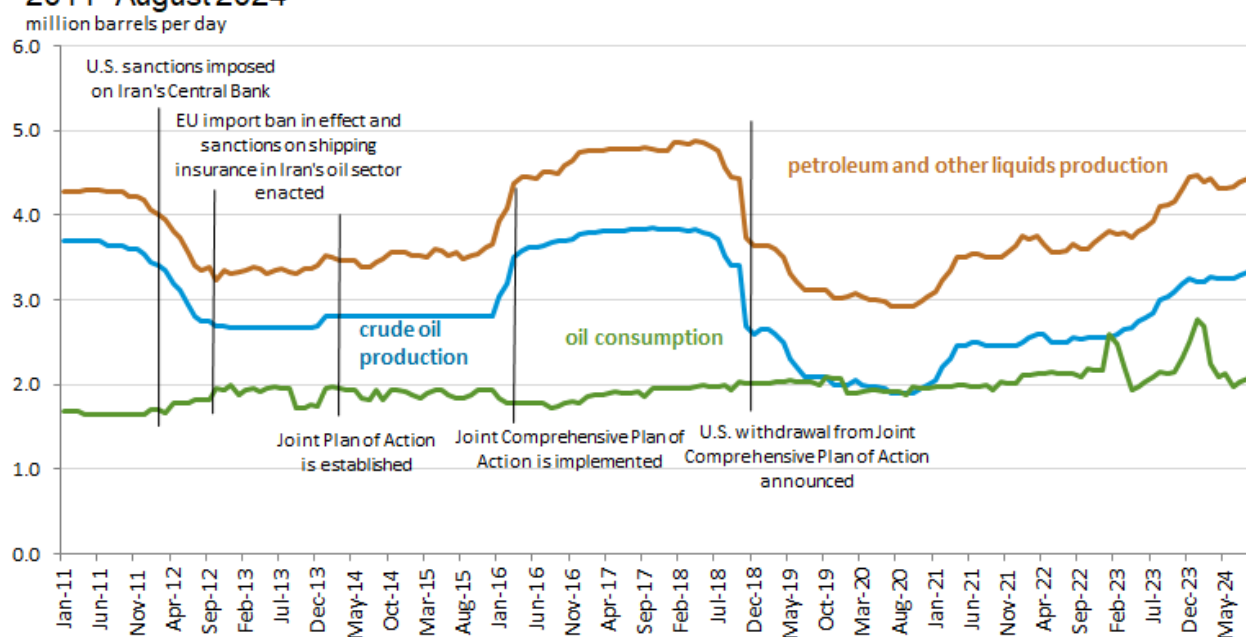
facility, located east of the Strait of Hormuz. This new facility allows Iran’s exports to bypass any disruption that may occur within the Persian Gulf or the Strait. Contractors completed the first phase of the Goureh-Jask pipeline, which began transporting crude oil from fields in Goureh, Iran, to the Jask terminal in 2021. Although the pipeline’s nameplate capacity is 1.0 million b/d, it can transport only 300,000 b/d as of mid-2024.²⁵ Iran exported a single cargo in July 2021, but it has not used the pipeline for crude oil exports since then, according to data from the tanker tracking company Vortexa.²⁶ The project’s pumping stations, storage tanks, loading points, and power generation facility are all under construction and could enter service at the earliest in 2025.²⁷

Figure 3. Maps of Iran’s largest oil and natural gas fields



Data source: World Bank, National Energy Technology Laboratory *Global Oil and Gas Features Database*, and U.S. Energy Information Administration

Figure 4. Iran's petroleum and other liquids production and consumption, January 2011–August 2024



eia Data source: U.S. Energy Information Administration, *Short-Term Energy Outlook*, September 2024
 Note: Iran's petroleum and other liquids production includes crude oil, condensate, and hydrocarbon gas liquids (HGLs).

Natural Gas

- Iran's estimated proved natural gas reserves were 1,200 trillion cubic feet (Tcf) as of December 2023, second only to Russia, according to *Oil & Gas Journal*. Iran holds 16% of the world's proved natural gas reserves and about 45% of OPEC's reserves (Figure 5).²⁸
- Iran was the world's third-largest dry natural gas producer after the United States and Russia in 2022.²⁹ Dry natural gas production rose by 64% between 2013 and 2023, expanding to 9.4 Tcf (Figure 6).³⁰ Iran produces most of its natural gas from fields not associated with oil production, and Iran has brought online several phases of the offshore South Pars natural gas field, the country's largest non-associated gas field, since 2014. Iran's increased crude oil production in 2022 and 2023 drove its associated gas output higher. In addition, Iran further raised production at the most recently developed phases of the South Pars field. Natural gas fields that yield condensate liquids as by-products were able to produce at higher levels after mid-2022 because the condensate storage capacity constraints that followed the re-imposition of sanctions eased as Iran's oil companies were able to sell more condensates held in storage.³¹
- After 2018, primarily domestic companies have developed Iran's natural gas fields. However, the country's natural gas production growth will remain limited because of insufficient investment and technology in field and upstream infrastructure development.³²
- NIOC and PetroPars, a privately owned oil company in Iran, partially brought online the last phase (SP11) of the 24-phase South Pars project in August 2023. Production at SP11

is expected to rise to an estimated plateau of 730 billion cubic feet per year (Bcf/y) by 2028 (Table 2).³³

- Iran plans to invest \$20 billion to build compression stations to stem pressure drops and production declines from some of the older phases of the South Pars field. Iran estimates that natural gas production from South Pars could lose about 350 Bcf/y before 2030 without sufficient investment in managing the pressure of these fields.³⁴ Iran's local companies are attempting to develop other natural gas fields and stem declines from existing non-associated gas fields (Table 2).³⁵ Without additional investment from foreign firms, Iran's domestic production of natural gas will face challenges to meet domestic natural gas demand and fulfill export agreements.
- In 2023, NIOC reinjected 0.6 Tcf of natural gas into oil wells for enhanced oil recovery (EOR), which plays a central role in Iran's oil production. Reinjecting natural gas volumes have recovered in the past two years because of Iran's higher oil and natural gas production, although insufficient natural gas supply to meet domestic demand and exports will likely restrain the amounts of reinjected volumes.³⁶
- In addition to the natural gas used for EOR, Iran vented or flared approximately 721 Bcf of natural gas in 2023, up 19% from 608 Bcf in 2022, because of higher oil production and associated natural gas production. In 2023, Iran flared more natural gas than any country except Russia.³⁷ Plans are underway to capture more flared natural gas for use in power plants, refineries, and petrochemical plants. Iran brought online the South Pars Phase 14 gas processing plant and the natural gas liquids (NGL) 3200 plant in 2023. NIOC is developing several other natural gas processing facilities, which will reduce natural gas flaring (Table 2).³⁸ The oil ministry plans to eliminate natural gas flaring by 2026;³⁹ however, eliminating flaring will depend on whether sufficient markets exist for natural gas liquids (petrochemical plants in Iran or exports) and whether sufficient natural gas liquids processing capacity is added. Sanctions have significantly slowed natural gas infrastructure development in Iran.⁴⁰
- In 2022, Iran was the world's fourth-highest consumer of natural gas after the United States, Russia, and China.⁴¹ Most of Iran's natural gas production is consumed domestically. Over the past decade through 2023, Iran's natural gas consumption grew by 60% because of highly subsidized prices, an extensive natural gas pipeline system, domestic production increases, greater industrial and petrochemical development, and government attempts to substitute the use of oil with natural gas in the residential, commercial, and electric power sectors.⁴²
- Iran's natural gas consumption averaged 8.9 Tcf in 2023, about 3% higher than in 2022 (Figure 6).⁴³ Growth in natural gas consumption accelerated in 2023 because of greater natural gas production; increased oil exports, which allowed more natural gas to replace oil in the electric power sector; higher than normal temperatures in the summer; and greater industrial use, mostly from the growth of Iran's petrochemical sector.⁴⁴
- In 2022, residential and commercial customers used the most natural gas (33%), followed by the industrial (including petrochemicals) sector (27%) and the electric power sector (28%).⁴⁵ The petrochemical industry is slated to grow in Iran over the next several years and will require more natural gas for feedstock. The residential and commercial sectors use more natural gas in the winter, and the electric power sector consumes more in the summer months. Iran lacks sufficient storage to meet variable seasonal demand, so in addition to its plans to increase natural gas production, Iran is working to expand storage capacity at existing facilities.⁴⁶

Table 2. Key natural gas projects in Iran, 2024

Project	Operator or project investor	Additional estimated capacity (billion cubic feet per year)	Announced start date	Notes
Natural gas processing facility projects				
NGL 3200	Persian Gulf Petrochemical Industries Company	183 (92 each phase)	April 2023 (Phase 1); 2024 (Phase 2)	Slated to process associated natural gas from the following oil fields along the border with Iraq: Azadegan, Yaran, Yadavaran, Jufair, Darquain, and Band-e-Karkheh. ⁴⁷
NGL 3100	Dehloran Petrochemicals	95	2024	Slated to process associated natural gas from the following oil fields along the border with Iraq: West Paydar, Chehsmeh-Khosh, Dehloran, Danan, Paydar, Changuleh, Dalpari, and Azar. ⁴⁸
Kharg NGL		110	2026 at the earliest	Slated to process associated natural gas from the following offshore oil fields: Hendijan, Bahregansar, Soroush, Nowruz Abuzar, Doroud, and Forouzan. ⁴⁹
East Karun	Persian Gulf Petrochemical Industries Company and NIOC	Maximum of 219	TBA	Slated to process associated natural gas from the following oil fields: Maroun, Gachsaran, Aghajari, and Reg-e-Safid. This project involves upgrades and rehabilitation of existing facilities. Most of the natural gas capture will be sent to Bidboland gas processing facilities. ⁵⁰
South Pars 14 gas processing plant		730	March 2023 ⁵¹	
Ilam Phase 2		44	2025 ⁵²	
Total		1,381		
Nonassociated natural gas projects				
South Pars Phase 11	Petropars	730	August 2023	Estimated production at the end of 2023 was around 180 Bcf/y, expected to rise to capacity of 730 Bcf/y. Plans to build an offshore compressor station were shelved once international oil companies left the project

					following the re-imposition of sanctions. ⁵³
Belal	Petropars	180	2027 at the earliest		In 2019, NIOC awarded agreements to Petropars to develop Belal over three years. Condensate production: 15,000 b/d. ⁵⁴
Farzad A and B	Petropars	730 (365 each field)	2029 at the earliest		Located offshore on the border with Saudi Arabia. NIOC awarded contract to Petropars in 2021 to develop Farzad B within five years. Fields contain high sulfur, carbon dioxide, and nitrogen as well as high pressure, making development technically challenging. ⁵⁵
Kish	Pars Oil and Gas Company	1,095 (365 in the first phase)	2025 at the earliest for Phase 1		Located offshore. Condensate production: 11,000 b/d. In 2023, local firms NIOC and Pars Oil and Gas Company signed a \$900 million deal to develop Kish. ⁵⁶
North Pars	NIOC	1,460 over four phases	TBA		As of November 2021, NIOC plans to invest \$4 billion. No progress made as of mid-2024. ⁵⁷
Khartang	Iranian Central Oil Fields Company (ICOFC)	256	2026 at the earliest		Onshore field. Condensate production: 10,000 b/d. ⁵⁸
Gardan	ICOFC	102	2029 at the earliest		Onshore field
Day, Sefid Zakhur, Sefid Baghun, and Halegan	ICOFC	402	2027 at the earliest		Onshore fields. Condensate production: 20,000 b/d
Eram	ICOFC	365	2030 at the earliest		Onshore field. Condensate production: 15,000 b/d
Total		5,320			

Data source: FACTS Global Energy, Fitch Solutions/BMI, Petropars, Offshore Technology, *Tehran Times*, Reuters, Iranian Central Oil Fields Company

Note: TBA=to be announced, Bcf/y=billion cubic feet per year, b/d=barrels per day

Figure 5. Largest proved reserve holders of natural gas, 2024
trillion cubic feet

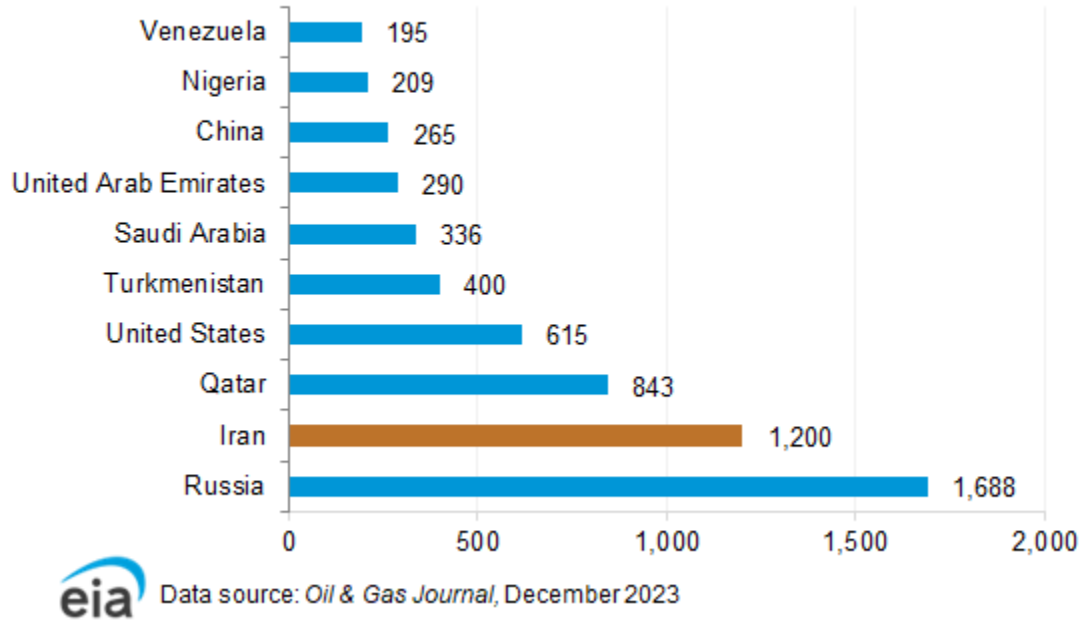
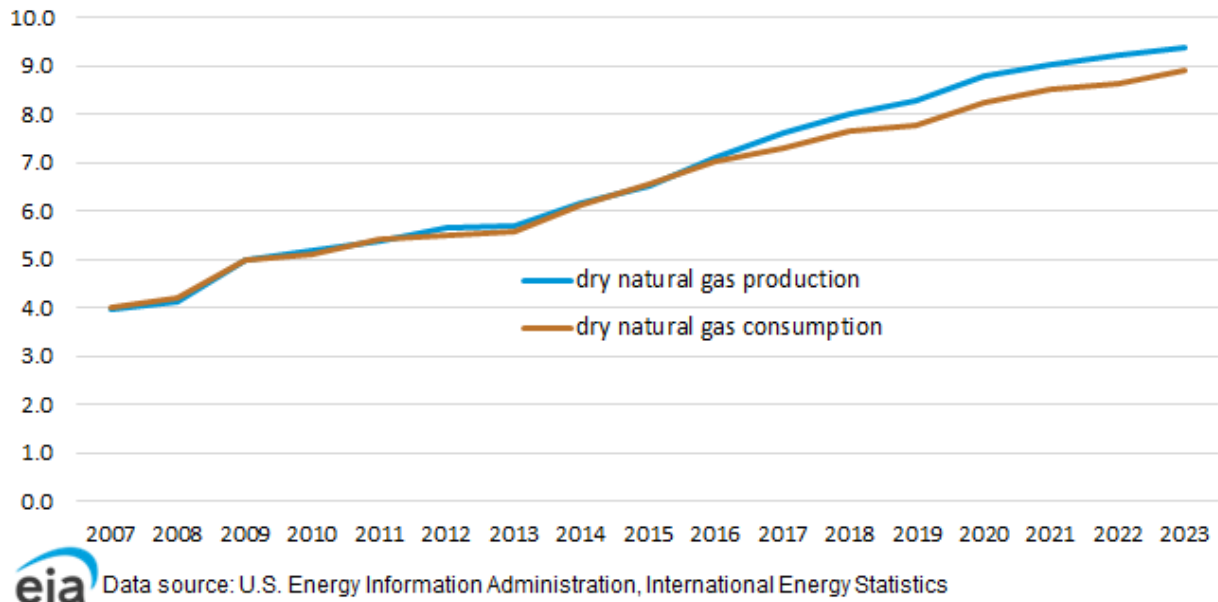


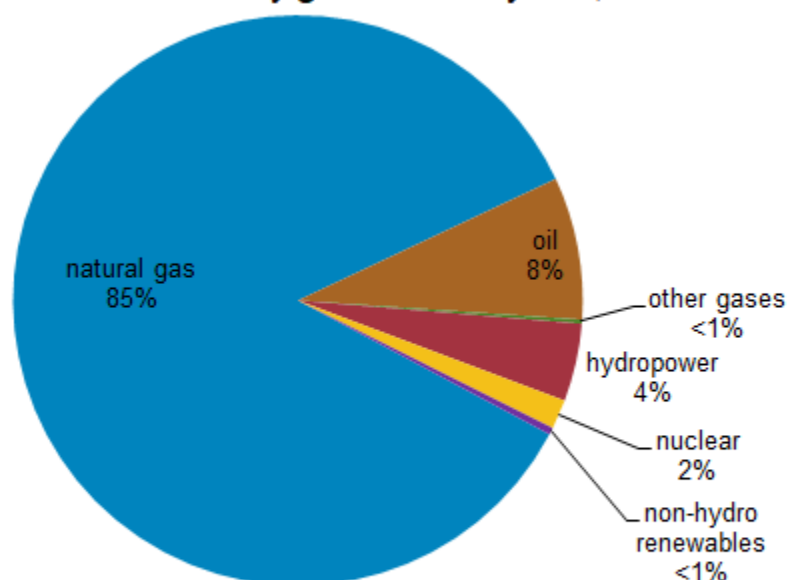
Figure 6. Natural gas production and consumption in Iran, 2007-2023
trillion cubic feet



Electricity

- In 2022, Iran generated 361 terawatt-hours (TWh) of net electricity, 93% of which was from fossil fuel sources. Natural gas is the largest source of fuel for electricity generation in Iran, accounting for 85% of total generation, up from 72% in 2014, after several phases of the South Pars field came online. Oil fueled 8% of Iran's electric power generation in 2022 (Figure 7).⁵⁹ Because sanctions limited Iran's oil exports and production of associated natural gas for a while, Iran used more oil for domestic purposes after 2018. Because Iran increased its oil exports after 2020, oil use in the electric power sector fell. Although Iran's natural gas production increased over the past decade, supply remains insufficient for power demand during the summer peak period. When Iran is short of natural gas supply, its thermal power plants burn diesel and fuel oil. Iran is converting its older, less efficient natural gas plants to combined-cycle plants and adding new capacity to use its abundant resources of natural gas, increase the efficiency of its electric power plants, and meet peak demand for electricity in the summer.⁶⁰
- In the past few years, illegal cryptocurrency mining, highly subsidized electricity prices, and higher power demand from the production of oil and natural gas drove steady growth in Iran's electricity demand and strained its capacity during the summer peak. Also, aging power plants in Iran reduce the overall available generation capacity from its installed capacity until more efficient plants come online. As a result, this supply gap has led to power shortages and rolling blackouts to the residential and industrial sectors almost every summer since 2020.⁶¹ In 2023, peak summer demand in Iran exceeded supply by 12 gigawatts (GW), and available capacity was less than 78% of installed capacity.⁶²
- Hydropower, nuclear, and non-hydropower renewables together account for the remaining 7% of Iran's electricity generation (Figure 7). Although Iran generates the most hydroelectric power in the Middle East, output is susceptible to regional droughts and water shortages, which have become more frequent, especially during the summer months, in the past few years.⁶³ Although non-hydro renewables currently account for a small share of total generation, Iran plans to boost its wind and solar capacity from less than 1 GW in 2023 to 10 GW by August 2025.⁶⁴ Iran has slowly increased its solar and wind capacities in the past decade and is constructing manufacturing plants for solar panels.⁶⁵ Iran produces electricity from one nuclear plant at Bushehr on the Persian Gulf and is constructing a second plant that is scheduled to come online in 2028. The first plant encountered significant delays, and we assess that the second will also encounter delays.⁶⁶

Figure 7. Iran's net electricity generation by fuel, 2022



Data source: U.S. Energy Information Administration, International Energy Statistics
 Note: Total may not add to 100% because of independent rounding.

Energy Trade

Petroleum and other liquids

- After Iran's crude oil and condensate exports reached a low of 0.4 million b/d in 2020 due to the United States' reimposition of sanctions in November 2018 and the decline in demand because of the COVID-19 pandemic, exports recovered to nearly 1.4 million b/d by 2023 (Figure 8). Based on tanker tracking data, China took nearly 90% of Iran's crude oil and condensate exports in 2023 (Figure 5), up from 25% in 2017, the year before sanctions were re-imposed.⁶⁷ China's independent refineries, located primarily in the country's northeastern Shandong province, have purchased most of Iran's oil exports during the past three years.⁶⁸ Estimates based on Vortexa show that Iran's oil exports continued to increase and averaged 1.5 million b/d in the first eight months of 2024.
- Although Iran supplied crude oil and condensates to a variety of countries in Europe and Asia in 2017, Iran sent all of its crude oil and condensate exports to China, Syria, the United Arab Emirates (UAE), and Venezuela in 2023 (Figure 9). While most of these export volumes have export destinations listed as [China](#), in many cases the destinations are listed as unknown, but we assess them to be destined for China. For 2018 and 2019, these specifically are listed as unknown, while in 2020 through 2023 these destinations also include Malaysia, Singapore, Vietnam, and destinations listed "unknown," which we have confirmed are all ultimately destined for China. Syria has been receiving small amounts of crude oil and oil products, mostly through a line of credit with Iran and through barter deals.⁶⁹
- After Russia's full-scale invasion of Ukraine in February 2022, European countries reduced their imports of Russia's oil, and the G-7 countries set a price cap on Russia's oil sales. As a result, Russia significantly discounted its crude oil price. China's independent refiners began purchasing

more crude oil from Russia, which displaced some of Iran's crude oil exports to China. In response, Iran increased oil price discounts to compete with Russia for crude oil market share in China.⁷⁰

- In 2021, Iran began exporting condensates to [Venezuela](#) (less than 100,000 b/d) under a swap agreement. Iran's condensates act as a diluent for Venezuela's extra heavy crude oil, helping to bolster Venezuela's oil production and exports. Under the swap agreement, Venezuela sends some of its heavy Orinoco crude oil back to Iran as payment.⁷¹ As part of the swap, Iran also began exporting some of its crude oil to Venezuela (less than 100,000 b/d) so that Venezuela could use the oil as a replacement for the similar Mesa 30 crude oil grade. Venezuela uses the Mesa 30 crude oil grade in its domestic refineries and for blending with its extra heavy oil to make its crude oil more suitable for exports. Using Iran's crude oil frees up more Mesa 30 crude oil for Venezuela to export.⁷² The partial easing of U.S. sanctions on Venezuela's oil exports to U.S. refiners in late 2023 diverted some of Venezuela's export cargoes away from Iran. In return, Iran's crude oil and condensate exports to Venezuela fell 42% from 2022 to 2023.⁷³
- Iran exported more than 1 million b/d of petroleum products in 2023, an increase from about 820,000 b/d in 2022. Liquefied petroleum gas, fuel oil, and diesel oil accounted for more than 70% of total petroleum product exports in 2023, according to Facts Global Energy estimates.⁷⁴ Petroleum products are generally shipped on smaller vessels, which can avoid detection more easily than crude oil cargoes.

Natural gas

- Iran, which is a net exporter of natural gas, trades all of its natural gas via pipelines with neighboring countries. After reaching a record high of 681 Bcf in 2022, Iran's natural gas exports fell to 515 Bcf in 2023 (Figure 10). In the same year, Iran imported 80 Bcf of natural gas, up from 66 Bcf.⁷⁵ Iran's exports to Türkiye dropped by 43%, and its imports from Turkmenistan rose by about 30% in 2023.⁷⁶ Iran stopped directly importing natural gas from Turkmenistan in 2017 because it had not settled the debt payments it owed to Turkmenistan, although Iran has imported smaller amounts through swap agreements with Turkmenistan since then.⁷⁷
- In 2023, Iraq and Türkiye accounted for 87% of Iran's natural gas exports.⁷⁸ Although Iraq is one of the largest importers for Iran's natural gas, the flows can be unstable especially during peak summer and winter seasons because of Iran's high domestic demand that exceeds supply, and Iraq's financial and logistical challenges in debt payments.⁷⁹ Electricity and natural gas exports from Iran are increasingly important to meet demand in [Iraq's](#) electric power sector.⁸⁰ To alleviate some of the payment challenges, in July 2023, [Iran and Iraq signed a barter agreement](#) whereby Iran is slated to provide Iraq with natural gas and electricity in return for crude oil or fuel oil from Iraq.⁸¹ In March 2024, Iran and Iraq signed an agreement for Iran to provide up to 644 Bcf/y of natural gas to Iraq.⁸² Also, Turkmenistan and Iraq agreed to a swap agreement that provides Iraq with natural gas from Iran, and Iran would import more natural gas from Turkmenistan.⁸³
- Iran's exports to Türkiye dropped in 2023 because of technical issues on the Iran side at the beginning of the year, lower Turkish natural gas demand because of the major earthquake in southeastern Türkiye in February 2023, and Türkiye's import contract commitments with other suppliers such as Russia.⁸⁴
- Iran's natural gas exports to Armenia and Azerbaijan are based on long-term swap agreements. At the beginning of 2022, Iran renewed its swap agreement with Azerbaijan to begin importing natural gas from Turkmenistan into northeastern Iran and to send an equal amount of natural gas to Azerbaijan from northwestern Iran. Iran receives a transport fee in the form of a small

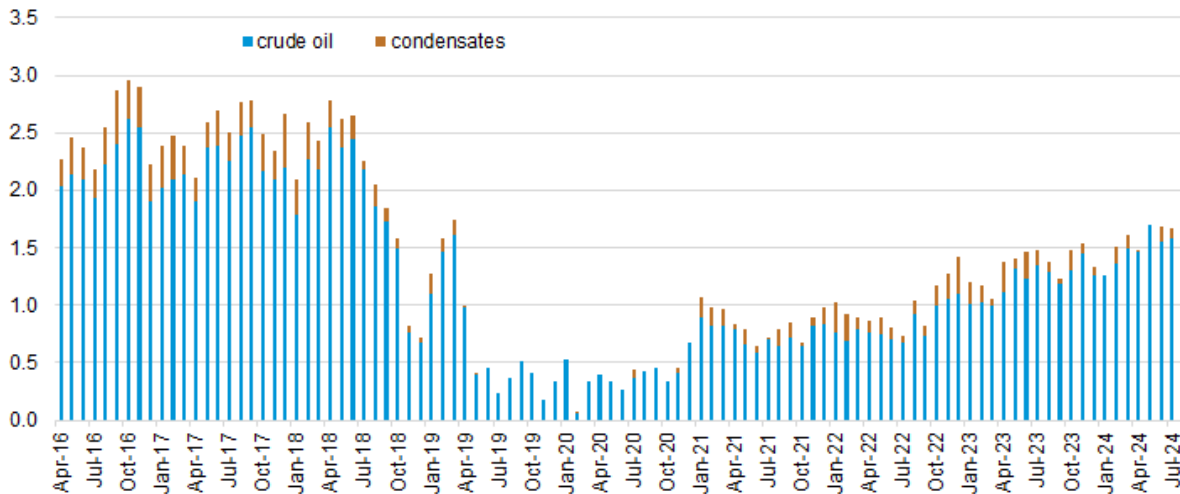
portion of the natural gas for domestic use in its northern provinces. These flows stopped at the beginning of 2024 because Turkmenistan and Azerbaijan did not renew the swap contract.⁸⁵ Iran has another swap agreement with Azerbaijan that allows Azerbaijan to send natural gas to its exclave, Nakhichevan, through Iran. Iran exports a small amount of natural gas to Armenia for electricity generation.⁸⁶

Electricity

- Iran trades a small amount of electricity with several neighboring countries and has been a net exporter for the past two decades.⁸⁷ However, after 2020, electricity exports declined, and imports increased, causing the net export levels to fall to around 1 TWh in 2023 from nearly 7 TWh in 2020. High electricity demand in Iran, inefficient and aging electricity infrastructure, and insufficient investment in the sector cause domestic power shortages especially during peak demand in the summer, which pose challenges to the reliability of Iran’s electricity exports.⁸⁸
- Iran exported the most electricity to Iraq, and smaller amounts went to Afghanistan and Pakistan in 2023. Iran’s electricity imports were primarily from Turkmenistan and Armenia.⁸⁹

Figure 8. Iran's monthly crude oil and condensate exports, January 2016–August 2024

million barrels per day



Data source: Vortexa tanker tracking (accessed October 2024)
 Note: August 2024 is a preliminary estimate.

Figure 9. Iran's crude oil and condensate exports by destination, 2023

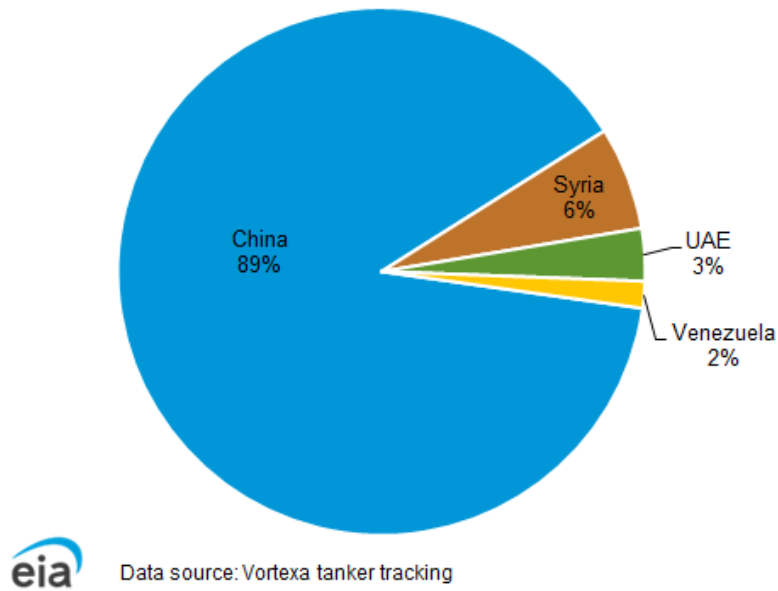
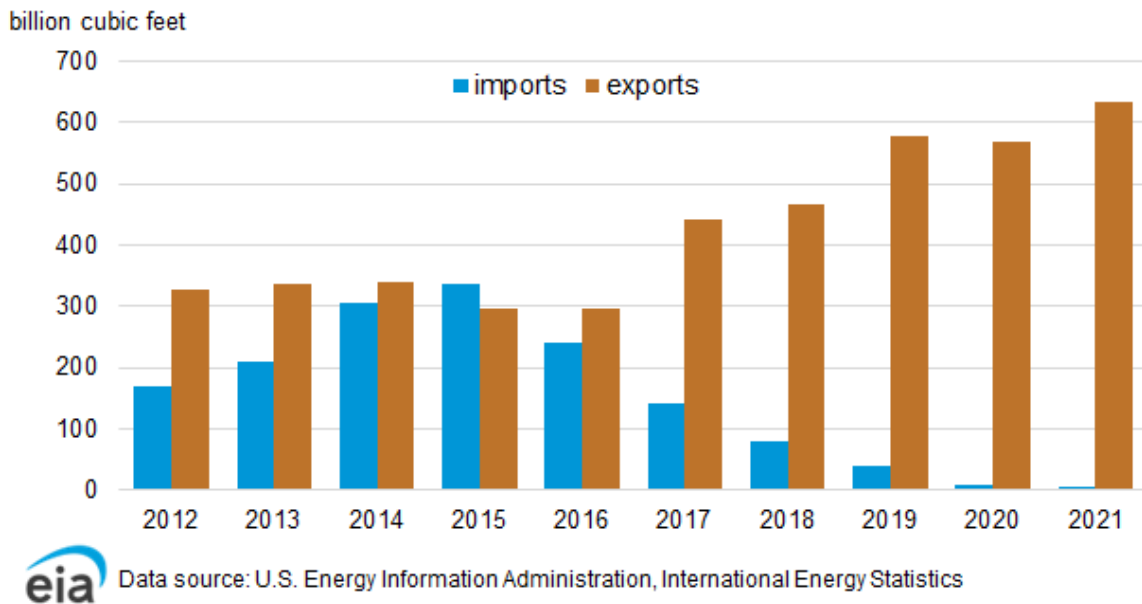


Figure 10. Iran's natural gas pipeline imports and exports



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- ¹ U.S. Energy Information Administration, *Short-Term Energy Outlook* (April 2024) and International Energy Statistics.
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