



Country Analysis Brief: Qatar

Last Updated: March 28, 2023

Next Update: March 2025

Overview

Table 1. Qatar's energy overview, 2021

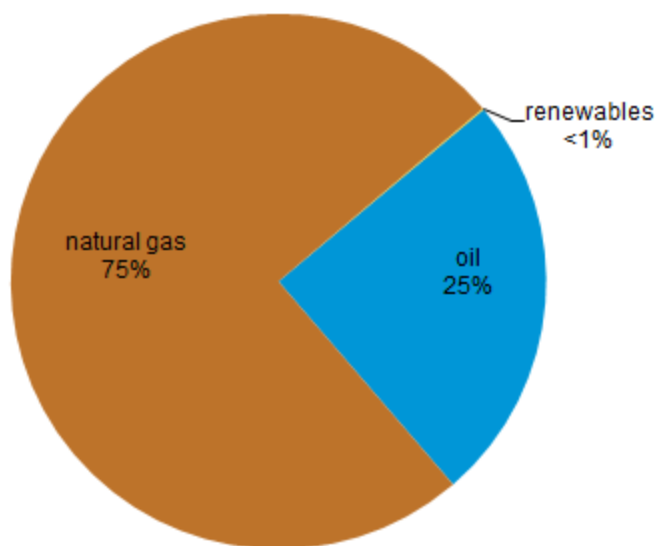
	Crude oil and other petroleum liquids	Natural gas	Coal	Nuclear	Hydro	Other renewables	Total
Primary energy consumption (quadrillion British thermal units)	0.5	1.6	--	--	--	<0.1	2.1
Primary energy consumption (percentage)	24.8%	75.1%	--	--	--	<0.1%	100.0%
Primary energy production (quadrillion British thermal units)	3.3	6.6	--	--	--	<0.1	9.9
Primary energy production (percentage)	32.9%	67.1%	--	--	--	<0.1%	100.0%
Electricity generation (terawatthours)	--	47.4	--	--	--	0.1	47.5
Electricity generation (percentage)	--	99.7%	--	--	--	0.3%	100.0%

Data source: U.S. Energy Information Administration, *Middle East Economic Survey*¹

- Political disputes led Egypt and four Gulf Cooperation Council members (Saudi Arabia, United Arab Emirates, and Bahrain) to sever diplomatic and trade ties with Qatar in June 2017. These countries also imposed blockades on air and sea space with Qatar during this period. In January 2021, the four countries reached a resolution and lifted the blockade to restore trade and diplomatic affairs with Qatar.² During the trade embargo, Qatar became more self-sufficient and adopted new supply chains and trade routes.³ Qatar's economy grew after 2017, and energy consumption rose through 2019 until the COVID-19 pandemic.⁴
- Qatar, one of OPEC's longest-standing members, left the organization in January 2019 to shift more of its resources and investment from oil production to natural gas and liquefied natural gas (LNG) infrastructure projects.⁵
- The energy industry plays a major role in Qatar's economy. According to the International Monetary Fund, Qatar's earnings from its hydrocarbon sector accounted for 81% of the country's total government revenues in 2021, up from 77% in 2020. Hydrocarbon export revenues rose from \$47 billion in 2020 to nearly \$77 billion in 2021.⁶

- Qatar was the world's sixth-largest dry natural gas producer (behind the United States, Russia, Iran, China, and Canada), the second-largest LNG exporter, and the third-largest holder of natural gas reserves in 2021.⁷ Qatar's high natural gas output yields significant and valuable petroleum liquid byproducts such as lease condensates and hydrocarbon gas plant liquids (HGLs). Qatar is also at the forefront of gas-to-liquids (GTL) production, and the country is home to the world's largest GTL facility.⁸
- Qatar's economy consumed an estimated 2.1 quadrillion British thermal units (quads) of primary energy in 2021, down from a peak of 2.3 quads in 2019. Qatar is a major hub for international air travel and a key exporter of oil, natural gas, petrochemicals, and fertilizers. Natural gas and oil accounted for virtually all of Qatar's total primary energy consumption, with renewable energy only making up a small fraction (Table 1 and Figure 1).⁹

Figure 1. Qatar's primary energy consumption, 2021



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

Petroleum and other liquids

- With proved reserves of crude oil estimated at 25.2 billion barrels as of January 1, 2023, Qatar held the 6th largest reserves in the Middle East and the 14th largest in the world (Figure 2).¹⁰ Qatar's crude oil and lease condensate production for 2021 ranks 14th in the world, and most of the country's production is exported.¹¹
- Qatar's total petroleum and other liquids production, which includes lease condensates and hydrocarbon gas liquids (HGLs), declined slightly from its peak of more than 2 million barrels per day (b/d) in 2012 to less than 1.9 million b/d in 2022 (Figure 3). Because all of Qatar's oil fields are mature, Qatar's crude oil production declined from its highest level of 852,000 b/d in 2008 to 616,000 b/d in 2022.¹² In addition to crude oil, which makes up 33% of its total liquids production, Qatar produces a significant amount of condensates from natural gas fields (38%) and HGLs that are removed from raw natural gas supply (20%). The remainder of its liquids supply is from the direct conversion of natural gas to oil products at its GTL plants and from refining gain (7%).

- Because decline rates at Qatar’s crude oil fields are high, QatarEnergy is using enhanced oil recovery (EOR) in redevelopment projects to sustain production capacity.¹³ These projects are likely to offset some of the production declines and could add small amounts of crude oil. The Al-Shaheen field, Qatar’s largest crude oil field, increased production by around 60,000 b/d from 2020 to 2022 through a major redevelopment effort, and a second project phase is underway.¹⁴ We expect that a redevelopment project at the Bul Hanine field will add 50,000 b/d in 2023.¹⁵
- Noncrude liquids production is increasing. The Barzan natural gas project added about 30,000 b/d of condensate, 34,000 b/d of ethane, and 17,000 of hydrocarbon gas liquids (HGL) in 2022.¹⁶ The North Field natural gas expansion projects are slated to come online starting in late 2025. Between 2025 and 2027, these expansion projects will add about 380,000 b/d of condensates and about 300,000 b/d of ethane and other HGLs (Table 3).¹⁷
- Qatar’s oil consumption reached about 292,000 b/d in 2022, up from about 260,000 b/d in 2020. Qatar hosted the FIFA World Cup 2022, which increased global travel to and economic activity in the country.¹⁸
- Qatar uses noncrude liquids, mostly ethane, as fuel at petrochemical plants. It has three projects which can process a combined 152,000 b/d of ethane. QatarEnergy intends to add another 120,000 b/d-capacity ethane processing facility, the Ras Laffan Petrochemicals Project, in 2026.¹⁹
- In late 2022, Qatar had the capacity to process 80,000 b/d of crude oil and 349,000 b/d of condensates in its three refineries (Table 2).²⁰ After QatarEnergy completed an upgrade to the Umm Said refinery in 2020, all of Qatar’s refineries were able to produce low sulfur diesel.²¹
- Qatar has the world’s largest capacity to directly convert natural gas to petroleum products.²² Its two GTL facilities plants can convert natural gas to 174,000 b/d of petroleum products and 120,000 b/d of HGLs such as ethane and propane.²³

Table 2. Qatar’s oil refining capacity, 2022

Refinery	Owners	Capacity (thousand barrels per day [b/d])	Notes
Crude oil and condensate refineries			
Umm Said / Mesaieed	QatarEnergy	137	80,000 b/d crude oil distillation unit and 57,000 b/d condensate splitter
Laffan Refinery 1	QatarEnergy 51%; Total 10%; ExxonMobil 10%; Cosmo 10%; Idemitsu 10%; Mitsui 4.5%; and Marubeni 4.5%	146	Condensate splitter processing condensates from the North Field
Laffan Refinery 2	QatarEnergy 84%; Total 10%; Cosmo 2%; Idemitsu 2%; Mitsui 1%; and Marubeni 1%	146	Condensate splitter processing condensates from the North Field
Total		429	
Gas-to-liquids (GTL) refineries			
Oryx GTL plant	QatarEnergy, Sasol	34	
Pearl GTL plant	QatarEnergy, Shell	140	Also produces 120,000 b/d of HGLs
Total		174	

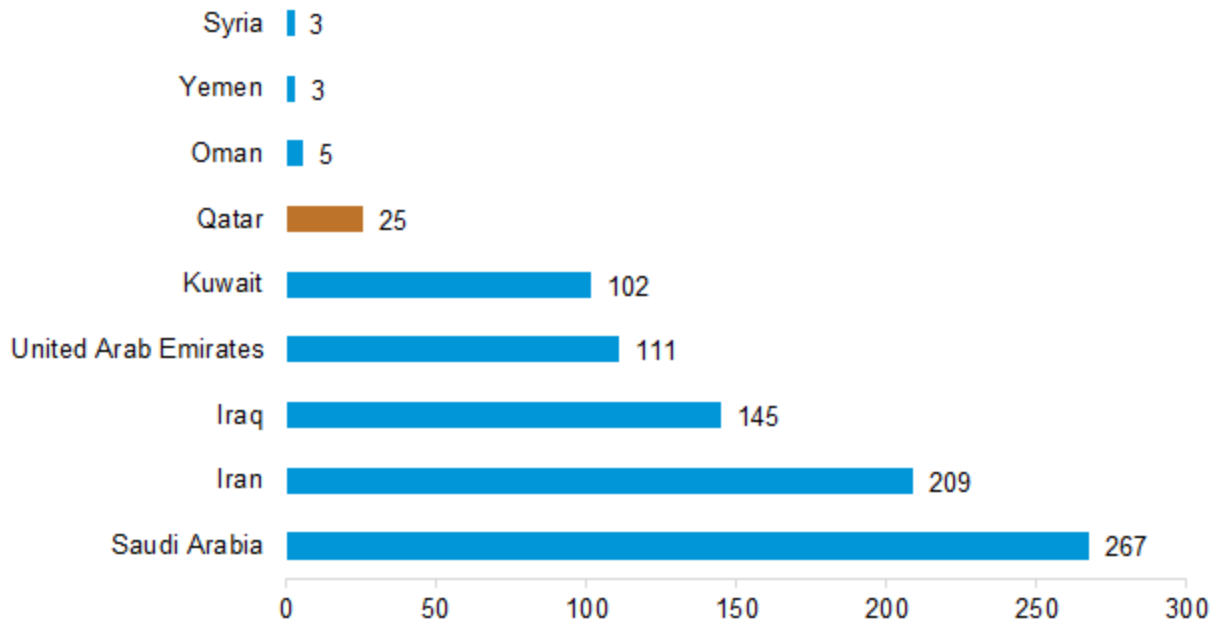
Data source: *Oil & Gas Journal*, FACTS Global Energy, *Middle East Economic Survey*, QatarGas, QatarEnergy, Offshore Technology, Shell, and Oryx GTL.²⁴

Table 3. Qatar’s noncrude liquids projects

Project name	Condensate production capacity (thousand b/d)	LPG production capacity (thousand b/d)	Ethane production capacity (thousand b/d)	Announced start date
Barzan Natural Gas Project	30	17	34	2022
QatarGas North Field East Expansion Project	260	128	76	2025
QatarGas North Field South Expansion Project	122	61	34	2027
Total	412	206	144	

Data source: *Middle East Economic Survey*, NHST Media Group’s Upstream Online
 Note: b/d=barrels per day, LPG=liquefied petroleum gas.

Figure 2. Largest proved reserve holders of oil in the Middle East, 2022
billion barrels

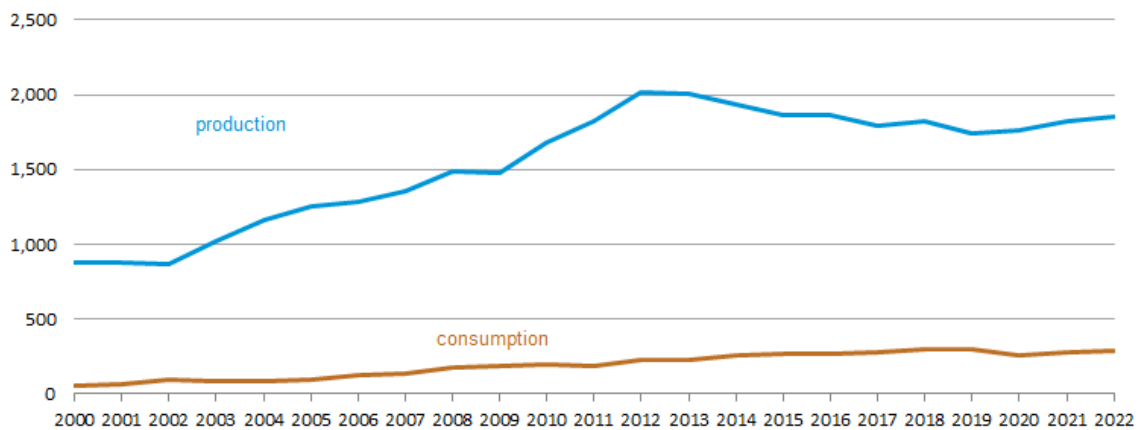


Data source: *Oil & Gas Journal*, December 2022

Note: Oil reserves include crude oil, condensates, natural gas liquids, and oil sands. Kuwait and Saudi Arabia reserves include Neutral Zone.

Figure 3. Qatar total petroleum and other liquids supply and consumption

thousand barrels per day



Data source: U.S. Energy Information Administration, *Short-Term Energy Outlook*, January 2023, *International Energy Statistics*

Natural gas

- Qatar's estimated proved natural gas reserves were 843 trillion cubic feet (Tcf) as of December 2022, third after Russia and Iran and just ahead of the United States (Figure 4). Qatar holds 11% of the world's proved natural gas reserves and almost 30% of the Middle East's reserves (Figure 4).²⁵ Qatar's vast natural gas reserves reside primarily in the giant offshore North Gas Field, which is known as South Pars on the Iranian side of the Persian Gulf.
- Qatar's natural gas production far exceeds its domestic demand, and over the past two decades, it became an important global LNG exporter. Qatar was the third-largest natural gas exporter and the second-largest exporter of LNG in the world in 2021, second to Australia (Figure 11).²⁶ Although Qatar's natural gas production grew at a rate of 18% per year between 2003 and 2013, output growth slowed considerably to average less than 1% growth per year after 2013 because many field wells reached maturity and no major projects came online until 2021 (Figure 5).
- The Barzan natural gas project, which can process up to 511 billion cubic feet per year (Bcf/y) of natural gas, began operating in late 2022.²⁷ The natural gas stream at the Barzan field also contains hydrocarbon liquids that are removed and used in Qatar's petrochemical industry.
- Two large natural gas production and liquefaction projects are under development and slated to come online starting in 2025 (Table 4). The North Field East and North Field South are part of the North Field expansion project that we expect will offset some of the declines from mature fields and raise Qatar's natural gas production. Output from these projects will supply two new LNG export terminals, which have a combined capacity of 2.3 trillion cubic feet per year (Tcf/y) (Table 4). As part of the government's plans to reduce the North Field project's CO₂ emissions, Qatar plans to install a carbon capture and storage system on North Field East that will capture up to 1 million metric tons of CO₂ per year by 2030.²⁸ Since 2022, high natural gas demand in Asia, global natural gas supply uncertainty because of Russia's full-scale invasion of Ukraine, and curtailed natural gas supply to Europe have created significant demand for LNG exports from new projects such as those in Qatar and the United States.
- Qatar's dry natural gas consumption has remained flat at an annual average of 1.4 Tcf since 2013 (Figure 5).²⁹ Domestic power plants, water desalination plants, and the industrial sector almost exclusively use natural gas for fuel³⁰. Qatar's petrochemical industry also mostly uses ethane produced from unprocessed natural gas. Natural gas is used for reinjection in crude oil production.³¹
- Qatar held the world's third-largest LNG exporting capacity behind the United States and Australia as of April 2022.³² After its last liquefaction facility came online in 2011, Qatar's LNG export capacity reached 3.7 Tcf/y (Table 4). Qatar's capacity will gradually rise to 6 Tcf/y when the six new liquefaction trains linked to the North Field expansion projects enter commercial service starting in 2025.

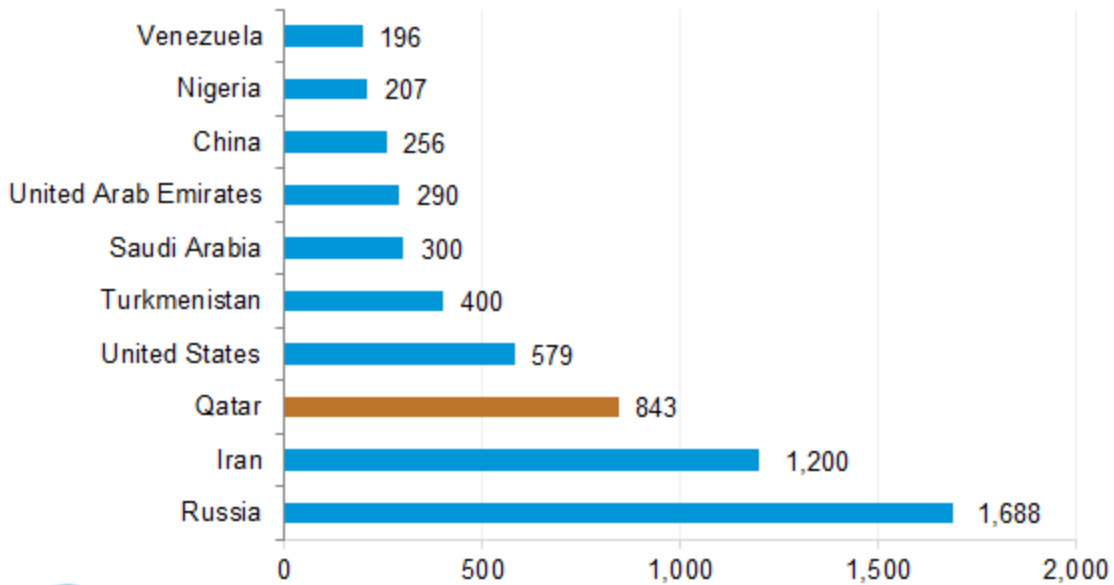
Table 4. Qatar’s existing and planned liquefaction terminals

Project name	Owners	Nameplate capacity (billion cubic feet per year)	Target start year
Existing liquefied natural gas export terminals			
QatarGas 1, Trains 1–3	QatarEnergy; Exxon-Mobil; TotalEnergies; Marubeni; Mitsui	461	Operational 1996–1998 ³³
QatarGas 2, Trains 4–5	QatarEnergy; ExxonMobil; TotalEnergies	749	Operational 2009
QatarGas 3, Train 6	QatarEnergy; ConocoPhillips; Mitsui	375	Operational 2010
QatarGas 4, Train 7	QatarEnergy; Shell	375	Operational 2011
RasGas 1, Trains 1–2	QatarEnergy; ExxonMobil; ITOCHU; Korea Gas; Sojitz; Sumitomo; Samsung; Hyundai; SK Energy; LG International; Daesung; Hanwha Energy	317	Operational 1999–2000
RasGas 2, Trains 3–5	QatarEnergy; Exxon-Mobil	677	Operational 2004–2007
RasGas 3, Trains 6–7	QatarEnergy; Exxon-Mobil	749	Operational 2009
Total		3,703	
Projects under development			
QatarGas North Field East Expansion Project, Trains 1–4 ³⁴	QatarEnergy 75%; Exxon-Mobil 6.3%; TotalEnergies 6.3%; Shell 6.3%; Eni 3.1%; ConocoPhillips 3.1%	1,537	2025
QatarGas North Field South Expansion Project, Trains 1–2 ³⁵	QatarEnergy 75%; TotalEnergies 9.4%; Shell 9.4%; ConocoPhillips 6.3%	768	2027
Total		2,305	

Data source: International Gas Union, *2022 World LNG Report*, *Middle East Economic Survey*, Fitch Solutions

Figure 4. Largest proved reserve holders of natural gas, 2022

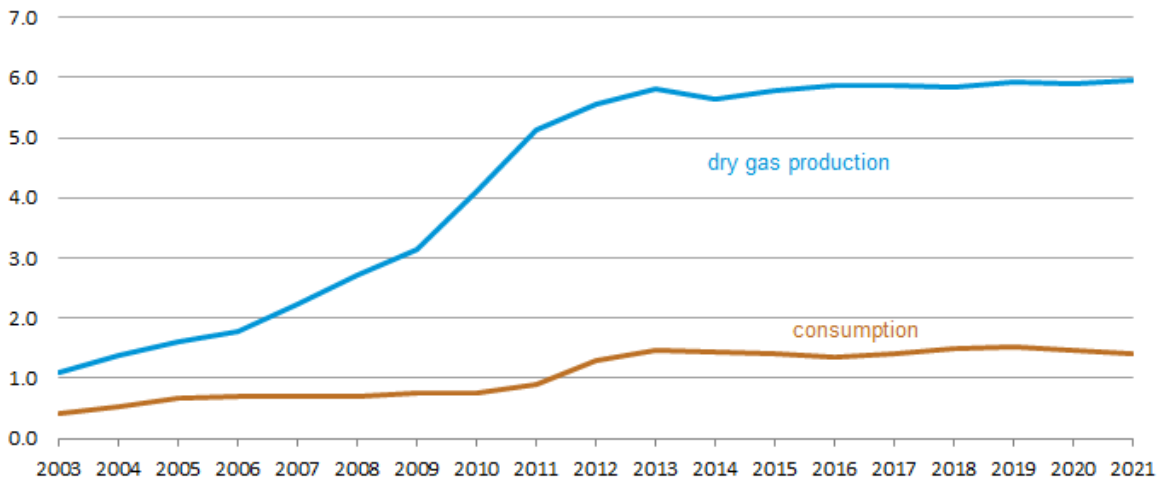
trillion cubic feet



Data source: *Oil & Gas Journal*, December 2022

Figure 5. Qatar's natural gas production and consumption

trillion cubic feet



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

Electricity

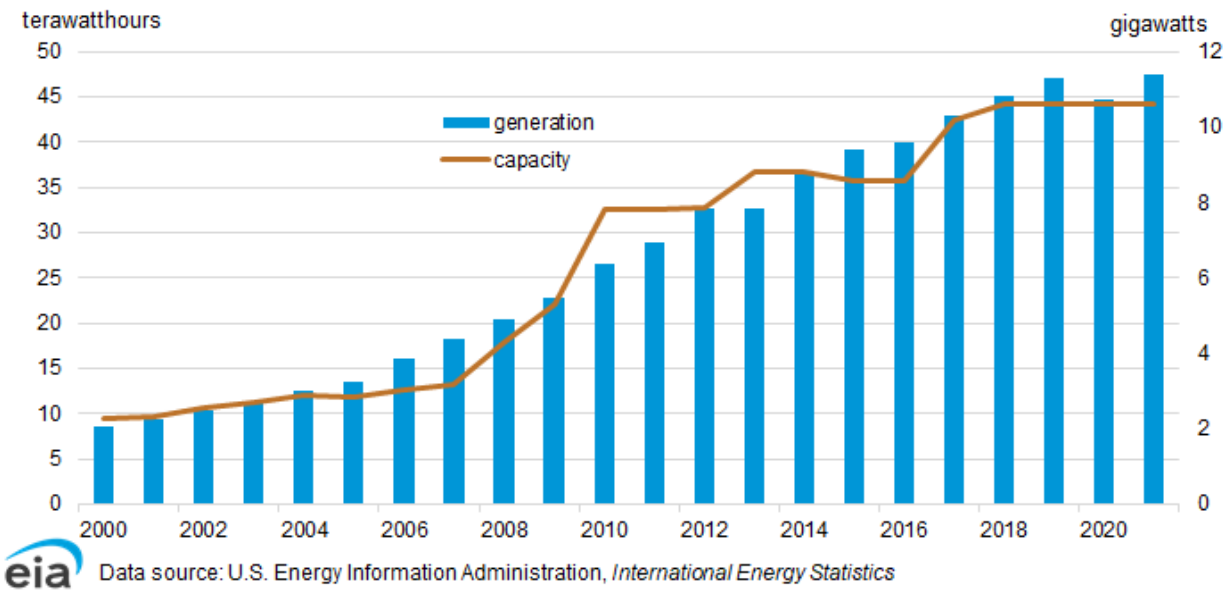
- Qatar's electric power generation capacity was 10.6 gigawatts (GW) in 2021 and rose about 36% between 2010 and 2021. However, the country's net electricity generation rose at a faster pace, about 80%, in the same time period, indicating higher utilization of generation capacity (Figure 6).³⁶ In 2021, Qatar generated 48 terawatt-hours (TWh) of net electricity, and virtually all of it was generated by natural gas.³⁷ High population growth, industrial and petrochemical growth, additional water desalination projects, and hotter summer temperatures raised electricity consumption over the past decade.³⁸
- Although Qatar's electricity generation fell in 2020 because of decreased mobility and economic slowdown during the pandemic, generation increased in 2021. Manufacturing and infrastructure work in preparation for the FIFA World Cup 2022 likely also raised electricity demand in 2022.³⁹
- Qatar installed its first utility-scale solar power project in mid-2022, and the government plans to replace some of its natural gas-fired power generation with renewable energy. Two more large-scale solar power projects with a total capacity of 875 megawatts (MW) are slated to come online in 2024 (Table 5).⁴⁰ As more solar power enters operation in the next few years, it will displace some of the natural gas-fired electricity.
- Qatar plans include increasing solar-powered capacity to 5 GW by 2035 as part of the government's goal to reduce CO₂ emissions. Qatar also pledged to secure 11 million tons of CO₂ emissions per year through carbon capture and storage technology by 2035.⁴¹

Table 5. Solar projects in Qatar, 2022

Project name	Operator or project investor	Capacity (megawatts)	Announced start date	Notes
Al Kharsaah Phase 1	QatarEnergy Renewable Solutions (60%), Marubeni Corp. (20.4%) and TotalEnergies (19.6%)	400	June 2022	Kahramaa, the state-owned electric and utility provider of Qatar, holds a 25-year power purchase agreement.
Al Kharsaah Phase 2	(same as Phase 1)	400	October 2022	
Ras Laffan	QatarEnergy	458	Late 2024	Engineering, procurement, and construction contract signed in August 2022. ⁴² Will serve the Ras Laffan LNG facility.
Mesaieed	QatarEnergy	417	Late 2024	Engineering, procurement, and construction contract signed in August 2022. Will serve the Mesaieed industrial city.
Total		1,675		

Data source: *Middle East Economic Survey*, Fitch Solutions

Figure 6. Qatar's net electricity generation and capacity



Energy trade

Petroleum and other liquids

- Qatar does not import any crude oil or condensates and only occasionally imports petroleum products because the country's oil production and refining sectors more than meet domestic demand.⁴³
- Qatar's crude oil and condensate exports decreased after the Ras Laffan refinery began operating in 2016 and processing them. Crude oil and condensate exports have remained around 800,000 b/d since 2017, down from 1 million b/d in 2015 (Figure 7).⁴⁴
- Qatar shipped most of its crude oil and condensates to Asia and smaller amounts to the United Arab Emirates and other countries (Figure 8).⁴⁵ Qatar is one of the world's key exporters of lease condensates. Asian markets, particularly China, South Korea, Thailand, and Singapore, have several condensate splitters that are able to process significant amounts of lease condensates and convert them to naphtha, which is used in the petrochemical industry. In 2018, the United States reimposed sanctions on all oil exports from Iran, another large condensate producer, which caused Asian consumers to turn to other sources of condensate, such as Qatar.⁴⁶
- Qatar exports of petroleum products were an estimated 670,000 b/d in 2022 and largely flat since 2018, the majority of which traveled to Asia. LPG accounted for close to half of total petroleum product exports, and naphtha made up more than one-third of the oil product exports.⁴⁷ Qatar has an abundance of lighter grade liquids that are from natural gas fields and liquids that are produced in condensate splitters. Because most of Qatar's domestic demand is in middle distillates—gasoline, diesel, and jet fuel—most of its LPG and naphtha are exported (Figures 9 and 10).

Natural gas

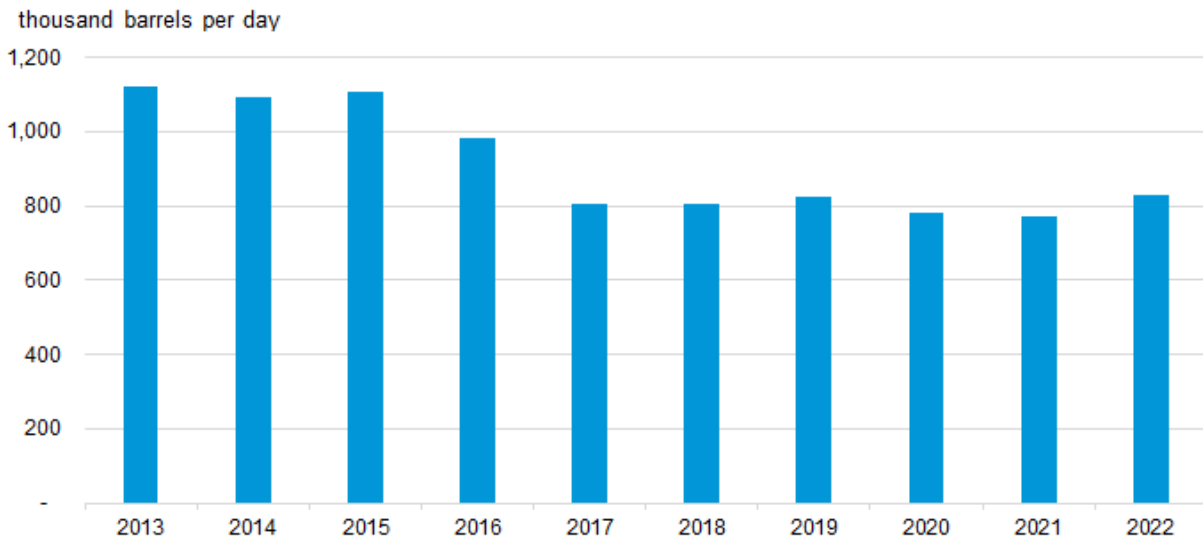
- In 2021, Qatar was the world's third-largest exporter of natural gas, exporting nearly 4.4 Tcf (Figure 11), and the country was the world's second-largest LNG exporter, accounting for 21% of global LNG exports.⁴⁸ Most of Qatar's natural gas exports went to markets in Asia and Europe in the form of LNG, and Qatar sent a small amount of natural gas via the Dolphin Pipeline to the United Arab Emirates (UAE) and Oman (Figures 12 and 13).⁴⁹
- After rising substantially between 2009 and 2011, Qatar's natural gas exports have stayed around 4.4 Tcf/y since 2012.⁵⁰ Qatar exported 0.7 trillion cubic feet (Tcf) through the Dolphin Pipeline, which has a design capacity of 1.2 Tcf/y, and exported more than 3.6 Tcf as LNG in 2021. Despite the trade embargo with UAE between 2017 and 2021, Qatar did not suspend exports through the Dolphin Pipeline.⁵¹
- Qatar's latest LNG export terminal addition came online in 2011, and we don't expect export volumes to change much until new liquefaction terminals become operational starting in 2025. Europe is looking to replace the natural gas pipeline exports it used to receive from Russia with LNG imports. Although Europe has held discussions with Qatar to import more LNG, until the North Field expansion project comes online, Qatar will not be able to export more than its LNG capacity of 3.7 Tcf/y (Table 4).⁵²

- QatarEnergy is seeking long-term buyers for contracts linked to its new LNG export projects. In 2022, Qatar signed the first two long-term LNG supply deals for the North Field expansion project with China and Germany in late 2022. China’s national oil company, Sinopec, signed a 27-year agreement with QatarEnergy for more than 190 Bcf/y of LNG.⁵³ QatarEnergy also signed agreements with ConocoPhillips to deliver nearly 100 Bcf/y of LNG to Germany beginning in 2026 for 15 years.⁵⁴

Electricity

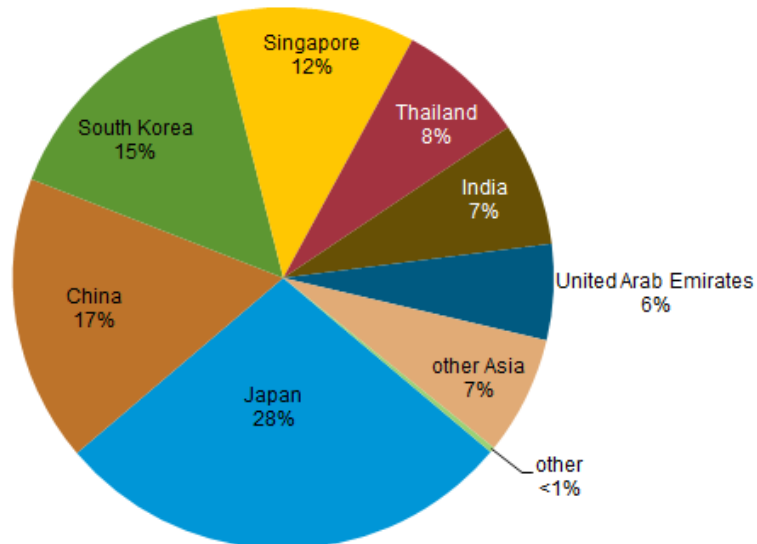
- As a member of the Gulf Cooperation Council Interconnectivity Authority, Qatar trades small amounts of electricity with its neighbors. The transmission line connecting Doha to the main line has a capacity of 750 megawatts.⁵⁵

Figure 7. Qatar's crude oil and condensate exports



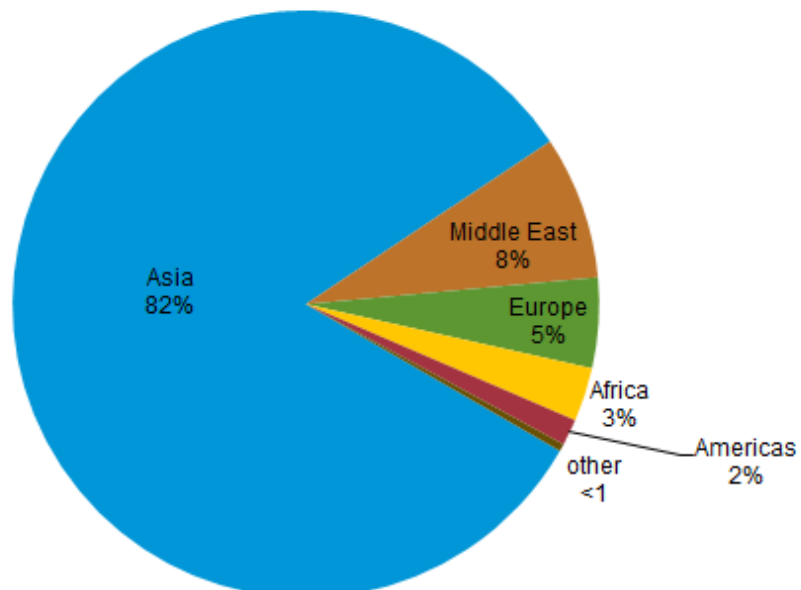
Data source: Kpler (accessed March 2023)

Figure 8. Qatar's crude oil and condensate exports by destination, 2022



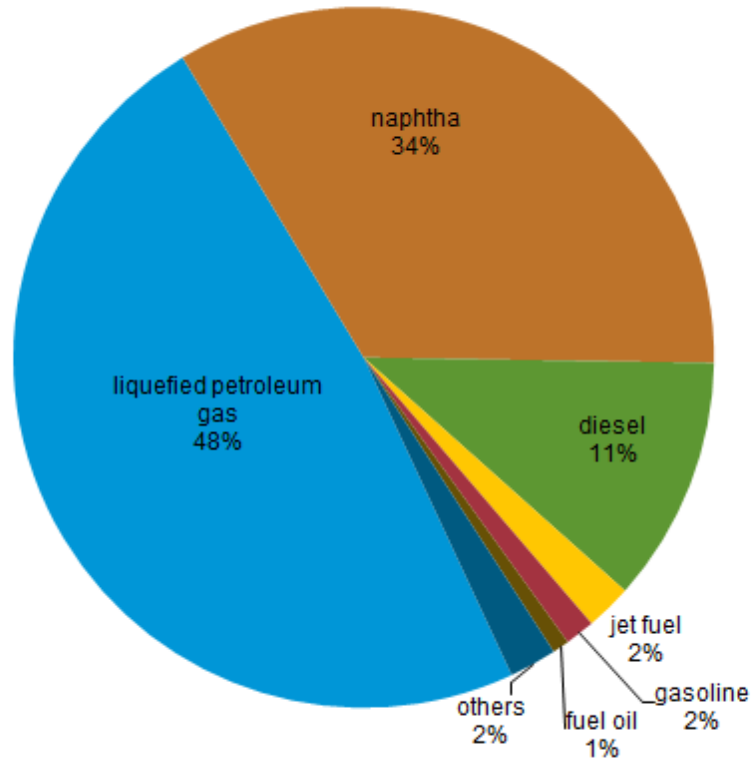
Data source: Kpler (accessed March 2023)
 Note: Numbers may not total 100% because of individual rounding.

Figure 9. Qatar's petroleum product exports by region, 2022



Data source: Kpler (accessed March 2023)
 Note: Numbers may not total 100% because of individual rounding.

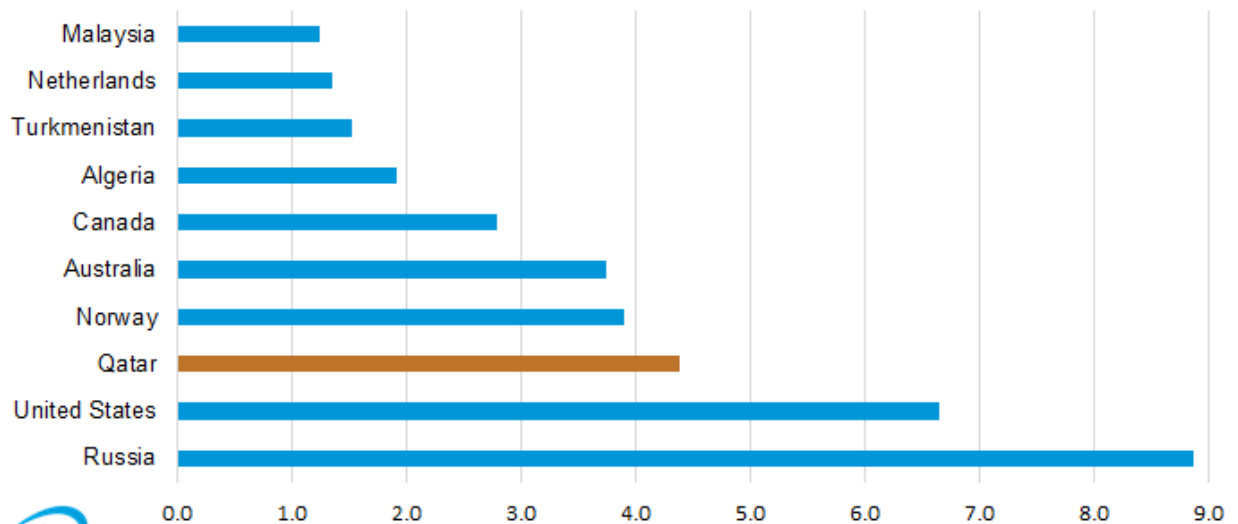
Figure 10. Qatar's petroleum product exports by type, 2022



Data source: Kpler (accessed March 2023)
 Note: Numbers may not total 100% because of individual rounding.

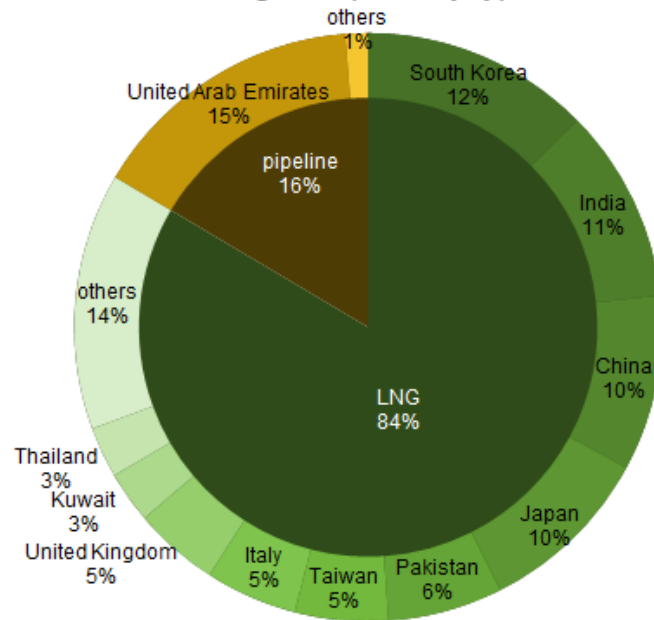
Figure 11. Largest natural gas exporters, 2021

trillion cubic feet



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

Figure 12. Qatar's natural gas exports by type and destination, 2021




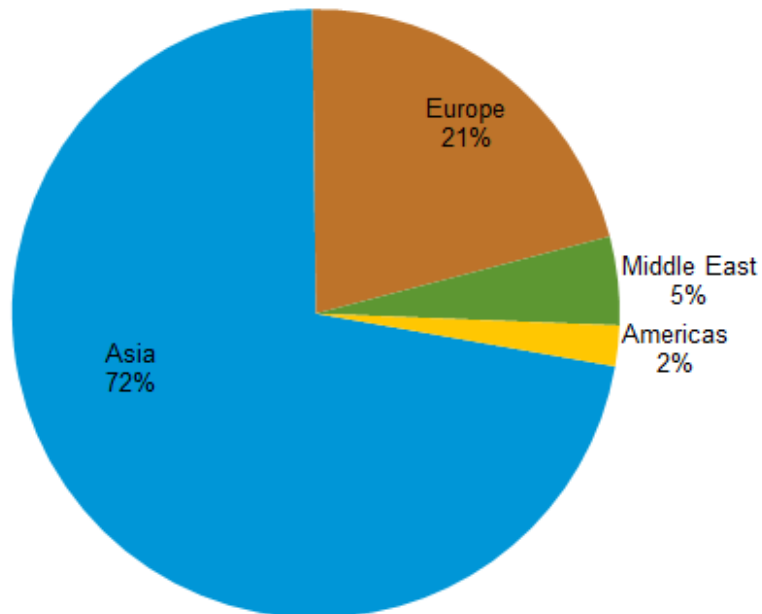

 Data source: *BP Statistical Review of World Energy 2022*
 Note: Total may not equal 100% because of independent rounding.

Figure 13. Qatar's liquefied natural gas exports by region, 2021



 Data source: *BP Statistical Review of World Energy 2022*
 Note: Total may not equal 100% because of independent rounding.

Notes

- Data are the most recent available as of January 2023.
- Data are EIA estimates unless otherwise noted.

Endnotes

- ¹ U.S. Energy Information Administration, *International Energy Statistics*; Jamie Ingram, “Qatar Inaugurates Al Kharsaah Solar PV Plant”, *Middle East Economic Survey* 65 No. 42, October 21, 2022.
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- ¹² U.S. Energy Information Administration, *Short-Term Energy Outlook*, January 2023; *International Energy Statistics*.
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- ²³ Shell, [Pearl GTL - Overview](#) (accessed December 2022); Sasol, Media Releases, [Oryx GTL Inauguration](#), June 6, 2006.
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- ²⁸ [“Qatar picks Shell as second North Field South partner”](#), *Argus Media*, October 23, 2022; Jamie Ingram, “Qatar Energy Concludes NFS Partner Selection With Conoco”, *Middle East Economic Survey* 65 No. 44, November 4, 2022; Maha El Dahan and Andrew Mills, [“Qatar’s LNG production capacity to reach 126 mln T a year by 2027, says Emir”](#) *Reuters*, February 22, 2022; Offshore Technology, [North Field East Project, Qatar](#), July 26, 2022.
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