



Country Analysis Brief: Libya

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Overview

Table 1. Libya's energy overview, 2022

	Petroleum and other liquids	Natural gas	Coal	Nuclear	Hydro	Other renewables	Total
Primary energy consumption (quads) ^a	0.5	0.3	--	--		<0.1	0.8
Primary energy consumption (percentage)	57.1%	42.5%	--	--		0.4%	100.0%
Primary energy production (quads) ^a	2.3	0.4	--	--		<0.1	2.7
Primary energy production (percentage)	83.8%	16.2%	--	--		<0.1%	100.0%
Electricity generation (terawatthours)	8.8	21.5	--	--	--	<0.1	30.3
Electricity generation (percentage)	29.0%	70.9%	--	--	--	<0.1%	100.0%

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

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

^a Hydropower and other renewables are combined, and small-scale solar accounts for all other renewables.

- Libya was the seventh-largest crude oil producer in OPEC and the third-largest total petroleum liquids producer in Africa, after Nigeria and Algeria, in 2023.¹ At the beginning of 2024, Libya held 3% of the world's proved oil reserves and 41% of Africa's proved oil reserves (Figure 1).² Despite Libya's large oil reserves, political conflicts and militia attacks on hydrocarbon infrastructure have limited investments in the country's oil and natural gas sectors. These challenges have also constrained exploration and development of its reserves since 2011.
- Although Libya is a member of OPEC, it is exempt from the production cuts under the [OPEC+ agreement](#).³ Crude oil production is very volatile and is frequently shut in because of conflicts, labor disputes, budget constraints, ongoing maintenance issues, and insufficient storage capacity.
- Political instability that began with Libya's civil war in 2011 [continues to pose risks for the energy sector](#).⁴ The two government factions, the Government of National Accord (GNA) in the western region and the Libyan National Army (LNA) in the eastern region, and other local militias used oil exports as leverage, and their fighting caused massive disruptions to Libya's oil production between 2014 and 2020. The GNA and the LNA signed a ceasefire agreement in October 2020 and formed an interim unity government, the Government of National Unity (GNU), in March 2021.^{5,6} The GNU scheduled presidential and parliamentary elections for late December 2021. However, the various parties could not agree on election laws and candidates, leading to the GNU indefinitely postponing the elections. The United Nations has been working with factions in Libya for almost three years to reach an agreement on constitutional laws and

procedures regarding the election process, but the political impasse has impeded elections moving forward.⁷

- In March 2022, Libya's parliament in the eastern region installed a new interim government and prime minister, Fathi Bashagha, in Tripoli, but the previous prime minister of the GNU, Abdulhamid al-Dbeibah, did not step down, resulting in the continuation of a divided government. Although Bashagha attempted to replace al-Dbeibah in Tripoli in July 2022, he was unsuccessful.⁸ Al-Dbeibah and the eastern military leader Khalifa Haftar struck a deal in July 2022, which involved replacing the head of the national oil company, the eastern government no longer pushing for Bashagha to become the interim prime minister, and eastern factions ending a blockade on oil infrastructure.⁹
- The most recent conflict, which began in 2024, involves a conflict between the eastern and western governments over leadership of the Central Bank of Libya (CBL). The GNU replaced the CBL's long-time governor, Sadiq al-Kabir, in August 2024 after he attempted to put more fiscal restrictions on spending by the GNU. In response, the eastern government imposed blockades on oil fields and eastern ports.¹⁰ However, the eastern government allowed a limited amount of oil cargoes to leave certain ports and oil production to go to refineries.¹¹ The two governments negotiated an agreement that installed an interim governor of the CBL at the end of September 2024.¹²
- Crude oil and natural gas export revenues are a significant part of Libya's economy, accounting for an estimated 97% of Libya's total government revenues and an estimated 93% of the country's total value of exports in 2023.¹³ We estimate that Libya's net oil export revenues totaled \$30 billion in 2023, similar to 2022 totals. Although Libya's oil exports rose in 2023, oil prices decreased from 2022.¹⁴
- Fossil fuels met nearly all of Libya's energy demand, with oil accounting for 57% and natural gas accounting for almost 43% in 2022. Rooftop solar projects met less than 1% of the remaining energy demand.¹⁵

Petroleum and Other Liquids

- At the beginning of 2024, Libya held Africa's largest proved oil reserves, at 48 billion barrels, representing 41% of the continent's total reserves (Figure 1). Libya ranked in the top 10 countries for global proved oil reserves.¹⁶ About 95% of Libya's recoverable reserves are located in the onshore Sirte Basin in the northeast and Murzuq Basin in the southwest. These two basins also account for most of the country's oil production capacity.¹⁷ Most of Libya remains unexplored for oil, and ongoing civil unrest has prevented a large-scale exploration program.¹⁸
- Libya produces mostly high-quality light, sweet (low sulfur) crude oil grades, which can be processed into valuable petroleum products in simple refineries.¹⁹ After Libya's crude oil production (excluding condensates) reached around 1.7 million barrels per day (b/d) prior to the start of the 2011 civil war, political dissention over the following decade caused a steep production decline and several major disruptions to production and exports. Libya's production could return to pre-2011 averages if the various political factions could form a unified and stable government, attract foreign investment for exploration and development projects, and provide sufficient revenue to strengthen the country's aging oil infrastructure (Figure 2).²⁰
- Following the ceasefire agreement signed by the eastern and western governments in October 2020, Libya's crude oil production recovered to more than 1.1 million b/d by 2021 (Figure 2).²¹ In 2022, crude oil production again dipped, to below 700,000 b/d from May through July,

because of a dispute, later resolved, between the two rival governments that resulted in blockades of eastern ports.

- Despite Libya experiencing stable oil production for nearly two years, crude oil production was severely disrupted in August 2024. The large Sharara oil field in the country's southwestern region went offline in early August, except for its output that serves oil-fired electricity production and the Zawiyah refinery on the western coast.²² Disputing the Spanish government over a charge made against one of General Haftar's sons, the Haftar family decided to close the Sharara field, which is partially operated by Spanish oil company Repsol.²³ The second disruption, primarily in the eastern oil fields, occurred in late August 2024 after the western government replaced the Central Bank of Libya's leadership. The dispute led to the eastern government closing or reducing production from most of Libya's oil fields and disrupting export flows from the eastern ports.²⁴ Crude oil production fell to below 600,000 b/d by the end of August and during September 2024.²⁵ After the two sides came to an agreement on leadership at the CBL and the national oil company (NOC) lifted the force majeure at Libya's oil fields and ports, production began to rise in early October 2024.²⁶
- Libya's natural gas fields produce condensates and natural gas plant liquids (NGPL) and contribute relatively small volumes to the country's total petroleum and other liquids production. We estimate that condensate and NGPL production was less than 100,000 b/d in 2023.²⁷
- Libya's NOC intends to bolster crude oil and condensate production to more than 1.5 million b/d by the end of 2024 and 2.0 million b/d by 2025.²⁸ To reach this target, the NOC's plans include increasing oil production through developing new projects, rehabilitating fields that were damaged during the conflicts of the past decade, and increasing power supply to the fields. To increase its production and offset current declines from older fields, Libya needs to attract more foreign investment and technical capacity. The NOC and international companies announced several projects, most from the Waha oil concessions, over the past few years (Table 2), although many of these projects have faced delays because of the complications from Libya's political conflicts.²⁹
- Despite the numerous challenges to maintaining oil production, the NOC kept oil production stable in 2023 and through July 2024 by starting production from new wells or rehabilitating existing wells across the country.³⁰
- After declining to just below 200,000 b/d in 2020, Libya's petroleum and other liquids consumption increased each year since then and reached 235,000 b/d in 2023.³¹ We estimate that the shares of gasoline (47%), diesel (32%), and fuel oil (8%) accounted for most of Libya's petroleum consumption in 2022.³²
- Most of the domestically consumed crude oil is processed in Libya's refineries, and less than 20,000 b/d of crude oil directly fuels power plants.³³ Libya has five refineries with a combined nameplate crude oil distillation capacity of 380,000 b/d (Table 3).³⁴ However, the country produced around 130,000 b/d of petroleum products, about one-third of total nameplate capacity.³⁵ The low plant utilization is the result of damage that occurred to some facilities during the civil war and the slow progress made to rehabilitate all of the plants.³⁶ Ras Lanuf, Libya's largest refinery by nameplate capacity, was significantly damaged after the 2011 civil war and has been offline since 2013. A legal dispute over the damages between the joint venture (JV) owners, the NOC and Trasta (an Emirati-owned company) was finally settled in February 2022. The arbitration ruled that the NOC did not owe any damage compensation to Trasta and could buy Trasta's 50% share in the JV. Although this agreement is a significant step toward bringing the Ras Lanuf refinery back online, negotiations regarding the sale of Trasta's stake in

the JV are ongoing, and the NOC would need to rehabilitate the refinery to bring it back into operation.³⁷

- The NOC is planning to build a 30,000-b/d refinery in southwestern Libya near the Sharara oil field (Table 2). Despite the facility's small size, it would be the first refinery to serve southern Libya. This region is far from the energy demand centers along the coast, and it relies on petroleum products transported a long distance by truck from the western coast. Construction has not begun, but the NOC estimates that the facility will be completed in about three years from the time that construction begins. The NOC signed an engineering contract with Honeywell International, Inc., in 2023. NOC subsidiary, Zallaf Company, reported in mid-2024 that the project is proceeding.³⁸

Table 2. Key oil projects in Libya, 2024

Project	Operator or project investor	Additional estimated capacity (thousand barrels per day)	Announced start date	Notes
North Gialo	ConocoPhillips, TotalEnergies, Libya's NOC	100	TBA	Part of the Waha concession fields
Dahra rehabilitation	ConocoPhillips, TotalEnergies, Libya's NOC	40	August 2022, but project is stalled over political dispute ³⁹	40,000 b/d for the mid-term; output was 120,000 b/d in 2015 when damaged by Islamic State (ISIS). ⁴⁰ Part of the Waha concession fields
Block NC-98	ConocoPhillips, TotalEnergies, Libya's NOC	80	TBA	Structures A & F to be developed. ⁴¹ Part of the Waha concession fields
Gialo III	ConocoPhillips, TotalEnergies, Libya's NOC	53	TBA	Part of the Waha concession fields
Mabruk rehabilitation	TotalEnergies, Equinor, Libya's NOC	25	2025 ⁴²	25,000 b/d for 2025; output was 40,000 b/d in 2014 when damaged by ISIS ⁴³
North Hamada	Libya's NOC	50	August 2023	Field began in August 2023, but production was 10,000 b/d in late 2024. ⁴⁴ Indonesia's MedcoEnergi divested its 50% stake in the project to Libya in May 2024 ⁴⁵
Total		348		

Data source: *Middle East Economic Survey*, Energy Intelligence, Libya Oil Monitor, Fitch Solutions/BMI, TotalEnergies

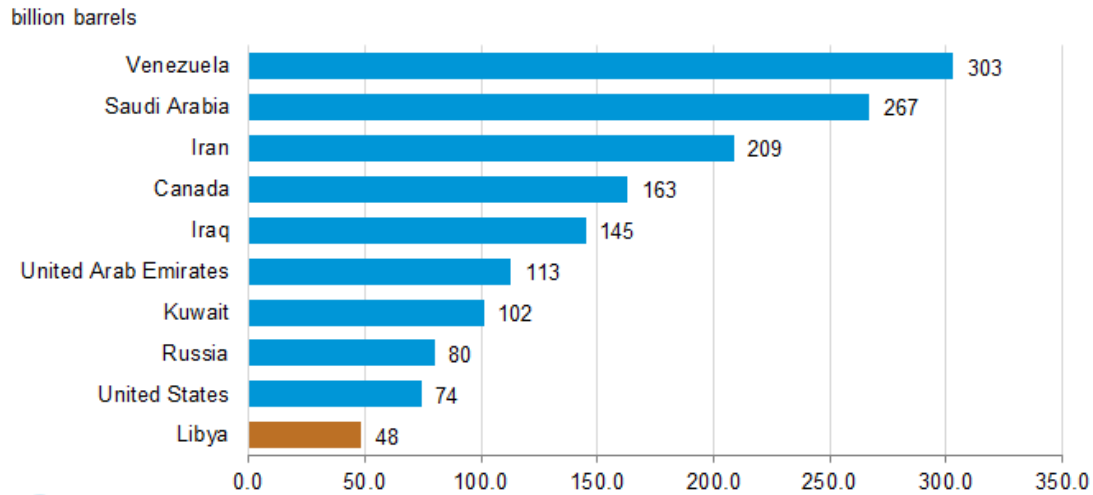
Note: TBA=to be announced; NOC=national oil company

Table 3. Libya’s existing crude oil refineries and projects

Refinery	Capacity (thousand barrels per day)	Status	Notes
Ras Lanuf	220	Closed since 2013	NOC is in the process of dissolving the joint venture with UAE’s Trasta company and will rehabilitate the refinery
Zawiya	120	Existing	
Tobruk	20	Existing	Topping plant in eastern Libya
Brega	10	Existing	Topping plant in eastern Libya
Sarir	10	Existing	Topping plant in eastern Libya
South Refinery	30	Planned	The NOC signed an engineering contract with Honeywell International, Inc., in 2023
Total nameplate capacity	380		

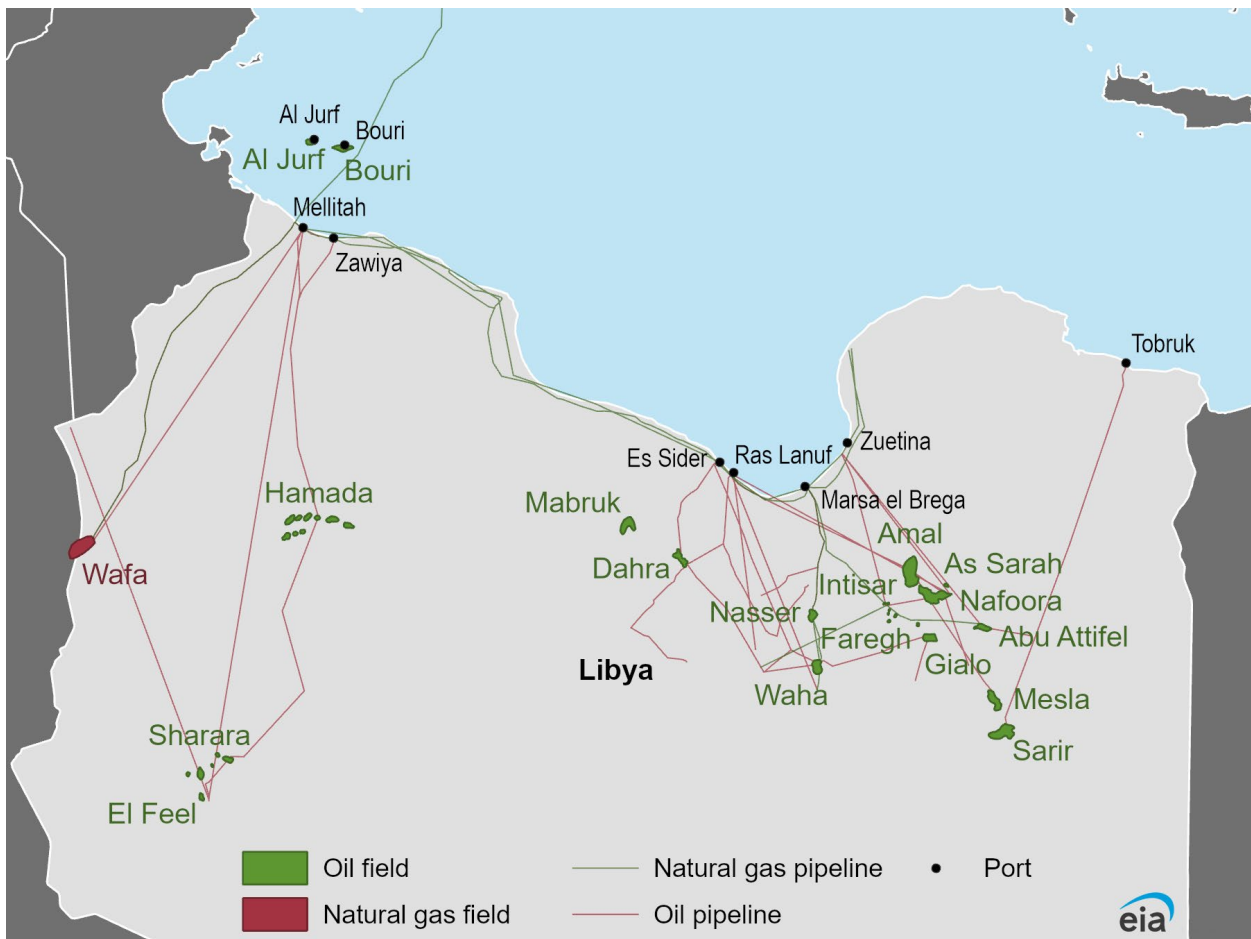
Data source: Fitch Solutions/BMI, *Middle East Economic Survey*, Reuters, and Libya Observer

Figure 1. Largest proved reserve holders of total oil, January 2024



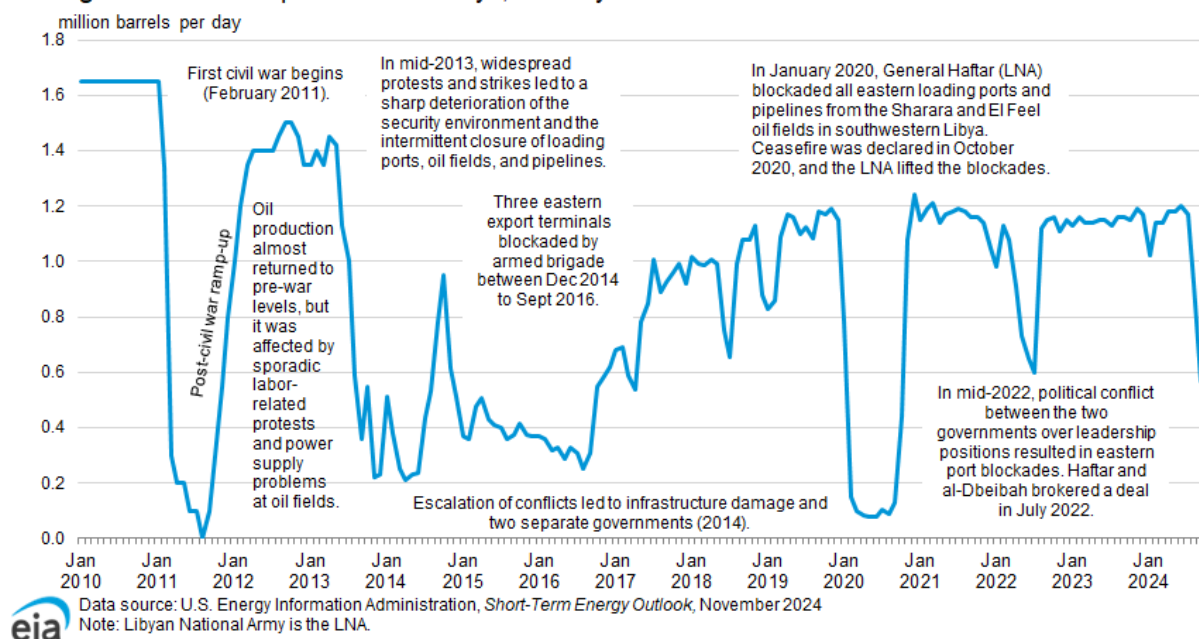
Data source: *Oil & Gas Journal*, December 2023
 Note: Oil reserves include crude oil, condensates, natural gas liquids, and oil sands.

Figure 2. Maps of Libya’s largest oil and natural gas fields



Data source: U.S. Energy Information Administration, *Global Energy Monitor*, *Global Gas Infrastructure Tracker* and *Global Oil Infrastructure Tracker*, National Energy Technology Laboratory, *Global Oil and Gas Infrastructure database*, and World Bank

Figure 3. Crude oil production in Libya, January 2010 to October 2024



Natural Gas

- At the beginning of 2024, Libya had proved natural gas reserves of 53 trillion cubic feet (Tcf), the fifth largest in Africa behind Nigeria, Algeria, Mozambique, and Egypt (Figure 4).⁴⁶
- Non-associated gas, which accounted for more than 90% of Libya's natural gas production over the past decade, is from the offshore Bahr Essalam fields northwest of Tripoli and the onshore Wafa field in the western Ghadames Basin straddling Algeria.⁴⁷ Most of Libya's natural gas associated with crude oil fields is in the onshore Sirte Basin in the eastern region.
- Libya's dry natural gas production fell from 423 billion cubic feet (Bcf) in 2022 to 394 Bcf in 2023 (Figure 5).⁴⁸ Output has declined from a high in 2017 because the volatile security situation and unfavorable regulatory environment have deterred upstream investment by international oil companies. Also, associated gas fields have been offline for significant periods of time when the accompanying oil fields are shut in.
- Because the NOC expects production from major natural gas fields Bahr Essalam and Wafa to decline starting in 2025, Libya will face domestic natural gas shortages if it cannot secure foreign investment to develop its proposed projects. Libya plans to increase natural gas production by reducing flaring and developing new fields to help meet growing domestic demand and export obligations. However, Libya's current political stalemate and budget constraints are major downside risks to reaching these goals. Oil and natural gas projects in Libya are typically delayed for several years because of security, regulatory, and financial challenges.⁴⁹
- The NOC plans to offset expected declines from mature fields and increase natural gas production from both offshore and onshore fields in western Libya (Table 4). Italy's Eni and Libya's NOC are developing a major offshore project to tie back to the Mellitah natural gas processing complex, Structures A & E. The project, which is slated to add 277 Bcf/y, is expected to begin production in 2027.⁵⁰ The NOC has proposed several other natural gas development projects, notably Atshan in the southwestern region, two projects in the Hamada Basin region,

and the offshore Bouri Gas Utilization project; some of these projects are in early stages of development.

- Libya's natural gas consumption totaled 305 Bcf in 2023 and accounted for more than 70% of domestic production after 2020 (Figure 5).⁵¹ The electric power sector drives Libya's domestic natural gas demand, accounting for about 85% of Libya's domestic natural gas use in 2022. The country's major industries and its oil sector consume the remainder.⁵² Libya's natural gas production is not able to fully meet domestic natural gas demand and export commitments, and the electric power sector often burns petroleum products when the natural gas supply is disrupted or is insufficient during the peak summer season.⁵³
- Libya ranked as the seventh-highest natural gas flaring country in 2023, when it vented or flared approximately 240 Bcf in 2023, up from 191 Bcf in 2022 and the highest in a decade. Flaring increased because Libya's associated gas production rose in tandem with crude oil production during 2023.⁵⁴ Libya lacks sufficient natural gas infrastructure, particularly processing plants, to capture natural gas from fields associated with oil production and to transport it to demand centers or power plants. Libya plans to eliminate natural gas flaring by 2030. Libya's NOC is in discussions with international oil companies to reduce flaring, increase the production of marketed natural gas, and free up more oil for export.⁵⁵

Table 4. Key natural gas projects in Libya, 2024

Project	Operator or project investor	Additional estimated capacity (Bcf/y)	Announced start date	Notes
Structures A & E	Eni and Libya's NOC	277 (58 Bcf/y for Structure A; 219 Bcf/y for Structure E)	2027 for Structure A; 2028 at the earliest for Structure E	Final investment decision made January 2023 between Eni and Libya's NOC for \$8 billion. ⁵⁶ Slated to produce 42,000 barrels per day of condensates ⁵⁷
Hamada field (Area NC-7)	TBA	91	TBA	Natural gas development is slated for Phase 2. Negotiations are ongoing to recruit international companies to develop the project, but political conflict about project's contract details poses a challenge ⁵⁸
Atshan	Zallaf Oil and Gas	73	TBA	Located near the Sharara oil field in the southwestern region and will replace the crude oil feedstock at the Ubari power plant ⁵⁹
North Hamada (Area 47) ⁶⁰	Libya's NOC	33	TBA	Located onshore in the Ghadames Basin in the northwestern area of the country
Bouri Gas Utilization Project	Eni and Libya's NOC	31	2026	Intended to capture natural gas flared from the Bouri oil field. Saipem awarded engineering contract August 2023 ⁶¹
Total		505		

Data source: *Middle East Economic Survey*, Libya Oil Monitor, Fitch Solutions/BMI, Eni, Saipem

Note: TBA=to be announced; Bcf/y=billion cubic feet per year; NOC=national oil company

Figure 4. Largest proved reserve holders of natural gas reserves in Africa, January 2024
trillion cubic feet

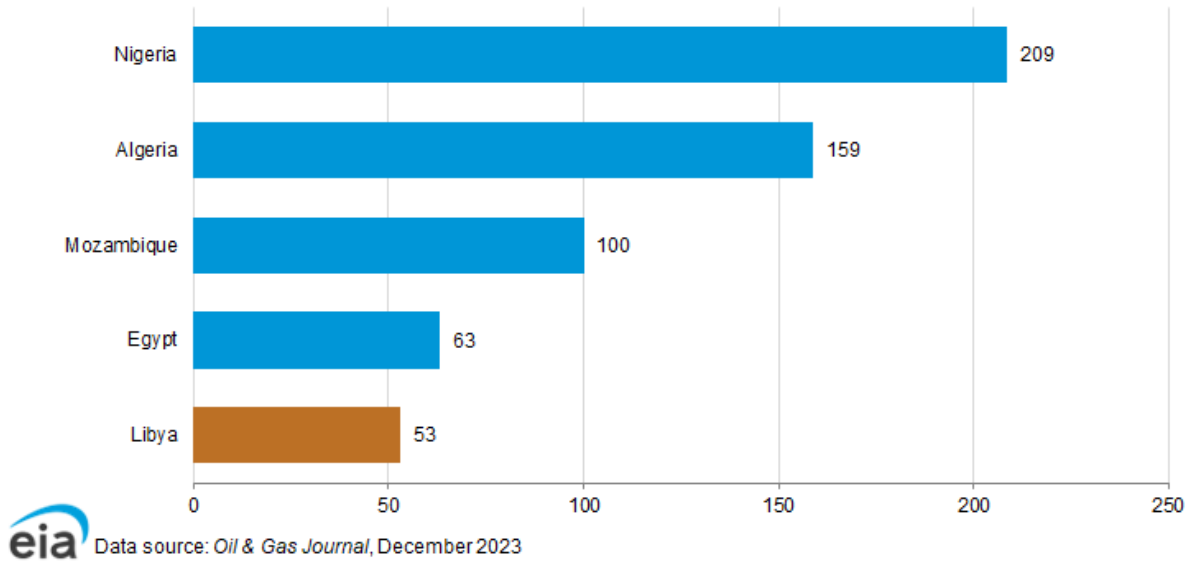
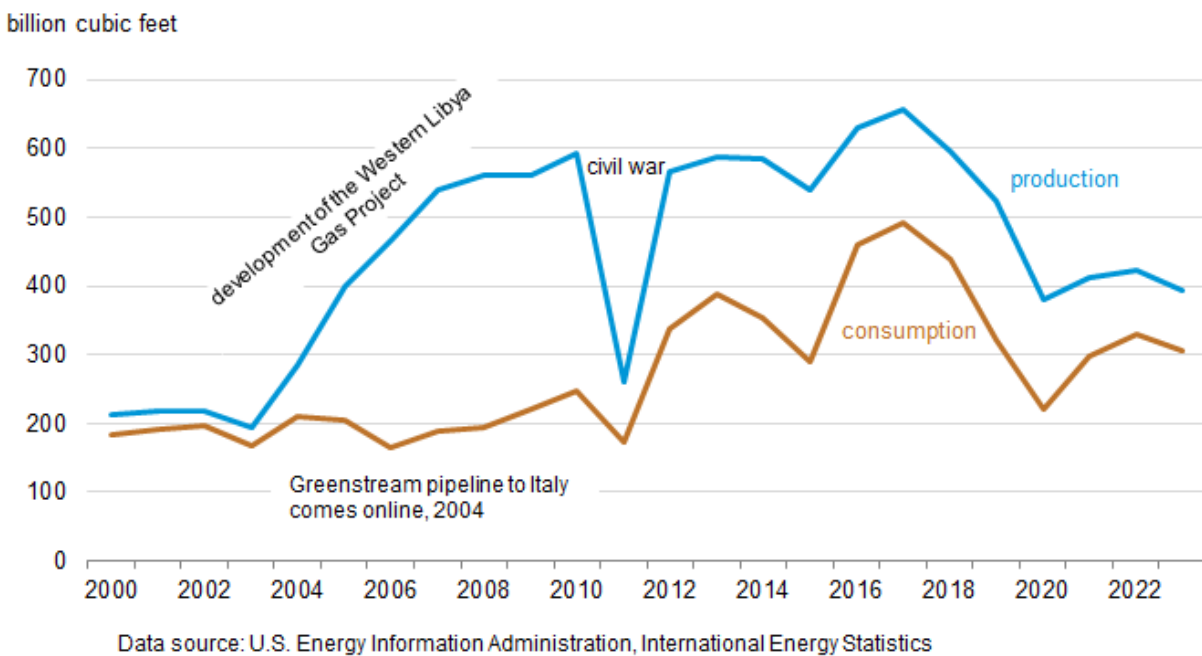


Figure 5. Libya's dry natural gas production and consumption, 2000–2023
billion cubic feet



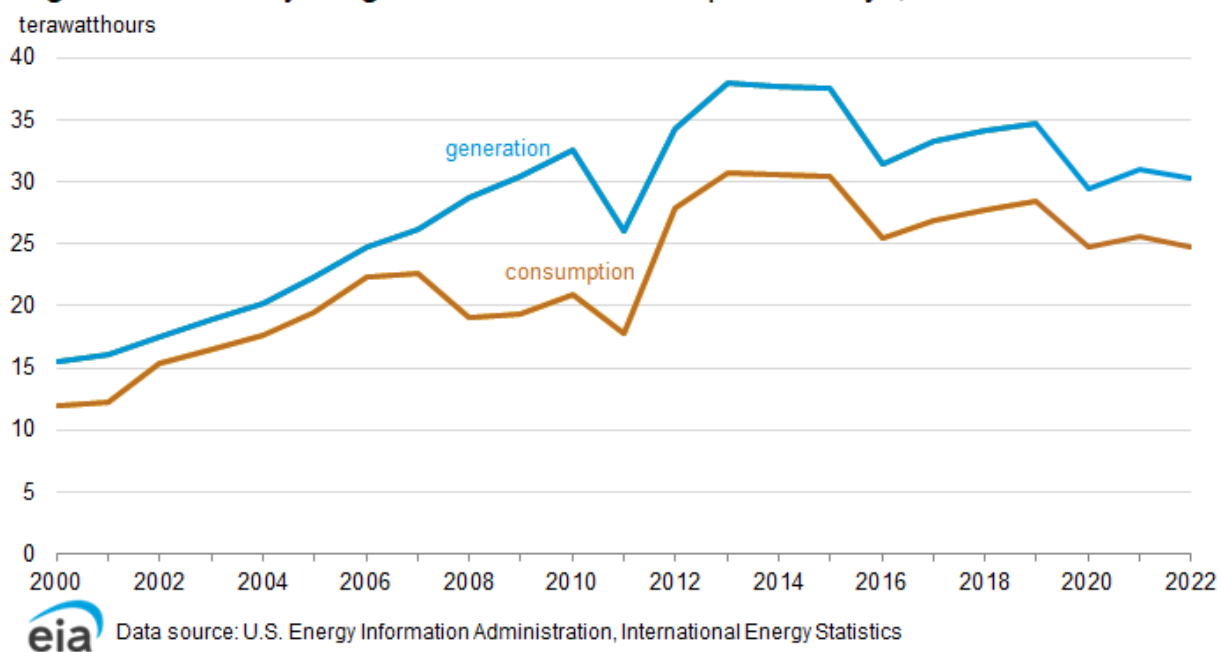
Electricity

- Libya’s electricity generation has declined overall since 2013, and output was an estimated 30 terawatt-hours (TWh) of power generation in 2022.⁶² Over a decade of civil war and insufficient maintenance and investment in aging plants and equipment reduced Libya’s ability to produce electricity. Libya fueled its electricity generation with natural gas (71%) and oil (29%) in 2022.⁶³

Diesel and fuel oil accounted for most of the petroleum used in power plants, although the Ubari power plant at the Sharara oil field uses crude oil as a fuel. Because of frequent historical blackouts, many businesses in Libya own diesel-fired generators for backup power generation.⁶⁴

- Historically, scheduled power curtailments and unscheduled blackouts have occurred frequently in Libya especially during the peak summer season because of heavily subsidized electricity tariffs, rising demand, aging or damaged infrastructure, and occasional fuel shortages.⁶⁵ However, in 2023, Libya's state-owned electricity company, GECOL, reported that operational capacity rose to 8.2 gigawatts (GW), the highest ever reported, from 5.8 GW a year earlier.⁶⁶ Libya's government changed the management at GECOL and pressed for the company to restore more operational capacity.⁶⁷ With the financial and technical assistance of foreign companies and USAID, GECOL was able to reduce electricity demand through efficiency measures, refurbishing existing facilities, bringing on new plants, and enhancing grid operations.⁶⁸ For the first time in several years, in 2023, Libya averted load shedding and blackouts.⁶⁹
- To meet growing electricity needs, Libya aims to capture more associated gas that is currently flared and develop more nonassociated gas fields, although these goals depend on greater investment in natural gas upstream projects and infrastructure development.
- Currently, solar power makes up a negligible amount of power generation in Libya, which has no utility-scale plants. All of Libya's solar power is from small-scale ventures such as microgrids at hospitals and public lighting projects.⁷⁰ Libya's government seeks to diversify its power supply and aims to produce at least 20% of its electricity from renewable power by 2035, according to a new renewable and energy efficiency plan published by the Libyan government and USAID in December 2023. The plan would increase Libya's solar and wind capacity to 4 GW by 2035, up from less than 0.1 GW in 2022, and promote installation of 500 MW of rooftop solar panels, especially in areas in southern Libya that are not connected to the grid.⁷¹ Libya's vast solar potential has attracted some foreign investors. In addition to its recent investment in Libya's oil and natural gas sectors, TotalEnergies intends to develop 500 MW of solar power projects in the country.⁷² Libya has also discussed solar power projects with Repsol, PowerChina, Petro Techna (Canada), and others.⁷³

Figure 6. Electricity net generation and consumption in Libya, 2000–2022



Energy Trade

Petroleum and other liquids

- Libya exported an estimated 1 million b/d of crude oil and condensates in 2023, up from 930,000 b/d in 2022. The oil supply disruption to many of the eastern fields in Libya in the summer of 2022 affected that year's export levels, which declined from nearly 1.2 million b/d in 2021.⁷⁴
- Most of Libya's crude oil is sold to European countries. In 2023, Europe's imports accounted for about 78% of Libya's crude oil and condensate exports. Most of Libya's exports went to Italy, Germany, and Spain. Asia, mostly China, received an estimated 10% of Libya's oil exports in 2023 (Figure 7). Libya sent a greater share of its crude oil and condensates to Europe in 2023 (78%, up from 72% in 2022) because Russia shifted more of its crude oil away from Europe to Asia and because China purchased more of Iran's crude oil.
- According to trade data, Libya is a net importer of petroleum products as a result of its low operational refining capacity. Petroleum product imports rose in 2023 to nearly 200,000 b/d from less than 150,000 b/d in 2021 as a result of higher oil demand.⁷⁵ Libya highly subsidizes its oil products to customers, which drives up oil demand. These subsidies also distort market prices and is one of the causes for significant levels of fuel smuggling.⁷⁶ Libya imports primarily gasoline and diesel fuel, and it exports mostly naphtha. In 2023, Russia captured a larger share

(29%, up from 5% in 2022) of Libya's oil product import market after Europe and the G7 countries instituted a price cap on Russia's petroleum product sales in early 2023.⁷⁷

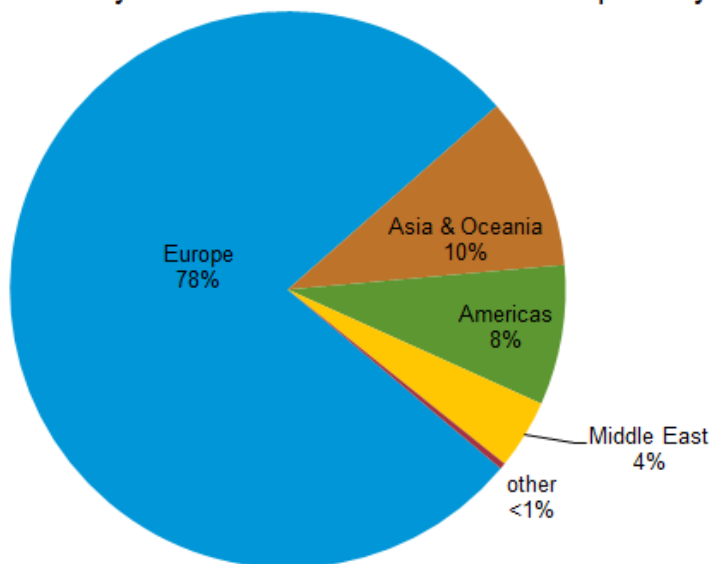
Natural gas

- The Greenstream natural gas pipeline connects Mellitah on Libya's northwestern coast to Gela, Italy, and became the only outlet of natural gas exports after armed conflict from the civil war destroyed the country's sole liquefaction terminal in 2011.
- Libya's natural gas exports reached around 200 Bcf in 2019, the most recent high, but fell by more than half to 89 Bcf in 2023, well below the pipeline's capacity of 283 Bcf/y.⁷⁸ Libya's reduced natural gas production and higher domestic demand have hindered exports during the past few years. Also, Libya's large Mellitah natural gas processing plant, which processes most of Libya's natural gas, has gone offline for maintenance, technical, or political issues several times during the past few years, limiting export levels.⁷⁹

Electricity

- Libya, which has electricity interconnections with Tunisia and Egypt, began to import significantly more electric power from these neighboring countries after 2015. Libya's electricity imports reached more than 0.8 TWh in 2022.⁸⁰ Egypt plans to expand its interconnection capacity to Libya from 150 MW to 2 GW, but as of September 2024, the expansion date is unknown.⁸¹

Figure 7. Libya's crude oil and condensates exports by destination, 2023



Data source: U.S. Energy Information Administration using Vortexa tanker tracker, Global Trade Tracker, Eurostat
 Note: Total crude oil and condensate exports averaged 1.0 million barrels per day.

¹ U.S. Energy Information Administration, *Short-Term Energy Outlook*, August 2024.

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- ¹⁶ *Oil & Gas Journal*, *Worldwide Look at Reserves and Production*, December 2023.
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