Independent Statistics & Analysis
U.S. Energy Information Administration

Country Analysis Executive Summary: Libya

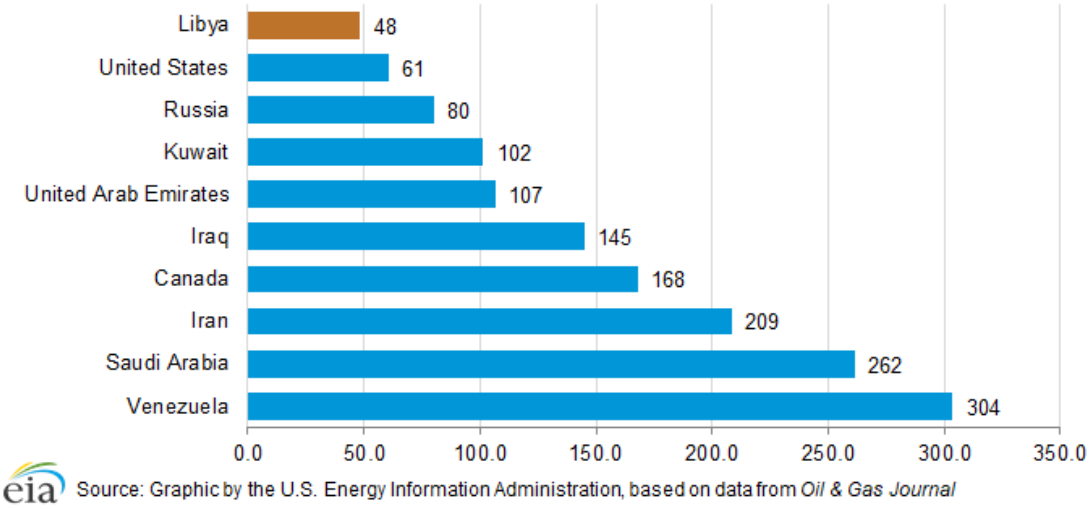
Last Updated: May 9, 2022

Overview

- 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 2021.[1] At the end of 2021, Libya held 3% of the world's proved oil reserves and 39% 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 has continued since Libya's civil war began in 2011 and continues to pose risks for the energy sector. Various local militias fought each other but subsequently formed a unified transitional government in 2012. The 2014 elections led to a split government with two major opposing parties, the internationally recognized Government of National Accord (GNA) in the western region and the Libyan National Army (LNA) in the eastern region. The GNA, the LNA, and separate local militias often fought each other and used oil exports as leverage and 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.[4,5] 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. Meanwhile, Libya's parliament installed a new interim government and prime minister, Fathi Bashagha, in Tripoli in March 2022, but the previous prime minister of the GNU, Abdulhamid al-Dbeibah, had not stepped down as of April 2022, resulting in a divided government. The United Nations is working with factions in Libya to reach an agreement on constitutional laws regarding the election process and a list of candidates.[6] Political divisions and the postponed elections pose significant risks to Libya's stability and oil output and exports, which have been mostly stable since the beginning of 2021.

- Crude oil and natural gas export revenues are a significant part of Libya's economy. In 2021, oil revenues accounted for an estimated 98% of Libya's total government revenues, according to Libya's Central Bank. Libya's oil and natural gas exports accounted for 73% of the country's total value of exports in 2020.[7] Real GDP growth fell 31% in 2020 as a result of the political conflicts between factions in the eastern and western regions, the oil export port blockades and pipeline shut-ins, and to a lesser degree, the economic slowdown during the global COVID-19 pandemic.[8] After the GNA and the LNA signed a ceasefire and lifted the restrictions on oil production and exports, preliminary real GDP growth estimates rose 70% for 2021.[9] We estimate that Libya's net oil export revenues totaled $23 billion in 2019, slightly higher than 2018 totals, as a result of the country's rise in oil export volumes since 2016. We expect that the oil price declines and disruption in Libya's oil supplies in 2020 significantly reduced its net oil export revenues but that the increase in oil prices and resolution of the oil blockades boosted Libya's oil export revenues in 2021.[10]

Figure 1. Top 10 holders of proved oil reserves, December 2021



Petroleum and other liquids

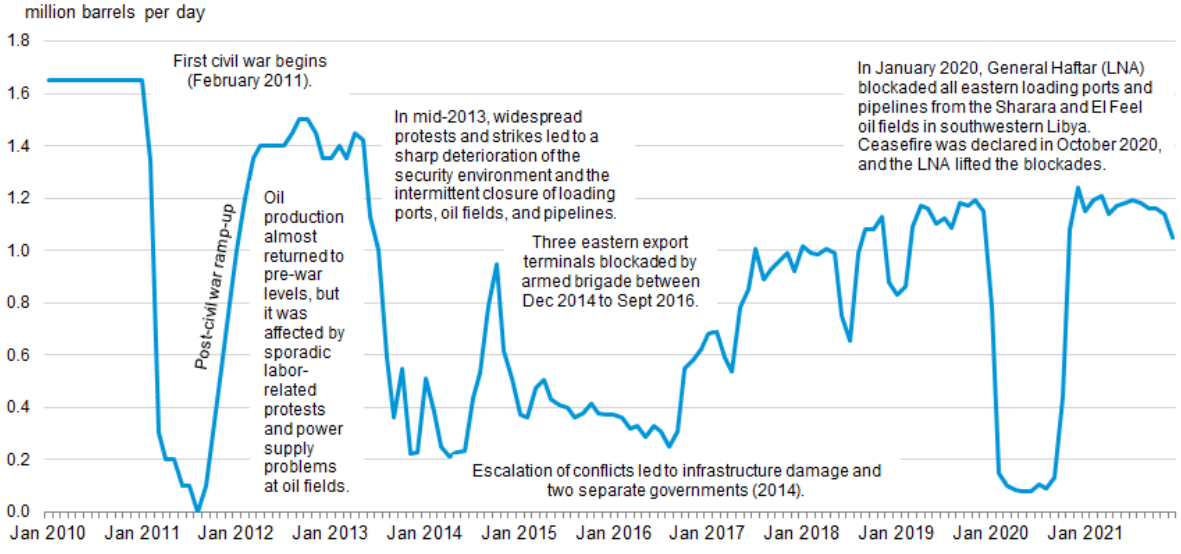
- At the end of 2021, Libya held Africa's largest proved oil reserves, at 48 billion barrels, representing 39% of the continent's total reserves. Libya ranked in the top 10 countries for global proved oil reserves, according to *Oil and Gas Journal*.[11] About 93% of Libya's recoverable reserves are 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.[12] Most of Libya remains unexplored, and ongoing civil unrest has prevented a large-scale exploration program.
- Libya produces mostly high-quality light, sweet (low sulfur) crude oil grades, which can be processed into petroleum products in simple refineries and are valuable to import markets. After Libya's crude oil production (excluding condensates) reached around 1.7 million barrels per day (b/d), between 2006 and 2010, the 2011 civil war and ensuing political dissention over

the following decade caused a steep production decline and several major disruptions to production and exports. We assess that Libya's maximum crude oil production capacity is 1.3 million b/d, although production often falls significantly short of this capacity. Libya's production could return to pre-2011 averages if the various political factions could form a stable government, attract foreign investment for exploration and development projects, and provide sufficient revenue to strengthen the country's aging oil infrastructure.[13]

- After Libya's crude oil production fell below 400,000 b/d in 2016, it recovered through 2019. Severe disruptions in 2020 forced Libya's crude oil production to fall significantly from 1.1 million b/d in 2019 to a record-low 365,000 b/d in 2020. In January 2020, the eastern government's armed forces blockaded all of the country's eastern oil export terminals and closed the pipelines connecting major oil fields, Sharara and El Feel, in the southwestern region to the coast. During most of 2020, Libya's offshore oil fields were the only ones in production, and from February through September, crude oil production averaged 100,000 b/d. The eastern and western governments signed a ceasefire agreement in October 2020, and Libya's national oil company lifted its *force majeure* on the coastal ports, which raised oil production. In 2021, Libya's crude oil production rose to nearly 1.2 million b/d, the highest output since 2012, with temporary disruptions to ports and pipelines during certain months because of pipeline leaks, maintenance issues, insufficient funding, and labor disputes (Figure 2).[14]
- Libya's natural gas fields produce condensates and natural gas plant liquids (NGPLs), which contribute relatively small volumes to the country's total petroleum and other liquids production. In 2020, production of condensates and NGPLs fell to around 50,000 b/d from 100,000 b/d in 2019 because when most of the country's oil fields were closed, that affected some of its natural gas production. In 2021, we estimate that condensate and NGPL production recovered to less than 100,000 b/d.[15]
- Libya's national oil company (NOC) plans to bolster oil production to 2.1 million b/d by 2025.[16] To reach this target, 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. NOC's subsidiary, Zallaf Oil, will commission the southwestern Erawin oil project in late 2022, where peak oil production will be 16,000 b/d. Future plans include connecting the Erawin field with the large Sharara oil field.[17] TotalEnergies announced in late 2021 its plans to invest in developing the 100,000 b/d North Giallo project and the rehabilitation of the 40,000 b/d Mabrouk field, which militant groups damaged in 2014.[18] Both of these fields are located in the large Waha field concession that is a joint venture between TotalEnergies, ConocoPhillips, and the NOC. Other sizeable fields that the NOC plans to develop are Gialo III and Block NC-98, which are in the eastern Sirte Basin. The NOC anticipates that more sufficient and reliable electricity generation could add another 125,000 b/d to crude oil production.[19]
- Despite the numerous challenges to maintaining oil production, the NOC did bring online a few small fields since the 2020 ceasefire began. Agoco, a state-owned company and subsidiary of the NOC, began production from the Sinawin field in late 2020, the first new oil project to come online in Libya since 2011. Although initial production was 10,000 b/d, a second phase will add 50,000 b/d.[20] Agoco also began operating the new Tahara field in the western Ghadames Basin near Algeria in February 2022. Agoco expects that the Tahara field will produce a maximum capacity of 14,000 b/d and 2.2 billion cubic feet per year (Bcf/y) of natural gas.[21]

- After declining from 2011 through 2015, Libya's petroleum and other liquids consumption remained slightly above 200,000 b/d each year after 2015 and was 220,000 b/d in 2021.[22] We estimate that the shares of gasoline (43%), diesel (31%), and fuel oil (12%) accounted for the majority of Libya's petroleum consumption in 2019.[23]
- Most of the domestically consumed crude oil is processed in Libya's refineries, and around 11,000 b/d of crude oil was used directly in power plants in 2021.[24] Libya has five refineries with a combined nameplate crude oil distillation capacity of 380,000 b/d.[25] However, the country produces less than 125,000 b/d of petroleum products from the 120,000 b/d Zawiya refinery and three small-scale facilities. 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.[26] 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), 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.[27] Although this is a significant step toward bringing Ras Lanuf refinery back online, the NOC would need to rehabilitate the refinery to make it functional.
- The NOC is constructing a 30,000 b/d refinery in southwestern Libya near the Sharara oil field. 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 by truck from a far distance on the western coast. Construction began in October 2021, and the NOC estimates that the facility will be completed in about three years.[28]

Figure 2. Crude oil production in Libya, January 2010 to December 2021

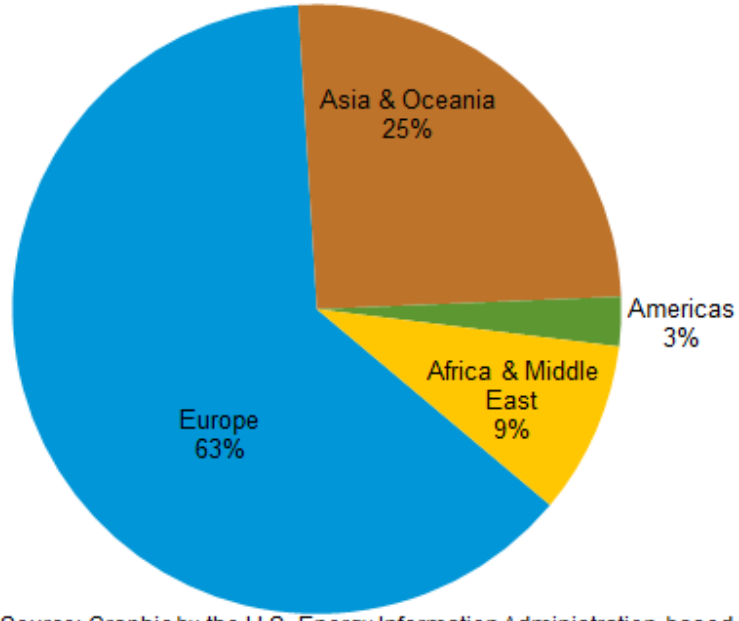


Source: U.S. Energy Information Administration, *Short-Term Energy Outlook*, March 2022

Exports

- Libya exported nearly 350,000 b/d of crude oil and condensates in 2020, down from about 1.1 million b/d from 2019.[29] A nearly 800,000 b/d decline in petroleum production caused by disruptions and, to a lesser extent, a decline in global demand both curtailed exports in 2020. In 2021, Libya's crude oil and condensate exports recovered to 1.1 million b/d, according to Clipper Data.[30]
- Most of Libya's crude oil is sold to European countries. In 2020, Europe's imports accounted for about 63% 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 25% of Libya's oil exports in 2020 (Figure 3). Although Europe accounts for the largest share of Libya's oil exports, Libya has diversified its oil export markets over the past few years with Asia and the Middle East receiving greater shares of total shipments.[31]
- The United States restarted oil imports from Libya in 2004, after sanctions on Libya were lifted. The United States imported 9,000 b/d of crude oil from Libya in 2020, only a fraction of the 63,000 b/d of crude oil it imported in 2019. Imports from Libya rose to 90,000 b/d in 2021.[32]
- 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 2020 to more than 120,000 b/d from about 100,000 b/d as a result of refinery closures during the shutdown of both crude oil production and export terminals during most of the year.[33]

Figure 3. Libya's exports of crude oil and condensates, 2020



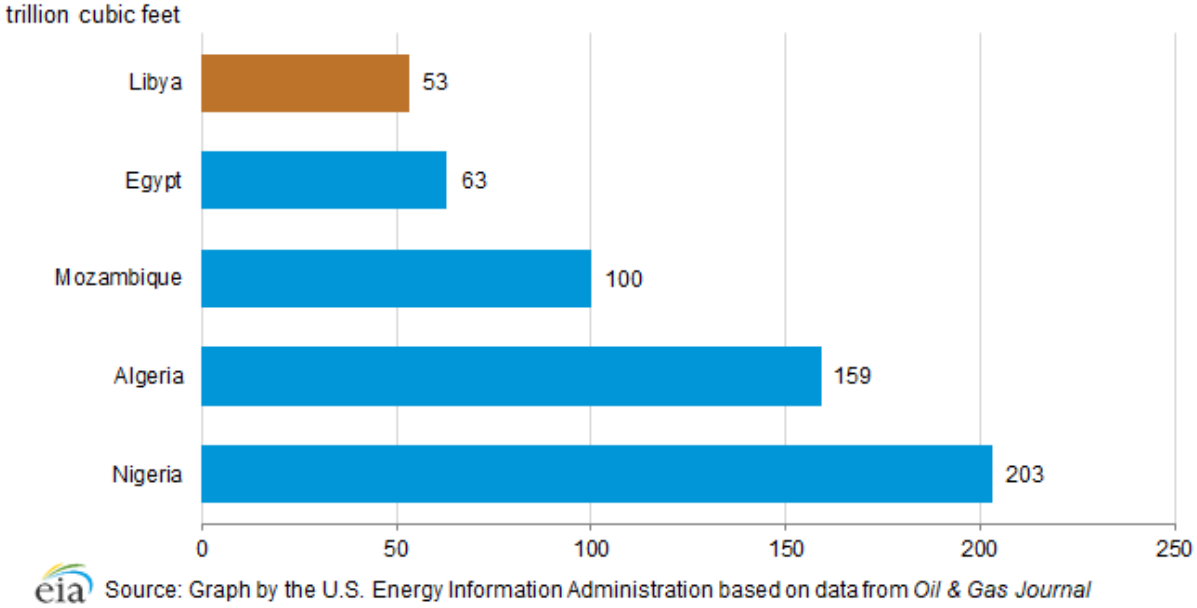
Source: Graphic by the U.S. Energy Information Administration, based on data from Eurostat, ClipperData, Global Trade Tracker
Note: Total crude oil and condensate exports averaged 344,000 barrels per day.

Natural gas

- At the end of 2021, 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).[34]
- Nonassociated gas, which accounted for more than 80% of Libya's natural gas production over the past decade, according to Rystad Energy, is from the offshore Bahr Essalam fields northwest of Tripoli and the onshore Wafa field in the western Ghadames Basin straddling Algeria.[35] Most of Libya's associated gas is located in the onshore Sirte Basin in the eastern region.
- Libya's dry natural gas production fell in 2020 to 438 billion cubic feet (Bcf) from 500 Bcf in 2019 (Figure 5).[36] Output has declined overall since 2014 because the volatile security situation and unfavorable regulatory environment have deterred investment and international oil companies from developing oil and natural gas fields. Also, associated gas fields have been offline for significant periods of time when the accompanying oil fields are shut-in. Libya's NOC plans to increase Libya's natural gas production by reducing natural gas flaring and developing new fields to help meet Europe's growing natural gas demand.[37] 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.
- The NOC started three new natural gas development projects since 2018 in an effort to bolster Libya's natural gas production and offset natural declines from aging fields. In late 2018, field operator, Mellitah Oil and Gas Company (partly owned by the NOC), brought online the 146 Bcf/y second phase of the Bahr Es Salam field and completed a compression upgrade at the Wafa natural gas field to increase the field's capacity.[38] The NOC started operations at the al Faregh oil and natural gas field project expansion, located in the Sirte Basin, in early 2021. This second phase adds 66 Bcf/y of natural gas and 15,000 b/d of condensate to production.[39]
- Additional NOC plans include increasing natural gas production from offshore and onshore fields. Italy's Eni and the NOC are developing the offshore project, Structures A & E development, which they expect to produce a maximum of 277 Bcf/y and 42,000 b/d of condensates. The project is slated to begin production in 2026.[40] The NOC has proposed several other natural gas development projects, notably Atshan in the southwestern region, the western Hamada Basin project, and the offshore Bouri Gas Utilization project, but these projects are in very early stages of development.[41]
- Libya's natural gas consumption totaled 271 Bcf in 2019, or about half of domestic production[42] (Figure 5). The power sector drives Libya's domestic natural gas demand and accounted for about 90% of Libya's domestic natural gas use in 2020.[43]
- Libya is one of the world's top natural gas-flaring countries, according to the World Bank's estimates. Libya vented or flared approximately 180 Bcf in 2019, ranking seventh highest in the world. Flaring decreased in 2020 to 87 Bcf because much of Libya's associated gas production was shut in along with almost all of the onshore oil fields during most of 2020.[44] Libya lacks the 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'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.[45]

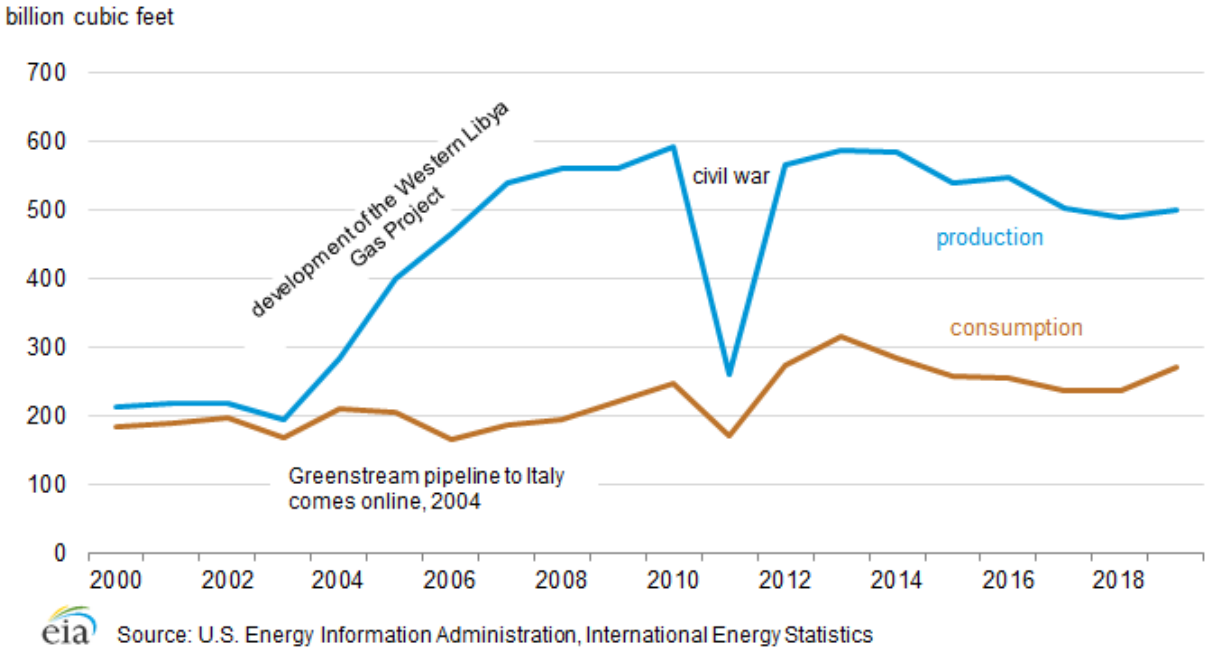
- The Greenstream natural gas pipeline connects Mellitah on Libya's northwestern coast to Gela, Italy, and became the only outlet of natural gas exports after armed conflict from the civil war destroyed the country's sole liquefaction terminal in 2011. Libya's natural gas exports reached around 200 Bcf in 2019 but fell by almost half to 114 Bcf in 2021.[46] Demand for natural gas in Europe fell during the COVID-19 pandemic in 2020, reducing the need for imports. Libya's reduced natural gas production and insufficient infrastructure have also hindered exports since 2019.

Figure 4. Top holders of proved natural gas reserves in Africa, December 2021



Source: Graph by the U.S. Energy Information Administration based on data from *Oil & Gas Journal*

Figure 5. Libya's dry natural gas production and consumption, 2000-2019



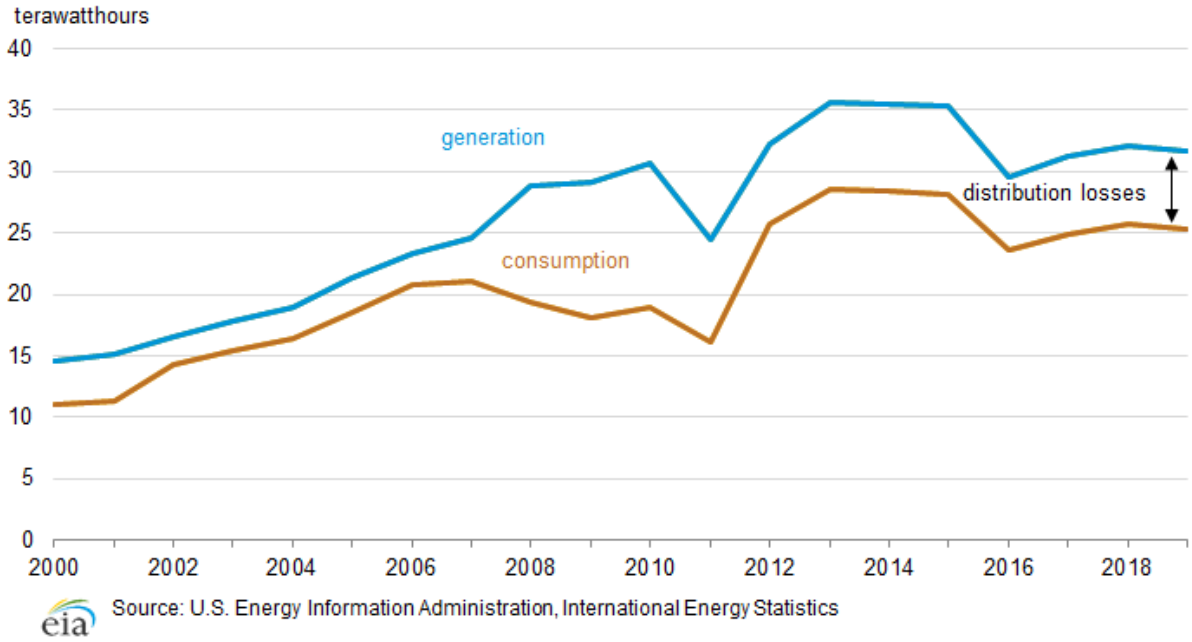
eia Source: U.S. Energy Information Administration, International Energy Statistics

Electricity

- At the beginning of 2021, Libya's Audit Bureau reported that the available capacity of power plants was 4.8 gigawatts (GW), or 42% of the country's 11.5 GW installed capacity. Peak demand was an estimated 7.5 GW in the summer, leaving a power deficit of nearly 3.0 GW.[47] Since 2011, Libya has had power outages caused by electricity shortfalls to end users, including operators of oil and natural gas fields, refineries, and natural gas processing facilities.
- Scheduled power curtailments and unscheduled blackouts occur regularly because of rising electricity demand, aging and damaged infrastructure, lack of maintenance, operational inefficiencies, theft of equipment, and at times, fuel shortages. Heavily subsidized electricity tariffs artificially boost power demand beyond what consumers can pay.[48] In 2020, severe fuel shortages of oil and natural gas caused by the port blockades and civil conflicts led to significant electricity blackouts, most acutely during the peak summer season. These prolonged power shortages sparked protests in Tripoli and Benghazi during the summer of 2020.[49]
- Libya's electricity generation has declined overall since 2013, and output was an estimated 32 terawatthours (TWh) of power generation in 2019.[50] Libya fueled nearly all of its electricity generation with natural gas (67%) and oil (33%) in 2019.[51] Diesel and fuel oil accounted for most of the petroleum used in power plants, although electricity stations located at oil fields have used crude oil in the absence of imported refined products. Because of frequent blackouts, many businesses in Libya use diesel-fired generators as a secondary source of power generation.[52]

- Libya aims to harness more of its associated gas that is currently flared and develop more nonassociated gas fields to provide for its growing electricity needs, although these goals depend on higher investment in infrastructure.
- The General Electricity Company of Libya (GECOL) has announced several power plant projects to bolster the country's available capacity, although many are in early stages. Three plants are under construction and slated to add more than 2 GW to operational capacity in 2022—the 740 megawatt (MW) Tobruk plant in the eastern region and the 650 MW Misrata and 671 MW Tripoli West plants along the western coast.[53] These plants are dual-fuel facilities that can use natural gas or distillate oil for their fuel supply.
- Solar power makes up a negligible amount of power generation in Libya, which has no utility-sized plants. All of Libya's solar power is from small-scale ventures such as mini-grids at hospitals and public lighting projects.[54] Libya's government seeks to diversify its power supply and aims to produce 22% of its electricity from renewable power by 2030.[55] Although this goal is ambitious, 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.[56] Libya has also discussed solar power projects with ENI and Shell.[57]
- 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 almost 0.5 TWh in 2019.[58] Egypt plans to expand its interconnection capacity to Libya from 240 MW to at least 500 MW; however, as of April 2022, the expansion date is unknown.[59]

Figure 6. Electricity net generation and consumption in Libya, 2000-2019



Notes

- Data presented in the text are the most recent available as of April 30, 2022.
- Data are EIA estimates unless otherwise noted.

[1] U.S. Energy Information Administration, *Short-Term Energy Outlook*, March 2022.
[2] *Oil & Gas Journal*, "Worldwide look at reserves and production", December 2021.
[3] The Libya Observer, "OPEC retains Libya exemption from oil output cuts", January 4, 2022.
[4] Reuters, "Factbox: What does Libya's ceasefire deal contain?," October 23, 2020.
[5] Reuters, "Libya's unity government sworn in", March 15, 2021; BBC, "Libya Profile – Timeline", March 15, 2021.
[6] Embassy of Libya in Washington D.C., "On the Approval of the Government of Libyan National Unity", Embassy News, March 10, 2021; Reuters, "Libya's Bashagha says he will not use force to take office," March 2, 2022; Reuters, "U.N. Libya adviser aims for elections agreement this month," March 10, 2022.
[7] Central Bank of Libya, Economic Bulletin Fourth Quarter 2021, pages 60 and 65.
[8] World Bank, GDP growth, Libya (website accessed March 2022).
[9] World Bank, "Libya's Economic Update — October 2021," October 7, 2021.
[10] U.S. Energy Information Administration, OPEC Net Oil Export Revenues, January 13, 2021.
[11] *Oil & Gas Journal*, *Worldwide Look at Reserves and Production*, December 2021.
[12] Rystad Energy UCube (accessed February 2022).
[13] U.S. Energy Information Administration, *Short-Term Energy Outlook*, March 2022.
[14] U.S. Energy Information Administration, *Short-Term Energy Outlook*, March 2022.
[15] U.S. Energy Information Administration, *Short-Term Energy Outlook*, March 2022.
[16] *Middle East Economic Survey*, "Libya's NOC Plans Massive Upstream Opening", June 11, 2021.
[17] *Middle East Economic Survey*, "Libya Adds New Refinery To Ambitious Southern Energy Development Plans", October 8, 2021; Zallaf Libya Oil and Gas, Projects, Erawin Project (accessed March 2022); Libya Oil Monitor, "Zalaf Oil, Sanalla discuss plans for Iraon, Atshan fields", January 18, 2022.
[18] Reuters, "UPDATE 2-Gunmen storm Libya's al-Mabrook oilfield", February 4, 2015; Argus Media, "TotalEnergies, ConocoPhillips to buy Hess out of Libya", November 22, 2021.
[19] *Middle East Economic Survey*, "'The Opportunities Are Massive': The Risks & Rewards Of Operating In Libya", January 14, 2022.
[20] *Middle East Economic Survey*, "Back To The Future: Libya Eyes 1.3mn b/d", November 6, 2020.
[21] Reuters, "Libya's NOC announces opening of Tahara oilfield", February 21, 2022.
[22] U.S. Energy Information Administration, International Energy Statistics and *Short-Term Energy Outlook*, March 2022.
[23] U.S. Energy Information Administration, International Energy Statistics (accessed March 2022).
[24] *Middle East Economic Survey*, "Libya Oil Revenues Skyrocket To $30bn", March 26, 2021.
[25] *Oil & Gas Journal*, "Worldwide Refining," (December 2020); *Middle East Economic Survey*, "Libya's Crippled Refining Sector Struggles To Meet Demand", March 5, 2021.
[26] *Middle East Economic Survey*, "Libya's Crippled Refining Sector Struggles To Meet Demand", March 5, 2021.
[27] United Nations Conference on Trade and Development, "Investment Policy Hub, Trasta v. Libya", (accessed March 2022); Libya Observer, "International Chamber of Commerce rules in favor of Libya's purchase of Trasta's share in LERCO", February 26, 2022; *Middle East Economic Survey*, "Libya's Crippled Refining Sector Struggles To Meet Demand", March 5, 2021.
[28] *Middle East Economic Survey*, "Libya Adds New Refinery To Ambitious Southern Energy Development Plans", October 8, 2021; Zallaf Libya Oil and Gas, Projects, South Refinery Project (accessed March 2022); Reuters, "Libyan unity govt, NOC say they will build new refinery", October 3, 2021.
[29] U.S. Energy Information Administration using data from Eurostat, Clipper Data LLC, and Global Trade Tracker (accessed February 2022).
[30] Clipper Data LLC (accessed February 2022).
[31] Clipper Data LLC (accessed February 2022).
[32] U.S. Energy Information Administration, International Energy Statistics, U.S. Imports by Country of Origin (accessed February 2022).
[33] *Middle East Economic Survey*, "Libya's Crippled Refining Sector Struggles To Meet Demand", March 5, 2021 (using Kpler data).
[34] *Oil & Gas Journal*, "Worldwide look at reserves and production" (December 2021).
[35] Rystad Energy UCube (accessed February 2022).
[36] U.S. Energy Information Administration, International Energy Statistics (accessed March 2022).

[37] Libyan News Agency, "Sanalla is discussing with Total the raising of the production of the Waha Company and the re-production of the Mabrouk field", March 8, 2022; Libya News Agency, "Sanalla: We seek to raise gas production rates to meet the needs of the European market", March 12, 2022.
[38] Libya Oil Monitor, "Mellitah gives more Bahr Essalam work details", December 10, 2019; Reuters, "Phase two development of Libya's Bahr Essalam gas field to finish by end 2018 – NOC", November 4, 2018; *Middle East Economic Survey*, "Libya Gas Exports to Libya Pick Up", January 28, 2022.
[39] Libya Herald, "NOC's Faregh field boosts production to 250 million cubic feet of gas per day", November 13, 2019; *Middle East Economic Survey*, "Libya's Faregh Gas Boost", January 29, 2021.
[40] Libya Oil Monitor, "NOC, Eni discuss increasing gas output, structures A&E", March 21, 2022.
[41] *Middle East Economic Survey*, "Libya Eyes 4.1bn Cfd Gas Output", June 11, 2021; Libya Herald, "NOC's Sanalla reviews Zallaf's operations, including Al-Atshan field", February 27, 2022; Zallaf Libya Oil and Gas, Projects, Atshan (accessed March 2022).
[42] U.S. Energy Information Administration, International Energy Statistics.
[43] Gas Exporting Countries Forum, GECF Annual Statistical Bulletin 2021, November 20, 2021, page 67.
[44] World Bank, Global Gas Flaring Tracker Report, April 2021, page 12.
[45] *Middle East Economic Survey*, "Libya's Road To 2mn b/d: Stability Is Key", December 3, 2021.
[46] *Middle East Economic Survey*, "Libya Gas Exports to Italy Pick Up," January 28, 2022; Snam SpA, 2020 Annual Report, page 205.
[47] *Middle East Economic Survey*, "Libya's Power Sector In a Race Against Time," February 5, 2021; Libya Herald, "Audit Bureau warns of increased summer power blackouts, calls for urgent mitigating measures", January 26, 2021.
[48] Libya Herald, "Libya's 2018-2030 Renewable Energy Strategic Plan is ready, studies complete and tenders put out: REAoL", July 28, 2021.
[49] Reuters, "NOC warns of deepening power cuts in eastern Libya", August 13, 2020; Reuters, "Protests flare in Libya's Benghazi over power cuts, living conditions", September 10, 2020; Reuters, "Libyans face painful power cuts as years of chaos hit grid", July 24, 2020; Reuters, "Rolling summer blackouts weigh on Libya's struggling traders", August 17, 2018.
[50] U.S. Energy Information Administration, International Energy Statistics.
[51] International Energy Agency, World Energy Statistics 2020.
[52] Al Jazeera, "War-weary Libyans yearn for end to daily blackouts", August 29, 2021.
[53] Libya Oil Monitor, "GNU gives progress updates on new power plants", February 28, 2022; [53] Libya Oil Monitor, "GECOL carries out transmission work for Tobruk plant", March 11, 2022.
[54] Afrik21, "LIBYA: Government launches construction of a solar power plant in Kufra", March 16, 2020; OPEC Fund for International Development, "UNDP solar power project in Libya helps save lives", January 1, 2018.
[55] Libya Herald, "Libya's 2018-2030 Renewable Energy Strategic Plan is ready, studies complete and tenders put out: REAoL", July 28, 2021; Libya Oil Monitor, "GECOL, PIB eye PPP component factories", January 30, 2022; Regional Center for Renewable Energy and Energy Efficiency, Member States, Libya (accessed March 2022).
[56] PV Tech, "TotalEnergies lands 500MW Libyan solar PV project alongside US$2bn oil and gas investments" November 23, 2021.
[57] Reuters, "EXCLUSIVE-Shell eyes return to Libya with oil, gas, solar investments", November 30, 2021; Libya Oil Monitor, "GECOL, PIB eye PPP component factories", January 30, 2022; Libya Herald, "ENI studying solar energy project in deepest south-east Libya as part of sustainable development programme with NOC", June 21, 2021; Libya Oil Monitor, "Total to invest $2bn in Waha, signs solar MoU", November 23, 2021.
[58] U.S. Energy Information Administration, International Energy Statistics; Reuters, "Libya to get electricity from Egypt, Tunisia to ease blackouts -Tripoli govt", August 5, 2015.
[59] Libya Oil Monitor, "Further details reported on Egypt-Libya interconnection upgrade", January 19, 2022.