Independent Statistics & Analysis
U.S. Energy Information Administration

Country Analysis Executive Summary: Mexico

Last Updated: November 30, 2020

Overview

Mexico is a major producer of petroleum and other liquids and is one of the largest providers of U.S. oil imports.

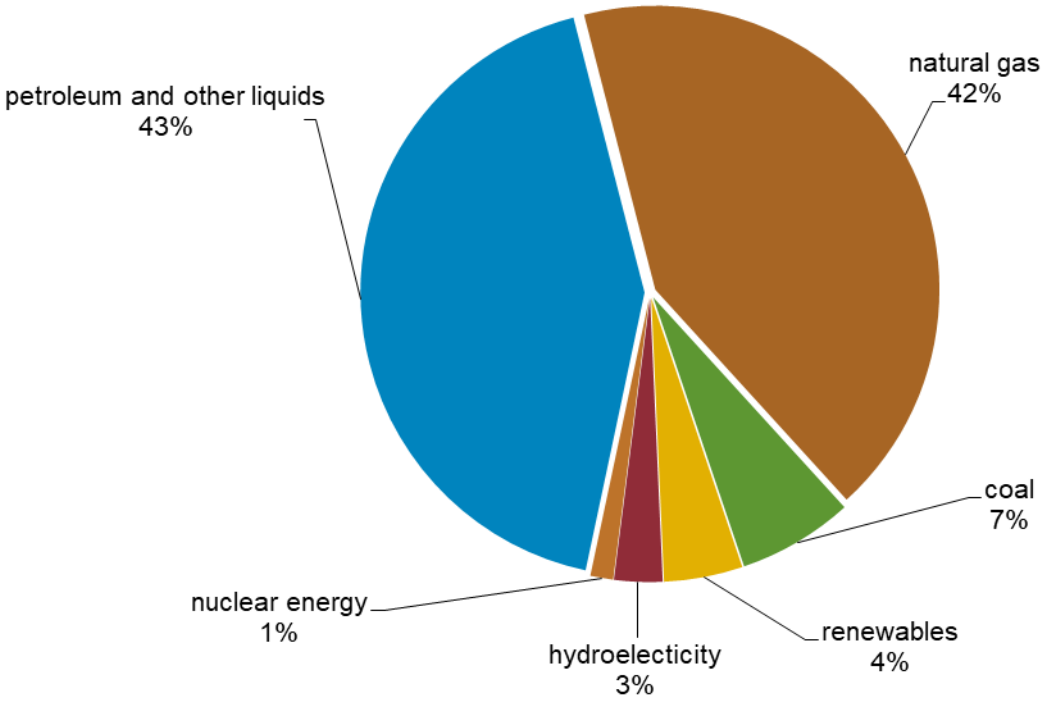
- Mexico is one of the largest producers of petroleum and other liquids in the world. Mexico is the fourth-largest producer in the Americas after the United States, Canada, and Brazil.

- Mexico is an important partner in U.S. energy trade. In 2019, Mexico accounted for almost 600,000 barrels per day (b/d), or 9%, of all U.S. crude oil imports. Effective July 1, 2020, the United States-Mexico-Canada Agreement (USMCA) replaced the North America Free Trade Agreement (NAFTA) as the framework for governing energy trade between the United States and Mexico.

- After years of declining production, Mexico enacted significant energy reforms in August 2014.

- Relatively energy intensive compared with other industrialized countries, Mexico's economy is fueled largely by petroleum and other liquids and natural gas (Figure 1). Natural gas is increasingly replacing oil in electric power generation. Increases in natural gas consumption have resulted in plans to build new pipelines to import natural gas from the United States. All other fuel types contribute relatively small amounts to Mexico's overall energy mix, although the country also has set goals for increased renewable energy generation capacity.

Figure 1. Total primary energy consumption in Mexico by fuel type, 2019



Source: *BP Statistical Review of Energy, 2020*

Petroleum and other liquids

Mexico's oil production has declined since 2004, as has the country's position as a net oil exporter.

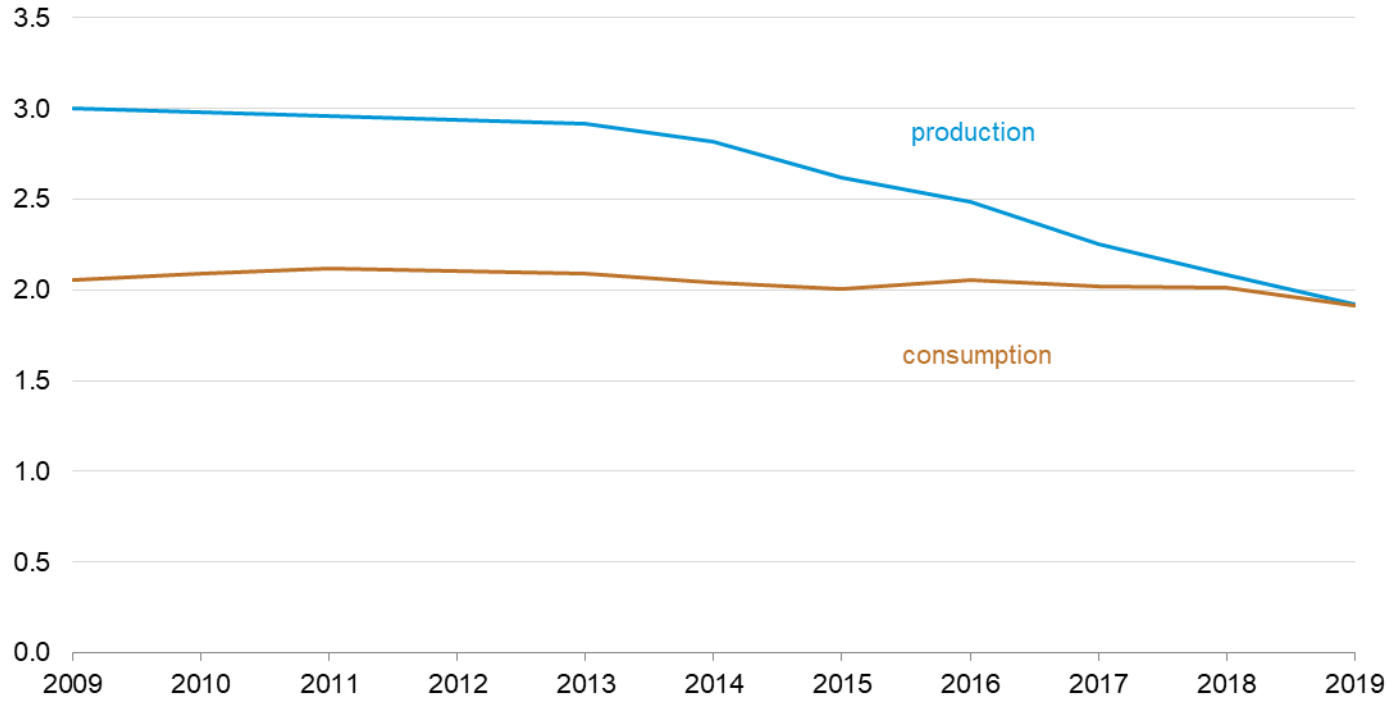
Reserves

- The *Oil & Gas Journal* estimates that as of January 2020, Mexico had 5.8 billion barrels of proved crude oil reserves (including lease condensate), placing it among the top 25 reserves holders in the world.[1] Most reserves consist of heavy crude oil varieties, and the largest concentration is offshore of the southern part of the country, particularly the Campeche Basin. The northern parts of Mexico also have sizable reserves in onshore basins.

Production and Consumption

- Mexico produced an average of 1.9 million barrels per day (b/d) of total petroleum and other liquids in 2019 (Figure 2). Crude oil and lease condensate accounted for 1.7 million b/d, or 89%, of total output, and natural gas and other liquids (as well as refinery processing gain) account for the remainder.

Figure 2. Mexico liquid fuels production and consumption (2009-2019)
million barrels per day



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

- Mexico's petroleum and other liquids production has substantially declined during recent years as fields have matured, falling 50% from its peak in 2004. Notably, crude oil and lease condensate production in 2019 was the lowest recorded level since 1979.

- In 2019, the National Hydrocarbons Commission approved development plans for 20 new priority fields through 2022 that Mexico's national oil company Petróleos Mexicanos (PEMEX) will develop as part of its new business strategy objective to stop and reverse the fall in oil production.

- Most of Mexico's oil production occurs off the eastern coast of the Bay of Campeche in the Gulf of Mexico. The largest production center is the Northeastern Marine region, consisting of the Ku-Maloob-Zaap (KMZ) and Cantarell complexes, of which the KMZ produces the overwhelming majority. Cantarell, which used to be the second-largest producing oil field in the world, combined with the KMZ, produced approximately 1 million b/d in 2019—or 60%—of Mexico's crude oil and condensate production.

- Mexico's liquid fuels consumption has fallen during the past few years, averaging 1.9 million b/d in 2019. According to Mexico's government data, gasoline accounted for about 53% of the country's petroleum product sales in 2019, and diesel accounted for another 21%.[2]

Refining

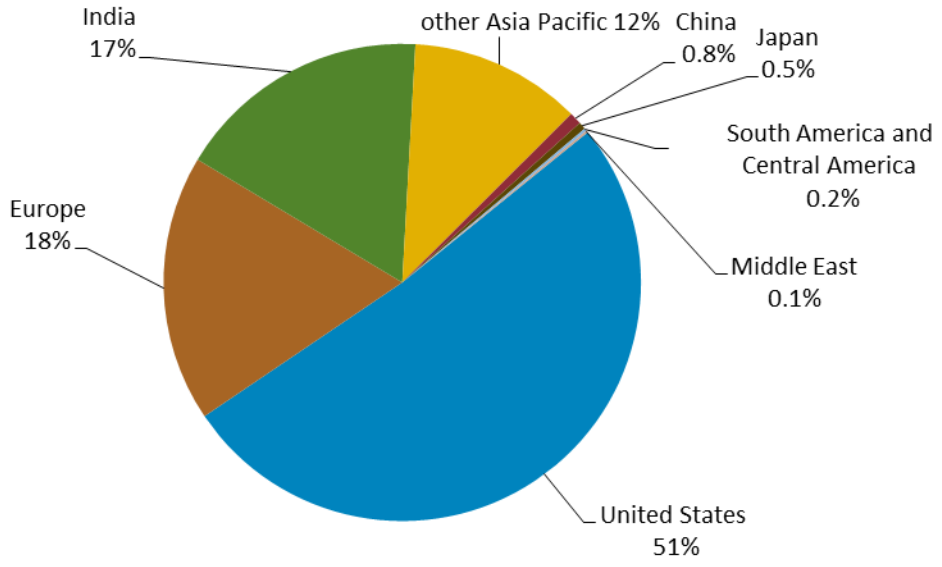
- Mexico's six refineries, all operated by PEMEX, had a total refining capacity of 1.6 million b/d as of the end of 2019.[3] In 2019, the refineries in Mexico operated at an estimated average refinery utilization rate of 38%.[4] Crude oil inputs at PEMEX refineries since 2014 have been constrained by operational issues associated with the company's refineries. PEMEX also controls 50% of the 340,000 b/d Deer Park refinery in Texas.

- In September 2018, the Mexico's government announced an initiative called the National Refining Plan to help Mexico achieve energy independence by 2022. The plan includes upgrades and reconfigurations at PEMEX's six refineries, as well as construction in Dos Bocas of a seventh refinery, which is designed to process 340,000 b/d of heavy crude oil. If achieved, PEMEX refineries would be able to process 1.86 million b/d of crude oil to produce an estimated 781,000 b/d of motor gasoline and 560,000 b/d of diesel fuel.

Exports and Imports

- Mexico is a significant crude oil exporter, the third largest in the Americas behind the United States and Canada. In 2019, Mexico exported 1.3 million b/d of crude oil.[5] The United States received 51% of Mexico's crude oil exports, most of which arrived by tanker (Figure 3). Mexico is the second-largest source of U.S. crude oil imports (behind Canada). The United States' crude oil imports from Mexico have declined since 2010, reflecting Mexico's steady drop in crude oil production along with dramatic increases in U.S. production in recent years.

Figure 3. Mexico crude oil exports by main destination, 2019



eia Source: BP *Statistical Review of Energy, 2020*

- Most crude oil exports from Mexico to the United States are Maya blend. Mexico retains most of the output from its lighter crude oil streams (Isthmus and Olmeca) for domestic consumption. The United States received most of Mexico's oil exports because of the proximity of the two

countries and the operation of sophisticated U.S. Gulf Coast refineries capable of processing heavier Maya crude oils.

- Despite its status as a large crude oil exporter, Mexico is a net importer of refined petroleum products. Declines in domestic production of liquid transportation fuels have increased Mexico's use of foreign sources of refined petroleum products. PEMEX maintains control over much of Mexico's petroleum product imports and distribution. According to PEMEX, Mexico imported 847,000 b/d of refined petroleum products in 2019. Of these imports, 62% was gasoline, and most of the remainder was diesel and liquefied petroleum gases (LPG).[6] Based on EIA data, Mexico was the destination for 59% of U.S. exports of finished motor gasoline in 2019.

- In 2019, Mexico exported 116,000 b/d of refined petroleum products, continuing a declining trend.[7] The United States imported 51,000 b/d of that export total, most of which was residual fuel oil and naphtha. As with crude oil, U.S. imports of refined petroleum products from Mexico have declined in recent years from a high of 132,000 b/d in 2010.

Natural gas

Mexico is a net importer of natural gas, mostly by pipeline from the United States, and its natural gas demand is rising because of expanding power generation capacity.

Reserves

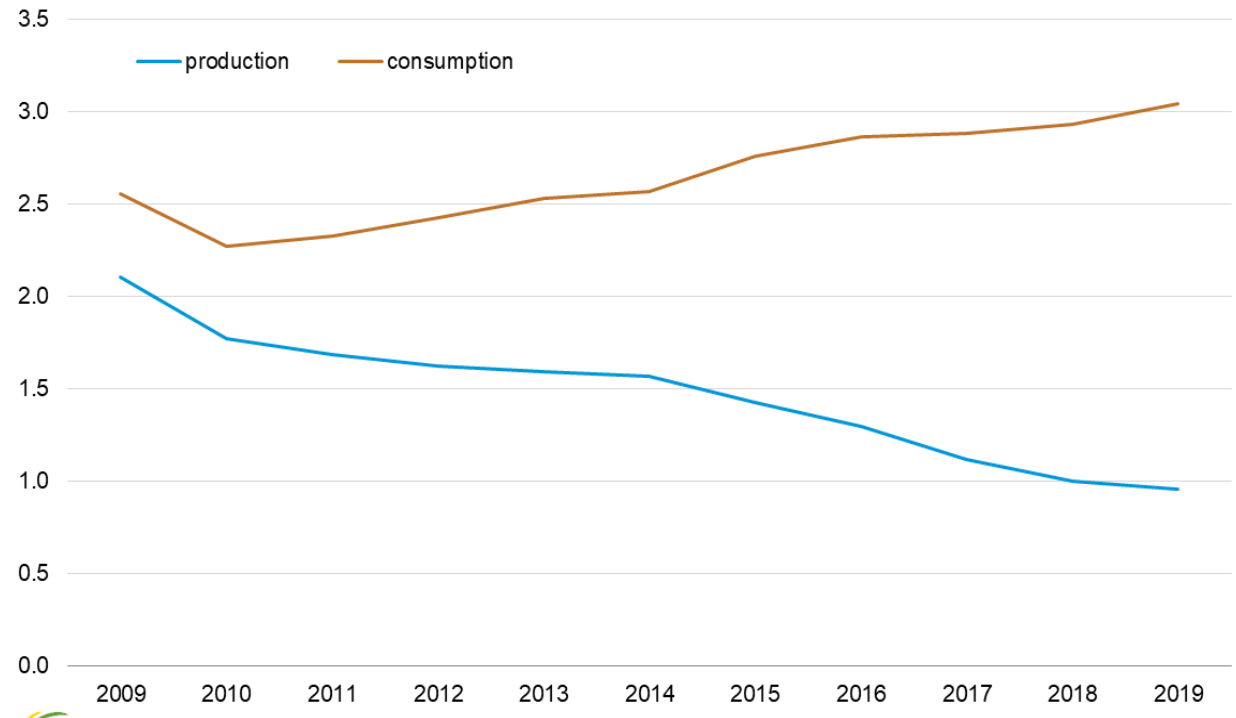
- According to the *Oil & Gas Journal*, Mexico had 6.4 trillion cubic feet (Tcf) of proved natural gas reserves at the end of 2019.[8] Technically recoverable shale gas resources are far smaller than the total resource base because of the geologic complexity and discontinuity of Mexico's onshore shale zone. Although the southern region of the country contains the largest share of proved reserves, the Burgos, Sabinas, and Burro-Picachos regions in the north have the potential to be the center of growth in future reserves.

Production and Consumption

- Mexico produced an estimated 1.0 Tcf of dry natural gas in 2019, its lowest level since the 1980s (Figure 4). Much of the decline has been from nonassociated gas produced from the Burgos Basin and Veracruz Basin as prices have fallen, making this resource increasingly unprofitable. In turn, production of associated gas, mostly from the Sureste Basin, has risen but not by high enough volumes to offset the decrease in nonassociated gas production.

- In the near term, producers in Mexico have no planned projects that will significantly increase domestic natural gas production. Producers might develop some resources in the onshore region of Burgos in the northeastern part of the country across the same geological basin that continues from southeast Texas. However, the required breakeven price for the full development of such reserves is on average higher than the price of imported natural gas, challenging the viability of such new projects.

Figure 4. Mexico's dry natural gas production and consumption, 2009-2019
trillion cubic feet



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

- In 2019, Mexico consumed 3.0 Tcf of dry natural gas. The Mexican government projects consumption to increase 30% from 2017 to 2032 and most consumption to be from the electricity sector.[9]

- Mexico's import needs are rising as domestic natural gas production stagnates as Petróleos Mexicanos (PEMEX) focuses on increasing crude oil production and as domestic demand increases, particularly in the electricity sector. Consequently, Mexico continues to rely on increased pipeline imports of natural gas from the United States and liquefied natural gas (LNG) imports from the United States and other countries.

Pipelines

- Since 2016, Mexico has been expanding its natural gas pipeline system. EIA expects U.S. natural gas pipeline exports to Mexico to increase with the completion of the southernmost segment of the Wahalajara system, the Villa de Reyes-Aguascalientes-Guadalajara (VAG) pipeline. The system began operations in June 2020, connecting new demand markets in Mexico to U.S. natural gas pipeline exports.

Exports and Imports

- Mexico is a net importer of natural gas, and most imports arrive by pipeline from the United States. In 2019, Mexico imported an average of 5.5 billion cubic feet per day (Bcf/d) of natural gas from the United States (including by truck, by pipeline, and as LNG), an increase of more

than 176% from 2014. Approximately 96% of Mexico's natural gas imports were from the United States in 2019.

- Because of ongoing pipeline constraints, Mexico has to meet some of its natural gas demand with LNG. The country imported 232 Bcf of LNG in 2019,[10] continuing a downward trend since 2014. With pipeline capacity expansions underway, LNG imports continue to decline as cheaper natural gas from the United States by pipeline displaces more expensive LNG imports.

- Mexico was the fourth-largest destination for U.S. LNG exports in 2019. The United States is Mexico's primary LNG supplier.

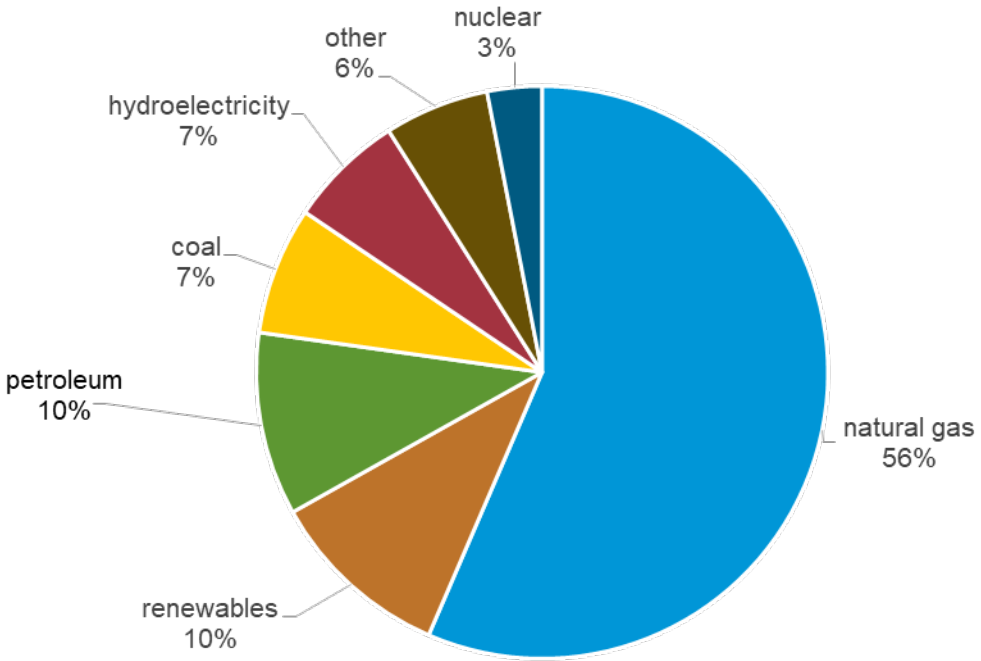
Electricity

Mexico has been a modest exporter of electricity to the United States since 2006.

- According to the Secretaría de Energía (SENER), Mexico had 80 gigawatts (GW) of installed generation capacity in 2019.[11] The largest amounts of installed capacity consisted of fossil fuel at 66% and hydroelectricity at 16%.[12] The country generated an estimated 364 billion kilowatthours (kWh) of electric power in 2019, an increase of 36% from a decade ago. [13]

- Power plants using fossil fuels provided 73% of Mexico's electricity generation in 2019 (Figure 5).[14] Although petroleum products were the leading fuels in Mexico's electric generation mix, natural gas used for electricity generation has risen rapidly in the past decade as price and availability have made it a more economical fuel source.

Figure 5. Electricity generation by fuel, 2019



eia Source: *BP Statistical Review of Energy, 2020*

- Mexico has one nuclear power plant, Laguna Verde, in Veracruz. The Laguna Verde power plant, operated by the national Comision Federal de Electricidad (CFE), includes two boiling water reactors with a combined generating capacity of 1,552 megawatts, accounting for 3% of Mexico's total electricity generation in 2019 (Figure 5).[15] In July 2020, SENER renewed the operating license for Unit 1 until July 2050.[16] The current operation license for Unit 2 expires in 2025 and will also need to be renewed.[17] CFE has announced plans to expand Mexico's nuclear generation capacity by building four new nuclear reactors.[18]

Trade

- In 2018, Mexico exported 6.8 billion kWh to the United States, or 12% of total electricity imports to the United States.[19] Mexico also exports smaller amounts of electricity to Belize and Guatemala.

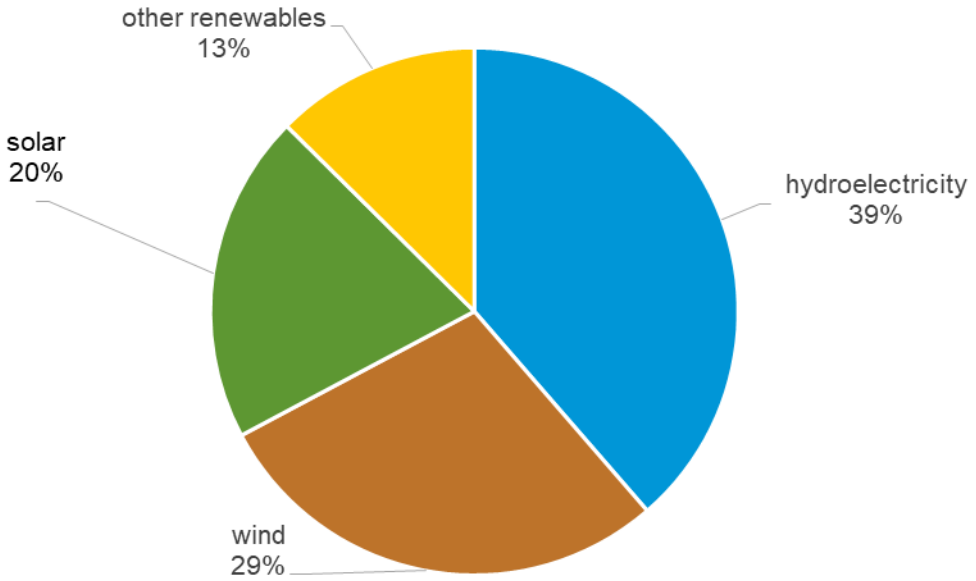
Renewable Energy Sources

- Mexico had 22 million kilowatts (kW) of total renewable energy installed capacity as of 2018, predominantly in hydroelectric, wind, and solar capacity. In 2012, Mexico enacted a climate change law[20] that established that by 2024, 35% of power generation is planned to be supplied through clean energy, a target that will increase to 43% by 2030.

- In 2018, the Secretaría de Energía (SENER) estimated that total investment for power generation during the next 15 years would be 1,692 billion pesos, of which 67% will be invested in generation from clean energy sources and 33% in conventional technology projects. [21] The largest share of clean energy investment will be in wind and solar projects, representing 24% and 13%, respectively.[22]

- The largest source of renewable power generation is hydroelectric power. Mexico had 13 million kW of hydroelectric capacity in 2018, which accounted for 17% of the country's total installed electrical capacity. Hydroelectricity supplied about 10% of Mexico's total electricity generation in 2018.[23, 24] In 2019, hydroelectricity accounted for 39% of all renewable generation (Figure 6).

Figure 6. Renewable generation by source, 2019



Source: BP *Statistical Review of Energy, 2020*
* Includes electricity generated from geothermal, biomass, and other sources of renewable energy

- Non-hydroelectric renewables, such as wind, geothermal, and solar photovoltaics, represented 6% of Mexico's electricity generation in 2018.[25] Mexico had 950 megawatts of geothermal capacity in 2018, making the country fifth in terms of global geothermal capacity.[26]

- Mexico currently has 5.7 gigawatts (GW) of installed capacity of solar power, and another 2 GW is expected to come online by the end of 2021. Mexico currently has over 60 large-scale solar projects in commercial operation across more than 15 states.

Notes

- Data presented in the text are the most recent available as of November 2020.
- Data are EIA estimates unless otherwise noted.

[1] *Oil & Gas Journal*, Worldwide Reserves, January 1, 2020.
[2] Petróleos Mexicanos (PEMEX), Monthly Petroleum Statistics, "Volume of Domestic Sales of Refined Petroleum Products and Natural Gas."
[3] BP *Statistical Review of Energy, 2020.*
[4] BP *Statistical Review of Energy, 2020.*
[5] BP *Statistical Review of Energy, 2020.*
[6] PEMEX, Monthly Petroleum Statistics, "Volume of Imports of Refined Products, Natural Gas and Petrochemicals."

[7] PEMEX, Monthly Petroleum Statistics, "Volume of Exports of Refined Products, Natural Gas and Petrochemicals."
[8] *Oil & Gas Journal*, Worldwide Reserves, January 1, 2020.
[9] SENER (Secretaría de Energía), "Natural Gas Outlook 2018-2032."
[10] BP *Statistical Review of Energy, 2020*.
[11] SENER, "El Gobierno de México fortalece al Sistema Eléctrico Nacional y avanza en la Transición Energética,"(Press release 06, 16 May 2020)
[12] International Energy Agency - Geothermal, "2019 Mexico Country Report," June 2020.
[13] BP *Statistical Review of Energy, 2020*
[14] SENER, "Programa de Desarrollo del Sistema Electrico Nacional 2019-2033," Chapter 5, page 21 and 27.
[15] BP *Statistical Review of Energy, 2020*.
[16] American Nuclear Society, "Operating license renewed for Laguna Verde-1,"July 22, 2020.
[17] Comision Federal de Electricidad (CFE), "Informe Annual 2018," page 124-126 and World Nuclear News, "Mexico's Laguna Verde plant relicensed for 30 years," (July 20, 2020).
[18] Mexico News Daily, "4 nuclear reactors under consideration by electricity commission," (December 11, 2019).
[19] U.S. Energy Information Administration, "Table 2.14 U.S. Electricity Imports from and Electricity Exports to Canada and Mexico, 2008-2018" (Accessed July 22, 2020).
[20] Ley General de Cambio Climático.
[21] SENER, "Programa de Desarrollo del Sistema Electrico Nacional 2018-2032," Chapter 7, page 129.
[22] SENER, "Programa de Desarrollo del Sistema Electrico Nacional 2018-2032," Chapter 7, page 129.
[23] SENER, "Programa de Desarrollo del Sistema Electrico Nacional 2019-2033," Chapter 5, page 27.
[24] International Hydropower Association, Mexico profile (2018).
[25] SENER, "Programa de Desarrollo del Sistema Electrico Nacional 2019-2033," Chapter 5, page 27.
[26] International Renewable Energy Agency (IRENA), Country rankings, accessed July 23, 2020.