COUNTRY ANALYSIS BRIEFS

Mexico

Last Updated: July 2011

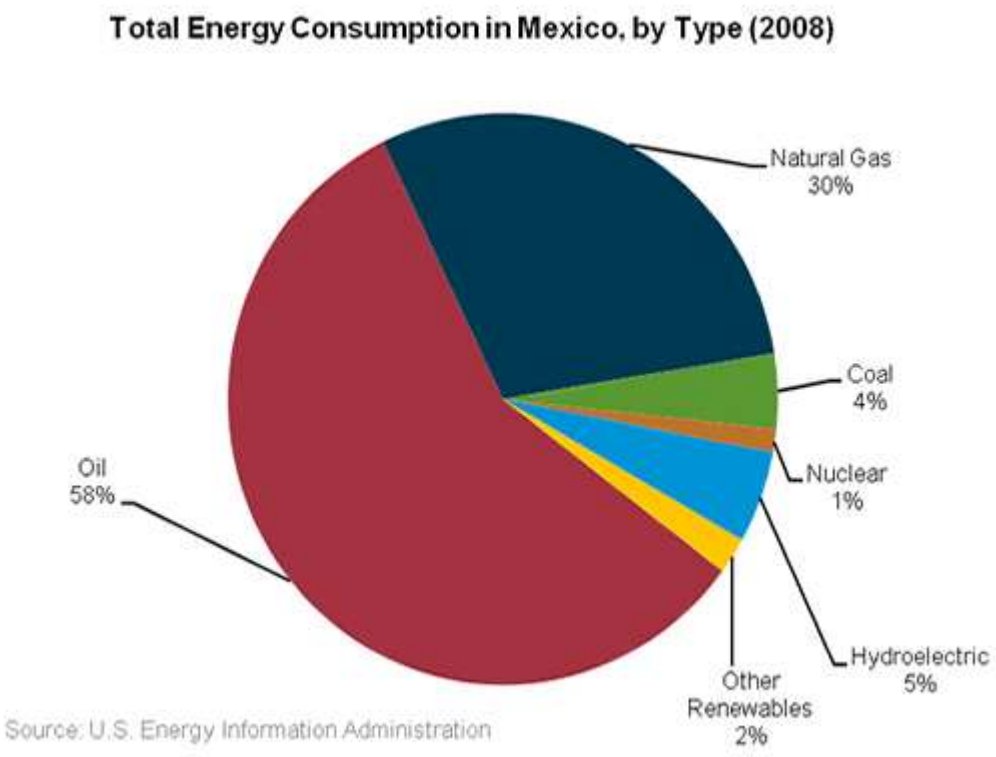
Background

Mexico is a major non-OPEC oil producer and the United States' second largest source of oil imports.

In 2010, Mexico was the seventh-largest oil producer in the world, and the third-largest in the Western Hemisphere. State-owned Petroleos Mexicanos (Pemex) is one of the largest oil companies in the world. However, oil production has decreased in recent years as production at the giant Cantarell field continues to decline. The oil sector is a crucial component of Mexico's economy: while its relative importance to the general Mexican economy has declined in the long term, the oil sector still generated 14 percent of the country's export earnings in 2010, according to Mexico's central bank. More importantly, the government relies upon earnings from the oil industry (including taxes and direct payments from Pemex) for 32 percent of total government revenues. Therefore, any decline in oil production has a direct effect upon the country's overall fiscal balance.

In early 2011, Mexico held licensing rounds for performance-based contracts on oil blocks allowing participation to foreign oil companies for the first time since the nationalization of the oil industry in 1938. The foreign firms will have no ownership rights over any oil they produce, but they are expected to provide Mexican fields with badly needed technological improvements.

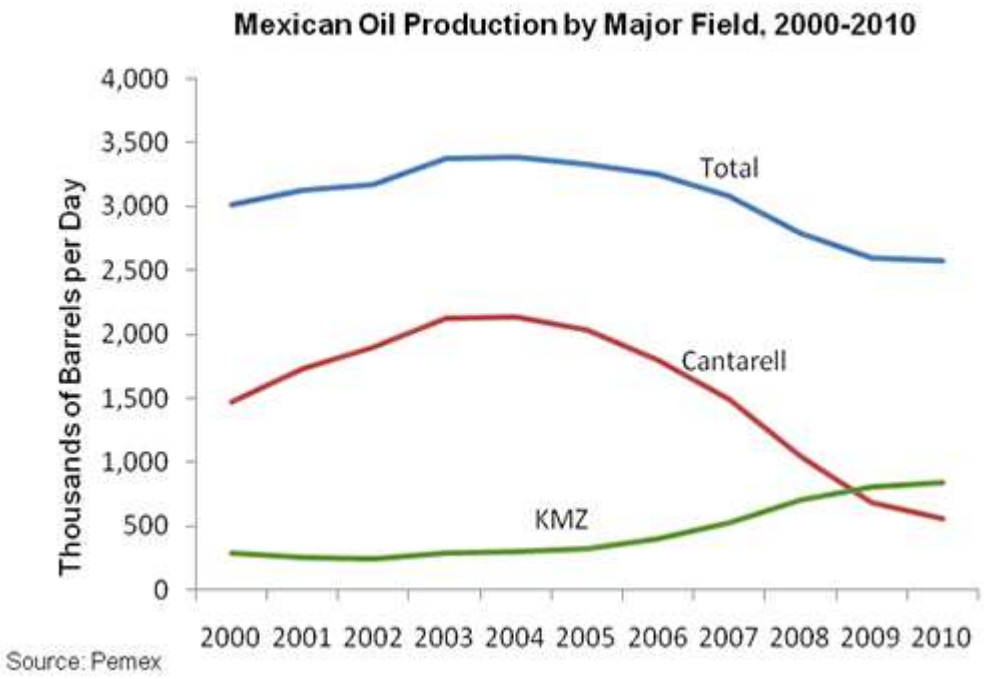
Mexico's total energy consumption in 2008 consisted mostly of oil (58 percent), followed by natural gas (30 percent). All other fuel types contribute smaller amounts to Mexico's overall energy mix. Natural gas is increasingly replacing oil as a feedstock in power generation. However, Mexico is a net importer of natural gas, so higher levels of natural gas consumption will likely depend upon higher imports from either the United States or via liquefied natural gas (LNG).



Oil

Mexico's oil production has declined in recent years, but the country continues to be the second largest source of U.S. oil imports.

According to the *Oil and Gas Journal* (OGJ), Mexico had 10.4 billion barrels of proven oil reserves as of January 1, 2011. Most reserves consist of heavy crude oil varieties, with the largest concentration of reserves occurring offshore in the southern part of the country, especially in the Campeche Basin. There are also sizable reserves in Mexico's onshore basins in the northern parts of the country. The country produced an average of 3.0 million barrels per day (bbl/d) of total oil liquids during 2010, down from 3.2 million bbl/d in 2008. Of Mexico's oil production, 86 percent was crude oil and condensate, the rest consisting of natural gas liquids (NGL) and refinery gain. Investment by foreign oil companies from current and future licensing rounds will likely be required to develop Mexico's deep offshore reserves in the Gulf of Mexico, and shale oil deposits in the north. Mexico is a net importer of refined petroleum products, with 447,000 bbl/d coming from the United States alone in 2010.



Sector Organization

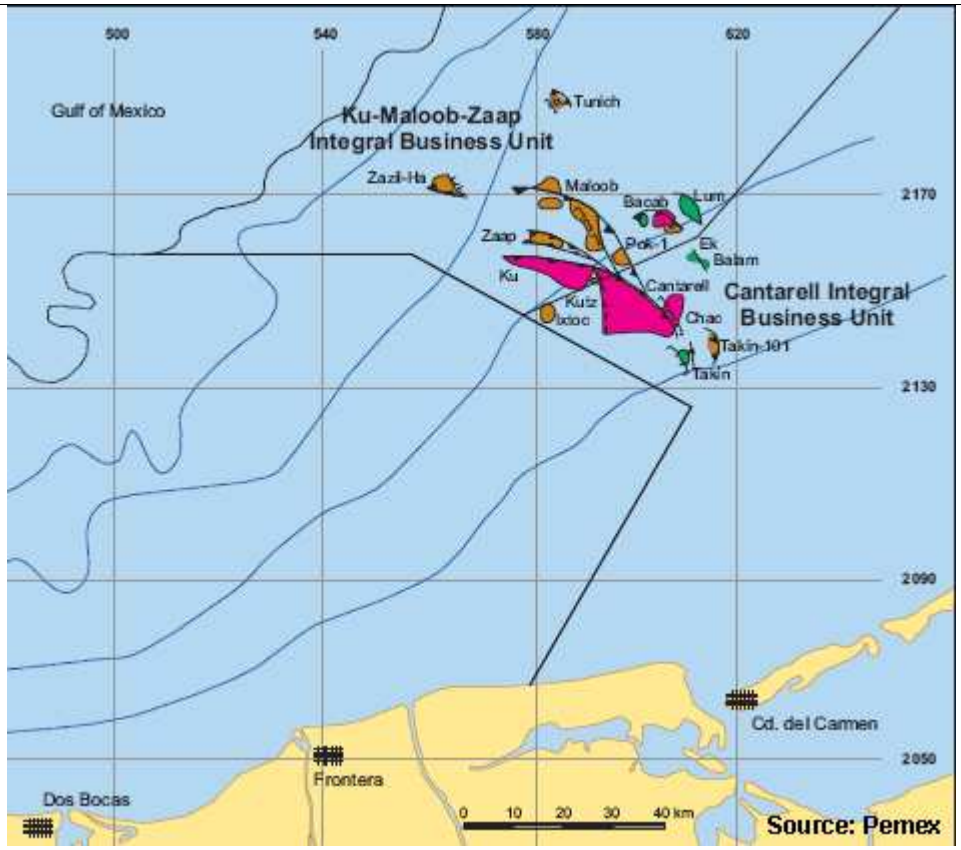
Mexico nationalized its oil sector in 1938, creating Pemex as the sole oil operator in the country. Pemex has four operating subsidiaries: Exploration and Production, Gas and Basic Petrochemicals, Petrochemicals, and Refining. Pemex is the largest company in Mexico and one of the largest oil and natural gas companies in the world.

In 2008, Mexico enacted new legislation that sought to reform the country's oil sector. The goal of these reforms was to enable Pemex to curb the slide in oil production experienced over the past several years. The measures included several administrative changes, such as adding new seats to Pemex's administrative board for outside industry experts, creating a new advisory board designed to provide independent coordination of long-term energy strategy, and establishing a new hydrocarbons agency to regulate the sector. The reforms permit Pemex to create incentive-based service contracts with foreign oil companies. Pemex also received greater autonomy under the reforms, including the ability to establish more flexible mechanisms for procurement and investment. In March 2011 Pemex announced Mexico's first production licensing round in more than 70 years, with 20 blocks to be tendered to international bidders.

Exploration and Production

Most of Mexico's oil production occurs in the Gulf of Campeche, located off the southeastern coast of the country. The two main production centers in the area include Cantarell and Ku-Maloob-Zaap (KMZ), with smaller volumes also coming from the fields off the coast of Tabasco state. In 2010, Cantarell and KMZ represented 54 percent of Mexico's total crude oil production. Due to the concentration of Mexico's oil production in the Gulf of Campeche, any tropical storms or hurricanes passing through the area can disrupt oil operations. In 2008, Pemex developed a new onshore field in the north at Aceite Terciario, which produced 41,000 bbl/d in 2010.

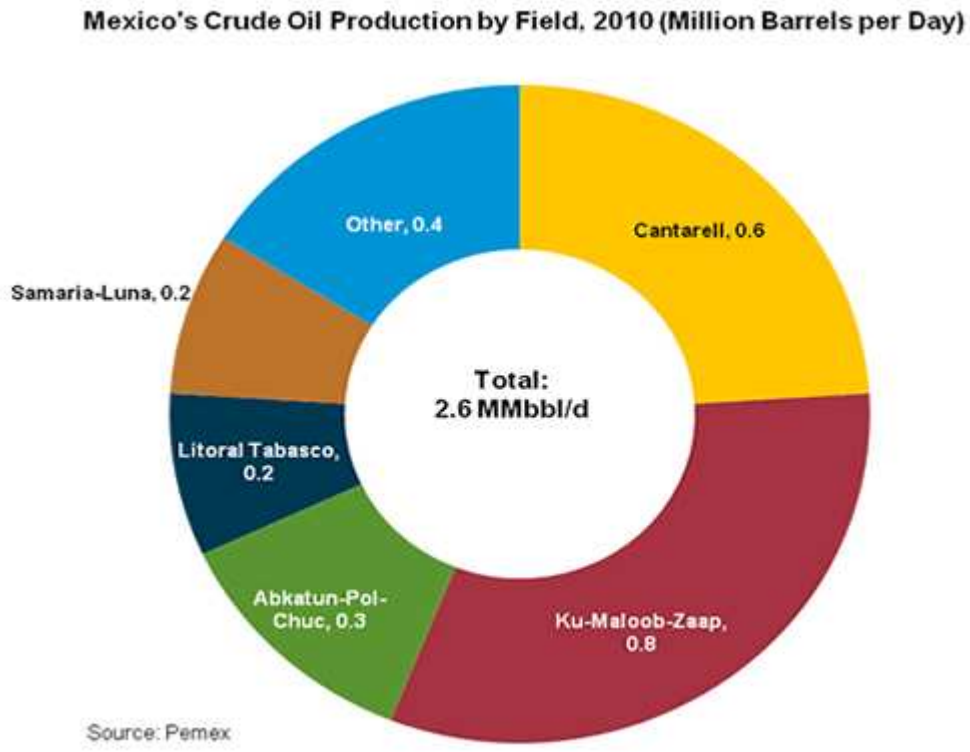
The Cantarell oil field was once one of the largest oil fields in the world, but production there has declined dramatically in the past several years. In 2010, Cantarell produced 558,000 bbl/d, down 19 percent from the 2009 level and down 74 percent from the peak production level of 2.14 million bbl/d in 2004. As production at the field has declined, so has its relative importance to Mexico's oil sector: Cantarell contributed 22 percent of Mexico's total crude oil production in 2010, compared with 63 percent in 2004, while other, more prolific fields have emerged. KMZ is now the highest producing field in Mexico. Another offshore field, Litoral Tabasco, has increased production from 212,300 bbl/d in 2009 to 248,100 in 2010, partially offsetting the losses at Cantarell.



Cantarell consists of four sub-parts: Akal, Nohoch, Chac, and Kutz. Production at Cantarell began in 1979, but it soon began to decline due to falling reservoir pressure. In 1997, Pemex developed a plan to reverse the field's decline by injecting nitrogen into the reservoir to maintain pressure, which was successful for a few years. However, production at Cantarell soon began to fall again, with the rate of decline accelerating in recent years, after reaching its peak in 2004.

The KMZ project has been the largest source of new production growth in the past few years. Located adjacent to Cantarell, the KMZ complex produced 839,200 bbl/d of crude oil in 2010, up from 808,000 bbl/d in 2009. In just the last four years, production at KMZ has doubled, as Pemex has employed a nitrogen re-injection program similar to that used at Cantarell. Production growth at KMZ has partially offset declines seen at Cantarell, and Pemex hopes to increase production further over the next few years.

The offshore area adjacent to Tabasco State contains the Abkatun-Pol-Chuc and Litoral de Tabasco projects. Each project consists of several smaller fields, with combined crude oil production from the area totaling 544,400 bbl/d in 2010. Production from this area has increased in recent years after a steep decline, but is still lower than levels seen a decade ago.



Onshore fields represent only around 25 percent of Mexico's total crude oil production. Most of this production is in the southern part of the country, which contains 80 percent of total onshore production. The largest oilfield in the south is Samaria-Luna, which produced about 200,000 bbl/d in 2010. Production in the north is distributed amongst many small fields, the largest of which do not exceed 10,000 bbl/d.

Chicontepec

Pemex sees the onshore Chicontepec project, located northeast of Mexico City, as a potentially large source of future production growth. Chicontepec contains 29 distinct fields spread over an area of 2,400 square miles. The area currently produces about 30,000 bbl/d, but Pemex hopes to increase production dramatically through an aggressive drilling program. In 2009, Pemex awarded tender offers for the drilling of 170 development wells at Chicontepec, following earlier tenders in 2008 for the drilling of 1,000 wells. According to Pemex, Chicontepec contains an estimated 17.7 billion barrels of oil equivalent of possible hydrocarbon reserves.

According to industry reports, Chicontepec is very challenging technically. Most of the crude oil at Chicontepec is very heavy. The reservoir is also highly fractured and at low pressure, meaning that recovery rates could be low and Pemex will need a large number of wells to fully exploit the area. The region does not yet have much of the necessary infrastructure for large-scale oil development, such as pipelines, which must be built amongst a dense, urban population.

Crude Varieties

Most of Mexico's crude oil production consists of heavy crude varieties. Maya, a heavy crude with high sulfur content, generally represents around 60 percent of Mexico's total crude oil production. The country also produces two lighter crude streams, Isthmus and Olmeca. In general, Mexico retains most of the lighter crude streams for domestic consumption and exports the bulk of its Maya production to the U.S. Gulf Coast, which has sophisticated refining capacity necessary to process these heavy crudes.

Pipelines

Pemex operates an extensive pipeline network in Mexico that connects major production centers with domestic refineries and export terminals. This network consists of close to 500 pipelines spanning over 3,000 miles, with the largest concentration occurring in the southern part of the country. Mexico does not have any international pipeline connections, with most exports leaving the country via tanker from three export terminals in the southern part of the country: Cayo Arcas, Dos Bocas, and Coatzacoalcos. Pipeline security and tap theft have increasingly become a

significant issue in Mexico. For example, a tap theft explosion in Puebla State in December 2010 killed 29 people and disrupted flows. Pemex estimates that pipeline theft from various criminal organizations results in losses of $2-3 billion per year.

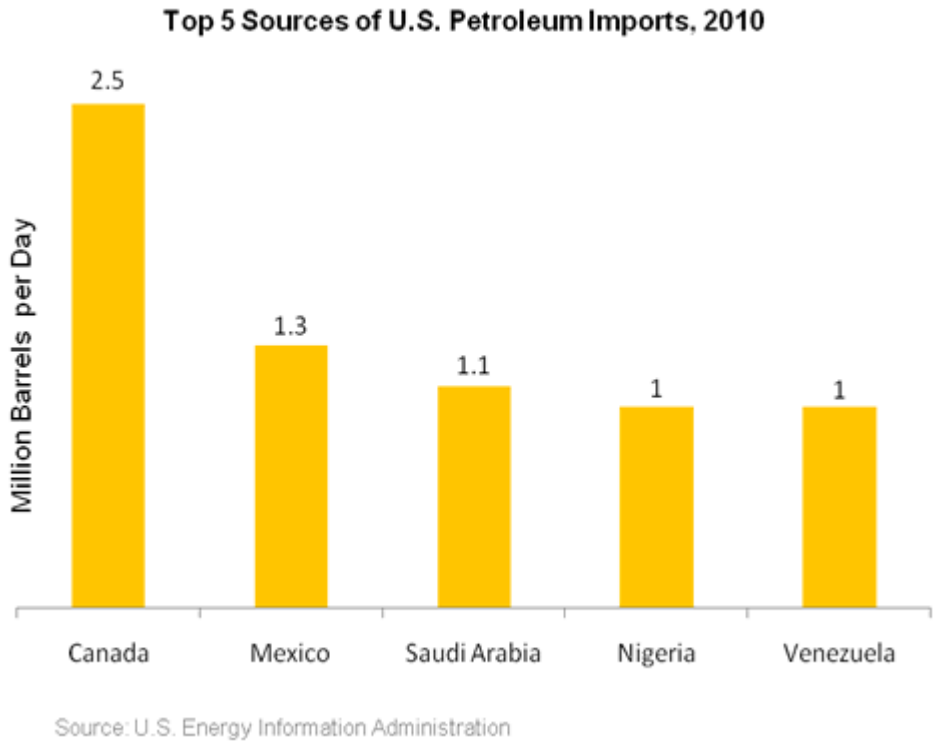
Forecast for Mexico's Oil Production

Based on the June 2011 Short-Term Energy Outlook, EIA forecasts that Mexico will produce 2.85 million bbl/d of oil in 2011 and 2.83 million bbl/d in 2012. The decline is driven mainly by falling production at the super-giant Cantarell field, which has only been partially offset by higher production from other areas. Over the long-term, the EIA International Energy Outlook 2010 forecasts that Mexico will become a net oil importer by 2020, with net imports of over 1 million bbl/d by 2035. As one of the largest oil exporters to the United States, this has important implications for future U.S. energy supplies. From Mexico's perspective, changing into a net oil importer would have important repercussions on the overall economy, due to the dependence of the federal government on Pemex for a sizable share of its revenues.

Oil Trade

Oil Exports

In 2010, Mexico exported 1.3 million bbl/d of crude oil, up from 1.2 million bbl/d in 2009. The United States receives the vast majority of Mexico's crude oil exports, which mostly arrive via tanker at the Gulf Coast. In 2010, the U.S. imported 1.14 million bbl/d of crude oil from Mexico, and about 140,000 bbl/d of refined products, mostly residual fuel oil, naphtha, and other unfinished oils.



Mexico is consistently one of the top three exporters of oil to the U.S., along with Canada and Saudi Arabia. The close proximity of the U.S. market and the sophisticated level of refineries in the United States should continue to attract the bulk of Mexico's oil exports. Mexico's crude oil exports to the United States rose steadily through the 1980s and 1990s, before peaking in 2004 at 1.6 million bbl/d. The combination of Mexico's falling oil production and rising domestic demand have led to a reduction in exports to the United States since that peak.

Oil Imports

Despite its status as one of the world's largest crude oil exporters, Mexico is a net importer of refined petroleum products. In 2009, Mexico imported 496,000 bbl/d of refined petroleum products, while exporting 199,000 bbl/d. Gasoline represented around 60 percent of product imports. A resumption of brisk economic growth is a reason for the increase in refined product imports, along with fixed domestic product prices that are below international market levels.

Downstream

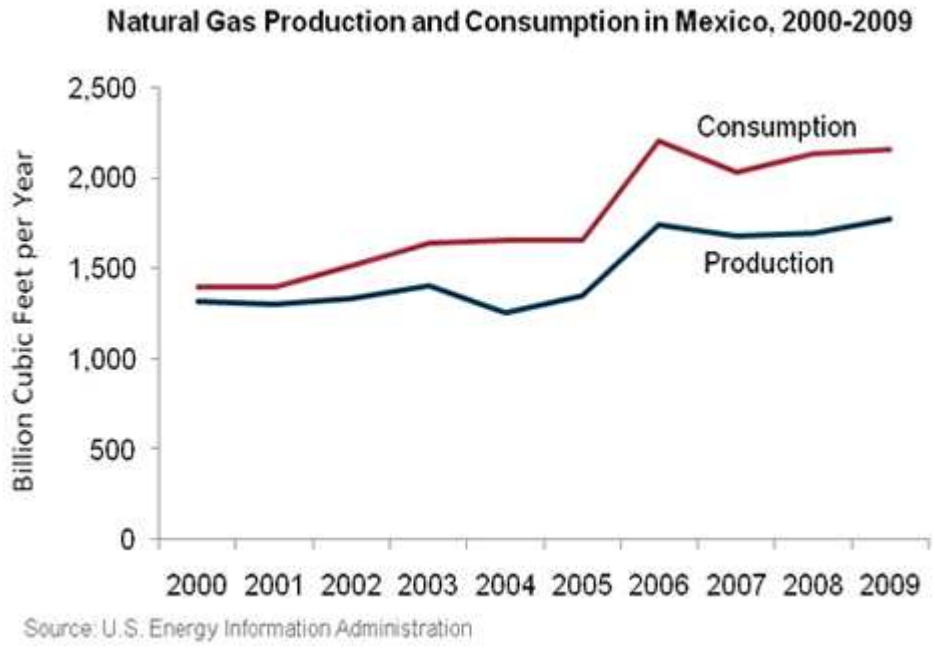
Mexico's oil consumption averaged 2.14 million bbl/d in 2010. According to *OGJ*, Mexico has six refineries, all operated by Pemex, with a total refining capacity of 1.54 million bbl/d. The largest facility in the country is the 330,000-bbl/d Salina Cruz facility. Outside of Mexico, Pemex controls 50 percent of the 334,000-bbl/d Deer Park refinery in Texas.

To reduce its imports of refined products, in March 2011 Pemex began building a new, 300,000-bbl/d facility in Tula, Hidalgo state at a reported cost of nearly $10 billion. The Tula plant will be the first new refinery built in Mexico in thirty years. In addition, the Minatitlan refinery has been expanded to produce an additional 34,000 bbl/d of diesel and 47,300 bbl/d of gasoline by August 2011.

Natural Gas

Mexico's natural gas consumption is rising primarily due to greater use of the fuel in power generation.

According to *OGJ*, Mexico had 12.0 trillion cubic feet (Tcf) of proven natural gas reserves as of January 2011. According to Pemex, the Southern Region of the country contains the largest share of proven reserves. However, the Northern Region likely will be the center of future reserves growth, as it contains almost ten times as much probable and possible natural gas reserves as the Southern Region. In 2010, Mexico produced 2.1 Tcf of natural gas, while consuming 2.2 Tcf, with imports coming both via pipeline from the United States and liquefied natural gas (LNG).



Mexico's natural gas production has grown in recent years, following steady declines during the late 1990s. Since 2007, natural gas consumption has also grown steadily, driven mostly by the electricity sector, whose share of total natural gas consumption increased from 29 percent in 2000 to 48 percent in 2009. According to Pemex, the company itself is the single largest consumer of natural gas, representing around 40 percent of domestic demand in 2010.

Sector Organization

Pemex holds a monopoly on natural gas exploration; however private participation is permitted in non-associated gas production. The Mexican government opened the downstream natural gas sector to private operators in 1995, though no single company may participate in more than one industry function (transportation, storage, or distribution). It also created the Energy Regulatory Commission (CRE) to monitor the sector.

Exploration and Production

Mexico's natural gas production is spread throughout the country. Onshore fields in the northern part of the country represented 36 percent of Mexico's natural gas production in 2010, while onshore fields in the south contributed 25 percent, and offshore fields in the Gulf of Campeche represented the remainder. While crude oil production at the Cantarell field has fallen in recent years, natural gas production has risen dramatically: natural gas production at the field increased

from 278 billion cubic feet (Bcf) in 2005 to 457 Bcf in 2010. However, the increase in natural gas production at Cantarell also has led to an increase in natural gas flaring, as there isn't adequate capacity to capture and process all of the new growth in production. According to NOAA, flaring of natural gas in Mexico increased from 75 Bcf in 2006 to 126 Bcf in 2008. However, gas flaring did decline to 88 Bcf in 2010, likely due to decreases in oil production.

The Burgos Basin in northern Mexico has been a center for natural gas exploration and production, and it currently represents about one-quarter of total natural production. Pemex announced a service contract in 2009 that would upgrade infrastructure in the area to facilitate increased natural gas production. In 2010, three new gas fields began production in the Burgos Basin, Alambra, Arenaria, and Perillan. In addition, Pemex produced its first shale gas in March, 2011 from an exploratory well at the Eagle Ford formation in the northeastern state of Coahuila.

Pipelines and Storage

Pemex operates over 5,700 miles of natural gas pipelines in Mexico. The company has twelve natural gas processing centers, with liquids extraction capacity of 5.9 Bcf per day. Pemex also operates most of the country's natural gas distribution network, which supplies processed natural gas to consumption centers. The natural gas pipeline network includes ten active import connections with the United States. In 2010, Mexico imported 342 Bcf of natural gas from the United States, while it also exported 30 Bcf to the United States.

Liquefied Natural Gas (LNG)

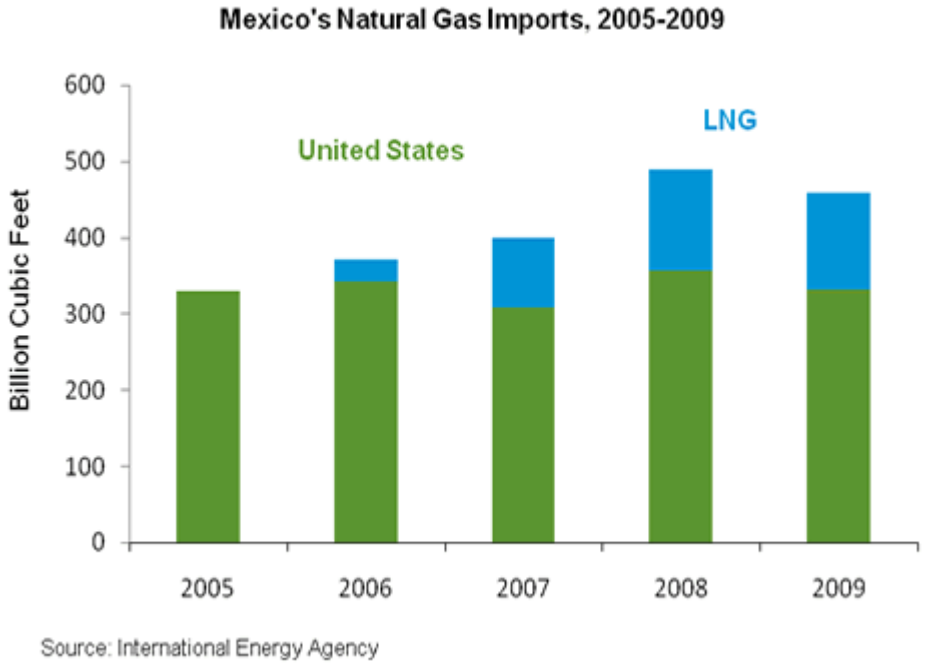
There are two operating LNG terminals in Mexico and one other currently under construction. In addition, there are other plants in various stages of the planning process. In 2009, Nigeria supplied Mexico with 74 percent of its LNG imports, followed by Egypt and Qatar.

East Coast

Altamira, a joint venture of Royal Dutch Shell (50 percent), Total (25 percent), and Mitsui (25 percent) received its first LNG cargo in August 2006. The plant, located in Tamaulipas state, has a capacity of 500 million cubic feet per day (MMcf/d), with plans to increase the project to a peak capacity of 1.3 Bcf/d at a later date. CFE, the state-owned electricity monopoly, has signed a 15-year contract to purchase the entire volume received at the terminal.

West Coast

The Costa Azul terminal near Ensenada, operated by Sempra, began receiving LNG in 2008. The current send-out capacity of the plant is about 1 Bcf/d. Most of the natural gas supplies domestic customers in northwest Mexico.



Construction of a new LNG terminal at the port of Manzanillo began in 2008. The plant will have

an initial capacity of 500 MMcf/d. A consortium of Mitsui, KOGAS, and Samsung is building the plant. The plant would be the second LNG terminal on the Pacific Coast and is expected to come online by the end of 2011. According to industry reports, LNG supplies for the Manzanillo plant will come from the Peru LNG project under a long-term contract.

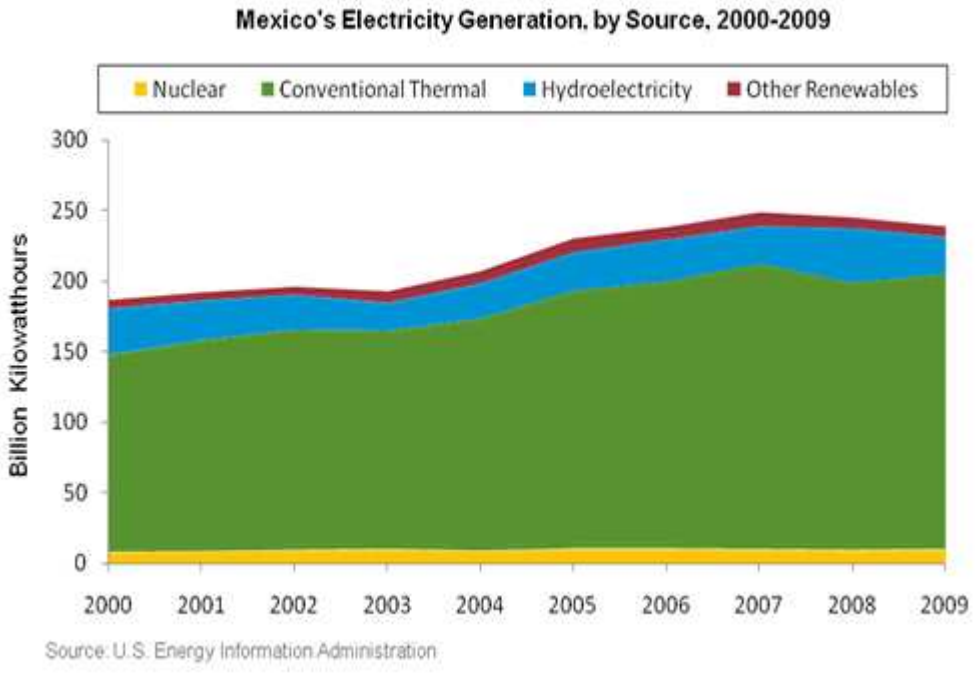
Electricity

Most of Mexico's electricity generation comes from conventional thermal sources, chiefly natural gas.

Mexico had 57.2 gigawatts of installed electricity generating capacity in 2008. The country generated 239 billion kilowatthours (Bkwh) of electric power in 2009. Conventional thermal generation represents the overwhelming majority of Mexico's electricity generation, though the mix from these sources is gradually shifting from oil products to natural gas. Mexico consumed 202 Bkwh of electric power in 2008.

Sector Organization

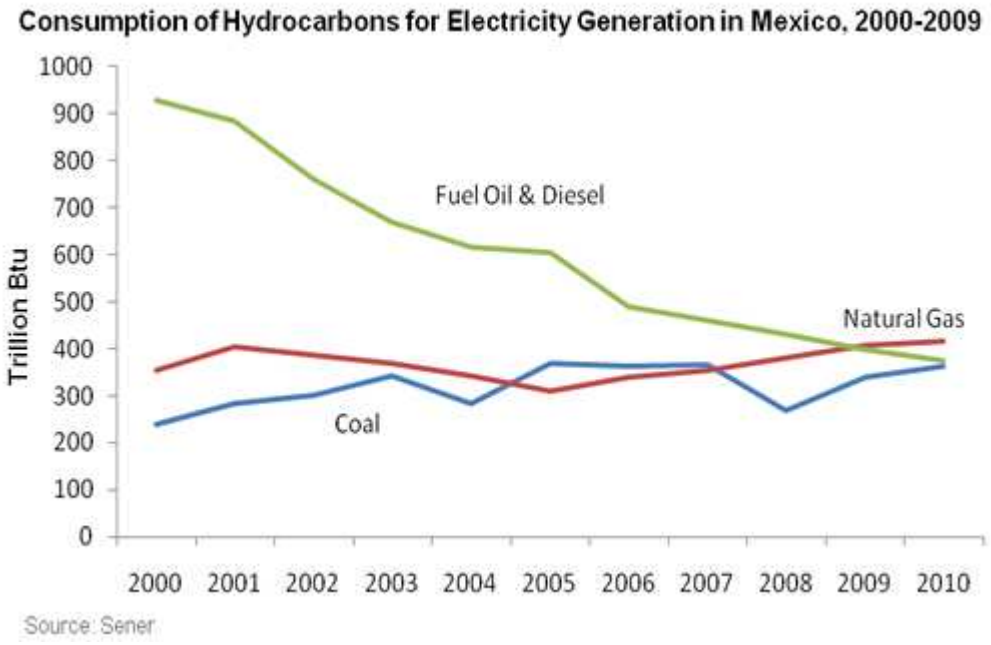
State-owned Comision Federal de Electricidad (CFE) is the dominant player in the generation sector, controlling about two-thirds of installed generating capacity. CFE also holds a monopoly on electricity transmission and distribution. In 2009, CFE absorbed the operations of Luz y Fuerza del Centro, a state-owned company that managed distribution of electricity in Mexico City. The Comision Reguladora de Energia (CRE) has principle regulatory oversight of the electricity sector.



Changes to Mexican law in 1992 opened the generation sector to private participation. Any company seeking to establish private electricity generating capacity or begin importing/exporting electric power must attain a permit from CRE. As of the end of 2010, private generators held about 11,644 megawatts (MW) of generating capacity, mostly consisting of combined-cycle, gas-fired turbines (CCGFT). CFE also operates Mexico's national transmission grid, which consists of 27,000 miles of high voltage lines, 28,000 miles of medium voltage lines, and 370,000 miles of low voltage distribution lines.

Conventional Thermal

In the past, fuel oil and diesel fuel represented the largest share of the feedstock in Mexico's conventional thermal generation mix. However, natural gas consumption for electricity generation has risen dramatically in recent years, and natural gas is now the dominant feedstock, although coal has also risen rapidly since 2008. According to Mexico's Energy Secretariat (Sener), Mexico consumed 416 trillion Btus of natural gas for electricity generation in 2010, compared with 373 trillion Btu of petroleum products. This shift has been the principle driver behind Mexico's rising natural gas consumption. Coal consumption by the electricity sector has also risen in recent years, reaching 364 trillion Btu in 2010.



Other Sources

Mexico has a single nuclear power plant, the Laguna Verde nuclear reactor in Veracruz, operated by CFE. In April 2007, CFE awarded a contract to an international consortium headed by Alstom to modernize the plant, and this project has increased total generating capacity from 1,400-MW in 2007 to 1,640-MW in 2011. Hydroelectricity supplied about 11 percent of Mexico's electricity generation in 2009. The largest hydro plant in the country is the 2,400-MW Manuel Moreno Torres in Chiapas. Non-hydro renewables represented about 3 percent of total generation in 2009.

Links

EIA Links

EIA - Mexico Country Energy Profile

U.S. Government

CIA World
U.S. State Department's Information Sheet - Mexico

Foreign Government Agencies

Comisión Reguladora de
Secretaría de Comunicaciones y Transportes (SCT)
Secretaría de Energía
Secretaría de Medio Ambiente y Recursos Naturales (Semarnat)

Oil and Natural Gas

PEMEX, the state-owned oil company of Mexico

Electricity

Comisión Federal de Electricidad

Sources

Associated Press
Business News Americas
Cambridge Energy Research Associates
CIA World Factbook
Comisión Federal de Electricidad
Deutsche Bank
Dow Jones
Economist Intelligence Unit
IHS Global Insight

International Energy Agency
LatAmOil
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Contact Info

(202) 586-8800
cabs@eia.gov