



# Mexico Country Report

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Mexican Energy Reform:

# Trends, Challenges and Opportunities

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Mexico adopted Constitutional changes in December, 2013 enabling fundamental reforms to its energy industry. Since then, Mexico passed new legislation, revised and expanded the roles of regulatory agencies, published regulations, and promulgated procedures to implement the reforms contemplated by those changes. In designing these reforms, Mexico took into account the successes and failures of other countries' efforts to attract foreign and local investment. Goals include expanding and modernizing Mexico's energy infrastructure, promoting manufacturing and export operations, fostering innovation and investment in technology and lowering energy costs to industrial and residential customers. The reforms directly impacted two sectors: oil & gas and power (electricity). In the discussion that follows, we review some of the more relevant trends, challenges and opportunities in light of the reform.

## Organizational changes

The reforms have already transformed governmental entities regulating the industry. The Ministry of Energy (SENER) was strengthened to determine the overall energy policy. The Energy Regulatory Commission (CRE) and the National Hydrocarbons Commission (CNH), as regulators, now have technical, operational and administrative independence, but must follow SENER's stated objectives. The National Natural Gas Center (CENAGAS) became the independent manager and administrator of the National Natural Gas Transportation and Storage System (SISTRANGAS). The National Center for Energy Control (CENACE) became the independent grid operator and governmental authority overseeing the new wholesale electricity market.

## Wholesale electricity market

Mexico's short-term electricity market (including the day-ahead market and the real-time market), in which generating companies offer their energy supplies to the grid on a daily basis, began operating in January, 2016. Mexico will continue to develop the wholesale electricity market in phases through

2017 and 2018. The hour-ahead market (within the short-term market) is expected to become fully operational during the 2017-2018 period.

The development of the wholesale electricity market has numerous facets. These include expanding clean energy sources; promoting more cost-efficient generators; implementing a more integrated and modern grid system; reducing the tariff subsidies gradually; and importing and exporting energy.

Several components make up this newly-implemented market, including (i) instituting electricity auctions and (ii) trading various energy-related products, all as described below.

Mexico will continue to develop the wholesale electricity market in phases through 2017 and 2018.

## Mexico's electricity auctions

In 2016, CENACE completed two long-term electricity auctions, attracting over US\$6.6 billion in new investment from companies from Asia, Europe and North America. The auctions were characterized by high participation levels and some of the lowest prices for solar and wind energy in the world. For example, the average bid price for solar energy in the first

auction was US\$45 per MWh. Average prices for wind and solar power dropped by 30% in the second auction. In the course of the auctions, the Federal Electricity Commission (CFE), the state-owned electric utility, purchased electricity, Clean Energy Certificates (CELs), and capacity from private generators. One of the winning capacity bidders in the second auction agreed to supply 475MW to CFE from a generation facility located in Texas. The long-term auctions feature power purchase agreements (PPAs) with a 15-year term for the acquisition of energy and capacity and a 20-year term for buying CELs.

During the second quarter of 2017, CENACE is expected to conduct a third long-term electricity auction for the CFE to purchase more electricity from private generators. Also, it is anticipated that CENACE will offer medium-term electricity auctions for energy and capacity. These PPAs will have three-year terms.

SENER and CENACE indicate that they will design new auctions allowing private entities (qualified suppliers or qualified

users), in addition to the CFE, to purchase energy and other products.

For those market participants in the auctions who have executed PPAs under the new regime, CENACE will develop a clearing house making it easier to manage the payment process and any required guarantees.

The foregoing steps and future plans reflect the coordinated efforts of the authorities to fulfill Mexico's commitment to ensure access to cleaner and more affordable electricity.

## Balancing market

The capacity-balancing market was established in March, 2017 to help suppliers and qualified users satisfy capacity requirements established by the CRE. This market will assist market participants to allocate available capacity. CENACE will coordinate the transactions and manage the corresponding capacity payments. The capacity will also be traded through independent PPAs or PPAs derived from long-term auctions."

## Clean energy certificates (CELs)

Mexico has committed to reach a 35% clean energy goal by 2024 and expects to reach a 50% goal by 2050. An important component for achieving those goals is the use of CELs. CELs are instruments equivalent to 1MWh of electricity from clean sources. A market will be developed for entities to trade CELs according to the rules from SENER and the CRE. Suppliers, qualified users and "dirty" generators are required to purchase specified amounts of CELs from generators with clean energy power plants. For 2018, at least 5% of such entities' electricity portfolio must be derived from clean energy sources. For 2019, this percentage will increase to at least 5.8%. If a company does not meet the requirement, it will need to purchase CELs. CENACE will operate a spot market for the trading of CELs at least once a year, establishing a schedule for the submission of purchase and sale offers. CELs may also be traded through independent PPAs or PPAs derived from long-term auctions.

CELs will offer companies the opportunity to help reduce carbon emissions which, besides being beneficial for the environment, may also create commercial and marketing advantages for companies as well.

## Financial transmission rights (FTRs)

Financial transmission rights (FTRs) are used to pay the equivalent of a physical right sold at the short term price without the necessity of actually trading the physical right, thereby providing a hedge for short term physical transactions.

CENACE will allocate FTRs through auctions. Holders of FTRs are expected to have the right and the obligation to

collect or pay the difference resulting from the value of the components of marginal congestion of Locational Marginal Prices (LMP) between a source node (injection) and a sink node (consumption) between locations. FTR auctions will be implemented in stages: (i) in the first stage, the auctions will be carried out annually and the FTRs will be valid for one year; and (ii) in the second stage, the auctions will be carried out monthly, and the FTRs will be valid for one or more months. Other auctions will be carried out seasonally and the FTRs will

be valid for three years.



Pedro J. Reséndez

## Transmission and distribution activities

Mexico, through the CFE or other state companies, retained control of transmission and distribution assets. Notwithstanding, the electric industry law (LIE) allows private entities to finance, install, build, maintain, manage, operate, expand, modernize, monitor and preserve the electricity transportation and distribution infrastructure. Accordingly, under the LIE, private parties may

actively participate in these sectors by forming associations or entering into contracts with the CFE or related companies. For the transmission line projects, the LIE allows the participation of the private sector with CFE using one of the following regimes: (i) Public Private Partnerships; (ii) Independent Power Transporter, or (iii) contracts. Mexico is anticipating an increase in electricity generation as well as an increase in electricity demand, both fostered by Mexico's future economic growth. To meet these increases, Mexico must expand and modernize its electric grid using substantial investment from private entities. Investment in transmission is expected to be approximately US\$15.264 billion and investment in distribution is expected to be approximately US\$17.662 billion.

In 2015, the length of all transmission lines in Mexico was 104,393 kilometers (approximately 64,867 miles); however, SENER expects to develop or reinforce another 28,000 kilometers (approximately 17,398 miles) by 2030.

Accordingly, CFE is initiating a tender process for the construction of 1,230 kilometers (approximately 764 miles) of a high-voltage direct-current (HVDC) transmission lines that will connect the Isthmus of Tehuantepec (in the Oaxaca region) to central Mexico. The project will exploit the Isthmus' wind power potential and satisfy the demand for electricity in the most populous part of the country. The winning bidder is expected to build-own-operate and transfer the transmission lines and related facilities to the CFE. This is the first of many transmission line tenders and is part of Mexico's effort to modernize its transmission and distribution power systems by incorporating new intelligent technologies.

Mexico has already announced its plans to auction at least two more HVDC transmission lines in 2017. One line is expected to interconnect Baja California's grid to the national interconnected system (SIN) and the other line is expected to stretch along a substantial segment of the U.S.-Mexican border.

## Distributed generation

Distributed generation in Mexico has the potential to reach over 3.5 million domestic and commercial clients with investments greater than US\$20 billion.

With a new set of rules already published in March 2017, all generators that own power plants with a generation capacity of less than 0.5MW are expected to have the option to interconnect to the general distribution grid (RGD) and sell their energy by executing an interconnection agreement with the State-owned distributor (*CFE Distribución*).

Generators will also execute contracts with basic suppliers. Basic supply is performed by state-owned *CFE Suministro Básico*, which provides power under regulated tariffs to all entities not participating in the wholesale electricity market. These entities include domestic and commercial clients with consumption of less than 1MW. There are three different alternatives for the generators to sell their energy. The first is net metering, where the energy delivered by the generator to the RGD and the energy received from the RGD compensate each other. If the generator delivers surplus energy to the RGD (calculated at the end of a year), the generator will receive the LMP of the applicable node as payment. The second is net billing, where the energy delivered to the RGD is regarded as independent from the energy received from the RGD. Energy received by the generator through the RGD will be paid by it under the applicable basic-supply rate and the energy delivered by the generator to the RGD will be paid by the CFE at the LMP of the applicable node. The last alternative is the total sale of energy to the RDG, where the basic supplier will trade the energy on behalf of the generator.

Generators will also have the possibility to sell their energy through a qualified supplier as long as their power plants do not share measuring equipment with the loading center being supplied by the basic supplier. Qualified suppliers supply energy to end-users with loads greater than 1MW under the terms of the PPAs executed between them.

Distributed generation is intended to not only reduce energy bills, but also to allow generators to enter into the fast-evolving wholesale electricity market.

## Disaggregation and transformation of the CFE

On October 31, 2016, the CFE was legally separated into new companies: nine subsidiaries (entities wholly owned by the State)

for its generation, transmission, distribution and basic supply activities and two *affiliates* (private entities which permit up to 49.99% private ownership) for its activities related to the qualified supply and the management of legacy interconnection agreements. With the reorganization, each of CFE's entities is completely independent from the others. These entities are prohibited from disclosing information to, or sharing information with, each other.

This disaggregation encourages transparency and efficiency within Mexico's electricity sector and creates competition among all players throughout the different links in the electricity production chain. Every CFE entity must compete on equal terms.



Robert J. Downing

## Cross-border electricity transfers

As part of the reform, Mexico hopes to increase trade in electricity with neighboring countries. At present, there are thirteen international interconnections, eleven with the United States and two with Central American countries. Five of the eleven interconnections with the United States

are only used in emergency situations. Under the reform, Mexico permits cross border trade of electricity in three different ways: (i) import and export from system-to-system; (ii) import from a power plant located abroad when such plant is exclusively connected to the Mexican grid; and (iii) import or export for self-use (isolated supply). Cross-border trade is expected to increase as more interconnections are added.

## Natural gas and fuels transport and storage infrastructure

As Mexico liberalizes its oil & gas industry, CENAGAS is taking over the transportation and technical operation of *Petróleos Mexicanos'* (Pemex) assets (i.e. SISTRANGAS). Pemex and the CFE have already reserved capacity in SISTRANGAS. In October, 2016, CENAGAS launched its first open season for all entities wishing to reserve capacity on a firm basis in SISTRANGAS for one year.

Users of SISTRANGAS may now assign, on a temporary or permanent basis, part of their reserved capacity through auctions to be managed by CENAGAS. Users that do not use the total amount of the reserved capacity may offer such available capacity to the market, thus creating a secondary market among users.

CENAGAS is in the process of retaining entities that will assess the current situation of SISTRANGAS as well as the costs for its operation and maintenance. Once CENAGAS completes this assessment, anticipated to be before the second half of 2017, it will launch tenders for operation and maintenance, dividing SISTRANGAS into service divisions.

As part of the five-year investment plan that is reviewed annually by SENER, CENAGAS is expected to issue tender

rules for the development of natural gas transport and storage infrastructure for strategic pipelines. The aim is to secure open access for the transportation of natural gas.

An open season in Pemex's fuels transport and storage infrastructure located in the north of Mexico was issued by Pemex in December, 2016. All interested parties wishing to reserve capacity in such infrastructure may participate to guarantee their future commercial necessities. Once this process concludes in mid-March 2017, Pemex will gradually continue to issue open season processes offering transport and storage capacity in other regions. These processes are expected to increase the use of Pemex's infrastructure and will be a necessary condition for the success of the liberalization of fuel prices in 2017.

Pemex plans to partner with private entities to maximize the profitability of certain activities. These activities include fuel storage, transport (by pipelines, tanker cars, tanker vessels or train) and use of port terminals. Partnerships are needed for the development of storage facilities and transport pipelines that are expected to be constructed in Southeast Mexico and from the Gulf of Mexico to central Mexico. In addition, one oil pipeline is anticipated to be converted into a fuels pipeline. Ports will also need investment for their modernization and, therefore, Pemex is seeking to establish joint ventures with operating partners.

In December 2016, SENER proposed a set of requirements to store a minimum amount of fuels, aiming to guarantee supply to increase the nation's energy security. SENER is currently seeking comments from the public. It is proposed that by 2019, marketers and distributors to end-users and at retail stations be obligated to maintain minimum inventories of certain fuels (gasoline, diesel and jet fuel). The quantities are equivalent to five days of the total national demand for 2019, ten days of the total national demand for 2021 and fifteen days of the total national demand for 2025. As of the second half of 2017, marketers and distributors will report the quantities of fuels as well as the quantities of crude oil available each week to SENER. SENER will publish this information. The objective is to foster investments in the development and modernization of storage infrastructure.

## Retail and liberalization of fuel prices as well as imports of fuel

The reform has already ended Pemex's monopoly in the retailing market (sale of fuels through service stations). However, fuel prices are still controlled and fixed by Mexico through the Finance Ministry. The liberalization of prices was scheduled originally to occur by January 1, 2018. Instead, the CRE accelerated the process, allowing the opening to be made in five phases beginning on March 30, 2017 in the North of Mexico and

ending on December 30, 2017 in the Southeast. On that date, the government will cede all control over what customers pay at retail gasoline stations to a free market.

## Exploration and production (E&P)

Mexico's first deep-water oil auction, completed in December, 2016, attracted the attention of major oil companies. Eight out of ten license contracts were awarded and Pemex completed the first farm-out process in the "Trion" oilfield located in the Gulf of Mexico. Mexico expects to receive investments of over US\$34 billion for the license contracts and US\$7.5 billion for the farm-out project.

Mexico has stated that it intends to double the number of oil & gas auctions in 2017. Between 2017 and 2018, Pemex will likely seek as many as 25 strategic partnerships or farm-outs with private firms. The CNH has scheduled three auctions for March and/or July 2017, including shallow-water and onshore blocks. Mexico expects to hold three additional auctions: one large deep-water

auction to take place around September or October, 2017, one shallow-water auction and another onshore auction which, for the first time, may include shale oil and gas.

Taking into account oil's present volatility and low prices, the completed auction processes have been widely seen as a big success. As a result, Mexico believes it can attract significant foreign direct investment in its oil & gas industry over the next few years.

## Disaggregation and transformation of Pemex

As with the CFE, Pemex completed its own corporate reorganization, transforming its four former subsidiaries in two *subsidiaries* (entities wholly owned by the State) and creating five *affiliates* (private entities which permit up to 49.99% private ownership). Pemex's two *subsidiaries* are: E&P and Industrial Transformation, the latter performing activities for the refining, transformation, processing, import, export, marketing, retail, manufacture and sale of hydrocarbons, petroleum products, natural gas and petrochemicals. The five *affiliates* consist on Drilling, Logistics, Fertilizers, Ethylene and Cogeneration and Services.

Pemex's reorganization eliminates its previous monopoly over all activities related to the oil & gas industry (geology, exploration, production, import, first-hand sales, refining, transportation, processing, petrochemical, marketing and supply to service stations that could only exclusively operate with its brand under a franchise framework). It is consistent with Mexico's goal to become more competitive by adopting corporate practices consistent with those of major oil companies participating in Mexico's oil & gas market. ■



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