Mexico’s Energy Regulatory Commission: Challenges and Opportunities in Reforming the Energy Industry

Guillermo I. García Alcocer
Chairman

November 14th, 2017
Houston, Texas
The Energy Regulatory Commission (CRE) has become the regulator of the mid and downstream segments of the oil and gas value chain, as well as the electricity supply chain.
CRE in comparison to other North American energy regulators

**CRE**
Federal regulator of the mid and downstream segments of the oil and gas value chain, as well as the entire electricity supply chain.

**FERC**
Federal regulator for *interstate* transmission of electricity, natural gas, and oil.

**NERC**
Not-for-profit international regulatory organization that develops protocols for the reliable operation of North America’s electric systems.

**NEB**
Federal regulator for *Inter-provincial and international* oil, gas and electric imports and exports, as well as construction and operation of power lines and pipelines.

**NARUC**
Local regulators for energy, telecommunications, power, water, and transportation utilities.

**CAMPUT**
Provincial and territorial regulators in charge of the electric, water, gas, and pipeline utilities.

“Mexico’s Grid Code includes 10 NERC standards in the Baja California Region”

The Energy Reform is in motion and it has already shown positive results. Some factors that guarantee its continuity are as follows:

- **The Energy Reform was a constitutional reform that required two-thirds majority vote cast of the Congress. Any amendment would require the same level of approval.**

- **The Supreme Court of Justice determined that federal judges can't abolish resolutions or laws from the energy regulating bodies, which reinforces its constitutionality and avoids the suspension of any regulation of the energy sector.**

- **CRE's Commissioners terms are staggered and transcend the political cycles of the country. Hence, the continuity of its duties is not affected by changes in the administration.**

- **The Energy Reform has already established commitments. Currently, there are 130 companies from 19 countries that have been awarded contracts to develop energy infrastructure.**

- **The Energy Reform facilitates the access to clean and low cost energy for state and municipal governments.**

- **Academic participation in the implementation of the Energy Reform enhances the professionalization and specialization of the human resources that will participate in the development of energy projects.**
Mexico’s landmark Energy Reform is now a reality, creating significant investment opportunities throughout the entire value chain.

**Estimated Investment : 255 billion dollars**

**Committed Investment**
83 billion dollars (30 billion more in 2017)

### Hydrocarbons: “Rounds One and Two”

**Round 1:**
- 1st Tender: 2.7 billion USD
- 2nd Tender: 3.1 billion USD
- 3rd Tender: 1.1 billion USD
- 4th Tender: 34.4 billion USD

**Ronda 2:**
- 1st Tender: 8.2 billion USD
- 2nd Tender: 1.1 billion USD
- 3rd Tender: 1.0 billion USD
- 4th Tender: 31.5 billion USD

**Farmouts:**
- Trión: 11 billion USD
- Cárdenas-Mora: 127 million USD
- Ogarrío: 95 million USD

**Seismic data:** 2.5 billion USD

### Natural Gas, LPG and Petroleum Products

Gas pipelines: 12 billion USD

LPG: 97.1 million USD

Petroleum Products: 17.9 billion USD
- Transportation: 3.9 billion USD
- Storage and Distribution: 2 billion USD
- Retailing: 12.0 billion USD

### Power Sector

1st Power Auction: 2.6 billion USD
2nd Power Auction: 4 billion USD

Other in PRODESENN*
- Generation: 97 billion USD*
- Transmission: 12.8 billion USD*
- Distribution: 9.6 billion USD*

A total of 130 companies from 19 countries, of which 51 are Mexican, have committed projects for the development of hydrocarbons and electricity industry.

*Total expected investment by PRODESEN throughout 2030. Source: Mexico’s Ministry of Energy
The renegotiation of NAFTA can promote a more balanced and interdependent market system in North America

"Preserve and strengthen investment, market access, and state-owned enterprise disciplines benefitting energy production and transmission and support North American energy security and independence, while promoting continuing energy market-opening reforms".

Summary of the objectives for the NAFTA renegotiation (July, 2017)*

- Natural gas interconnection points between Mexico and the United States
- There are 20 natural gas interconnection points between Mexico and the United States
- Natural gas imports by pipeline will contribute to satisfy the increasing demand of the industrial and electricity generation sectors in Mexico
- The liberalization strategy of the fuels market in Mexico has aroused the interest of international companies, including several corporations from the United States and Canada
- Mexico assisted the United States during the 2011 power outage in California and, the United States assisted Mexico during the 2016 power outage in Baja California
- Additionally, in May 2017, Tamaulipas and Texas worked together during the power outage registered in Matamoros and Reynosa

From January 2012 to June 2013, 35 critical alerts were issued in Mexico, curtailing natural gas consumption. Pemex limited the natural gas volumes used by the manufacturing sector.

With this information, the Bank of Mexico built a "shortage index" which represents the percentage of natural gas that was restricted.

Estimate: Shortage of natural gas reduced the GDP annual growth rate by 0.28 percentage points in the second quarter of 2013.

Between 2012 and 2017, 6 incidents of an average duration of 25 days occurred. Such episodes had a maximum affectionation of 14% of the SISTRANGAS demand.

On August 24th, 2017, CENAGAS issued a temporary state of alert due to the impact of hurricane Harvey. Nevertheless, there were no natural gas supply disruptions registered.

Due to the following reasons:
- The Capacity Reserve Regime
- Imports from alternative points to the affected ones
- The employment of maximum capacity in the regasification terminals of Manzanillo and Altamira

Source: Banxico
http://www.banxico.org.mx/publicaciones-y-discursos/publicaciones/documentos-de-investigacion/banxico/%7BAE74D86B-7539-FD1E-4DDE-6765739A8E9%7D.pdf
Mexico’s Gas Pipeline Network will expand considerably from 2012 to 2019

12 Billion dollars
Committed investment

7,586 km* / 4,714 mi
Committed pipelines since 2013

2,386 km / 1,483 mi
Committed and operating pipelines

* kilometers (km) / miles (mi)
CRE is continuously working to provide a regulatory framework that encourages natural gas integration ties between Mexico and the U.S.


Considering “Round Zero” capacity allocation Pemex and CFE, the first Open Season and the recognition of previously existing contracts, 97% available capacity on SISTRANGAS has been allocated on a firm basis.

- **CFE (11%)**
- **Pemex as a trader (19%)**
- **Independent power producers (29%)**
- **PEMEX (self-consumption) (26%)**
- **Other (traders and end-users) (15%)**

✓ Up to 44% of reserved capacity was allocated to agents different of PEMEX (traders, independent power producers and other end-users). This will facilitate the participation of new actors in the natural gas market.

As of September 5th, 2017, **Pemex has released 32.16% of its total trading volume associated to its client portfolio**.
Geographic Areas of Natural Gas Distribution

**Total Investment**

$2,017 Million dollars

Pipeline network

54,450 km* / 33,834 mi*

**Users**

2,482,376

**Geographic Areas in Operation**

21 geographic areas with 29 permits

**Geographic Areas with Construction permits**

11 geographic areas with 15 permits

**New Geographic Areas**

3 geographic areas with 3 permits in process

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1/ Units in million dollars (USD)
2/ Investment corresponds to Geographic Areas in Operation. Geographic Areas with Construction permits estimate an investment of 42.3 million dollars.

By the end of the first five year period, an investment of 42.3 million dollars is estimated in the Geographic Areas with Construction permits (Sinaloa, Noroeste, Morelia y Occidente) not considered in the total investment.

* / kilometers (km) / miles (mi)
The drop of natural gas production occurs because current market prices do not justify production since 2009, Mexico needs to import natural gas because the demand is larger than the supply.

On July 1st 2017, CRE approved the beginning of the Capacity Reserve Regime and the new Terms and Conditions for PEMEX First-Hand Sales (FHS)

- Since 2009, Mexico needs to import natural gas because the demand is larger than the supply.
- The drop of natural gas production occurs because current market prices do not justify production.

On June 15, 2017, CRE removed the maximum natural gas price subject to FHS*, which will:

- Promote natural gas production of Pemex, and contribute to the mitigation of gas shortages in the south and south-east of the country.
- Increase domestic production from stakeholders other than PEMEX**: as a result of CNH rounds, there are 23 producers different from Pemex, that already have a contract (from which 12 are in the South region).
- Allow different traders from Pemex, that already have import and transport capacity in the SISTRANGAS, to offer natural gas supply alternatives at competitive prices.
- Generate incentives for the development of new transportation, storage, regasification and compression projects that will allow, in the medium term, to have more alternatives to access natural gas.

*The removal of the maximum natural gas price does not mean a total deregulation of the FHS. CRE will continue to regulate the FHS through the Terms and Conditions, as well as the commercialization contract models of Pemex. Also, the following stages of the Gas Release Program will be completed.

**The bidding process of Round 2.4 will occur on January 2018. There are 15 potential areas for the production of natural gas (2 located in the South region).
Power sector planning from 2017-2031 is essential to boost Mexico’s economic competitiveness.

An estimated 55,840 MW of additional capacity will be installed to meet Mexico’s electricity demand towards 2031.

- 63% clean technologies
- 37% conventional technologies

119.5 Billion dollars in the next 15 years

- 81% Generation: 97 billion USD
- 11% Transmission: 12.8 billion USD
- 8% Distribution: 9.6 billion USD

1/ Programa de Desarrollo del Sistema Eléctrico Nacional (PRODESEN) 2017-2031
The Mexican law establishes clean power generation targets

The First and Second Long-Term Auction will contribute to Mexico’s clean energy generation by 1.9% and 3% starting in 2018 and 2019, respectively.

With the Third Long-Term Auction it will be possible to achieve the established goal for 2024.

Renewables have surpassed coal last year to become the largest source of installed power capacity in the world.

Energy Transition Law

<table>
<thead>
<tr>
<th>Year</th>
<th>Conventional Power Generation</th>
<th>Clean Power Generation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>80%</td>
<td>20%</td>
</tr>
<tr>
<td>2018</td>
<td>75%</td>
<td>25%</td>
</tr>
<tr>
<td>2021</td>
<td>70%</td>
<td>30%</td>
</tr>
<tr>
<td>2024</td>
<td>65%</td>
<td>35%</td>
</tr>
<tr>
<td>2030</td>
<td>62.3%</td>
<td>37.7%</td>
</tr>
<tr>
<td>2050</td>
<td>50%</td>
<td>50%</td>
</tr>
</tbody>
</table>
CRE is currently developing a system (S-CEL) to issue, register, track, trade and retire Clean Energy Certificates. The S-CEL aims to ensure compliance among industry players, so Mexico can achieve its national clean energy goals.

CRE is working to incentivize the use of renewable energy sources, with the support of the US Agency for International Development (USAID).

The S-CEL will begin operations in January 2018.

Clean Energy Certificates foster investment and electricity generation based on carbon-free technologies, reducing greenhouse gas emissions.
As a result of the two Long-Term Auctions, 15 states will benefit from the development of new clean energy projects in Mexico.

- 34 companies from more than 10 countries, including Mexico
- 6.6 billion of investment in the coming years

**Maximum Price VS Average Price**

<table>
<thead>
<tr>
<th></th>
<th>First Auction</th>
<th>Second Auction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Price</td>
<td>70 dollars/MWh</td>
<td>90,016 dollars/MWh</td>
</tr>
<tr>
<td>Average Price</td>
<td>48 dollars/MWh</td>
<td>32,258 dollars/MWh</td>
</tr>
<tr>
<td>Saving (%)</td>
<td>31.4%</td>
<td>64.1%</td>
</tr>
</tbody>
</table>

- **Clean Energy Package (Cumulative Energy + CEL)**
  - First Auction: 70 dollars/MWh
  - Second Auction: 90,016 dollars/MWh
- **Clean Energy Package (Cumulative Energy + CEL)**
  - First Auction: 48 dollars/MWh
  - Second Auction: 32,258 dollars/MWh

Increase of 5,000 MW to the current generation capacity in Mexico.
Evolution of average solar prices in auctions, January 2010 - September 2016

Approval of the Energy Transition Law (2015)

“The cost of renewable energy, in the best of cases, is 48% higher than the cost of generating electricity with a combined cycle natural gas plant” - CANACERO¹

The bidding rules for the Third Long-Term Auction and the call for the First Mid-Term Auction were published in May and August, respectively.

For the first time, different buyers others than CFE are able to participate in this process.

Clearinghouse (filter)
Only companies that prove a solid credit quality can buy

It will be possible to buy 3 products: Energy, Certificates of Clean Energy and Capacity

3 companies have applied to be participants as buyers, and 50 as suppliers

CFE’s buying offer: Energy: 5.5 million MWh/year Clean Energy Certificates: 5.5 million Capacity: 1,288 MW/year

According to the Ministry of Energy (SENER), with the Third Auction, the goal of 35% generation from clean energy in 2024 will be achieved.

The Mid-Term Auction will reduce vulnerability towards mid-term price volatility.

First Mid-Term Auction

Buyers and suppliers
Will be able to execute contracts of electrical coverage for 3 years maximum

It will be possible to buy 2 products: Energy and Capacity

The offered energy, will be set by the stakeholders, according to their commercial strategies and needs

Final Ruling: February, 2018

Final Ruling: November 22, 2017
CRE is currently working with NERC and CENACE to develop shared grid reliability protocols to strengthen energy security on both sides of the border.

Due to the close bilateral relationship between both countries, Mexico supported the U.S. during the power outage in California in 2011. In return, the U.S. supported Mexico in 2016, when there was also a power outage in Baja California.

11 interconnection points with the US

**Voltage**
- 40 kV
- 230 kV
- 115 kV
- 161 kV, 138 kV and <34.5 kV

Substation

Source: PRODESEN (2017)
Following the recommendations issued by OECD in the report "Driving Performance of Mexico’s Energy Regulators", CRE, ASEA and CNH have developed effective communication and coordination mechanisms.

An example, is the creation of the **Energy Sector Regulators System** which has the following initiatives:

1. **The “2017-2022 Strategy of the Energy Sector Regulators System”** to align the planning efforts of the three agencies.
2. **A “Decalogue of Smart Regulation”** which establishes general guidelines for the elaboration of regulatory instruments.
3. **A joint risk-based inspection pilot.**
4. **The establishment of a Coordinated Assistance Office in each of the regulator’s premises.**
5. **An Interagency Visiting Program** for knowledge exchange and specialization of human resources.

In this regard, CRE will adopt a **“Life Cycle”** approach that will follow up on the permit projects, in order to:

- Increase transparency
- Promote citizen participation
- Provide information for decision making
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Mexico’s Energy Regulatory Commission:
Challenges and Opportunities in Reforming the
Energy Industry

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November 14th, 2017
Houston, Texas
Analysts agree that within a reconfiguration of NAFTA, Mexico and its North American Partners will share the basis for more cooperation in the energy sector.

- Technology exchange
- Investment options
- Capacity building
- Cooperation in climate change
- Sharing of industrial best practices
- Increased trade flows and complementarity
- Strengthen the regulatory coordination in North America
- Encourage infrastructure development

The implementation of the Energy Reform fosters the access of new competitors to the natural gas market. The previous single supplier model is left behind in order to open to competitiveness.

The Gas Release Program is an asymmetric regulation instrument that has 3 phases in order for Pemex TRI, in a maximum period of 4 years, to release 70% of its market share to third party traders of natural gas.

At the end of Phase I of the Gas Release Program, Pemex has released 32.16% of the total volume associated to its trading portfolio (10.86% larger than expected).

<table>
<thead>
<tr>
<th>Phase I</th>
<th>Phase II and III (Final phase)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume of market share that Pemex TRI had</td>
<td>100%</td>
</tr>
<tr>
<td>Raffle selection:</td>
<td></td>
</tr>
<tr>
<td>31.04%</td>
<td>21.30%</td>
</tr>
<tr>
<td>Volume of trading contracts that Pemex TRI maintains:</td>
<td></td>
</tr>
<tr>
<td>Results of phase I:</td>
<td>32.16%</td>
</tr>
<tr>
<td>Volume of contracts subject of releasing</td>
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</tbody>
</table>

On February 1st, 2017, through a raffle, the contracts that will remain with Pemex TRI (31.04%) and those subject of releasing in Phase I (21.30%) were selected.

The results of Phase I of the Gas Release Program, complement the results of the Open Season of SISTRANGAS strengthening the market.

On Phase I of the Gas Release Program the electricity sector had a major role in the released contracts, which reinforces the electricity-natural gas bundle.
Since August 17, 2017, CRE is publishing on a monthly basis the National Natural Gas Wholesale Price Index (NGWP), which’s objective is to provide information to the natural gas market in an indicative way.

The NGWP is an average Price, weighted by volume, that considers monthly sales made by different natural gas traders in the Mexican market. It portrays the prices charged in the previous month.

Is an index of national scope that is built based on the monthly information reported by natural gas traders.

Is a reference price for voluntary use.

Is built according to the best international practices.

Next steps: expand the availability of Price indexes

Have a disaggregated index per region, that reflects the characteristics of the different markets in the country.

Have indexes that reflect the actual conditions under which transactions are agreed on, considering future dates for the delivery of the molecule.

Future vision

Indexes published by CRE will have a temporary character. Forthcoming, it is expected that private agencies become the providers of the reference index prices to the market.
CRE has published online tutorials and initiated a workshop program to explain the application process and issuance of permits. Obtaining a permit is easy, fast and transparent.

**Proceedures and Online Services**

Format for requesting hearings

16 working days, on average, to hold a hearing.
To enrich all conversations by streamlining gender perspective in all the Forum’s activities, which will include some of the more powerful female voices in the energy sector.

To present a diverse and multicultural group of experts, making sure every region is represented and both developed and developing perspectives are heard.

To include in the different sessions key players from diverse backgrounds to discuss how innovations are currently transforming the fundamentals of the entire energy value chain.
More than 80% of speakers and moderators have already confirmed
4 PMG

D0

Tuesday March 20, 2018
4 activities
9 – 19h

Registration

1st Steering Committee Meeting
ICER- WFER

Regulatory Training Day

Welcoming cocktail

D1

Wednesday
March 21, 2018
7 activities
9 -18:30h

Opening
Welcome address

Plenary session

Concurrent sessions I

Lunch
HLCRT (1-2)

Concurrent sessions II

WIE event

2nd Steering Committee Meeting ICER

D2

Thursday
March 22, 2018
7 activities
9-22h

Plenary session

ICER award

Concurrent sessions III

Lunch
HLCRT (3-4)

Concurrent sessions IV

Keynote I

Gala Evening

D3

Friday
March 23, 2018
5 activities
9-15:30h

Concurrent sessions V

Keynote II

Plenary session

Closing ceremony & Farewell reception

ICER working groups

HLCRT: High Level Commissioner Round Table.