MEXICO’S ENERGY REFORM

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HISTORICAL POLITICAL ACHIEVEMENT
In 2012, Mexico’s energy sector was showing serious signs of strain, despite Energy reform of 2008 and growing investment:

- **Declining** oil and gas production.
- Increasing **power production costs**.
- Stagnant **investment** in renewables.
- **Ageing infrastructure** and limited investment.
- Limited **technological development**.
- Widening **human resources gap**.
- Increasing **dependency on natural gas and oil products imports**.

• Average rates: 25% higher than in the US
• Without subsidies: difference would be 73%
• Subsidies equal to 0.75% of GDP

Sources: Sistema de Información Energética (Mexico), Energy Information Administration (USA)
Electoral commitment: Energy reform to reduce electricity rates

- Energy Security
- Promote clean energies, comply with climate change commitments
- Attract investment and state of the art technology
- Optimize the use of oil revenues
- Boost economic growth
- Job creation
- Competitiveness of Mexican economy
Mexico’s New Energy Model

State-Owned Monopoly → Open and Competitive Markets

Hydrocarbons belong to the Nation
Rule of Law
Stronger Institutions
Sustainability
Transparency
# New Legal Framework and Institutional Arrangement

<table>
<thead>
<tr>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3</strong></td>
<td><strong>22</strong></td>
</tr>
<tr>
<td>Articles of the Constitution</td>
<td>Laws</td>
</tr>
</tbody>
</table>

Arts.: 25, 27 y 28
10 new
12 amended

- **ISO**
- **CENAGAS**
- **CNH**
- **PEMEX**
- **CENACE**
- **CRE**
- **CFE**
- **ASEA**
- **FMP**

**Industrial Safety and Environmental Protection**

**Oil Revenues Administration**
ENTITLEMENTS (ASIGNACIONES)

CONTRACTS

UPSTREAM
PEMEX can partner up with other companies to access capital and technology through associations that require a bidding process conducted by the State.
Mexico’s new upstream contracting model is designed to:

- Attract **investment**
- Facilitate access to **state of the art technology**
- **Balance risks** as we move into frontier fields
- Awarded through bidding process

Concessions are banned by the Mexican Constitution.
ROUND ONE

FIRST APPROACH, ANNOUNCED AUGUST 13, 2014
1st Bid: Exploration in Shallow Waters
• Production Sharing Contract
• 2 contracts awarded on July 15, 2015
• First oil: 2019
• Peak production: 79 Mboed
• Estimated Investment: 2.7 billion USD

2nd Bid: Extraction in Shallow Waters
• Production Sharing Contract
• 3 contracts awarded on Sept. 30, 2015
• First oil: 2018
• Peak production: 124 Mboed
• Estimated Investment: 3.1 billion USD

3rd Bid: Extraction in Onshore Fields
• License Contract
• 25 contracts awarded on Dec. 15, 2015
• First oil: 2016-2017
• Peak production: 77 Mboed
• Estimated Investment: 1.1 billion USD

Mboed: thousand barrels of oil equivalent per day.
Round 1.4
Bidding Dec. 5, 2016

8 CONTRACTS AWARDED

34 BILLION USD
EXPECTED INVESTMENT

- CNOOC
- Total-Exxon Mobil
- Statoil-BP-Total
- Chevron-Pemex
- Petronas-Sierra Oil&Gas
- Murphy-Ophir-Petronas-Sierra O&G.
**PEMEX can partner up with other companies through farm-outs to access the capital and technologies required to develop advanced projects.**

- First farm-out
- First tie offer

**BHP Billiton will partner with Pemex in Trión.**
1st Bid: Exploration and Extraction in Shallow Waters
- Production Sharing Contract
- 15 contracts
- Awarding: March 2017

2nd Bid: On-Shore Exploration and Extraction
- License Contract
- 12 contracts
- Awarding: July 2017

3rd Bid: On-Shore Exploration and Extraction (small fields)
- License Contract
- 14 Contracts
- Awarding: July 2017
**INCREASING THE AVAILABILITY OF GEOLOGIC INFORMATION**

- Creation of the **National Center of Hydrocarbons Information** (CNIH)
- Registry of authorized surface exploration companies

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43 AUTHORIZED RECOGNITION AND SURFACE EXPLORATION PROJECTS

2.4 TIMES THE AVAILABLE 3D WAZ SEISMIC DATA

2 BILLION USD

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* Authorizations for Recognition and Surface Exploration granted by CNH.
The **Mexican Petroleum Fund** is designed to **optimize the use of Mexico’s oil revenue** following unprecedented transparency and accountability standards, contributing to the **stabilization of Mexico’s public finances**, and fostering **industrial and human development** in the **medium and long term**.

**OIL REVENUE**

- **Federal Budget (4.7% GDP)**
- **Long term savings**

When saving exceed 3% of GDP, up to 60% of the surplus will be spent in:

- **Universal Pension Fund** (10%)
- **Research and Development** (10%)
- **O&G projects and Infrastructure** (30%)
- **Scholarships, Connectivity Projects, Regional Development** (10%)

- First transfers from Pemex: January 2015.
- First payments derived from Round One: October 2015.

Financial information related to the Mexican Petroleum Fund is available at: [www.fmped.org.mx](http://www.fmped.org.mx)
CREATING ENERGY MARKETS

- Electricity Market
- Natural Gas Market
- LPG Market
- Gasoline Market
CENAGAS
INDEPENDENT SYSTEM OPERATOR

LIBERALIZATION OF NG MARKETS

NEW PRICE REFERENCES

NATURAL GAS
According to the Gas Pipelines Five Year Plan* Mexico will have the following infrastructure by 2019:

- **10 New strategic gas pipelines**
- **2 Social coverage pipelines**
- **5 new interconnections with the USA**
- **9 Bcf import capacity** (currently at 5 Bcf)

**Estimated Investment:**

**16 billion USD**

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** Excluded from the Five Year Plan

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**Merchant pipelines can be developed through permits at investors own cost and risk.**

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Mid & Downstream

Increasing demand for fuels

Liberalization of imports

Open access to infrastructure
Maximum prices scheme open to adjustments based on international prices development. Prices defined by the market.

Imports: Pemex

Interested parties can import LPG

The implementation of a focalized support program aimed at low income sectors.
The variety of **North American crudes** (light and sweet vs. heavy and sour) allows for the optimization of **existing regional refining infrastructure** to fulfill the current and growing demand for fuels and other oil derived products.

**Mexico imports:**
- Petrochemicals 75%
- Gasolines 53%
- Diesel 38%
- Jetfuel 34%
- LPG 36%
- Natural gas 40%

**Storage baseline:**
- 77 Storage and Distribution Terminals
- 5 Maritime Operation Terminals
- Nominal capacity: 30.5 Million barrels
- Useful capacity: 23.7 Million barrels
DEREGULATION OF FUEL PRICES THROUGH OUT 2017

Etapas de la estrategia de flexibilización del mercado de gasolinas y diésel

15-FEB-2017
30-MAR-2017
- Baja California
- Sonora

14-SEP-2017
30-OCT-2017
- Baja California Sur
- Durango
- Sinaloa

15-NOV-2017
30-DIC-2017
- Campeche
- Quintana Roo
- Yucatán

1-MAY-2017
15-JUN-2017
- Chihuahua
- Coahuila
- Nuevo León
- Tamaulipas
- Municipio de Gómez Palacio, Durango

16-OCT-2017
30-NOV-2017
- Aguascalientes
- Ciudad de México
- Colima
- Chiapas
- Estado de México
- Guanajuato
- Guerrero
- Hidalgo
- Jalisco
- Michoacán
- Morelos
- Nayarit
- Puebla
- Querétaro
- San Luis Potosí
- Oaxaca
- Tabasco
- Tlaxcala
- Veracruz
- Zacatecas

* El precio mayorista regulado se eliminará el mismo día que ocurra la flexibilización de precios al público.
Power Sector

Wholesale Power Market

Independent System Operator

Energy Transition Law
MEXICO’S WHOLESALE POWER MARKET

Generation

System Control and Power Market

Retail

Consumption

Short Term Transactions

Spot Market

Unregulated Supply

Qualified Users

Basic Service Users

Long Term Contracts

Auctions

Regulated Supply

CFE Subsidiary “A”

CFE Subsidiary “B”

CFE Subsidiary “C”

Private Parties

Long Term Contracts

Transmission

Distribution

CFE and Contracts

CFE and Contracts
Clean Energy Potential

Clean Energy Goals:
35% in 2024, 40% in 2035 and 50% in 2050

<table>
<thead>
<tr>
<th>Renewable Energy Potential</th>
<th>Actual Generation Year 2013 (% of total GWh)</th>
<th>Actual Generation + Proven Resources</th>
<th>Actual Generation + Proven Resources +Probable Resource</th>
<th>Actual Generation + Proven Resources +Probable Resources +Possible Resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind</td>
<td></td>
<td>1.4%</td>
<td>5.3%</td>
<td>5.3%</td>
</tr>
<tr>
<td>Geothermal</td>
<td></td>
<td>2.0%</td>
<td>2.2%</td>
<td>22.5%</td>
</tr>
<tr>
<td>Solar</td>
<td></td>
<td>0.01%</td>
<td>0.6%</td>
<td>0.6%</td>
</tr>
<tr>
<td>Mini Hydro</td>
<td></td>
<td>0.5%</td>
<td>1.7%</td>
<td>9.5%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>4.0%</td>
<td>9.9%</td>
<td>37.9%</td>
</tr>
</tbody>
</table>

Installed Capacity 2º semester 2014 (MW):
- Wind: 1,900
- Geothermal: 823
- Solar: 64
- Mini Hydro: 419
- Total: 3,206

Solar Resources

Wind Resources

Geothermal Resources
## Market Features

<table>
<thead>
<tr>
<th>Market</th>
<th>Periodicity</th>
<th>Market Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy and Ancillary Services</td>
<td>Daily, Hourly</td>
<td>Cost Based</td>
</tr>
<tr>
<td>Capacity</td>
<td>Yearly</td>
<td>Administered</td>
</tr>
<tr>
<td>Clean Energy Certificates</td>
<td>Yearly</td>
<td>Unrestricted offers</td>
</tr>
<tr>
<td>Financial Transmission Rights</td>
<td>Yearly / Monthly</td>
<td>Unrestricted offers</td>
</tr>
</tbody>
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### Auctions and Long Term Contracts

- CRE will set requirements for retailers to contract forward energy and associated products.
- Basic Service Retailers may only contract forward through auctions operated by CENACE.
Investment by source

Clean Energy: Solar & Wind

Approx. 6.6 billion dollars of total investment.

15 states with investment in new projects.
INTERNATIONAL COMPARISON

**Solar**
- Brazil
- France
- Germany
- India
- Jordan
- 1st Mexican Auction
- 2nd Mexican Auction
- Peru
- Saudi Arabia
- South Africa

**Wind**
- Australia
- Brazil
- 1st Mexican Auction
- 2nd Mexican Auction
- Peru
- South Africa
- United Kingdom

**Solar. Assigned Capacity (MW), 2016**
- 1st & 2nd Mexican Auctions: 3,483
- United Arab Emirates: 800
- Peru: 184
- India: 100

**Wind. Assigned Capacity (MW), 2016**
- 1st & 2nd Mexican Auctions: 1,406
- Australia: 200
- Peru: 162
CAPTURING MEXICO’S GEOTHERMAL POTENTIAL: SPECIFIC LAW AND GEOTHERMAL BIDDING ROUND

BEFORE THE REFORM
(1959 - 2014)

ONLY 4 GEOTHERMAL FIELDS IN OPERATION
1 GENERATOR IN 4 STATES

AFTER THE REFORM
(2014 - 2015)

4 + 2 EXPLOITATION CONCESSIONS
50% INCREASE
15 EXPLORATION PERMITS
11 FILED REQUESTS UNDER EVALUATION
4 GENERATOR IN 10 STATES
25,000 km expansion of the national transmission network:
- Total Interconnection
- Interconnection with North and Central America

**Required Investment in the Next 15 Years**
(Generation, Transmission and Distribution)

131.6 Billion US Dollars
Energy reform will generate 135,000 new direct jobs.

*Human Resources Development Program to:*

- Inform decision making processes.
- Provide qualified personnel (technical level).
- Talent that generates knowledge (R&D, senior management).
- Attract and retain talent within the energy sector.

- Scholarships: 60 thousand by 2018.
- Global partnerships (Universities, Research Institutes, Companies)
Investment in R&D:

Strengthening of existing institutes:

✓ Instituto Mexicano del Petróleo

✓ Instituto Nacional de Electricidad y Energías Limpias

Creating Centers for Clean Energy Innovation (CEMIEs)

✓ 5 centers have been created: solar, wind, geothermal, biofuels, wave energy.
✓ New centers are being created

Investing in R&D:

100 Millions pesos invested in R&D

Mission Innovation commitment to double investment.
MEXICO’S ENERGY REFORM: CHALLENGES AHEAD

1. Increase O&G production and availability of refined products
2. Succeed in the creation of competitive markets
3. Implement a security of supply policy
4. Strengthen PEMEX and CFE
5. Succeed in the social licensing of projects
6. Generate benefits at the local level
7. Develop value chains to supply the energy sector
8. Widen Public understanding and acceptance of the Reform