



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

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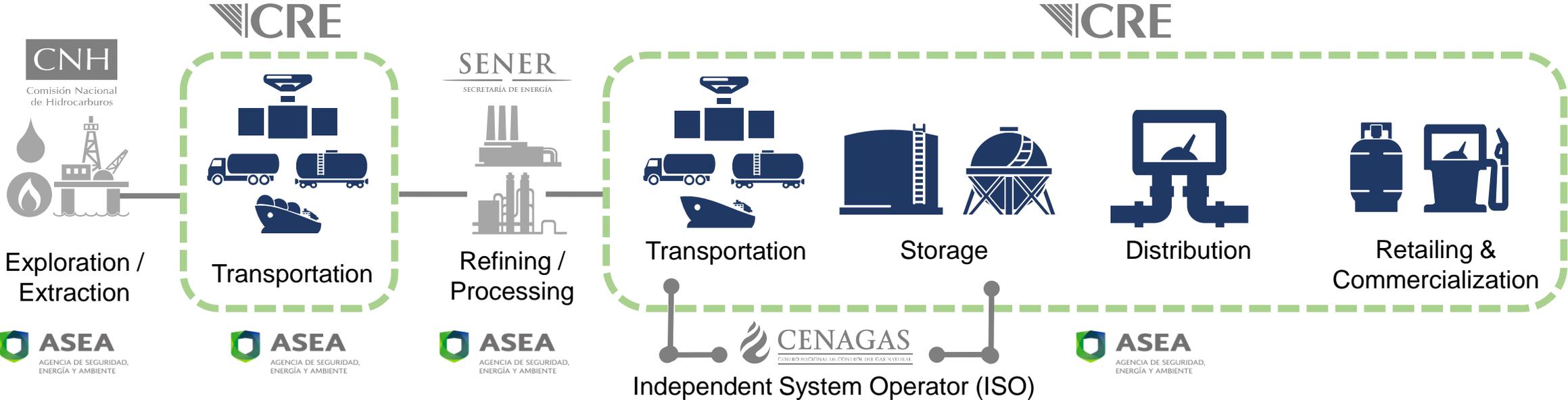
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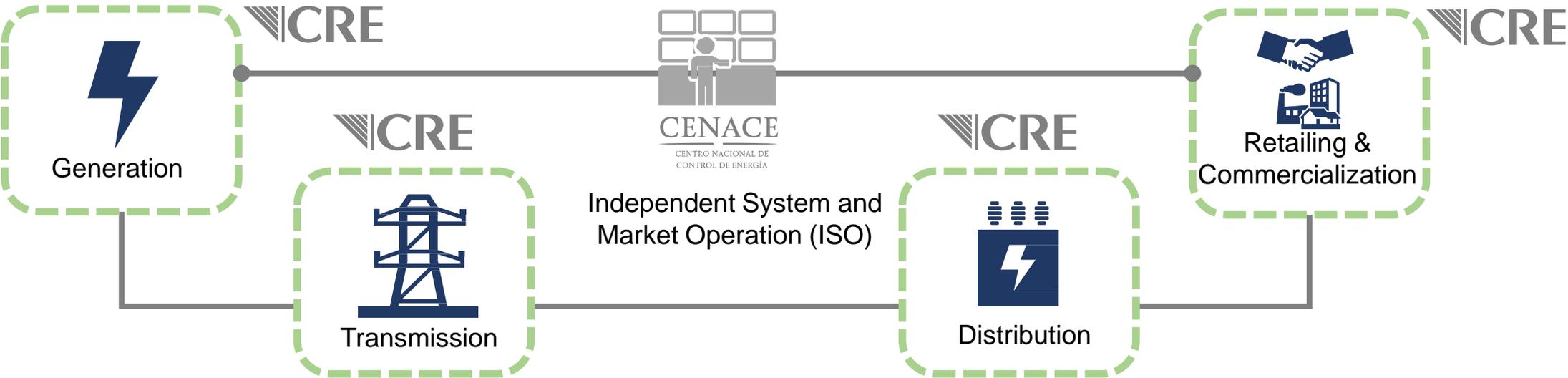
# The Energy Regulatory Commission (CRE) has become the regulator of the mid and downstream segments of the oil and gas value chain, as well as the electricity supply chain



Hydrocarbons



Electricity



# 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 129 companies from 18 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:  
**251 billion dollars**



## Hydrocarbons "Rounds One and Two"

### Round 1:

- 1<sup>st</sup> Tender: **2.7** billion USD
- 2<sup>nd</sup> Tender: **3.1** billion USD
- 3<sup>rd</sup> Tender: **1.1** billion USD
- 4<sup>th</sup> Tender: **34.4** billion USD
- Trión: **11** billion USD

### Round 2:

- 1<sup>st</sup> Tender: **8.2** billion USD
- 2<sup>nd</sup> Tender: **1.1** billion USD
- 3<sup>rd</sup> Tender: **1.0** billion USD
- 4<sup>th</sup> Tender: **31.5** billion USD

**Seismic data:** 2.5 billion USD



## Natural Gas and Petroleum Products

Gas pipelines: **12** billion USD

Petroleum Products: **16.8** billion USD

- Transportation and Storage: **4.8** billion USD
- Distribution and Retailing: **12.0** billion USD



## Power Sector

First Power Auction: **2.6** billion USD

Second Power Auction: **4.0** billion USD

Other in PRODESEN\*:

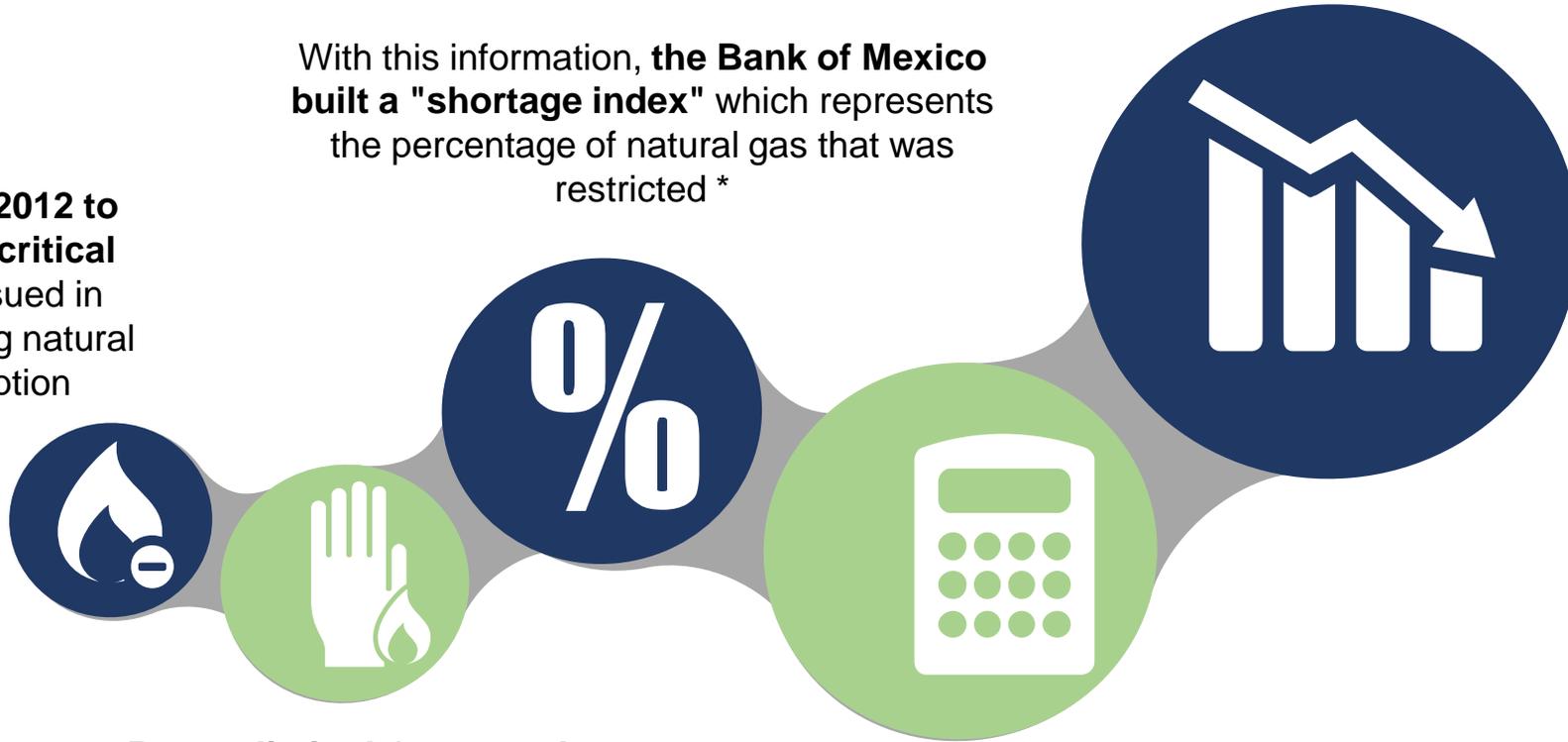
- Generation: **97** billion USD\*
- Transmission: **12.8** billion USD\*
- Distribution: **9.6** billion USD\*

A total of **129 companies** from **18 countries**, of which **51 are Mexican**, have committed projects for the development of hydrocarbons and electricity industry

# 51 months have passed since the last critical alert on record restricted natural gas consumption in the country

From **January 2012 to June 2013**, **35 critical alerts** were issued in Mexico, curtailing natural gas consumption

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

**Pemex limited the natural gas** volumes used by the manufacturing sector

The impact of natural gas shortage on the manufacturing sector and the national GDP **was quantified** \*

Source:  
 BANCO DE MÉXICO

# Mexico's Gas Pipeline Network will expand considerably from 2012 to 2019



**12**  
Billion dollars

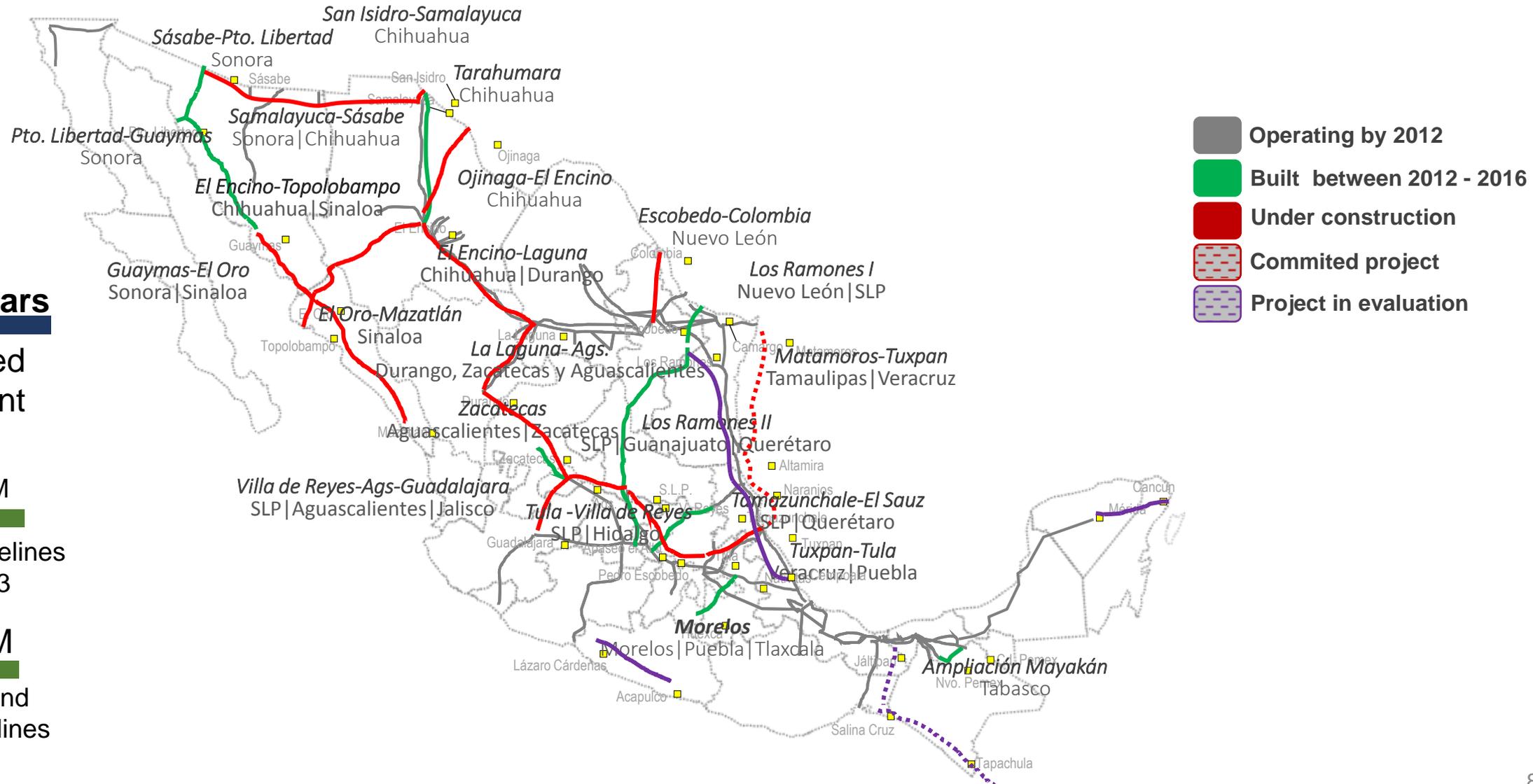
Committed investment

**7,586** KM

Committed pipelines since 2013

**2,386** KM

Committed and operating pipelines



# Prior to the Reform, Mexico's fuel retail model generated significant inefficiencies:



## Fixed Price Regime

- National single price (prevented adequate cost recognition on a regional basis)
- Fluctuations of international prices were reflected with a delay
- Lack of efficient price signals resulted in underinvestment throughout the value chain
- The excessive subsidy benefited the population with the highest income (200 billion pesos per year)



## Pemex did not recover logistical costs

- Pemex lost resources for unacknowledged logistical costs in the overall gas price



## Underinvestment in the industry

- Limited infrastructure: low capacity and vulnerability (extreme weather events)
- Mexico accounts only with 10% (3 days) of the internationally recommended inventory capacity
- Lack of incentives to improve service quality in gas stations
- 40% of municipalities do not have gas stations

# Fuel price liberalization strategy in Mexico

Price Liberalization

**MAR-30th-2017**

- Baja California
- Sonora

**OCT-30th-2017**

- Baja California Sur
- Durango
- Sinaloa

**NOV-30th-2017**

- |                    |              |                   |             |
|--------------------|--------------|-------------------|-------------|
| • Aguascalientes   | • Guanajuato | • Morelos         | • Oaxaca    |
| • Ciudad de México | • Guerrero   | • Nayarit         | • Tabasco   |
| • Colima           | • Hidalgo    | • Puebla          | • Tlaxcala  |
| • Chiapas          | • Jalisco    | • Querétaro       | • Veracruz  |
| • Estado de México | • Michoacán  | • San Luis Potosí | • Zacatecas |

**JUN-15th-2017**

- Chihuahua
- Coahuila
- Nuevo León
- Tamaulipas
- Municipio de Gómez Palacio, Durango

**DEC-30th-2017**

- Campeche
- Quintana Roo
- Yucatán



# 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<sup>1</sup>

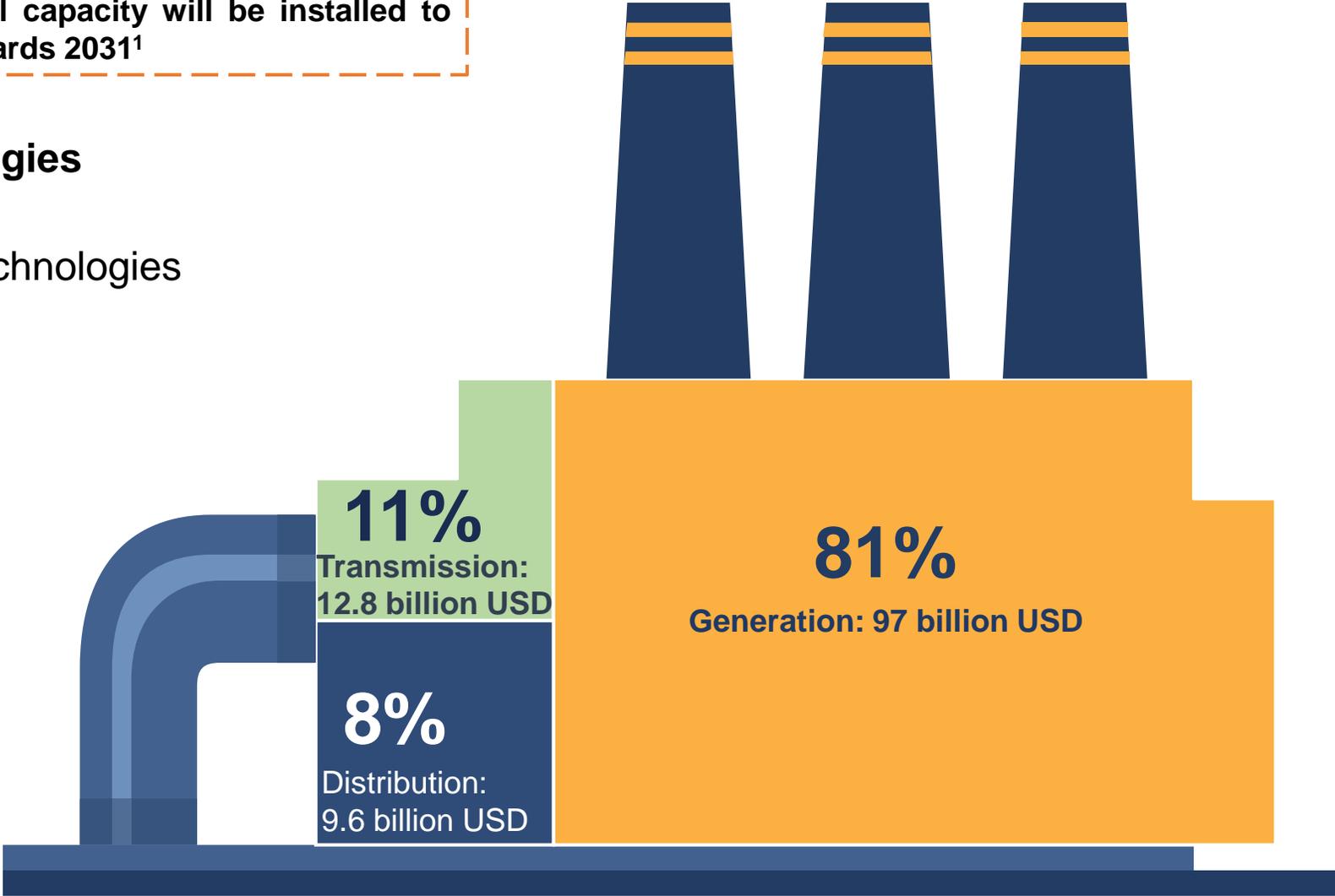


63% clean technologies



37% conventional technologies

  
**119.5**  
**Billion dollars**  
in the next 15 years



1/ Programa de Desarrollo del Sistema Eléctrico Nacional (PRODESEN) 2017-2031

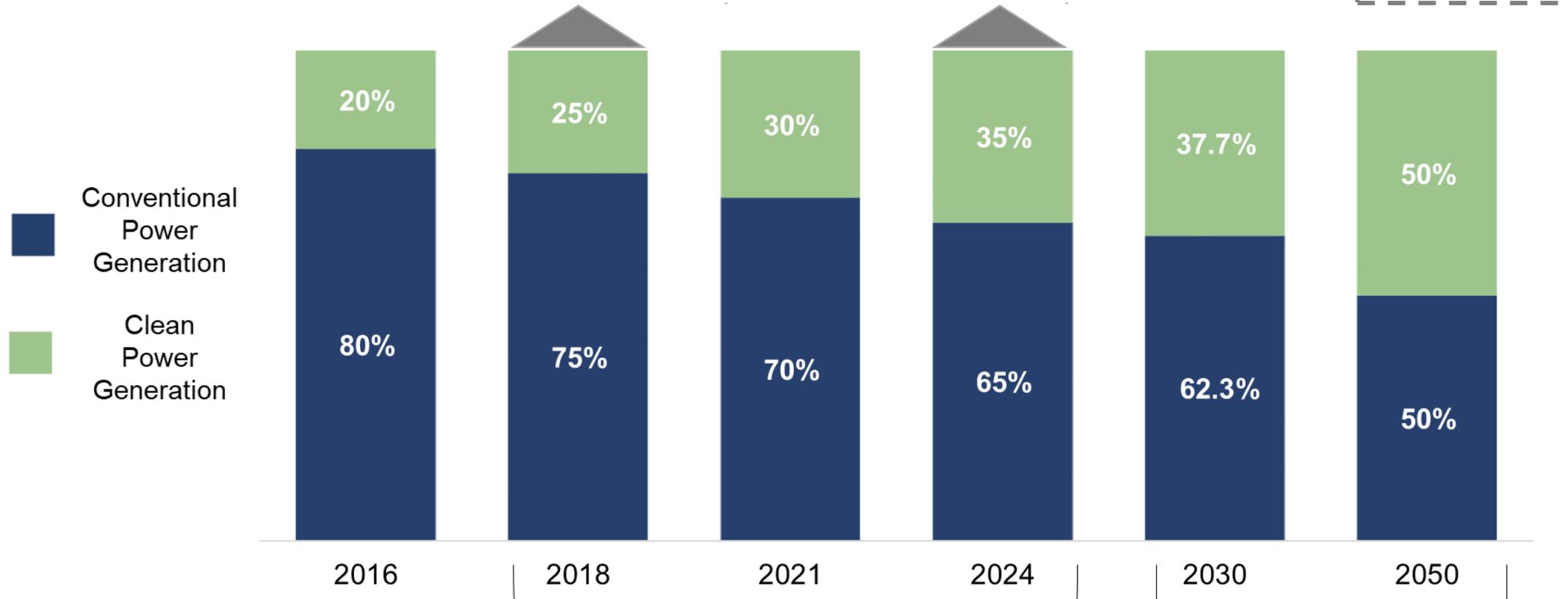
# The Mexican law establishes clean power generation targets



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.**



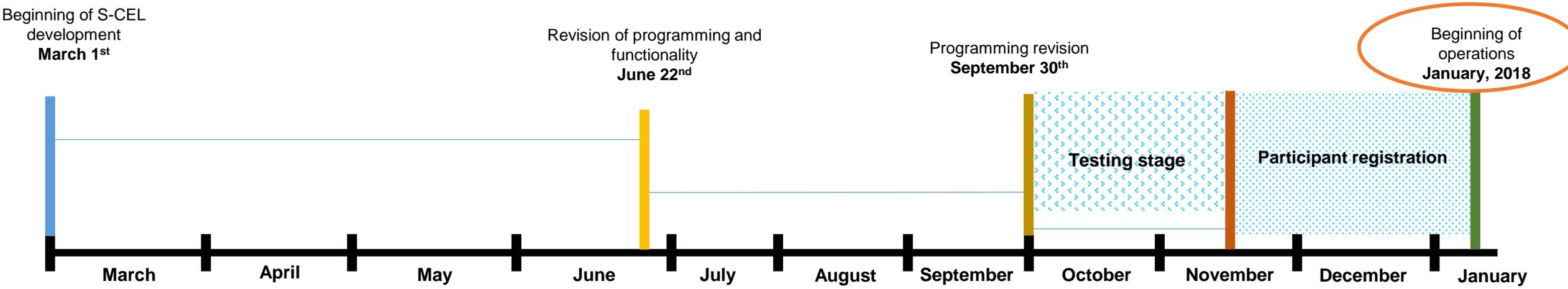
Energy Transition Law

Transition Strategy to Promote the Use of Cleaner Fuels and Technologies

# As of 2018, CRE will operate the Clean Energy Certificate Tracking System (S-CEL), which will ensure the compliance of overall renewable generation targets

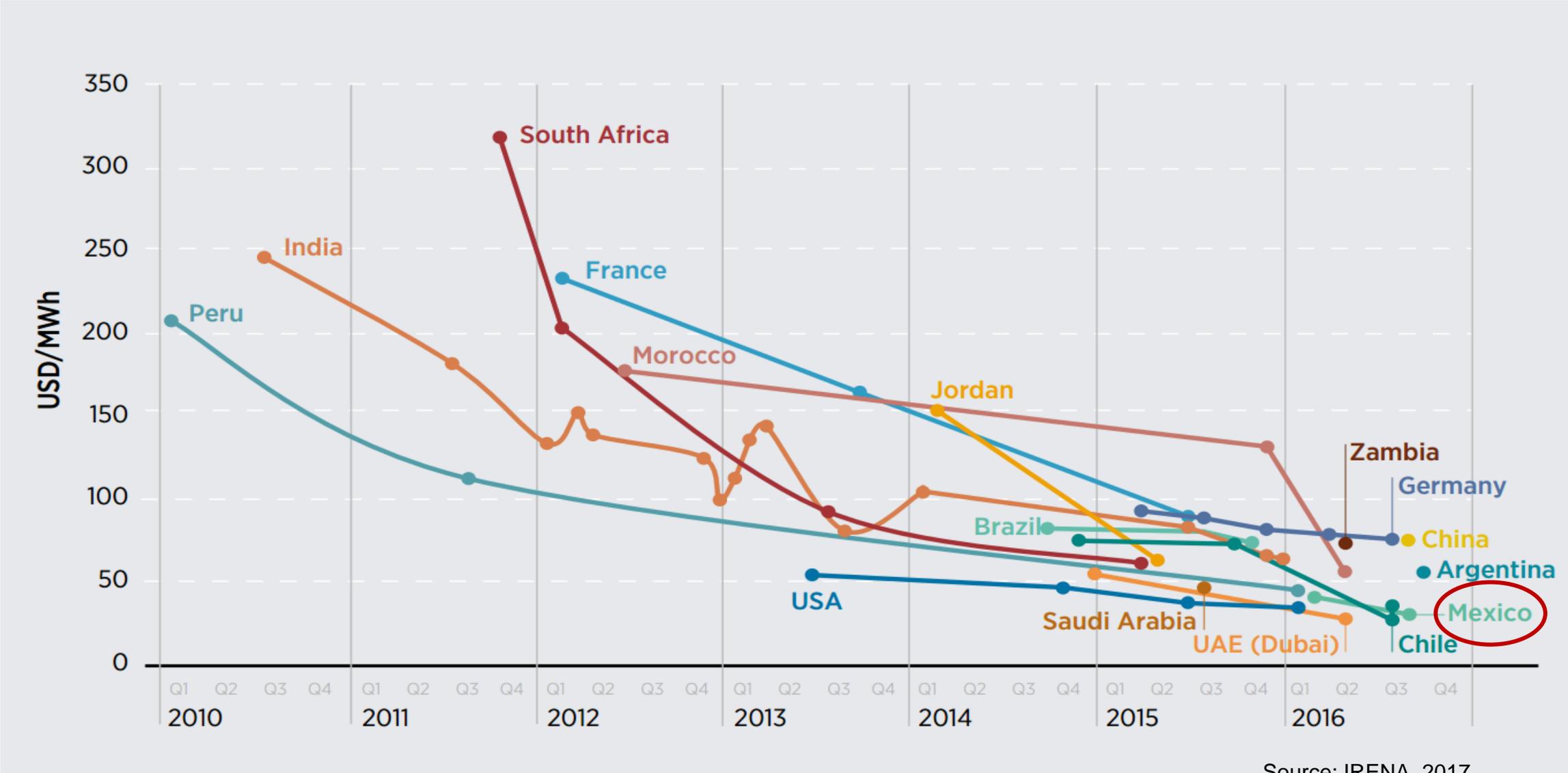


This system is being developed with the support of the MLED II Program and **it will begin operations in January 2018**



Clean Energy Certificates **foster investment** and electricity generation based on carbon-free technologies, **reducing greenhouse gas emissions**

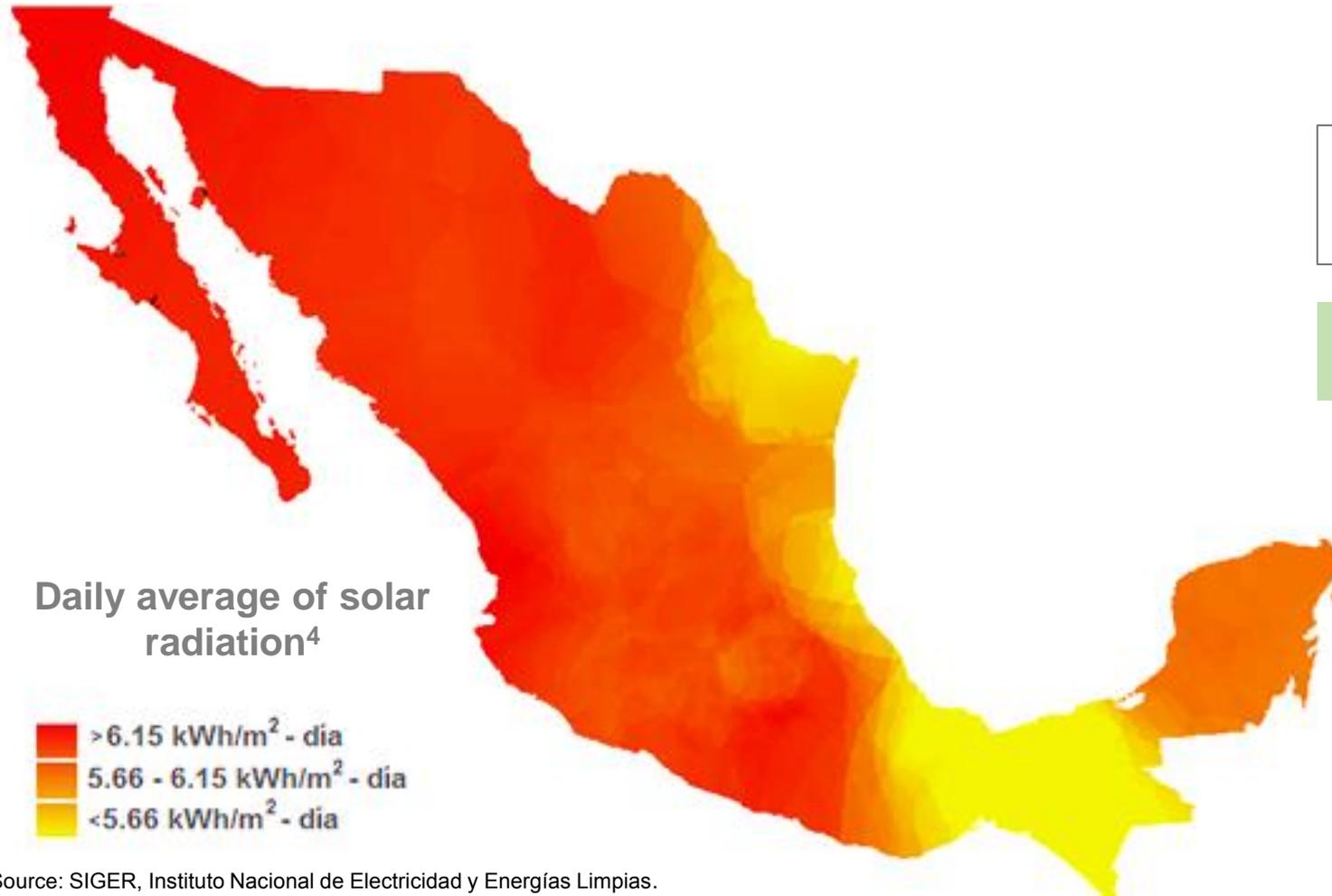
# Evolution of average solar prices in auctions, January 2010 - September 2016



Source: IRENA, 2017

1/ CANACERO (2015). Recovered from: <https://www.elcontribuyente.mx/noticia/1110/-ley-de-transicion-energetica-afectara-inversiones-dice-ip>

**Mexico has a significant, constant and highly predictable solar potential: a medium annual irradiation of approximately 5.5 kWh/m<sup>2</sup> per day**



**Leaders of solar capture in Europe\*:**

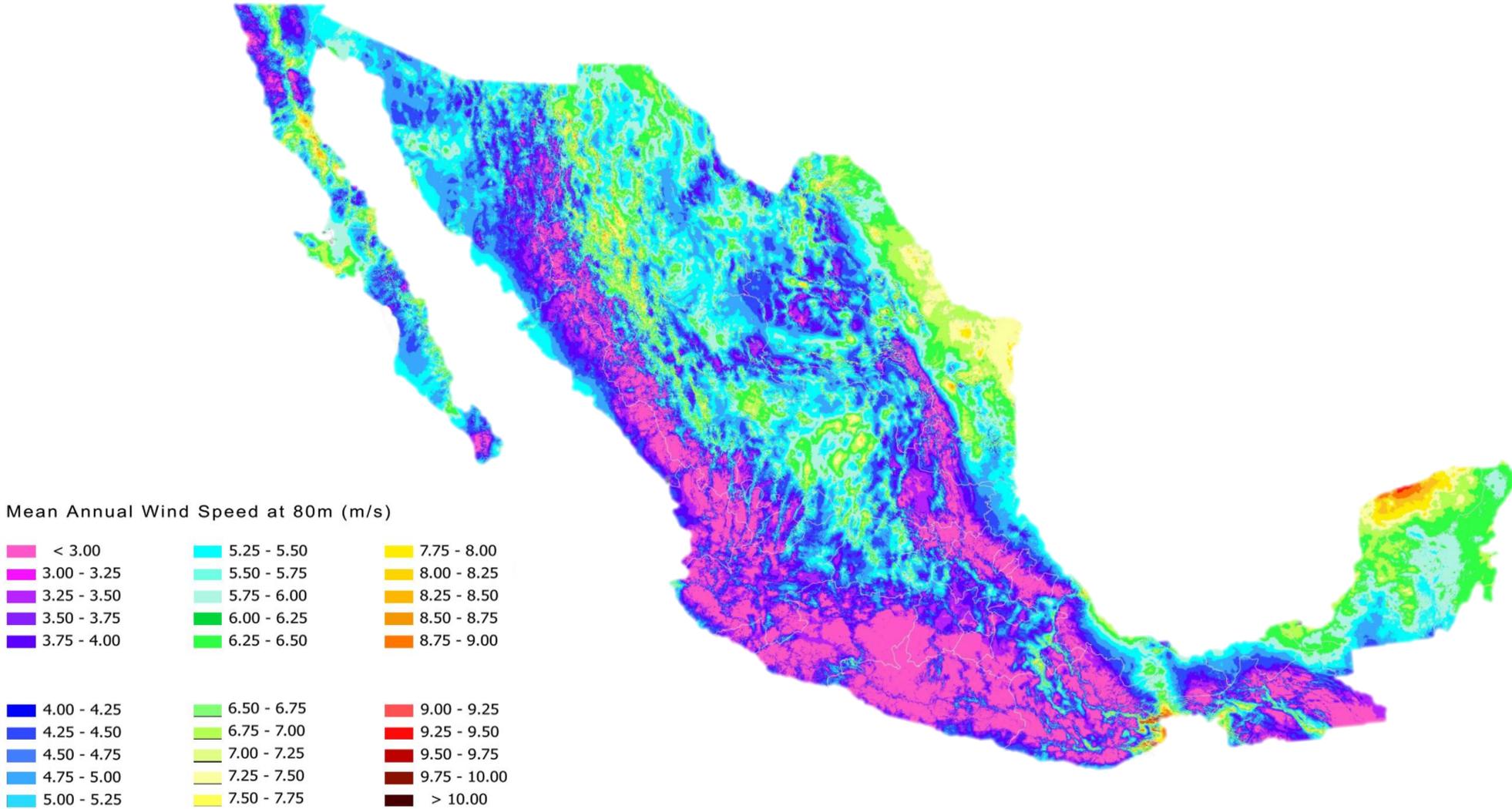
- **Sevilla** with 4.7 kWh/m<sup>2</sup>
- **Leipzig** with 2.7 kWh/m<sup>2</sup>

- **Astana** has an average irradiation of 3.6 kWh/m<sup>2</sup> per day<sup>1</sup>

Source: SIGER, Instituto Nacional de Electricidad y Energías Limpias.

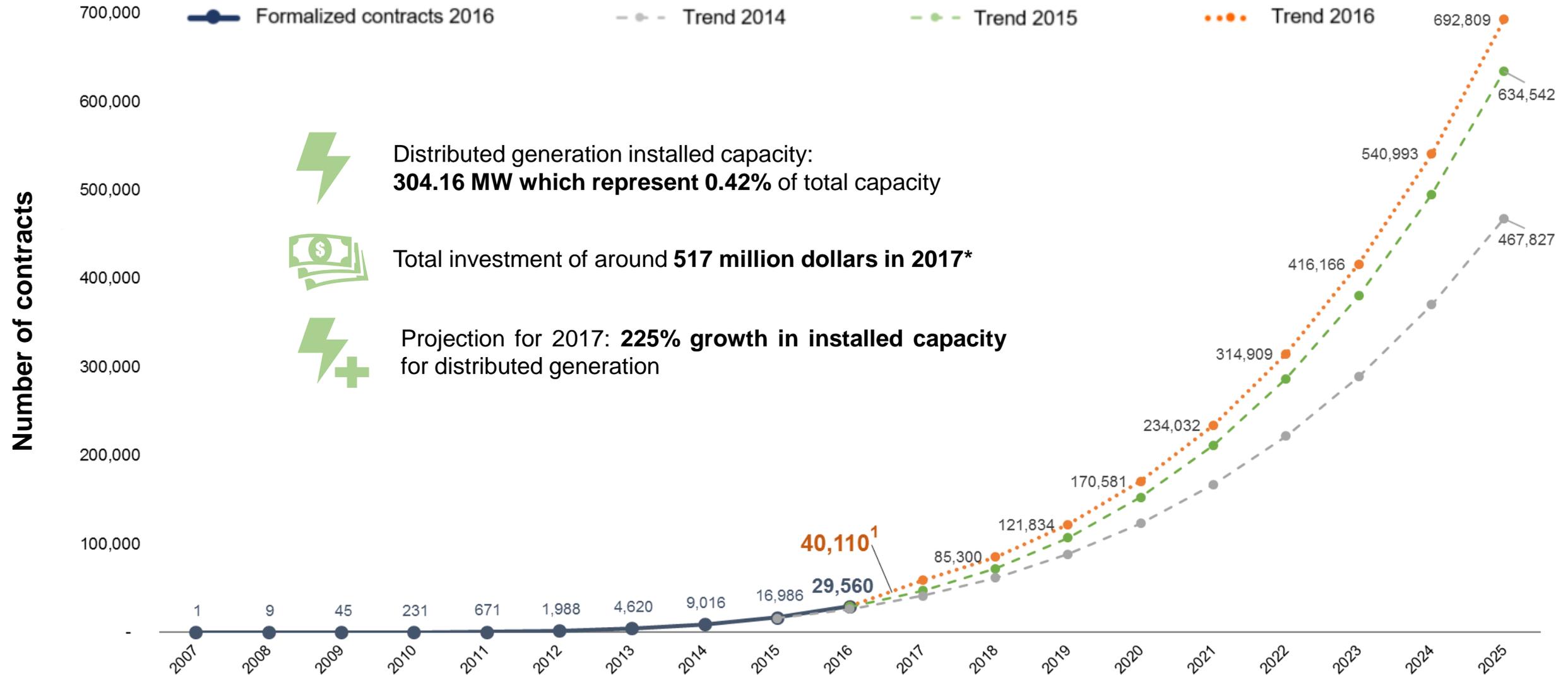
\*Sistema Geográfico de Información Fotovoltaica de la Comisión Europea.  
1: Solargis (2014). Recovered from: <http://solargis.com/products/maps-and-gis-data/free/download/kazakhstan>

Mexico also has competitive wind capacity factors, ranging from 35% to 40%



Source: International Energy Agency, "Next Generation Wind and Solar Power", 2016: <https://www.iea.org/publications/freepublications/publication/next-generation-wind-and-solar-power.html>

# In March 2017, CRE issued a new set of regulations fostering the sustainable integration of distributed energy resources nationwide



\*Considering an average investment of 1.7 million dollars per MW of installed capacity, according to Bloomberg  
 1/ Elaborated with information provided by CFE. Preliminary data up to December 31<sup>st</sup>, 2016.

# Energy storage can deliver tangible benefits across the energy value chain. Hence, CRE is working along with other institutions towards the development of a storage-friendly market environment in Mexico



**Energy Transition Law (2015)**  
Includes storage as a strategic new technology



The **Market Rules (2015)** and the **Capacity Market Manual (2016)** comprise storage as a generator and contain the requirements for this technology to be considered in the firm capacity market



**The market potential in Mexico is estimated in 2,333 MW under a 10 year forecast\***



The **Electric System Development Program (PRODESEN) 2015-2029** contains a battery storage project (Baja California Sur, 20 MW installation)



**Distributed Energy Resources Regulation (2017)**  
Includes storage as a figure acknowledged by CRE

On CRE's side, what is needed is a **regulation that recognizes all the services and benefits that storage can bring to the electricity system and that bases its remuneration on that value.**

\*Source: Quanta Technology "Feasibility Study for Large Scale Energy Storage Systems in Brazil, Colombia and Mexico. Project performed by Quanta Technology for ISA, under USTDA financial support"



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