



Energy Reform in Mexico: An Update

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National
Association of
Regulatory
Utility
Commissioners

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ComisionReguladoraEnergia



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From March 20th to March 23rd, 2018, the VII World Forum on Energy Regulation (WFER) took place in Cancun, Mexico

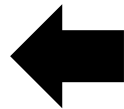
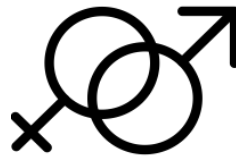
This edition's main topic was: **“Regulating in a Time of Innovation: Empowered Consumers, Dynamic Markets and Sustainable Infrastructure”**

Some highlights of the VII WFER are:

- ✓ The **most attended WFER** ever, with more than 1,200 participants
- ✓ **80 countries** represented
- ✓ **Key Lectures** by Michael Liebreich and Bertrand Piccard
- ✓ **New activities:** Regulatory Training Day, High Level Commissioner Round Tables, and Women in Energy Panel

Percentage of **men and women who participated:**

- ✓ 65% men
- ✓ 35% women



**Gender
Perspective**



**Global
Reach**



**Sectorial
Balance**



VIII WFER will take place in
Lima, Peru in 2021

Osinerghmin



VIII WFER
PERÚ 2021

The reform of Mexico’s energy industry in 2013-2014, triggered a significant portfolio of energy projects nationwide

Estimated Investment:
318 billion dollars



Committed Investment:
188 billion dollars



Power Sector

- 1st Power Auction: **2.6 billion USD**
- 2nd Power Auction: **4 billion USD**
- 3rd Power Auction: **2.4 billion USD**

- Distributed Generation: **700 million USD**

- Others in PRODESEN¹
 - Generation: **83 billion USD**
 - Transmission: **8.5 billion USD**
 - Distribution: **6.8 billion USD**

1/ Total expected investment by the National Electric System Development Program (PRODESEN, for its acronym in Spanish) 2018-2032. Mexico's Ministry of Energy



Natural Gas, LPG and Petroleum Products

- Natural Gas: **22.6 billion USD**
 - Transportation and distribution by pipeline: **12.2 billion USD**
 - Retailing: **37.2 million USD**
 - Other activities: **10.4 billion USD**
- LPG: **428.9 million USD**
 - Transportation: **93.3 million USD**
 - Storage and Distribution: **298.3 million USD**
 - Retailing: **37.3 million USD**
- Petroleum Products: **20.1 billion USD**
 - Transportation: **4.2 billion USD**
 - Storage and Distribution: **3.9 billion USD**
 - Retailing: **12.0 billion USD**



Hydrocarbons:

“Rounds One, Two, and Three”

- 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**
- Round 2:**
 - 1st Tender: **8.2 billion USD**
 - 2nd Tender: **1.1 billion USD**
 - 3rd Tender: **1.0 billion USD**
 - 4th Tender: **93 billion USD**
- Round 3:**
 - 1st Tender: **8.6 billion USD**
- Farmouts:**
 - Trión: **11 billion USD**
 - Cárdenas-Mora: **127 million USD**
 - Ogarrio: **95 million USD**
- Seismic data: 2.0 billion USD**

A total of **135 companies** from 19 countries, of which **51 are Mexican**, are currently developing hydrocarbon and electricity projects in Mexico

Mexico's Gas Pipeline Network

11,347 kilometers (km) / **7,051** miles (mi)

National Pipeline Network (SNG, for its acronym in Spanish) as of 2012

4,639 km / **2,882** mi

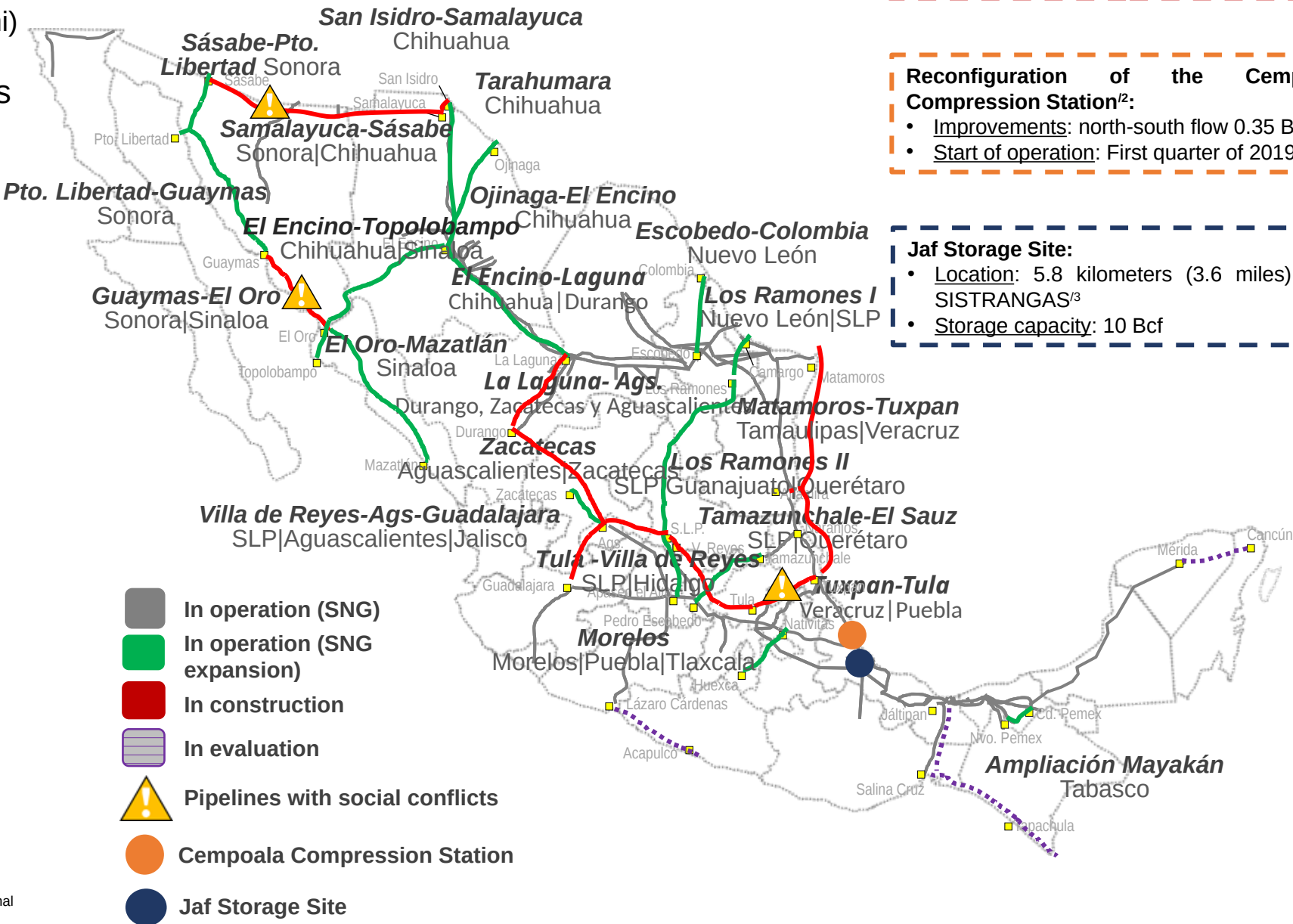
Additional capacity since the expansion of the SNG

Since 2012, the pipeline network has increased in 41%

7,586 km / **4,714** mi

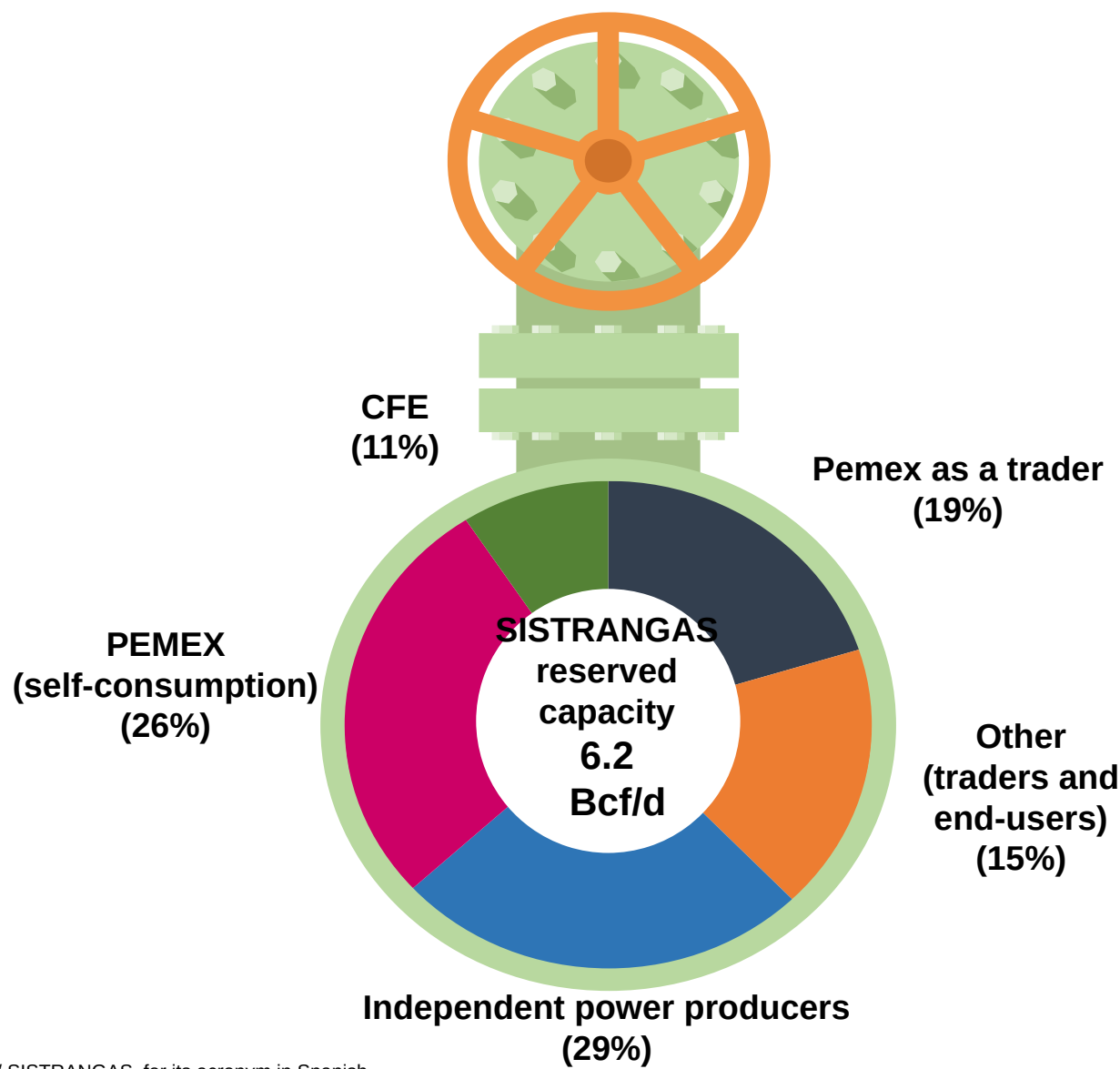
Committed pipelines since 2012

Towards 2020, the pipeline network will have grown by 67% compared to 2012



^{1/} Billion cubic feet day
^{2/} Third Annual Revision of the Five Yearly Plan for Expansion of Mexico's National Natural Gas Transportation and Storage System 2015-2019
^{3/} Mexico's National Natural Gas Transportation and Storage System

Considering the legacy capacity allocated to Pemex and CFE, the first Open Season, and the recognition of previously existing contracts, 97% of the available capacity on Mexico's National Natural Gas Transportation and Storage System (SISTRANGAS)¹ has been allocated on a firm basis



✓ Up to **44% of the 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



By the end of Phase 1 of the Natural Gas Contract Release Program, **Pemex had released 39.4%² of its total trading volume** associated to its client portfolio

1/ SISTRANGAS, for its acronym in Spanish
2/ The figure is subject to further clarifications requested to Pemex by CRE

79% of Mexican households use Liquefied Petroleum Gas (LPG) as the main fuel for cooking and water heating, followed by firewood with 11% of households



Fuel ^{1/}	% of total
GLP	79%
Firewood	11%
Natural Gas	7%
Electricity	1.5%
Others ^{3/}	1.5%

Social Lagging Indicators	Share of Households
Unavailability of power	0.49%
Earthen floor	3.07%
Unavailability of tap water from the public grid	7.09%
Unavailability of drainage	4.98%
Firewood Use	11.00%

To encourage the **substitution of firewood with LPG**:

- In July 2017, the “**Program for the adequate coverage of LPG and firewood substitution**”^{2/} began. In it, CRE, the Ministry of Energy (SENER, for its acronym in Spanish), and the Ministry of Social Development (SEDESOL, for its acronym in Spanish) will participate
- CRE promotes the diversification of supply through the figure of **cellars** (As of today, **203** cellars have been set up)
- In coordination with distributors and Federal Government entities, **15 thousand kits** (grills and cylinders) have been donated to homes that used firewood as fuel

1/ National Institute of Statistics and Geography (INEGI, for its acronym in Spanish). First National Survey on Energy Consumption in Households (ENCEVI, for its acronym in Spanish)

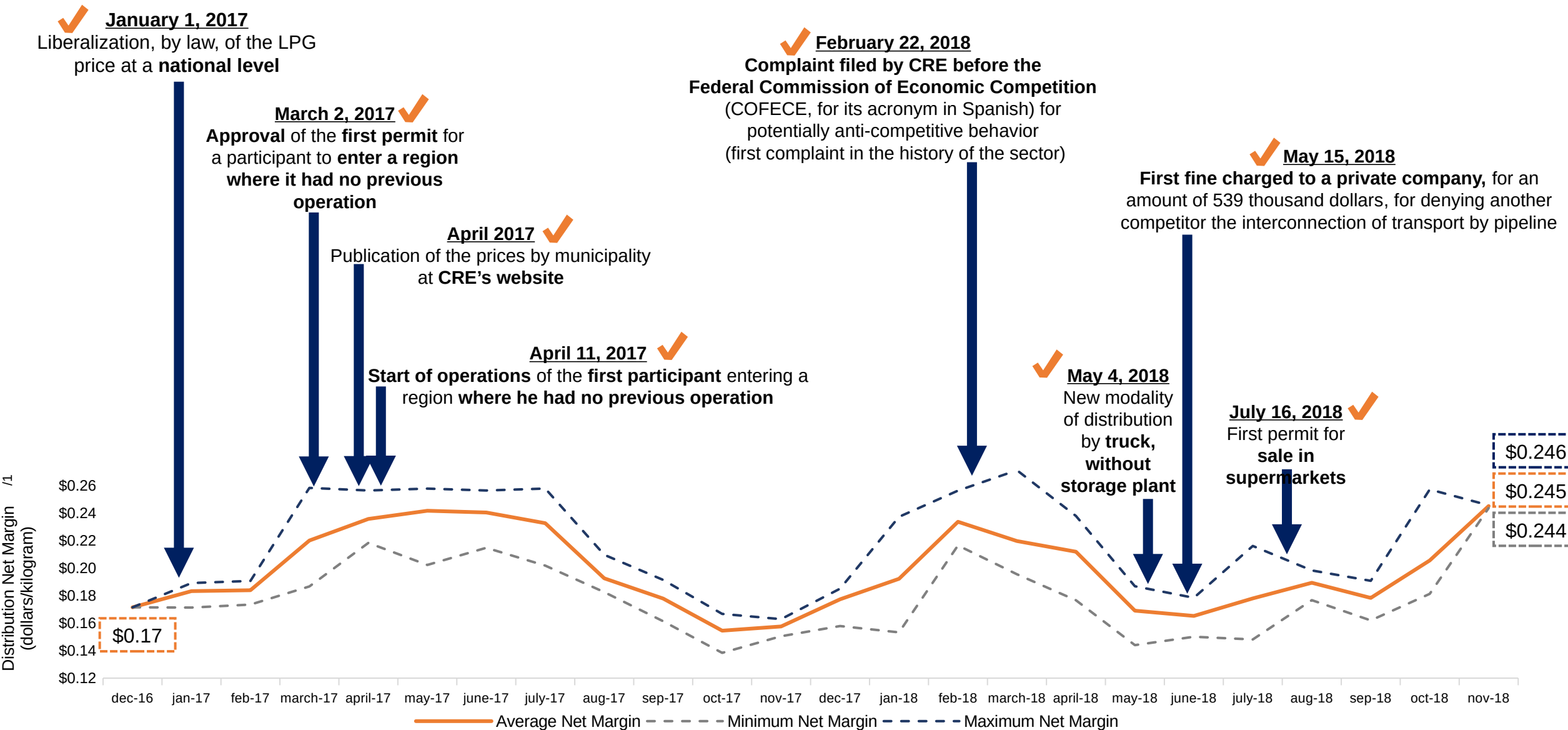
2/ The program will reach the states of Tlaxcala, Jalisco, Yucatán and Guanajuato

3/ Does not use fuel or does not cook

There are opportunity areas in the logistics considered for the calculation of LPG costs under market conditions

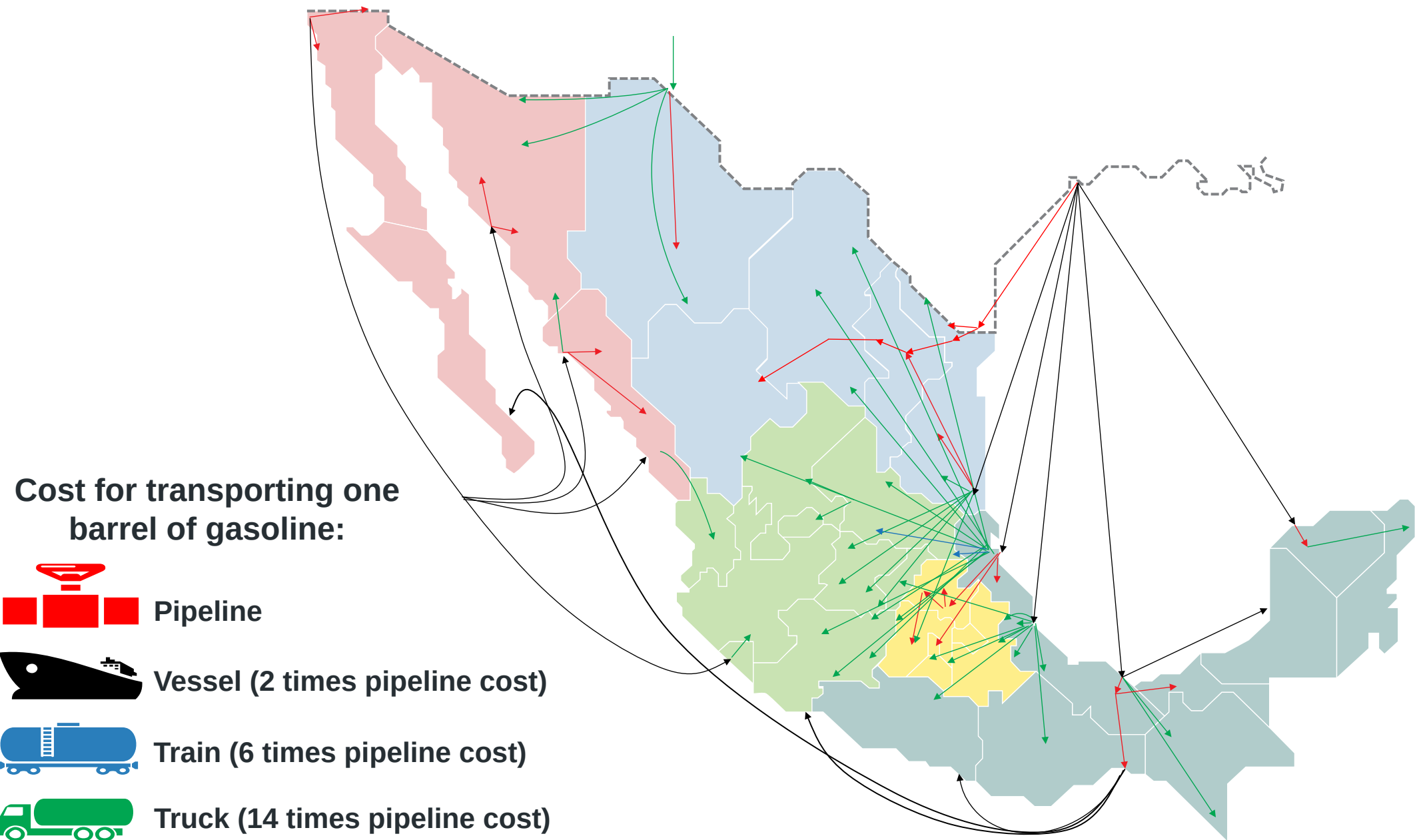


CRE has focused in introducing competition measures in the LPG industry. Ever since the price liberalization, distribution margins have reacted to market signals



1/ Distribution net margin = Consumer prices - First-hand sales price - Logistics (0.02 dollars/kilogram). Prices until November 5, 2018

Logistical routes for the import and supply of petroleum products in Mexico



CRE grants permits for the transportation of petroleum products by pipeline and other means such as railways



Baja California Railroad, S.A. de C.V.
Permit: PL/20174/TRA/OM/2017
Destinations: Tecate, and Tijuana, Baja California.

Ferromex

Ferrocarril Mexicano, S. A. de C. V.
Permit: PL/12953/TRA/OM/2015
Destinations: Guadalajara, Jalisco; Chihuahua, Chihuahua; Piedras Negras, Coahuila de Zaragoza; Nogales, Sonora; Mexicali, Baja California; and Manzanillo, Colima.



Línea Coahuila Durango, S.A. de C.V.
Permit: PL/13373/TRA/OM/2016
Destination: Durango, Durango.



Invex Infraestructura 4, S. A. P. I. de C. V.
Permit: PL/21495/TRA/DUC/2018
Destinations: Tuxpan, Veracruz and Tula, Hidalgo



FERROSUR, S. A. DE C. V.
Permit: PL/12954/TRA/OM/2015
Destinations: Veracruz and Coatzacoalcos, Veracruz.



Kansas City Southern de México, S.A. de C.V.
Permit: PL/12952/TRA/OM/2015
Destinations: Puebla, Puebla; Mexico City; Cadereyta Jiménez, Nuevo León; Tampico and Ciudad Madero, Tamaulipas; Lázaro Cárdenas, Michoacán; Durango, Durango; Minatitlán and Coatzacoalcos, Veracruz; Salina Cruz, Oaxaca; Ciudad Valles, San Luis Potosí, Tula de Allende, Hidalgo, as well as Salamanca and Irapuato, Guanajuato.

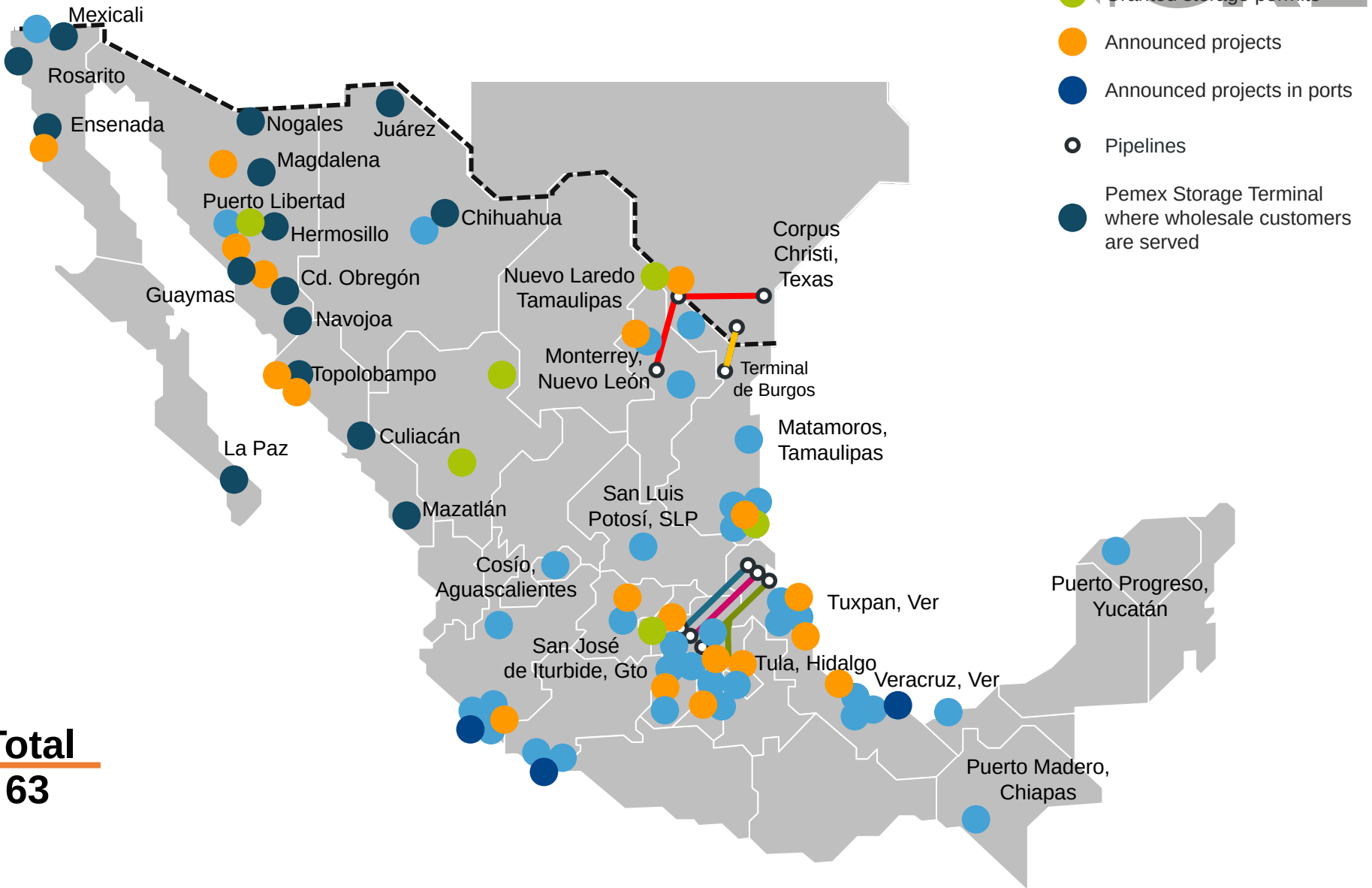


Ferrocarril del Istmo de Tehuantepec, S. A. de C. V.
Permit: PL/13551/TRA/OM/2016
Destinations: Valladolid and Mérida, Yucatán

Symbology:
 Railways
 —•— Pipelines

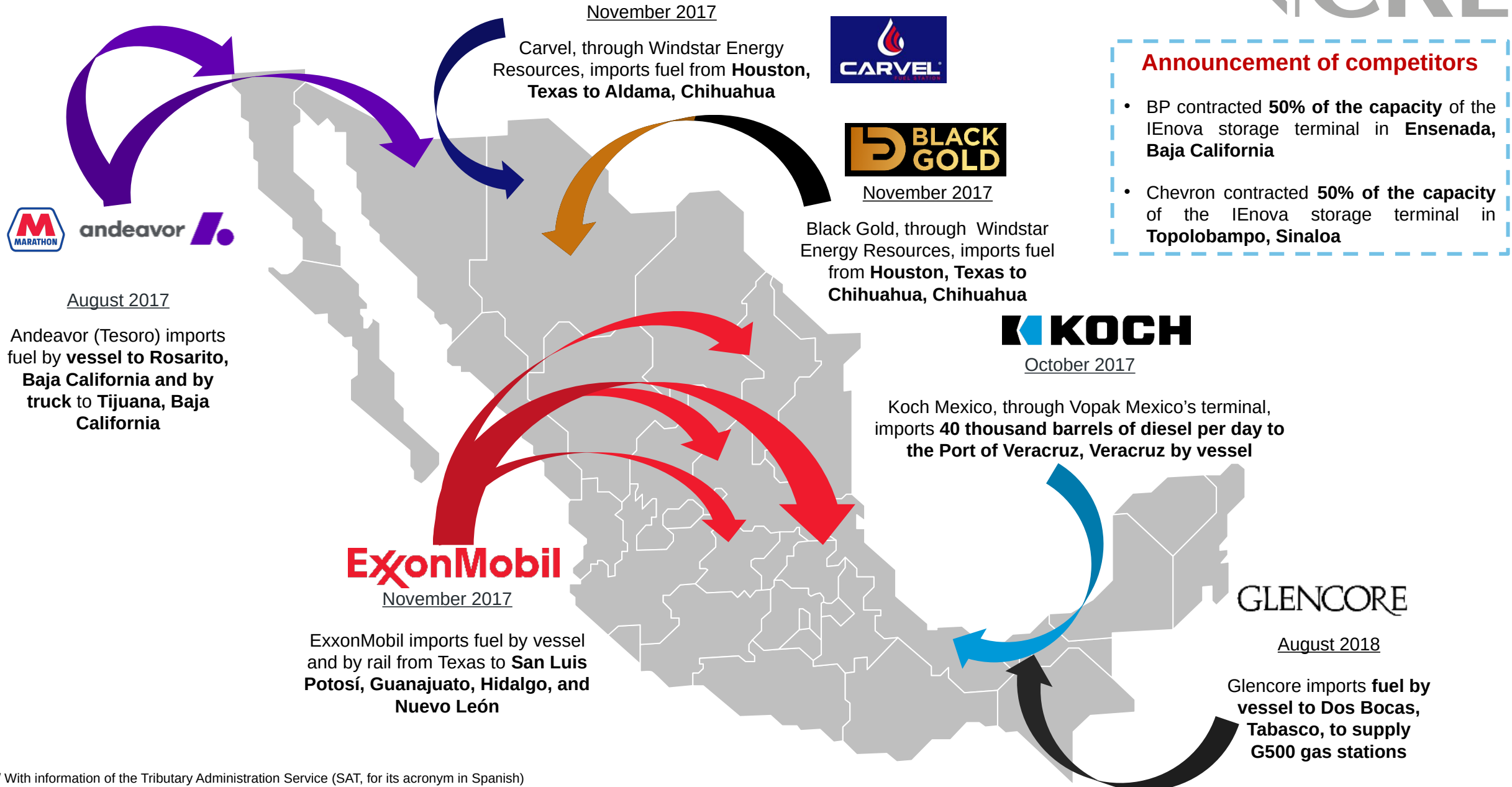
Storage and distribution projects of gasoline and diesel^{1/}

State					
Aguascalientes	1				
Baja California	1		1		
Chiapas	1				
Chihuahua	1				
Colima	3		2	1	
Durango		2			
Guanajuato	1				
Hidalgo	1		2		
Jalisco	1				
Mexico	6		1		
Michoacán	2		1	1	
Nuevo León	2		1		
Puebla	1				
Querétaro		1	2		
San Luis Potosí	1				
Sinaloa			2		
Sonora	1	1	3		
Tabasco	1				
Tamaulipas	5	2	2		
Veracruz	6		3	1	
Yucatán					
Total	36	6	18	3	63



^{1/} Corresponds to project information with granted permissions, and in evaluation with the Commission, to November 3rd , 2018. Information of the announced projects corresponds to media and web pages of the operating firms

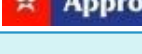
There are new traders that import gasoline and diesel. This strengthens the security of fuel supply in Mexico^{1/1}



1/ With information of the Tributary Administration Service (SAT, for its acronym in Spanish)

There are 12,138 gas stations operating in Mexico. CRE has identified 3,271 (27% of total) that operate under 54 new brands (35 are Mexican)^{1/}

Of the 18 brands that offer differentiated product by additivation, 5 do not use Pemex's base product^{2/}

 483	 83	 16
 314	 81	 12
 238	 66	 10
 233	 63	 6
 204	 54	 6
 172	 50	 6
 158	 49	 5
 137	 44	 4
 130	 38	 4
 128	 37	 3
 116	 31	 3
 115	 26	 3
 99	 20	 2



Upcoming competitors



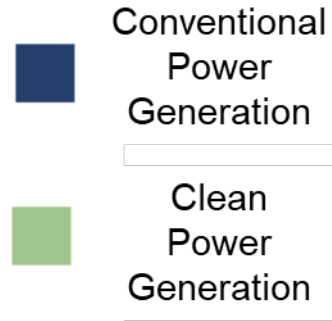
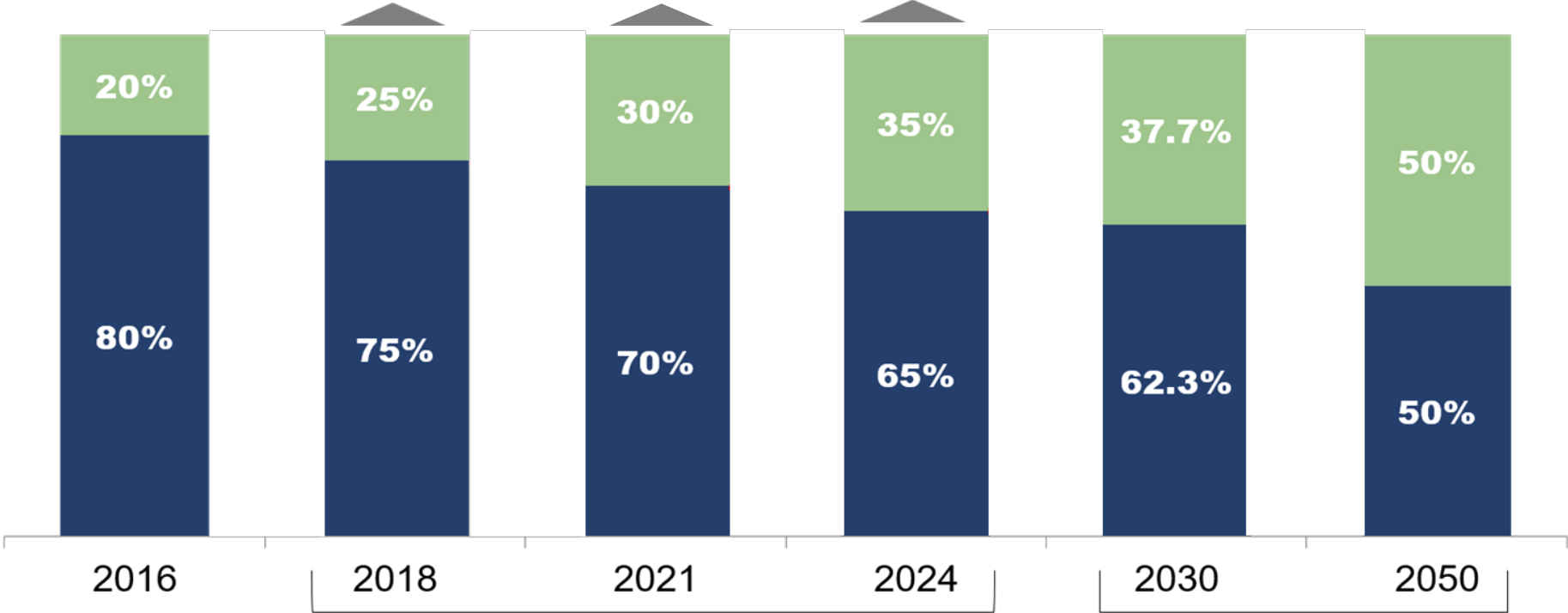
1/ The Ministry of Energy (SENER, for its acronym in Spanish) that has been obtained from a market study based on information in the media and internet pages pertaining to gasoline and diesel dispensers, as well as information provided by CRE. Information as of November 9, 2018.
2/ The 5 brands with totally different product are: G500; ExxonMobil; Arco; Black Gold y; Carvel.

The Mexican law establishes clean power generation targets^{1/}



The first, second and third Long Term Auction will contribute to Mexico's clean power generation by **1.9%, 3% and 1.8%** starting in **2018, 2019, and 2020** respectively

By 2024, **38% of the energy dispatch** is expected to come from clean energies^{2/}



Mexico occupies the **4th** position of 71 economies with greater **attractiveness for investments in clean energy**^{3/}

Energy Transition Law

Transition Strategy to Promote the Use of Cleaner Fuels and Technologies

The above mentioned remarks, will depend on 4 factors:



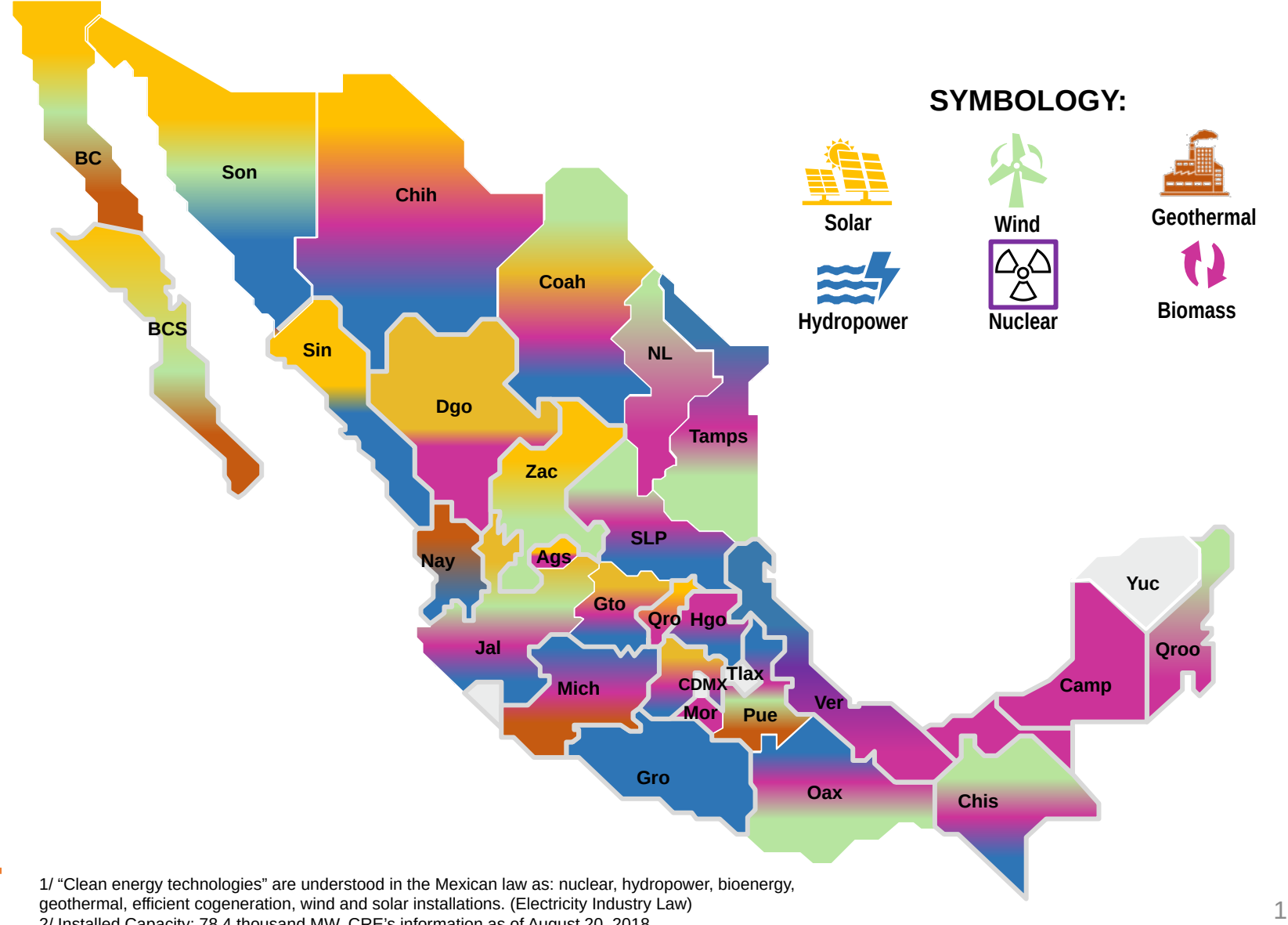
- 1 The consolidation of the **Wholesale Electricity Market**
- 2 The development of **transmission and distribution infrastructure**
- 3 The deployment of **distributed generation**
- 4 **Social engagement** of the infrastructure projects

1/ "Clean energy technologies" are understood in the Mexican law as: nuclear, hydropower, bioenergy, geothermal, efficient cogeneration, wind and solar installations. (Electricity Industry Law)
2/ Estimated by Mexico's National Energy Control Center (CENACE for its acronym in Spanish)
3/ "Climatoscope". Bloomberg New Energy Finance. 2017.

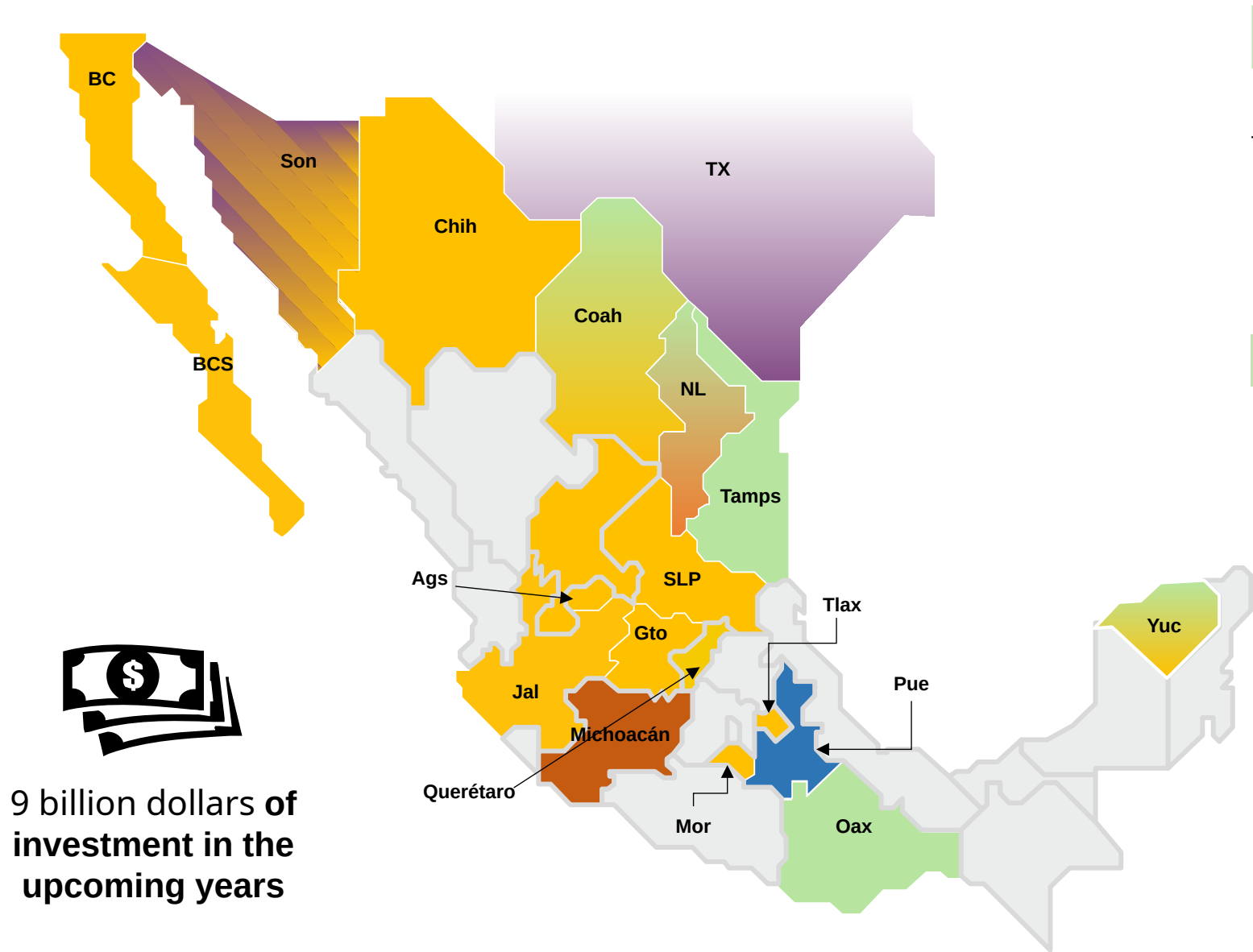
Currently, more than 200 clean electricity plants operate in 28 states of Mexico, which represent an installed capacity of 20 GigaWatts (26% of the total installed capacity in Mexico)¹

State						
Aguascalientes	1					2
Baja California	1	2		1		
Baja California Sur	2	1		1		
Campeche						1
Chiapas		2	7			2
Chihuahua	4		2			2
Coahuila	1	1	1			2
Durango	4					2
Guanajuato	1		1			1
Guerrero			4			
Hidalgo			1			2
Jalisco	1	2	13			5
Mexico	2		3			1
Michoacán			14	1		2
Morelos						1
Nayarit			4	1		
Nuevo León		3				3
Oaxaca		23	2			1
Puebla		1	21	1		1
Querétaro	1					2
Quintana Roo		1				1
San Luis Potosí		1	3			1
Sinaloa	1		6			
Sonora	2	1	3			
Tabasco						1
Tamaulipas		5	1			1
Veracruz			13		1	7
Zacatecas	1	1				
Total	22	44	99	5	1	41

Total
212



As a result of the three Long Term Auctions of the Electricity Market, 70 new electricity plants will be developed in 19 states in Mexico



Average auction prices ¹ (USD/MWh+CEL)			
	1st	2nd	3rd
Solar	44.97	31.22	21.34
Wind	55.33	33.27	18.48
Winners			
Companies	11	23	8

1/ Weighted average of offers of packages that only offered Energy and CELs. Exchange rate (MX / USD) used by LTA: 1st 17.3192, 2nd 20.17, 3rd 19.185

SYMBOLOLOGY:



Solar



Wind



Geothermal



Hydropower



Turbogas



Combined Cycle

On March 15, 2018, the fourth Long Term Auction was announced. In this regard, CRE will grant continuity to the positive results shown in the previous auctions

Fourth Auction Characteristics:



It will be possible to buy 3 products:
Clean Energy Certificates (CELs),
Energy, and Capacity



The clearinghouse mechanism will continue



Buyers different from CFE will be able to participate in the process

CFE SSB and Load Serving Entities (LSEs) purchasing offers^{1/}



CELs

5.9 million with a maximum price of 18.87 dls/CEL

Energy

5.9 MWh with a maximum price of 38.58 dls/MWh

Capacity

132 MW-year on average for the three zones with an average maximum price of 69,873 dls/MW-year^{2/}

66% corresponds to the offer of CFE SB and 34% to the LSE



December 18th
(deadline)

Ruling of the fourth Long Term Auction



34 generating companies with 396 selling offers are pre-qualified

It is estimated that the fourth Auction will increase Mexico's current generation capacity by around 5% (additional 3.8 GW)

1/ LSEs are: Iberdrola Clientes, Servicios de Energía México Syem S. A. P. I de C. V., Menkent S. de R. L. de C. V., FSE Suministradora Fénix S. A. P. I. de C. V. y Tuto Energy Trading S. A. P. I. de C. V.
2/ National Interconnected System (SIN), Baja California Sur Electric System (BCS) and Baja California Interconnected System (BCA)

Towards 2021, around 200 renewable electricity plants¹ will be developed in 30 states of Mexico. This will represent an increase of 19.5 GigaWatts in installed capacity

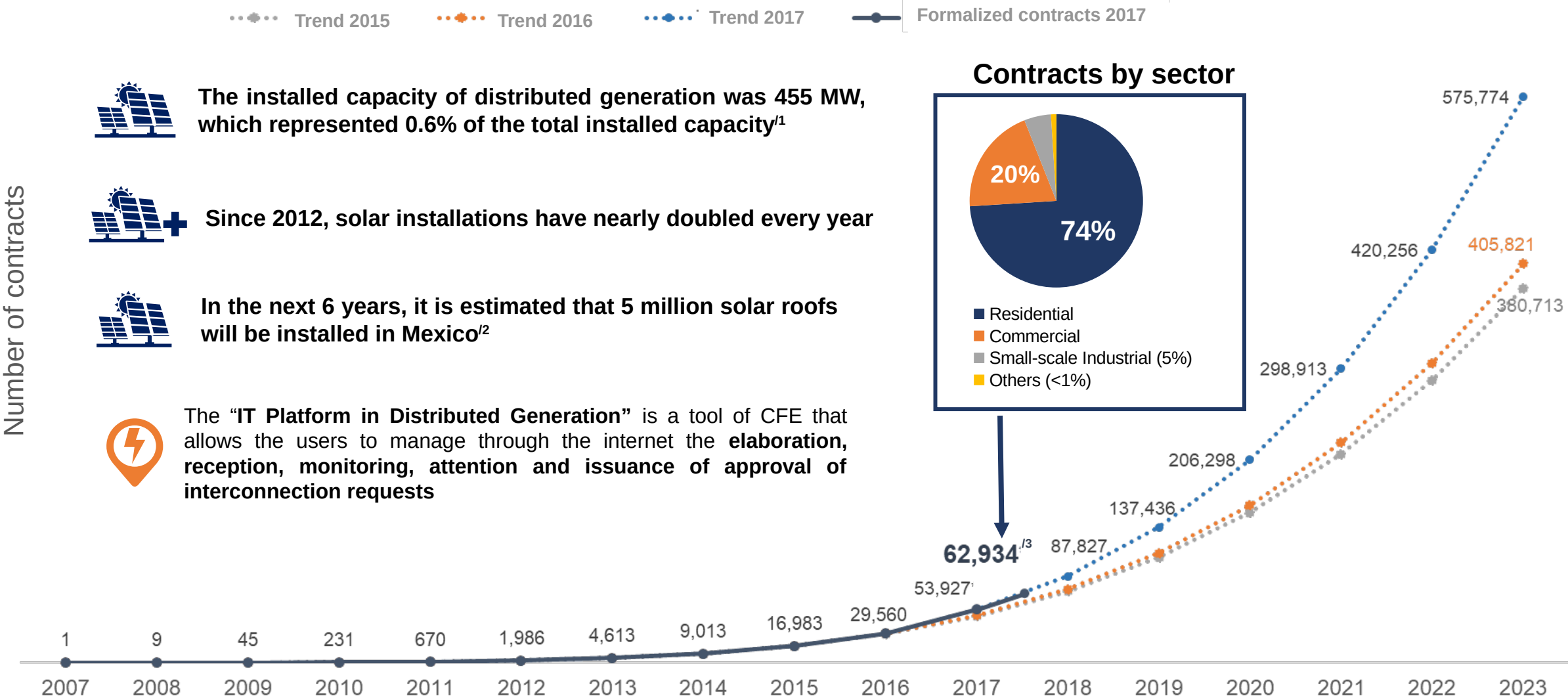
State					
Aguascalientes	11				
Baja California	3	2			
Baja California Sur	2				2
Campeche		2			
Chiapas					1
Chihuahua	15		1		
Mexico City	1				
Coahuila	11	5			
Durango	14				
Guanajuato	6	1			
Guerrero			1		
Hidalgo	4	1	4		1
Jalisco	7	2	4	1	
Mexico	1		1		3
Michoacán				1	
Morelos	2				
Nayarit				1	
Nuevo León	1	2			
Oaxaca		1	1		
Puebla	5		4		
Querétaro	1	1			
Quintana Roo	2				
San Luis Potosí	2	1			2
Sinaloa			2		
Sonora	31	1			1
Tamaulipas		12			
Tlaxcala	2				
Veracruz	1	1	1		1
Yucatán	6	11			
Zacatecas	8	1			
Total	136	44	19	3	11

**Total
213**



1/ "Clean energy technologies" are understood in the Mexican law as: nuclear, hydropower, bioenergy, geothermal, efficient cogeneration, wind and solar installations. (Electricity Industry Law). Electric generation permits granted by CRE starting from 2014 for energy plants that will start operating before 2021
 2/ Estimation of Mexico's National Energy Control Center (CENACE for its acronym in Spanish)

In addition to large-scale generation projects, there has been significant growth in distributed generation in Mexico. It is expected that this trend will continue in the upcoming years



1/ The figure is shown at the National Electric System Development Program (PRODESEN, for its acronym in Spanish)
2/ ASOLMEX, 2018. <https://www.pv-magazine-mexico.com/2018/09/11/el-corto-plazo/>
3/ Estimated data for the first semester of 2018, based on information presented by CFE's distribution subsidiary as of December 31, 2017. Own elaboration.



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Comisión Reguladora de Energía

What is the Energy Regulatory Commission?

- CRE is a **coordinated regulatory body on energy matters**, which promotes the efficient development of the energy sector and the reliability of hydrocarbons and electricity supply
- CRE has its own **legal personality, technical and managerial autonomy** as well as **budgetary self-sufficiency**



CRE's Governing Board is composed by **7 Commissioners**, including its President



For the designation of each Commissioner, the President of Mexico submits to the Senate a list with three recommendations for its consideration.



The Senate appoints each Commissioner by a **two-thirds majority** vote cast



Commissioners are designated by **staggered periods of seven years**, with the possibility of being re-designated, for a single occasion, to another period



Mission



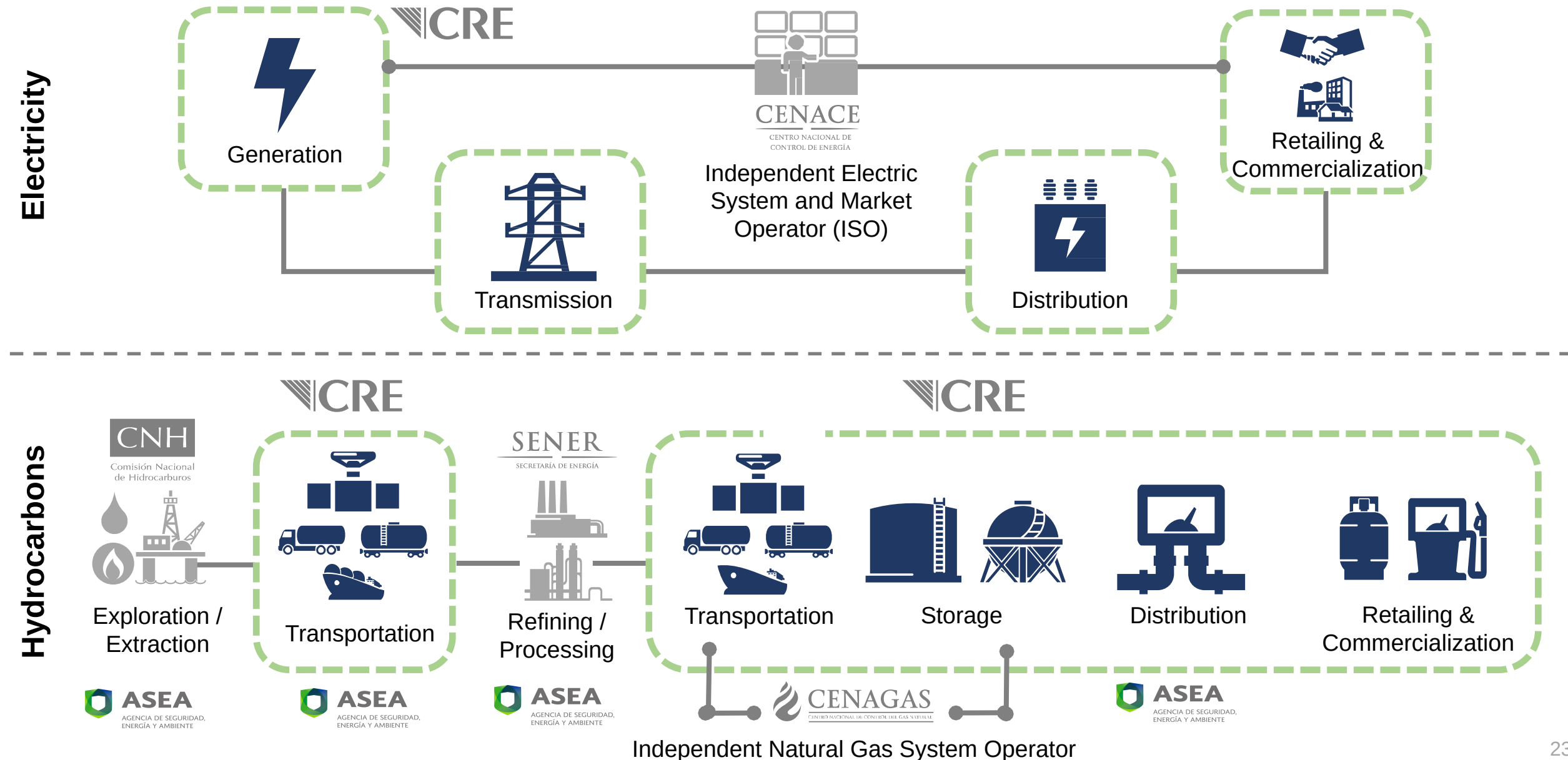
“To guarantee the conditions to assure that the **availability of energetic resources** in Mexico is the required, with **quality** and **competitive prices**”

Vision



“To be a **transparent, efficient and highly-qualified organism**, whose autonomous decisions establish an efficient, participative and reliable regulatory environment for the energy sector in Mexico”

Mexico's Energy Regulatory Commission (CRE) issues technic and economic regulation; grants and manages permits; monitors, verifies and in the given occasion, sanctions the participants of the entire electricity value chain as well as the downstream hydrocarbons sector



CRE has rules of operation, contact and transparency, which have allowed it to promote an honest and institutional integrity agenda



- ✓ **Open-door policy.** Anyone can request online a meeting with the technical staff and Commissioners (first in time, first in right)



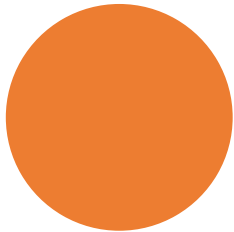
- ✓ **Hearings** with permit holders are **recorded. All Commissioners are called** and, at least, two must be present



- ✓ The **Governing Council's sessions** are broadcasted live. **All permits and resolutions are public** and are available on the CRE website



- ✓ The **Commissioners have the obligation to inform** in advance of their activities outside CRE (i.e. commissions, forums, congresses, etc.)



- ✓ **100% of our procedures are carried out online** through the Clerk's Office

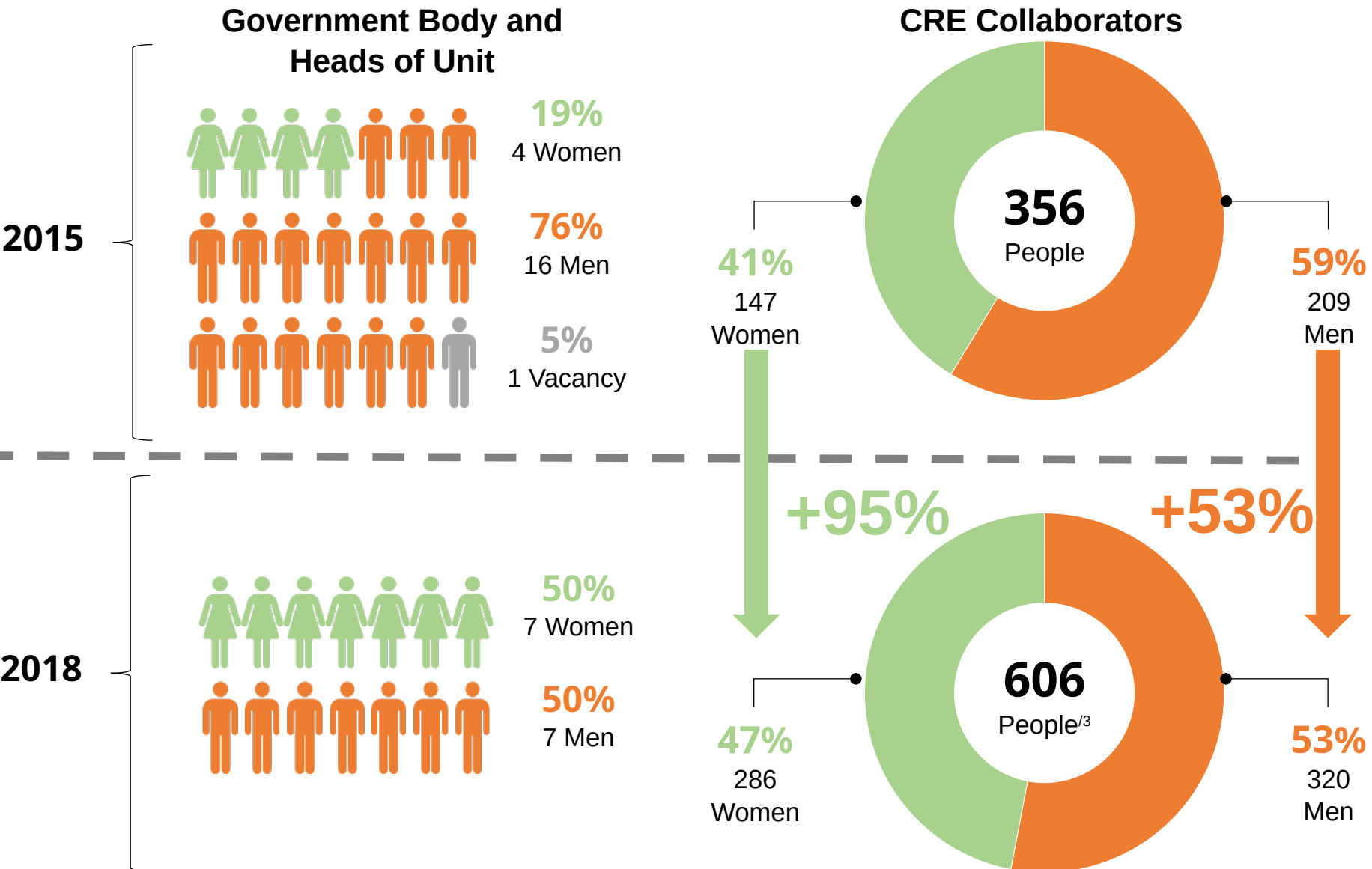


- ✓ **Online tutorials and on-site workshops** are offered. CRE has also a **telephone assistance line (with a 91% satisfaction level)** to explain permit request and issuing procedures



- ✓ Since 2016, CRE implements an institutional **austerity policy**

For CRE, it is essential to include gender perspective in energy regulation decisions, which is why it has increased the number of women in positions of managerial responsibility



According to the "Study on equality between women and men in matters of jobs and wages in the Federal Public Administration", conducted by Mexico's National Human Rights Commission (CNDH, for its acronym in Spanish), **women occupy less than 20% of the positions at the Head of Division level.**^{1/}

According to the study "Untapped Reserves" developed by the Boston Consulting Group in collaboration with the World Petroleum Council, **only 22% of the employees in the hydrocarbon sector are women.**^{2/}

On August 16, **CRE issued gender balance guidelines for the participation of its personnel in events.** The guidelines of the Organization for Economic Co-operation and Development (OECD) on gender equality were taken as reference and CRE adopted them as its own in the activities of its scope.

1/ National Human Rights Commission (CNDH) <http://www.cndh.org.mx/sites/all/doc/Informes/Especiales/Estudio-igualdad-20180206.pdf>
2/ <https://www.bcg.com/publications/2017/energy-environment-people-organization-untapped-reserves.aspx>
3/ Data as of July 15, 2018