



Integration of Renewable Energy in Mexico's New Energy Market

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Energy Regulatory Commission

October, 2014



Key messages

- 1** Mexico has enacted an Energy Reform oriented to the opening and development of its energy markets. The new market design entails stringent goals for the introduction of RE.
- 3** The main public policy to foster renewables is the creation of a Renewable Energy Certificate market.
- 4** The development of new transmission capacity and the introduction of smart grid technology will support this policy.



New Electric Industry Act (LIE) creates a whole new framework..

The recently-approved Electric Industry Act (August, 2014) sets the guidelines under which the development of the new power sector will take place.

After market liberalization, the Government will remain control only over strategic activities namely planning, operational control, transmission and distribution, **whereas generation and marketing will be under a competitive environment for the first time in 60 years.**

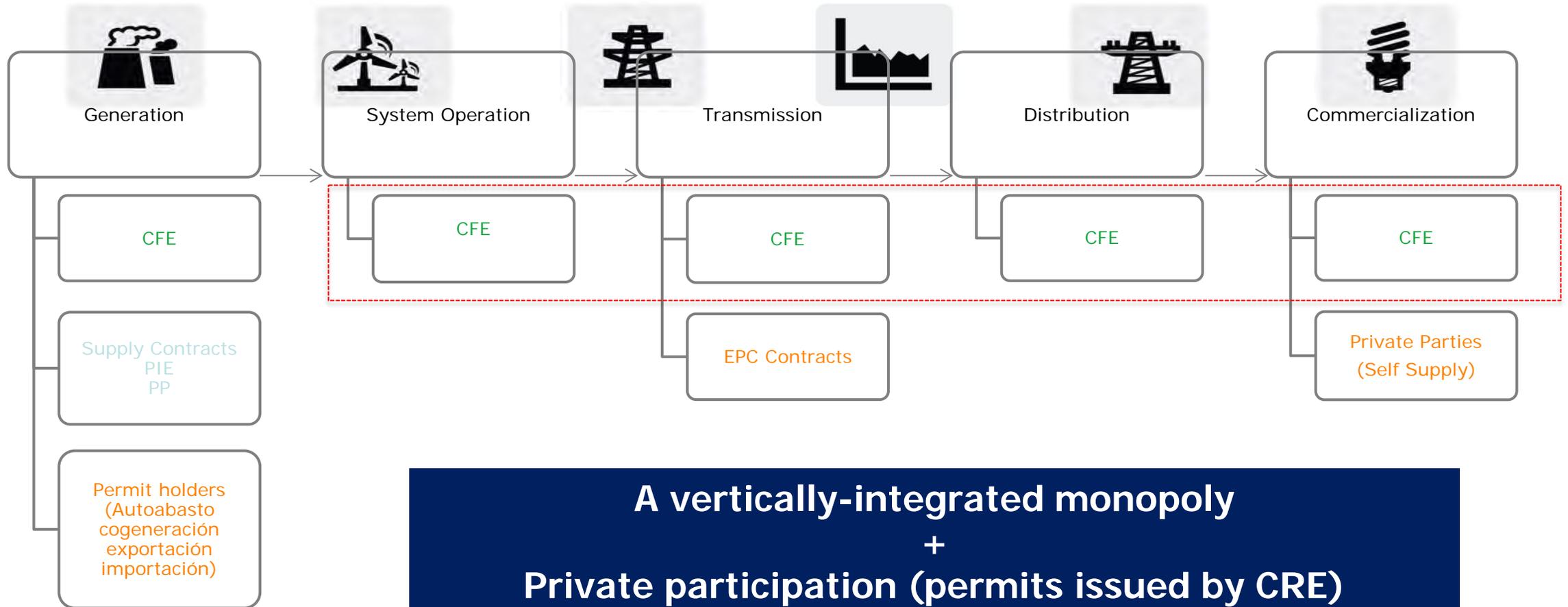
Key elements:

- Conditions for a fair and transparent interconnection for generators are guaranteed (open access)
- **Clean energy generation is promoted and removal of obsolete plants is accelerated to reduce generation costs.**
- Generators can enter into long term bilateral contracts or sell power in a wholesale electricity market.
- The state owned company, CFE, compete with other actors on a leveled play field.



... so the economic environment becomes adequate for the introduction of competition...

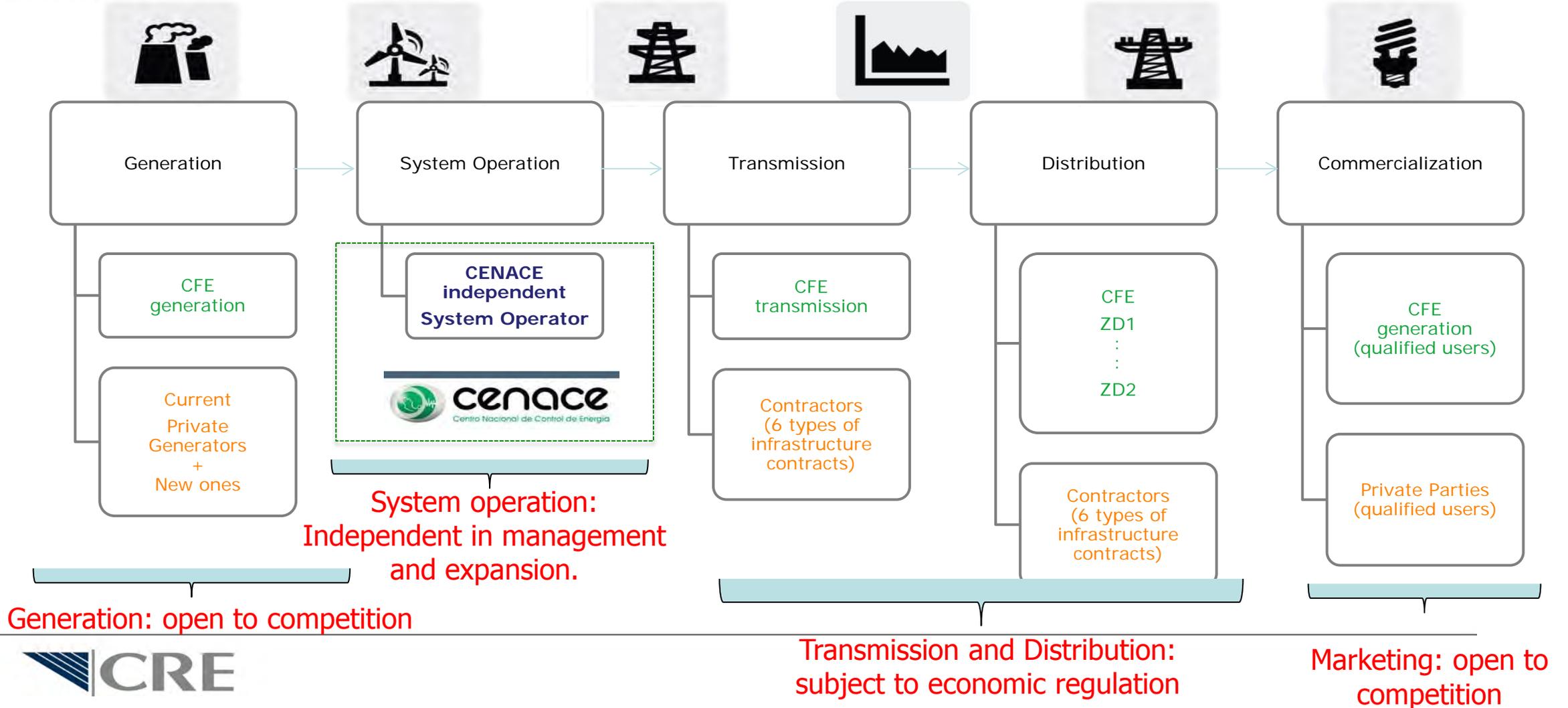
Electricity: Former Market Structure:





... so the economic environment becomes adequate for the introduction of competition...

Electricity: NEW market structure:





... so the economic environment becomes adequate for the introduction of competition...



Creation of CENACE

- A new public entity, independent from the CFE, and with a modern corporate governance.

Main powers

- Overall System Operation.
- **Determines interconnection requirements for new generation plants (including RE).**

Transmission grid expansion

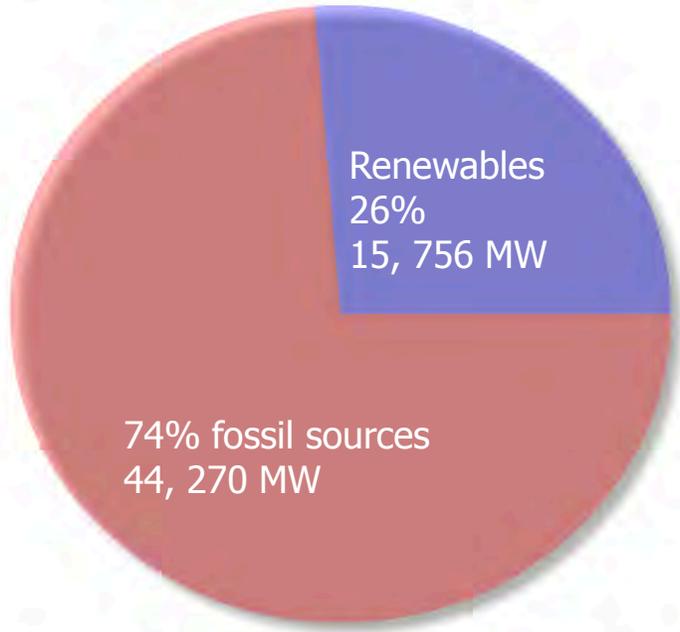
- Shall develop the transmission expansion program, on a neutral basis, considering the requirements of the system as a whole, and without favoring any particular market participant.



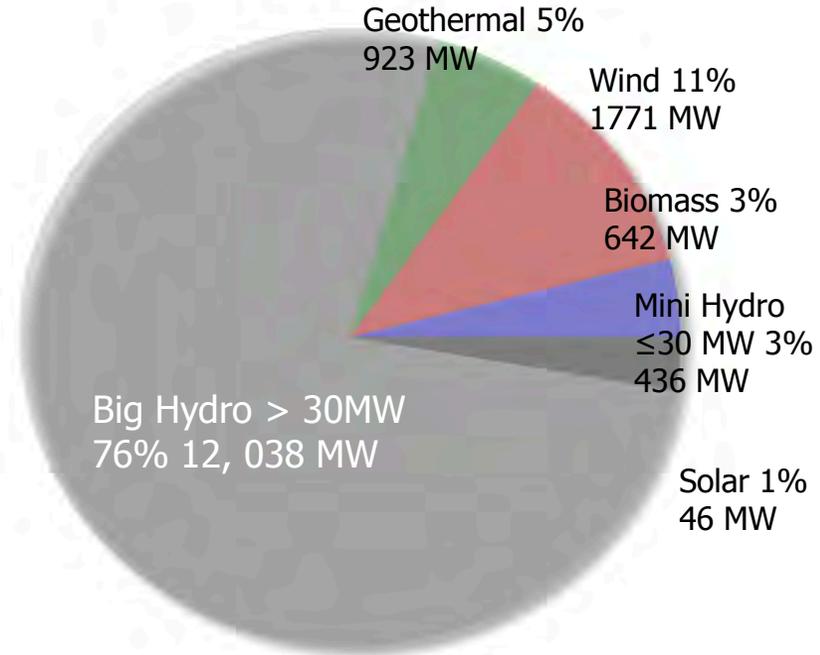
Key messages

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Although its potential, integration of RE in Mexico is still in an early stage



Total Capacity



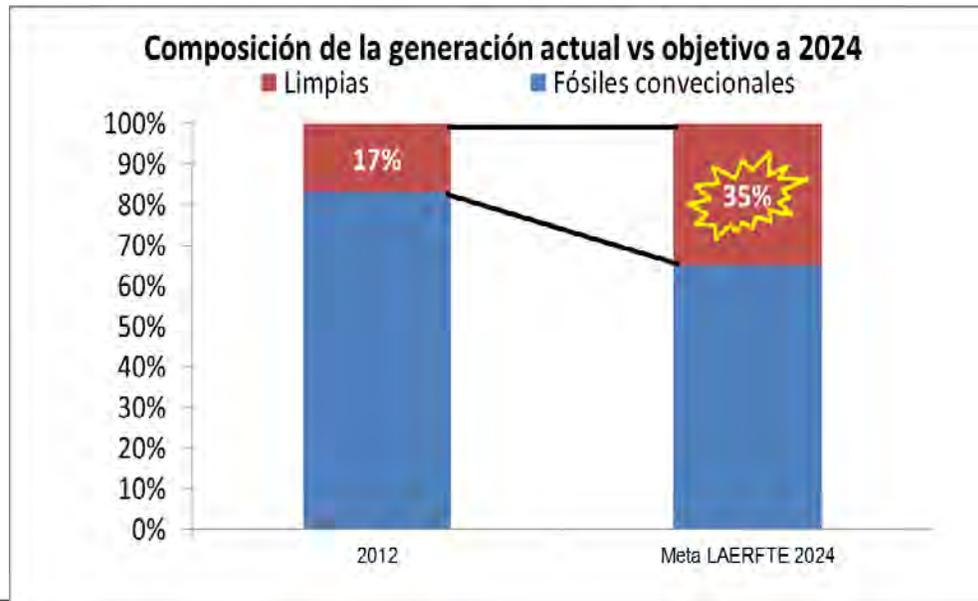
Total RE Capacity

Although its potential, integration of RE in Mexico is still in an early stage: REC

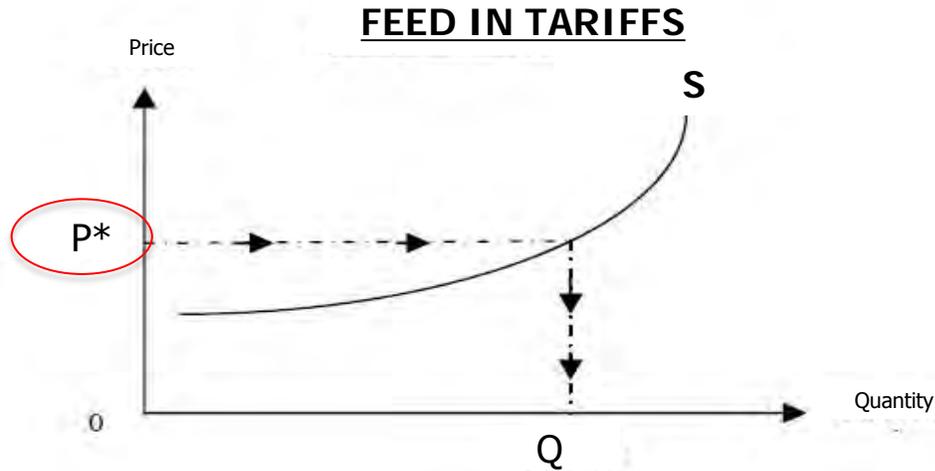


- The Climate Change Act established the obligation of promoting the generation of electricity through renewable energy setting a target of 35% for the year 2024.
- **The Electric Industry Act provided for new instruments to address this issues through Renewable Energy Certificates.**

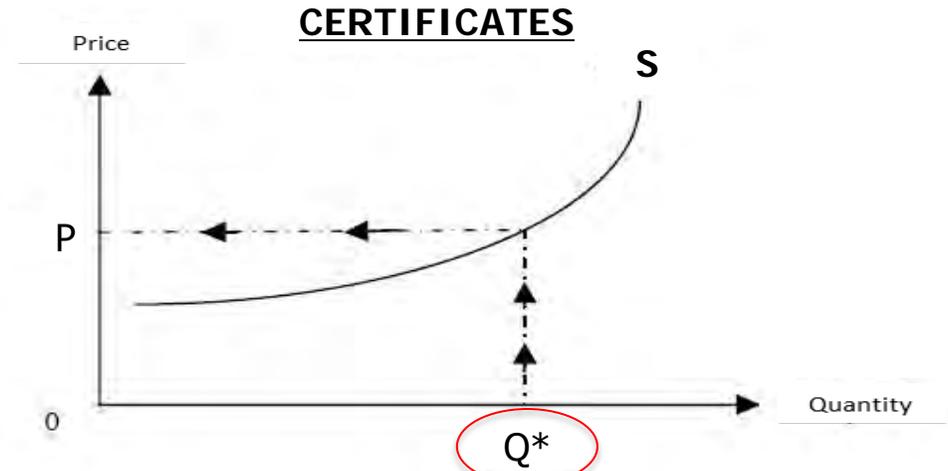
Energy Certificates.



The 2014 Reform aims at introducing policies to foster RE in the new market: REC



- A defined tariff is determined (P^*).
- The renewable energy power units may generate up to the marginal cost which shall be equal to the tariff (Q).



- An estimate of a percentage of total energy to be produced with renewable energies is determined (goal).
- An obligation to purchase the amount of energy Q^* is set.
- RECs are gradually acquired as to obtain the required amount.



The 2014 Reform aims at introducing policies to foster RE in the new market: REC

TARIFFS/CERTIFICATES

- Feed in Tariffs:
 - ✓ Reduces the variability of income facilitating the financing of the projects.
 - ✓ If the price is low, the renewable generation target may not be achieved.
 - ✓ If the price is high, the financial burden for the promotion of renewables may be substantial.
 - ✓ May be set depending on type of generation technology, to that effect the goals shall not accomplish the lower possible cost.

In very broad terms, Mexico's decision is based on the assumption that re-calibrating the required percentage of RE (Q^*) is easier than re-calibrating a tariff (P^*).



The 2014 Reform aims at introducing policies to foster RE in the new market: REC

- If the CEC is assigned based on the generated energy, the supply becomes exogenous in the short term, since building capacity takes time.
- To that effect if the price is determined in the spot market, it may occur that:
 - ✓ If the fixed total demand determined by the regulator exceeds the available supply, the price will be so high that would equal the penalty for not acquiring it.
 - ✓ If the fixed total demand determined by the regulator falls behind the available supply, the price will be too low.

The CEC market shall consider an optimal time so that the renewable generation capacity responds to the prices.



The 2014 Reform aims at introducing policies to foster RE in the new market: REC

However, pursuant to the IEA's* analysis, there is not a "one size fits all" solution:

- The difference between the results and benefits of the feed in tariffs and the CEC are lower than the given result between countries using the same methodology.
- The best practices emerge from proper implementation and planning, as of the absence of non-economic entry barriers.
- Also, the determination of the mechanism depends on the degree of technological advance of the country, the scale of planned projects and the alignment with the planned design for the electric market.



The 2014 Reform aims at introducing policies to foster RE in the new market: REC

1. Renewable energy producers receive 1 REC for each generated MW.

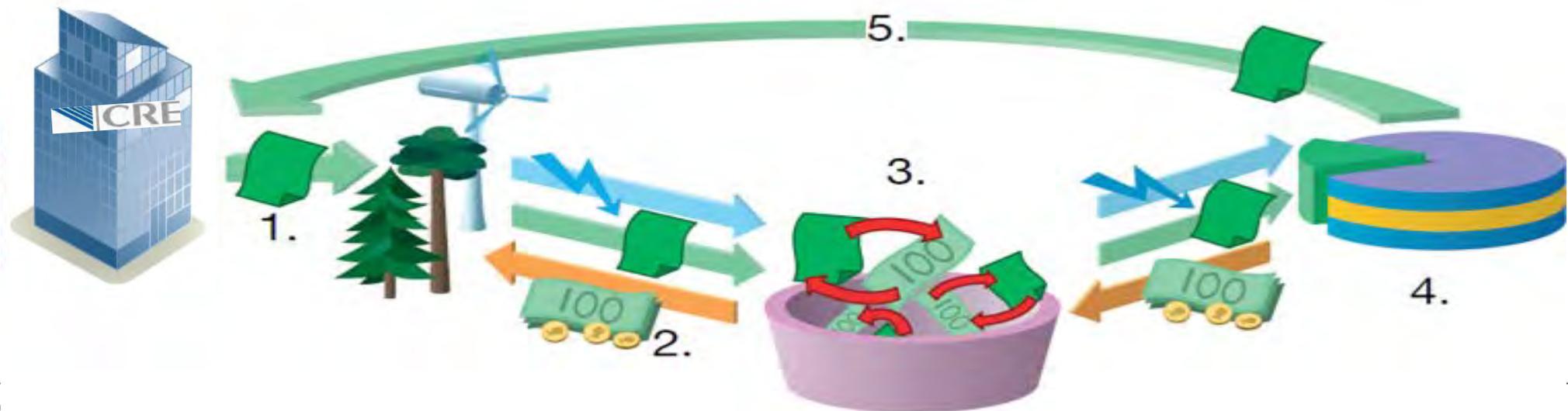
2. Producers can sell RECs and received another flow of income.

3. RECs are traded on the market and the price is set by supply and demand.

4. The RECs shall be purchased by the wholesale electricity market participant subject to renewable energy obligations.

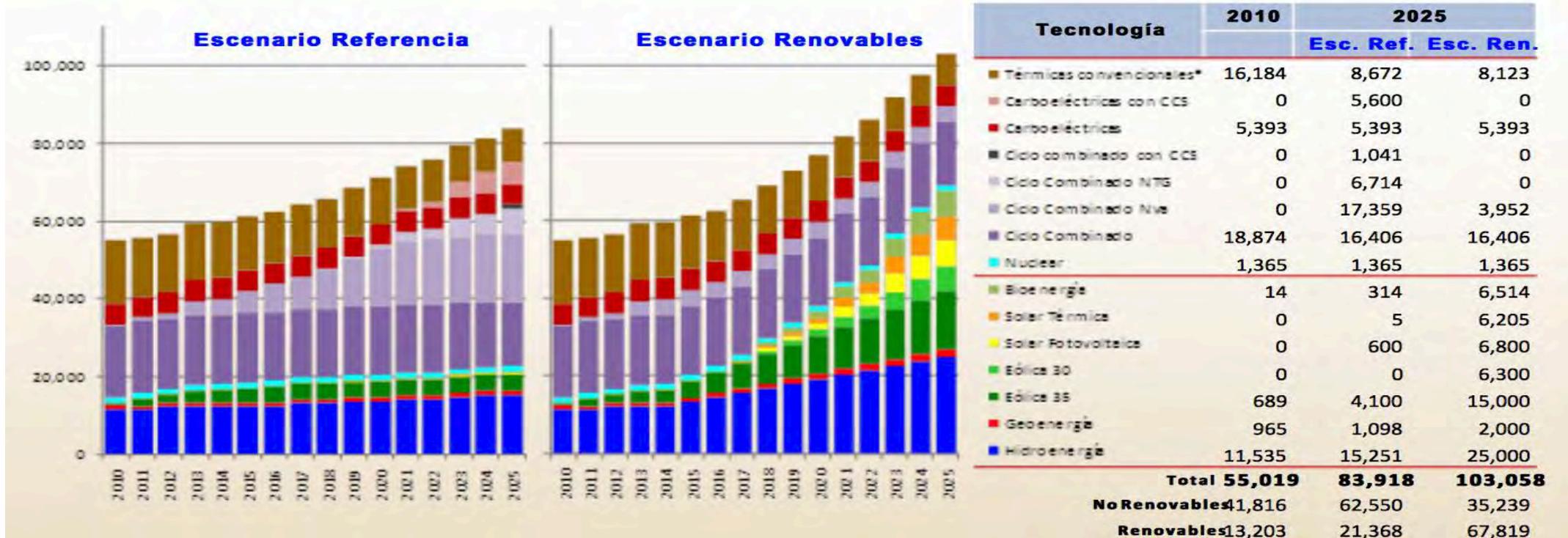
5. At the end of each year, the market participants with RE obligations shall be obligated to present the amount of certificates required to comply with its goal.

Those certificates are cancelled and cannot be traded.



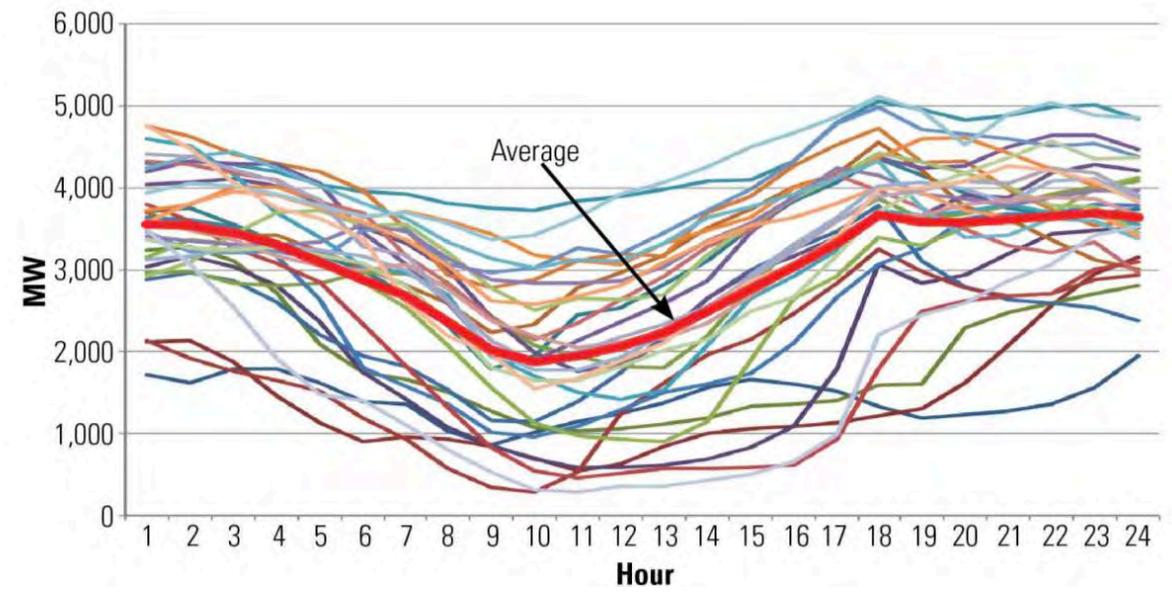
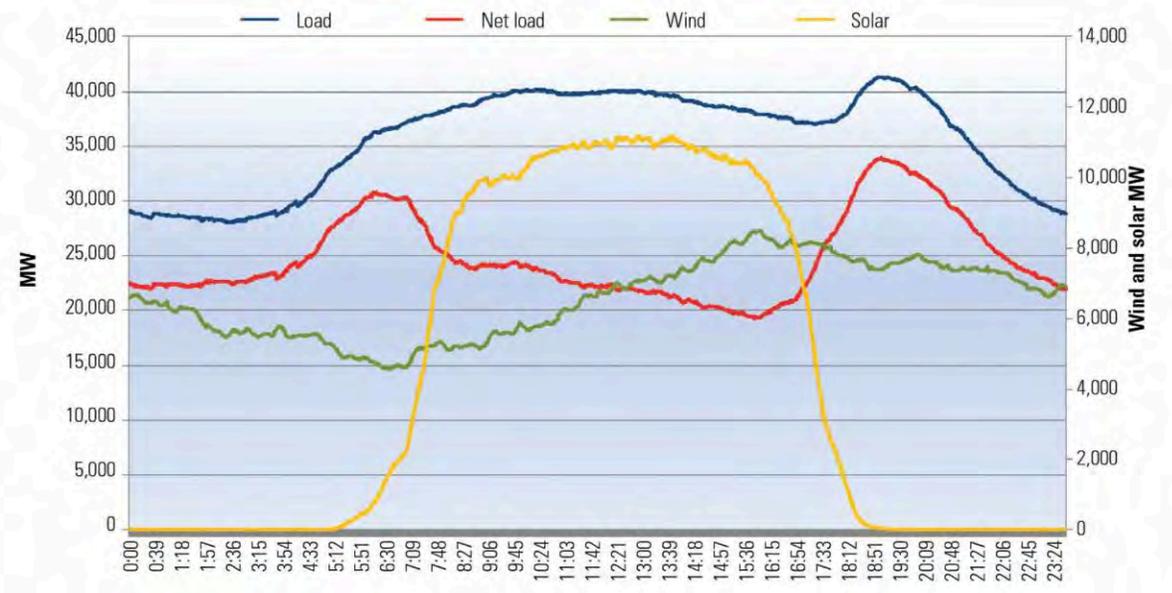


The 2014 Reform aims at introducing policies to foster RE in the new market: REC





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Key messages

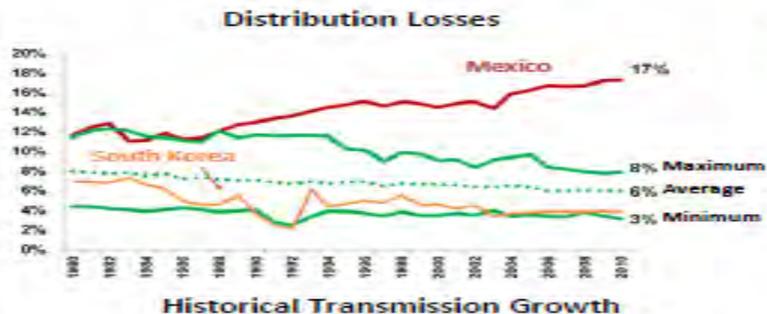
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The 2014 Reform aims at introducing policies to foster RE in the new market: New Transmission Capacity

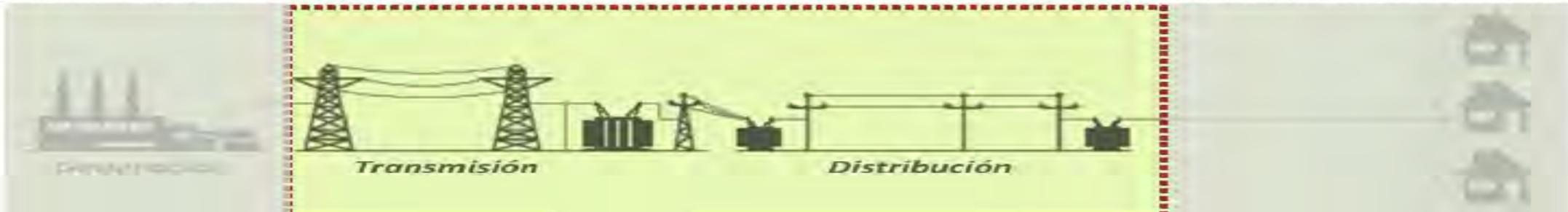
Current Situation

- Distribution losses have grown in Mexico.
- More transmission is needed to interconnect clean energy sources.



Reform

- CFE can celebrate contracts with the private sector to expand, modernize, finance and operate its transmission and distribution networks (and reduce losses).
- CRE will regulate transmission and distribution rates.
- The Universal Electric Service Fund is created.

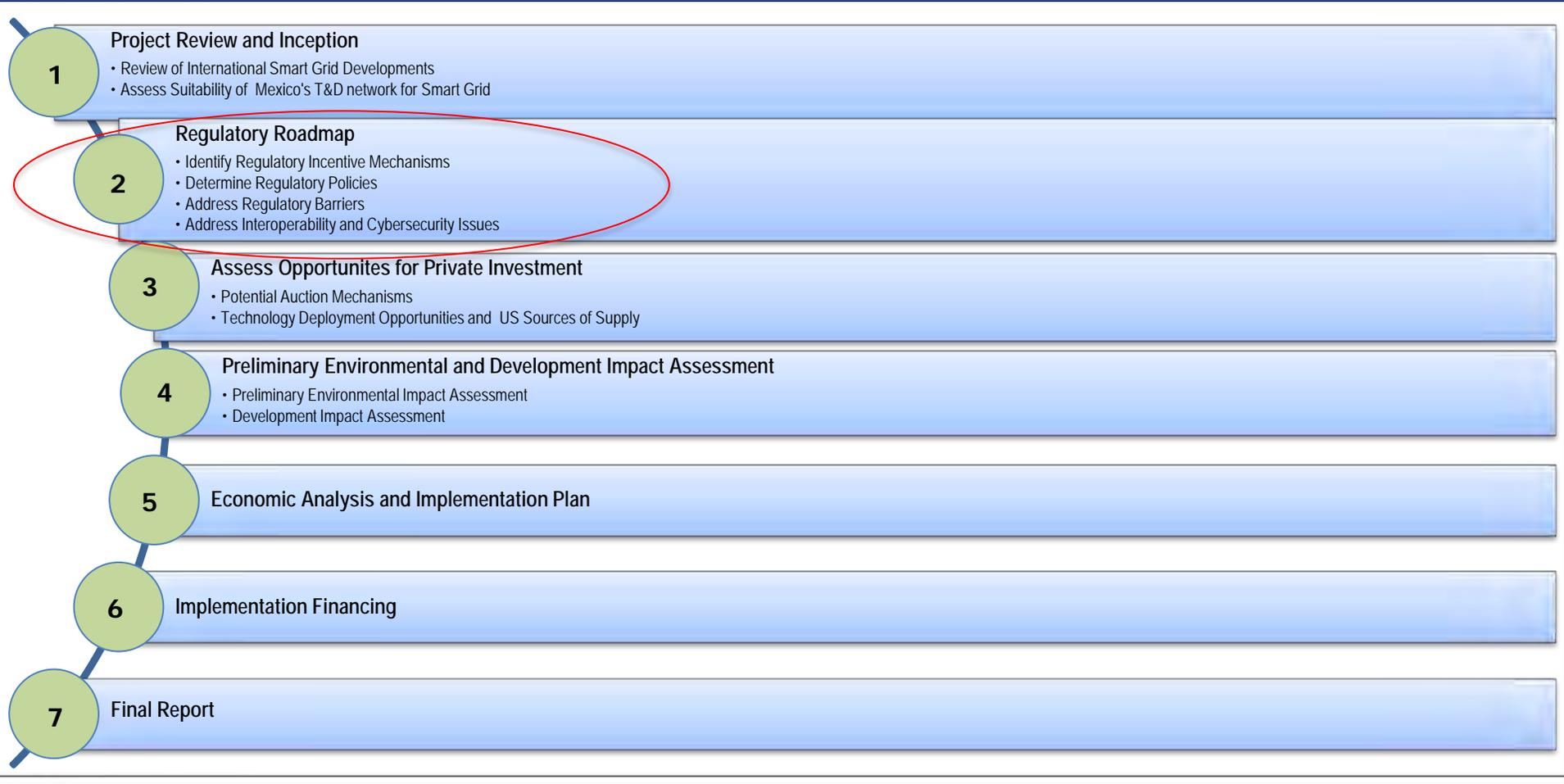




The 2014 Reform aims at introducing policies to foster RE in the new market: Smart Grid

- ✓ It is a way to referring to the modernization of electricity networks. The base of that modernization is the use of state-of-the-art technology to achieve important goals such as: better management of demand, improve efficiency, reduce loses and achieve higher integration of renewables to the grid.
- ✓ Smart Grid concept encompasses the complete chain of the Electric Sector: generation, transmission, distribution, marketing and consumption.
- ✓ The Energy Reform and the current transformation of CFE (our former monopoly and still the only utility in the country) is a great window of opportunity.

Smart Grid: Scope of Activities





Smart Grid: Roadmap fundamentals

- Take advantage of past experiences and the current regulatory framework: consider the adjustment of the existing regulatory instruments.
- The Roadmap has to be understood as a strategy to move forward. It will help to define how regulation should be developed to support further the Smart Grid implementation in Mexico.

The smart grid is not a “luxury”, its implementation can be crucial to achieve better performance and integrate variable loads from RE generation units.



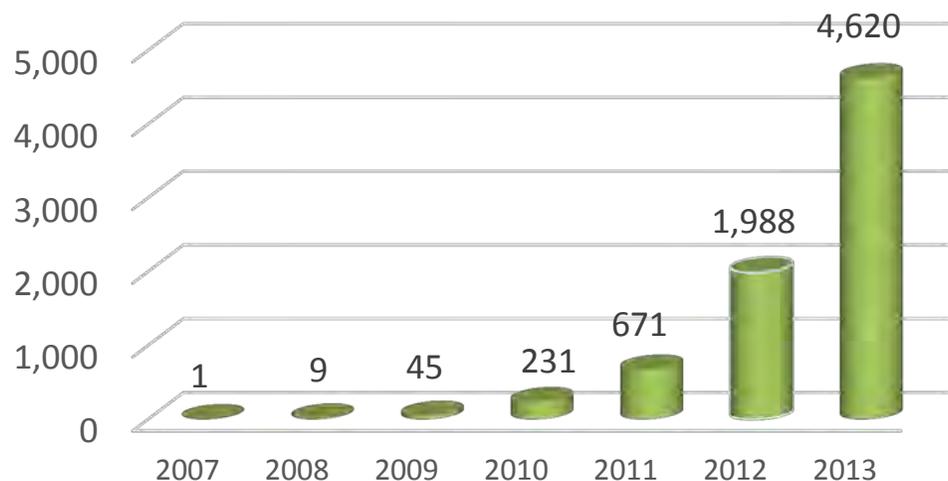
The 2014 Reform aims at introducing policies to foster RE in the new market: Distributed Generation

Distributed Generation

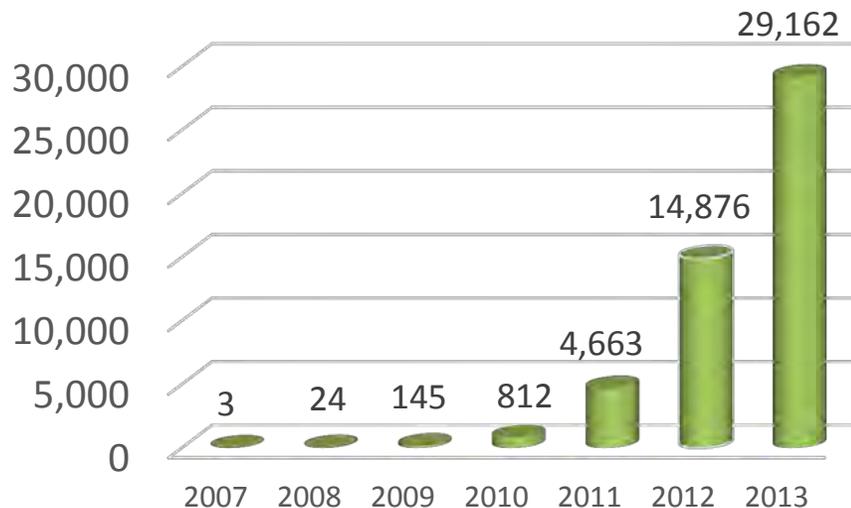
- The Electricity Industry Act provides for the development of policies to guarantee efficient interconnection and the possibility to sell energy to CFE or other market agents.



Number of Net-Metering contracts and installed distributed capacity as of December, 2013.



kW





Thank you!

www.cre.gob.mx