Status-quo and challenges of the Mexican electricity reform

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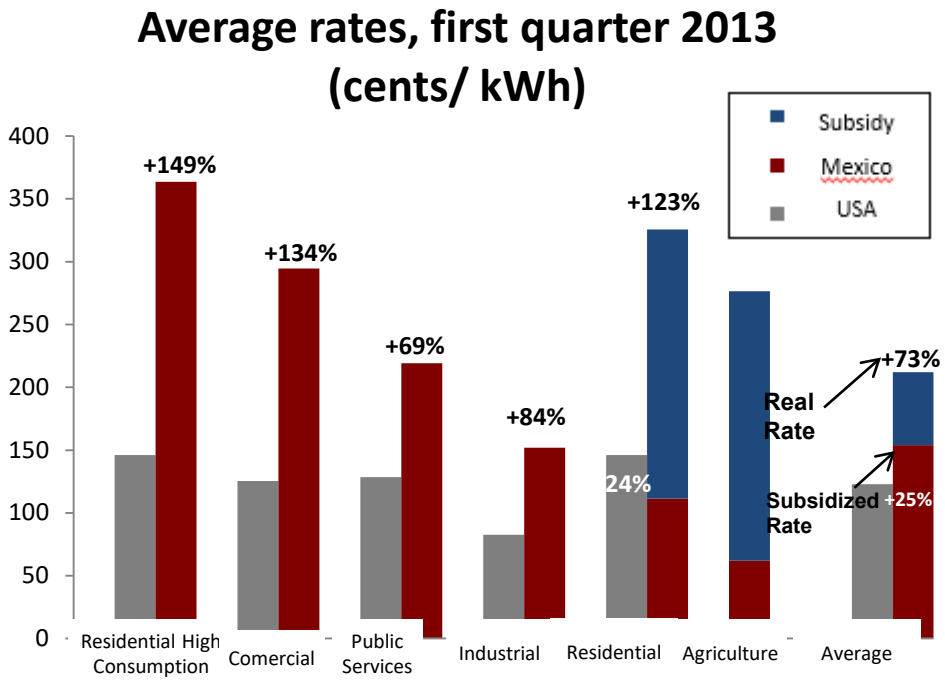
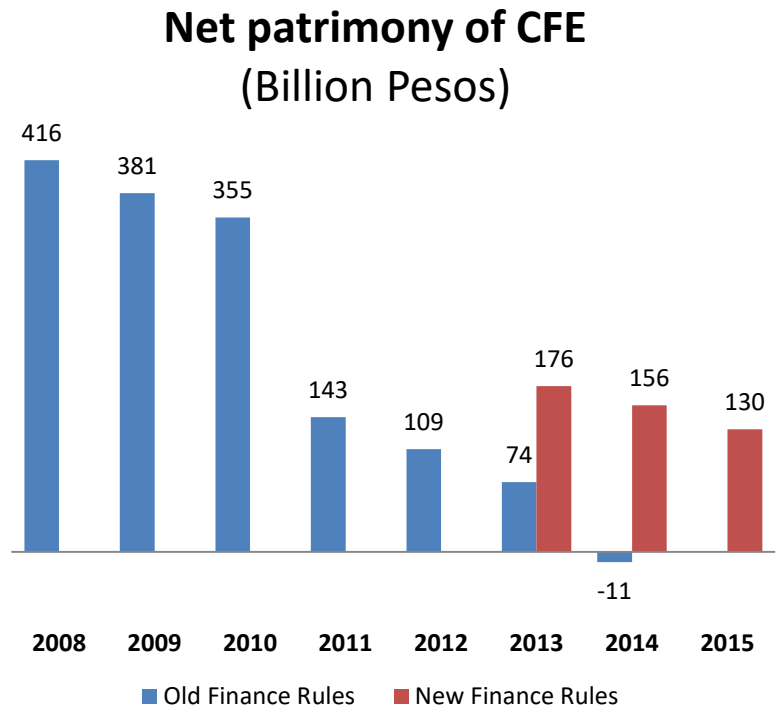
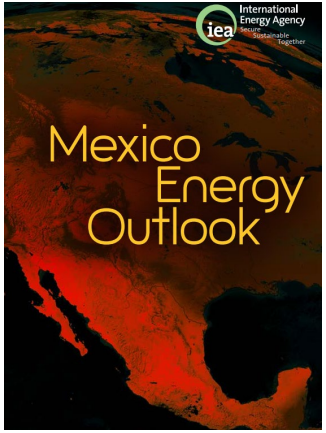
Diagnosis: Energy Tariffs and CFE



Source: Energy Information Administration – EIA (USA)
USA Tariffs converted to pesos considering 12.64 MXP/USD, daily average from the first trimester of 2013.

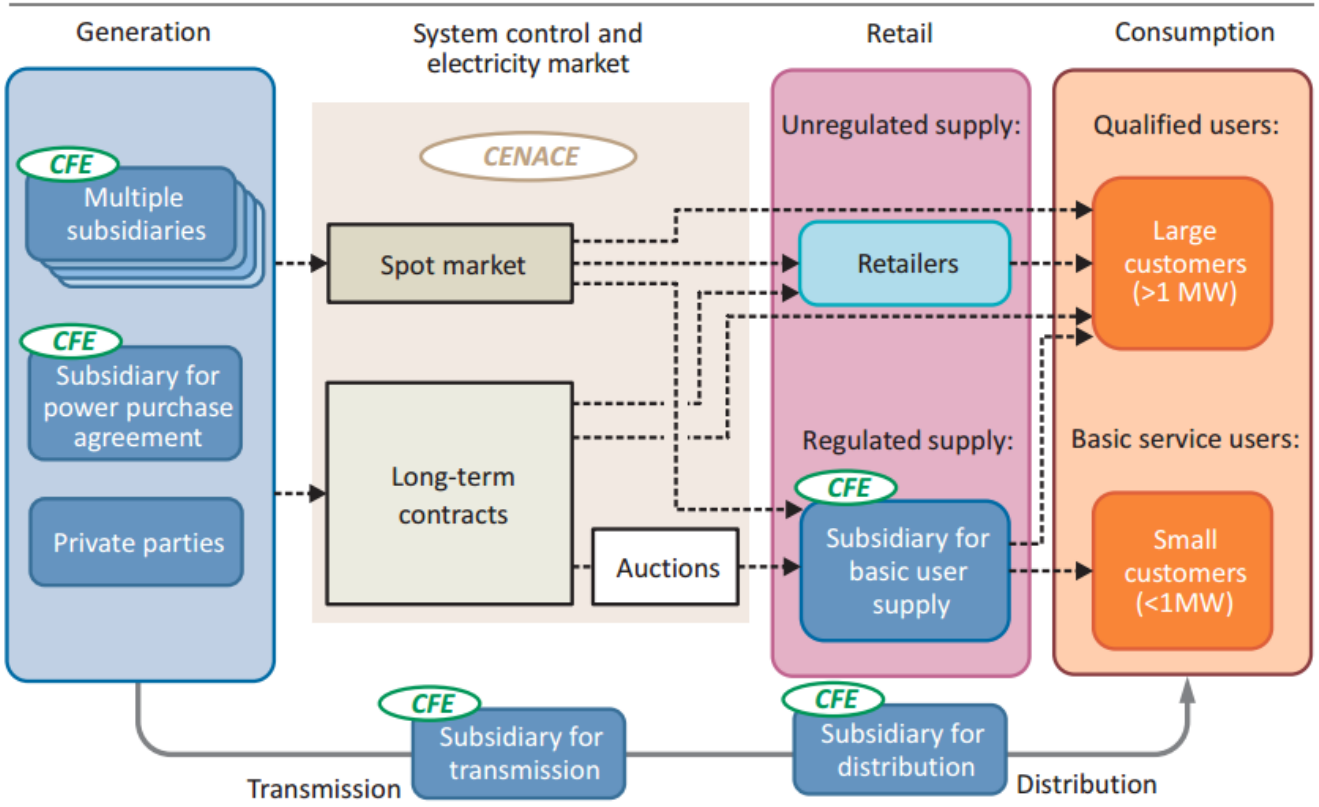


Source: CFE Financial Statements; Finance Division 2012 of CFE



https://www.iea.org/publications/freepublications/publication/MexicoEnergyOutlook.pdf

Figure 3.7 ▷ **New structure of the power sector in Mexico**



The power sector in Mexico is set to become competitive, as CFE is unbundled both vertically and horizontally

Source: Mexico Energy Outlook, 2016, OECD/IEA

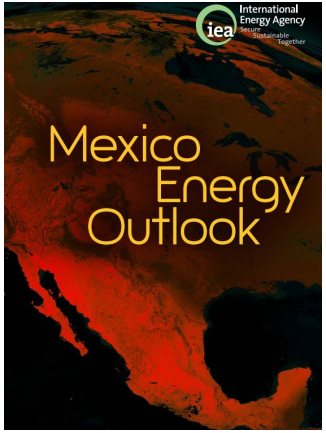
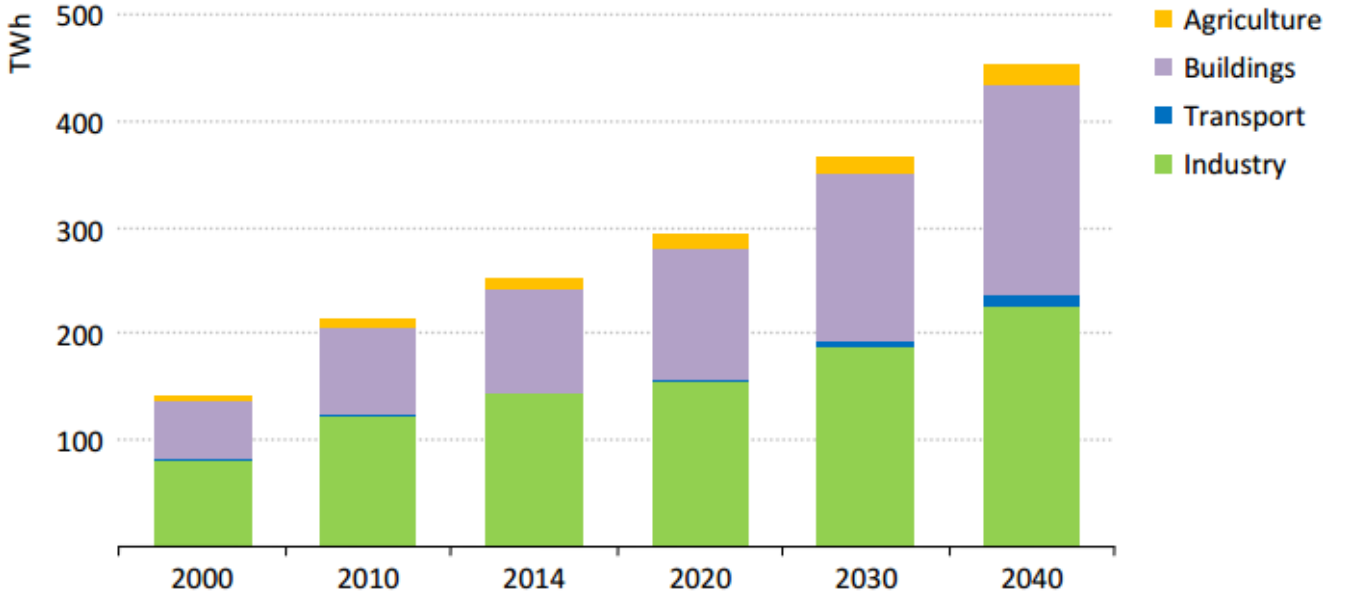


Figure 2.4 ▷ **Electricity demand by sector in Mexico in the New Policies Scenario**



Industry remains the largest electricity user in Mexico in the New Policies Scenario, although buildings sector demand rises more quickly

Note: TWh = terawatt-hours.

Source: Mexico Energy Outlook, 2016, OECD/IEA

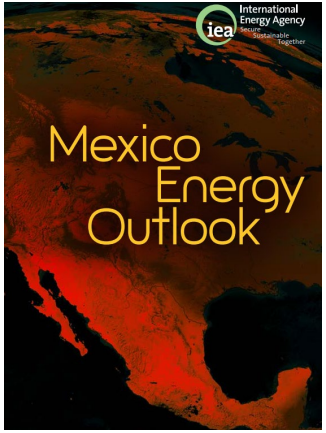
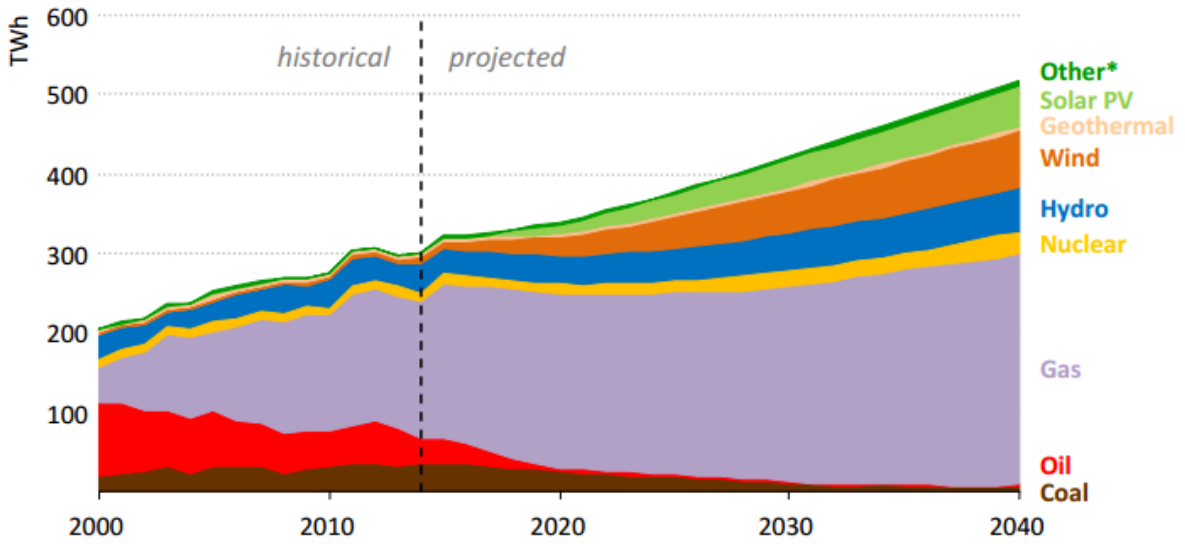


Figure 2.6 ▷ **Electricity generation by source in the New Policies Scenario, 2000-2040**



The power generation mix in Mexico becomes steadily more diverse and less carbon-intensive in the New Policies Scenario

*Other renewables include bioenergy and concentrating solar power.

Source: Mexico Energy Outlook, 2016, OECD/IEA

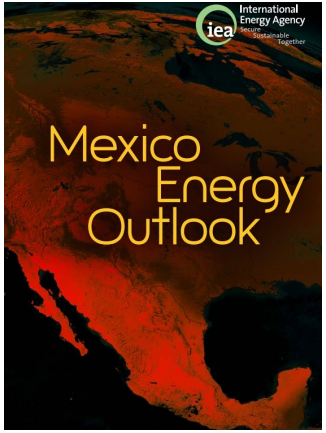
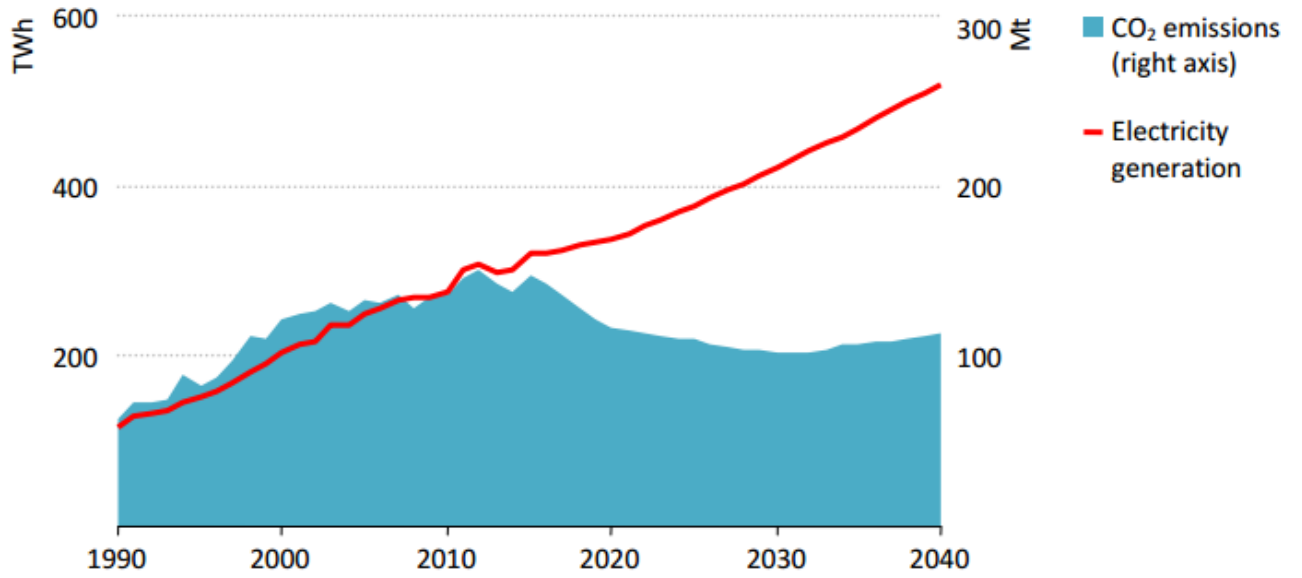


Figure 2.19 ▻ **Electricity generation and energy-related CO_2 emissions, 1990-2040**

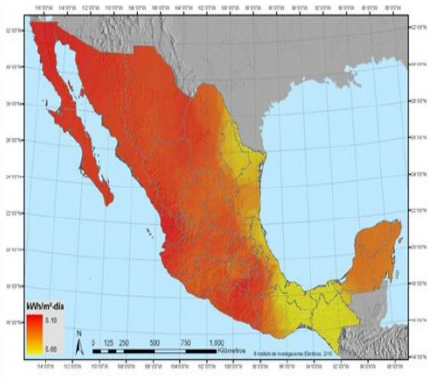


Note: Mt = million tonnes.

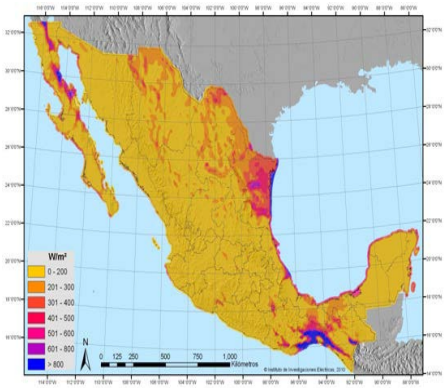
Source: Mexico Energy Outlook, 2016, OECD/IEA

Clean energy potential in Mexico

Solar Resources



Wind Resources



Geothermal Resources

	Installed Capacity 2° semester 2014 (MW)	Renewable Energy Potential			
		Actual Generation Year 2013 (% of total GWh)	Actual Generation + Proven Resources	Actual Generation + Proven Resources +Probable Resources	Actual Generation + Proven Resources +Probable Resources +Possible Resources
Wind	1900	1.38%	5.30%	5.30%	34.80%
Geothermal	823	2.04%	2.22%	22.52%	40.03%
Solar	64	0.01%	0.65%	0.65%	2,189.40%
Mini Hydro	419	0.54%	1.72%	9.48%	24.35%
Total	**3206**	**3.97%**	**9.89%**	**37.95%**	**2,288.59%**

Source: SENER

Regulatory reform on renewables in Mexico

- Mexico: 13th largest GHG emitter in the world (Mexico represents approximately 1.4% of global emissions)
- Ambitious GHG reductions goals adopted in Paris COP 21
- 35% and 43% of domestic energy should come from renewable sources by 2024 and 2030, respectively

Regulatory reform on renewables in Mexico

- CEL markets
  - Different schemes to foster renewable electricity technologies
  - Direct subsidies
  - Feed in tariffs
  - CEL (or CEC) markets
- Renewable auctions with premia
  - Designed for CFEs public service
- PV Solar Distributed Generation

PV solar distributed generation

- 90% of total energy consumed in Mexico comes from fossil fuels, including more than 70% of electricity generation
- Generation explains more than 20% of total GHG emissions; residential sector accounts for 25% of total electricity consumed
- More than 75% of the country has an isolation greater than 5 kWh/m^2/day. Mexico's solar potential could be considered among the largest in the world (SENER, 2016)
- Aligning policy objectives to reduce subsidies, households' electricity expenses and GHG emissions

PV solar distributed generation

Hancevic P. I., Nuñez, H. M. and J. Rosellón (2017), "Distributed Photovoltaic Power Generation: Possibilities, Benefits, and Challenges for a Widespread Application in the Mexican Residential Sector," Energy Policy, Volume 110, November 2017, Pages 478-489 https://www.sciencedirect.com/science/article/pii/S0301421517305529

Table 10
Annualized savings, payback period and internal rate of return, when opportunity co pricing is implemented.

Tariff class	Levelized savings (USD/year)		Payback period (years)		IRR (%)
1	41,0	(19,4)	11,7	(1,1)	10,8%
1A	46,0	(22,1)	11,9	(1,3)	10,5%
1B	47,2	(22,8)	12,9	(1,6)	9,2%
1C	59,0	(28,0)	14,0	(1,7)	7,8%
1D	66,3	(32,4)	14,4	(1,4)	7,8%
1E	77,1	(34,4)	14,9	(0,5)	8,7%
1F	77,2	(35,0)	16,0	(0,2)	8,3%
DAC	729,0	(150,7)	5,1	(0,5)	26,3%

Source: own elaboration using ENIGH 2014 and CFE.
Standard deviations in parenthesis.

Table 12: Relative change in household welfare by distribution region when opportunity cost pricing is implemented

Tariff class	mean	standard deviation
1	10.4%	(10.3%)
1A	13.8%	(10.6%)
1B	13.5%	(10.6%)
1C	14.0%	(9.2%)
1D	19.9%	(15.2%)
1E	28.3%	(19.1%)
1F	28.7%	(21.7%)
DAC	44.1%	(34.0%)

Source: own elaboration based on ENIGH 2014 and CFE.

- Regressively subsidized residential tariffs:
  - Fiscal burden represents more than 0.5% of the GDP. This happens in a country where poverty and inequality are significantly high

Concluding remarks

- Mexico possesses enormous potential on renewable energy.
- But is an accelerated decarbonization process a good idea for Mexico, in FINANCIAL terms?
- Will CFE count with the needed resources to meet by itself demand growth?
- Or will private investment also be needed?
- What is the future of renewable energy auctions?