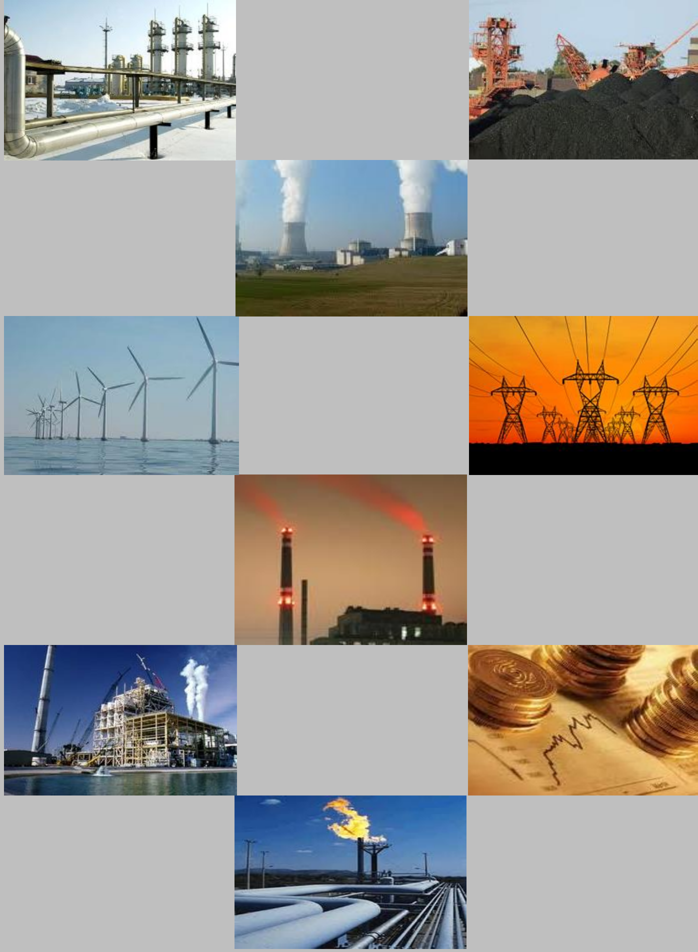
Current International Perspectives on Recent Market Developments in Mexico



Opportunities and Challenges

Presented to: NARUC 2019

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Development in Mexico

Drivers in the First Year of the AMLO Administration, Who Is Involved

- For CFE, development closely linked to the growth of natural gas fired resources and avoidance of retirements to retain wholesale market share.
- For the private sector, renewable energy resources remain the focus which likely ultimately will require larger amount of variable resources to be integrated.

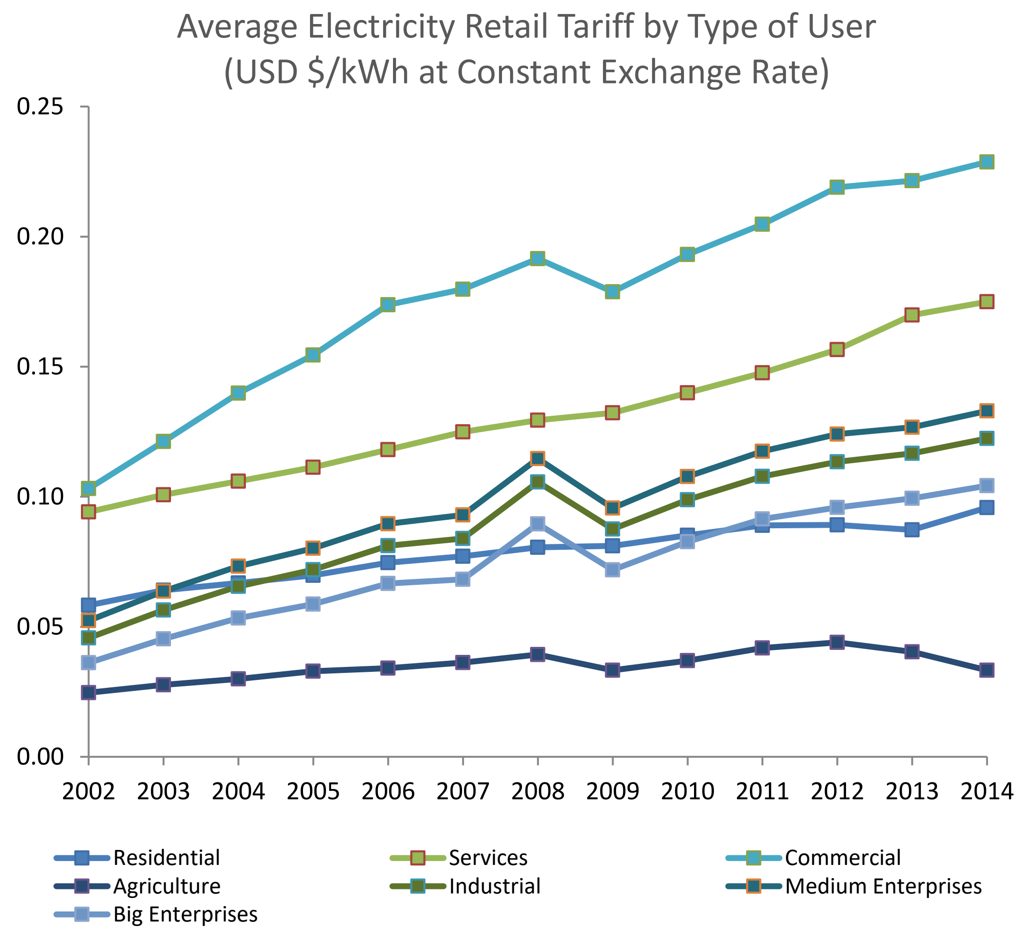
Acronym	Title/Function
SENER	Ministry of Energy
SHCP	Ministry of the Treasury
SE	Ministry of the Economy
SFP	Ministry of the Controller
CFE	Modernization, Distribution, Customer Services, Operations
CENACE	ISO, including Planning, Transmission, Generation
CRE	Regulatory Commission
CONUEE	Energy Efficiency Commission
PROFECO	Consumer Protection Agency
NOM	Standards Organization

Source: Que

Mexico Retail Electricity Prices

Tariff Structures Leading To the 2013 Reform

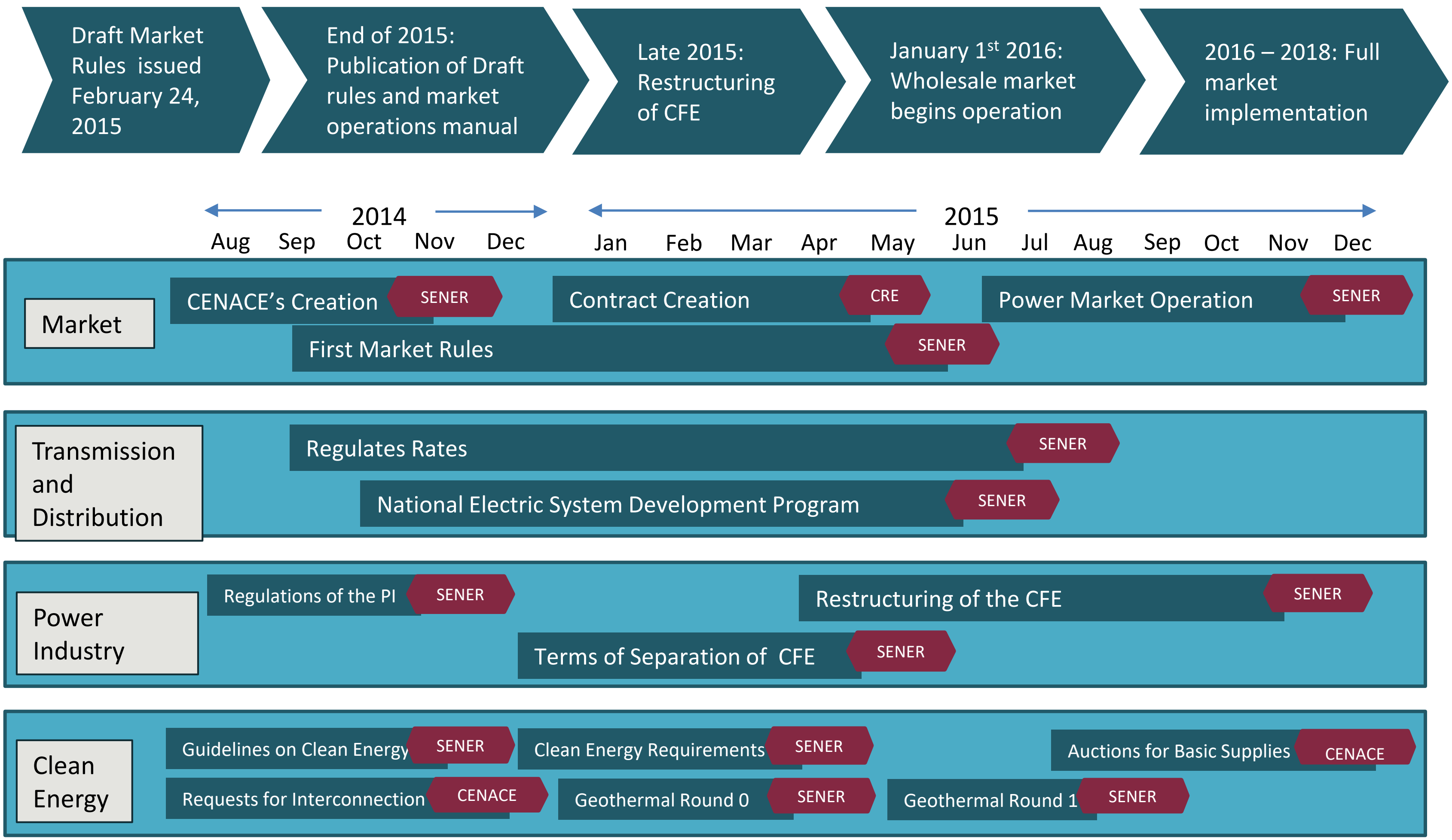
- Retail electricity prices in Mexico varied widely between different consumer classes and regionally.
- Agriculture and Residential consumers had the lowest tariffs, with agriculture clients paying less than a third of the second least expensive group.
- Medium and large enterprises paid roughly the same tariffs as industrial and residential clients.
- Customers in the services and commercial sectors paid the highest retail tariffs.



Source:. CFE, CRE, SENER, Que Advisors

Mexico Electricity Sector Reform

Initial Timeline

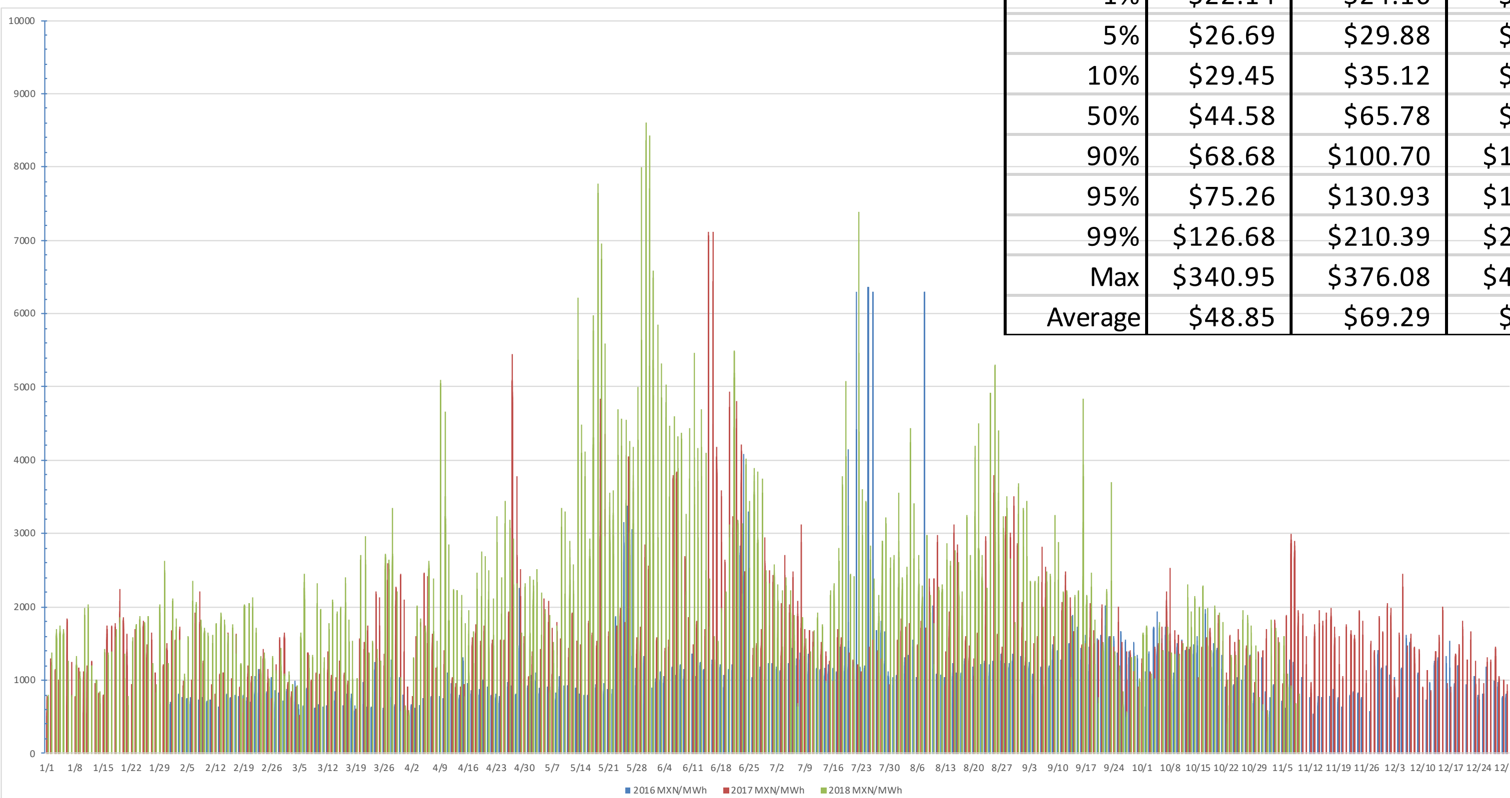


Source: CFE, CRE, SENER, Que Advisors

Mexico Wholesale Production Costs

Sample Region

Feb-Nov	2016	2017	2018
Min	$17.25	$19.06	$7.34
1%	$22.14	$24.16	$16.14
5%	$26.69	$29.88	$26.75
10%	$29.45	$35.12	$31.25
50%	$44.58	$65.78	$83.48
90%	$68.68	$100.70	$141.87
95%	$75.26	$130.93	$168.14
99%	$126.68	$210.39	$253.44
Max	$340.95	$376.08	$449.51
Average	$48.85	$69.29	$88.06



Source: CFE, CRE, Que Advisors

Investors During the Transition

Observations From the First Year of the AMLO Administration

Type	Description	Status
Traditional CFE RFP's	Power generation and gas pipelines.	Limited in 1H2019.
"Special Situations"	Border Gen/Transmission assets	Continue interest in 1H2019.
"Clean Energy"	Renewable generation – Project Development.	Slowed beginning 4Q2018; refined activities 1H2019.
"Clean Energy"	Portfolio Adjustment – New Investor Interest.	Continue interest in 1H2019. Structures and economics vary.

- 4Q2018 suspension of auctions have shifted focus to bilateral transactions for PPAs.
- Situation still challenging but some projects are moving ahead independent of CFE.
- Difficult to structure PPAs; few credit worthy marketing entities both QS and Aggregators. Project finance structures challenging; bias for larger amounts of equity; favors corporates.
- SENER indicates possibility exists for new auctions in "special situations".
- Overall, investment depends in part on market design specifics that CENACE, CENAGAS, and stakeholders develop as well as forthcoming policy vehicles.
- International investors have questions/concerns about CFE gas pipeline renegotiation process.
- Recent revisions to the role of CFE would benefit from greater industry consensus.

Source: Que Advisors

Mexico Electricity Sector Reform

Observations About the First Year of the AMLO Administration

Milestones Reached

- Independent system operators CENACE and CENAGAS established and functioning.
- Initial market design largely implemented.
- System expansion plans continue to be presented (PRODESEN).
- Initial CFE separation completed.
- Spot Market operations and reliability management continuing.
- Three auctions for long term energy and CEL contracts completed; currently suspended.

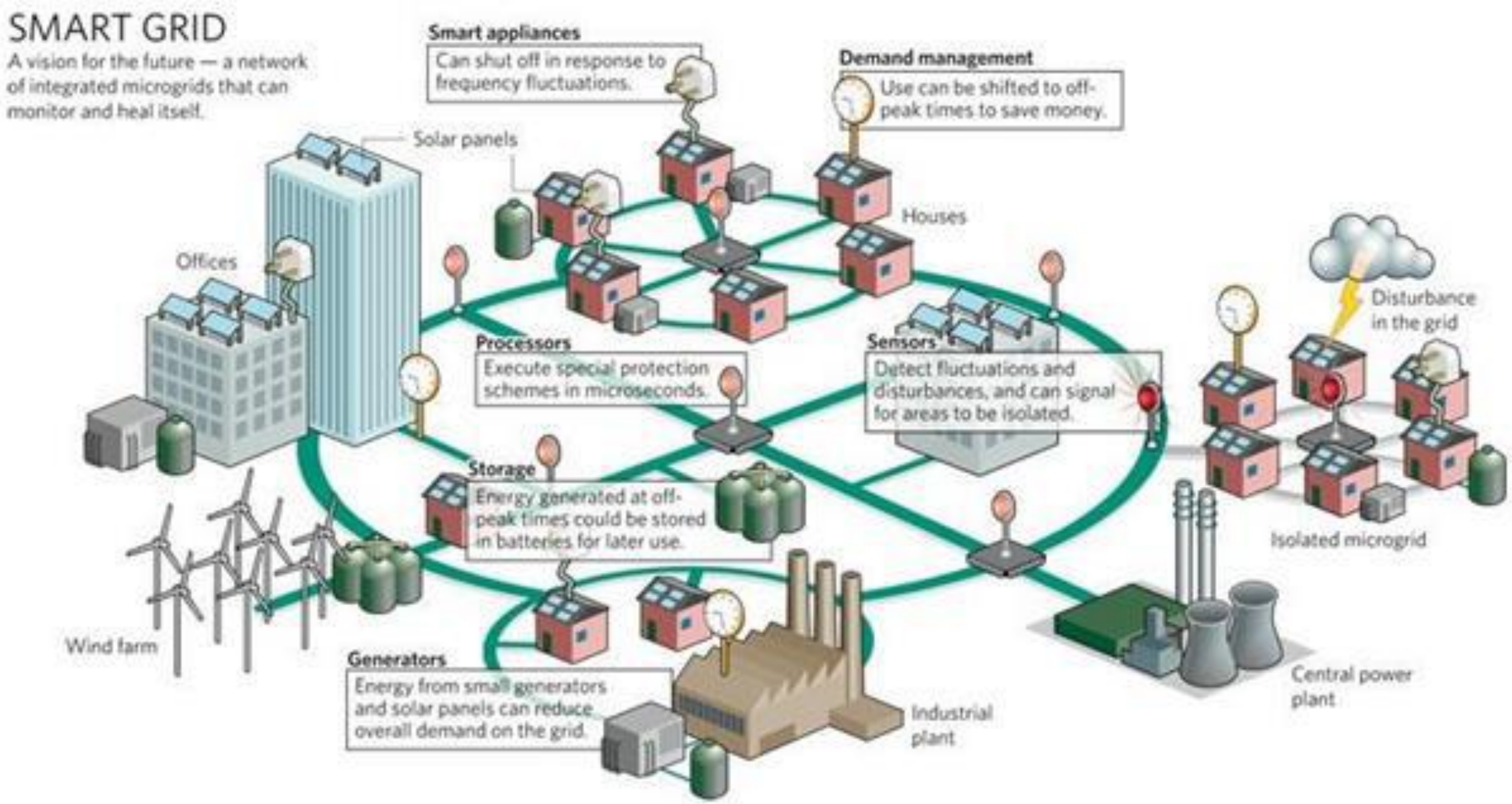
Next Steps

- Need consensus for revised market design and enhancements; long term auction process and revisions not clear; centralized institutions not fully implemented or not operational.
- System expansion plans presented; questions remain among industry participants as to quantitative results; lack of consensus about operating reserve margin.
- Revisions to CFE separation lack industry consensus.
- Revisions to the role of CELs and long term commitments to CEL process and Paris accords not clear; recent pilot for managing greenhouse gases under review by industry participants.
- Need process for future transmission additions; not currently clear.

Source: SENER, Que Advisors

CFE View of Smart Grid

Traditional Components, Changing Rules, Implication for Implementation



Source: CFE

Smart Grid Drivers

Vary Globally

	CFE	Latin America/Caribbean	Europe/Eurasia	Middle East/Africa	Asia/Oceania
1	Lowering power losses in the national system	Reliability Improvements	Integration with Renewable Energy	Optimizing Energy Consumption	Reliability Improvements
2	Enterprise Architecture for IT	Power Quality Improvements	Demand Response and Management	Reducing Operating and Maintenance Costs	Power Restoration Improvements
3	Strengthening customer comm systems	Improving revenue collection and assurance; reduction of commercial losses	Reducing Operating and Maintenance Costs	Reducing Losses	Optimizing Energy Consumption
4	Asset Management Systems	Power System Restoration Improvements	Integration of Distributed Energy Resources	New and Improved Services for the Customer	Reduce Operating and Maintenance Cost
5	Institutional system of GIS	Energy Efficiency	Power Quality Improvements	Improved Revenue Collection and Assurance	Power Quality Improvements

Additional Mexico-Specific Issues: Retail Customer Classes, Retail Subsidies, Energy Poverty, Unmet Demand, Market Rules in Transition, Interconnection Rules and Long Implementation, CEL Credits, Capacity Market Participation.

Source: ESTA international survey of International Smart Grid Drivers, Que Advisors