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Cleantech for Latin America



# Renewable Energy in Mexico's Northern Border Region

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# Renewable Energy Today

- Mexico has reached 25% of installed capacity from renewables mainly through the growth of wind energy.
- 35% generation goal by 2024 can be achieved through a combination of technologies and business models

	2010	2014
Total Installed capacity	60,072 MW	62,233 MW
Hydroelectric	19.3%	20%
Wind energy	0.7%	3.1%
Geothermal	1.6%	1.3%
Solar	0%	0.1%
Biomass and biogas	0.1%	0.3%

# SENER Scenarios (2014)

	2014	2028
Total Installed capacity	62,233 MW	107,503 MW
Hydroelectric	20%	14.6%
Wind energy	3.1%	11.5%
Geothermal	1.3%	1.0%
Solar	0.1%	1.7%
Biomass and biogas	0.3%	0.3%

12,362 MW of wind

1,827 MW of solar

# New Electric Industry Law

- Reform Creates Late 20th Century Electric Market:
  - Centralized planning
  - Wholesale, commercialization and retail
  - National clean energy targets
  - Large scale infrastructure and players
- Distributed energy not fully taken into account
- Green package stuck in Senate
- Local governments still play a minor role in Mexico

# Mexico's Northern Border



- The six border states are an economic powerhouse:
  - 22% of Mexico's GDP
  - **33%** of electricity **use**
  - 38% of electricity generation
- But **95%** of their installed capacity is from **fossil fuels**

# **Electric Control Regions**



# Baja California



- Most "dynamic" electricity market in the whole country (export-import, selfsupply)
- Most important geothermal project with 570 MW
- First state to own and operate a 10
  MW wind farm
- Recently announced 150 MW project to supply state government

# Baja California



# Baja California

Eighth largest state in Small and Medium scale solar with **2.6 MW** accumulated capacity



# Chihuahua



- State with the highest energy intensity for its GDP = 30.53 GWh/million MXP
- Largely dominated by fossil fuels representing 98.6%
- Only **1.4%** from hydroelectric and biogas, including second largest municipal landfill biogas project

### Chihuahua



# Chihuahua

Third largest state in Small and Medium scale solar with 6.9 MW accumulated capacity, similar to installed biogas capacity



# Coahuila



- Relies the most on **coal power** plants for electricity generation (90.1%)
- Wind power to supply the mining industry with a projected installed capacity of 550.6 MW
- The state government and the municipalities of Torreon and Matamoros municipalities are expected to be supplied by a 20 MW solar project

# Coahuila



# Coahuila

Fourth largest state in Small and Medium scale solar with **3.9 MW** accumulated capacity



# Nuevo Leon



- **100%** of public service\* electricity from **fossil fuels**
- Installed capacity from self-supply projects adds up an additional 1,175 MW
- **60.56 MW** (biogas and wind) from renewables for state and municipal government off-takers
- Self-supply market is actually larger, with large corporations involved in energy generation projects elsewhere (mainly wind in the state of Oaxaca)

### Nuevo Leon



#### Nuevo Leon

Second largest state in Small and Medium scale solar with **12.1 MW** accumulated capacity, with 7 MW installed in 2014 alone



# Sonora



- 94% of its installed capacity relies on fossil fuels
- **163.7 MW** of hydroelectric power
- The vast majority of the 1190 MW of solar projects are under the small power producer legacy modality, with some for self-supply to automobile industry and municipalities
- Mining industry developing 37 MW of hydroelectric power

#### Sonora



#### Sonora

Tenth largest state in Small and Medium scale solar with 2.4 MW accumulated capacity



# Tamaulipas



- Tamaulipas is the top electric power generator state in northern Mexico, and second after Veracruz.
- Responsible for **12.7%** of the national public service generation
- **97.6%** of installed capacity if from fossil fuels
- 33 MW of hydroelectric power and a recently inaugurated private 54 MW wind farm

# Tamaulipas



# Tamaulipas

Eighteenth largest state in Small and Medium scale solar with **1.3 MW** accumulated capacity, of which more than half was installed in 2014 alone



# A New Border?



### Small and Medium Solar



#### Additional installations per year (kW)

# Energy at the Border

- Plentiful geothermal, wind and solar resources.
- All have set up an energy agency, commission or office.
- Municipalities of Nuevo León were the first to embrace renewable energy (landfill biogas) for public lighting
- Baja California is a rare example of a subnational government that owns and operates a major wind project.

# Obstacles and Challenges

- Regulatory permitting and interconnection agreements
- Land Use known issue for developers
- Financial unclear incentives beyond CEC
- Security slowdown in some high-potential areas such as Tamaulipas
- Transmission capacity permitting for large scale projects

# **Policy Recommendations**

- Renewable energy generation goals at the regional level (for each electricity control regions) through complementary mechanisms
- Set aside a percentage for small-scale Clean Energy Certificates with to promote distributed generation (similar to Australia)
- Strengthen state government energy agencies and encourage the participation of state-level institutions

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