



Renewable Energy Resources in Mexico

Workshop on the United Nations Framework Classification for fossil energy and mineral reserves and resources (UNFC)
September, 2012



Sener-DGIDTMA www.renovables.gob.mx



GOBIERNO FEDERAL

SENER



Vivir Mejor

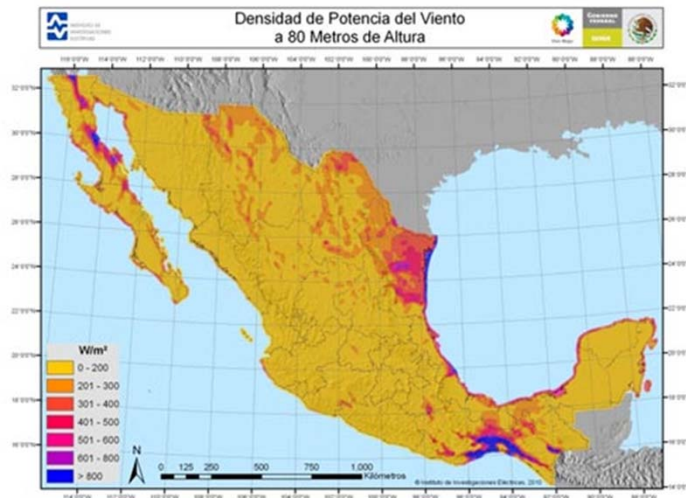
Renewable energies

As defined in the Renewable Energy Law, RE are those whose source reside in natural phenomena, processes or materials that can be transformed into useful energy, and that are regenerated naturally. This allows them to be continuously or periodically available.

Renewable resources are identified as:

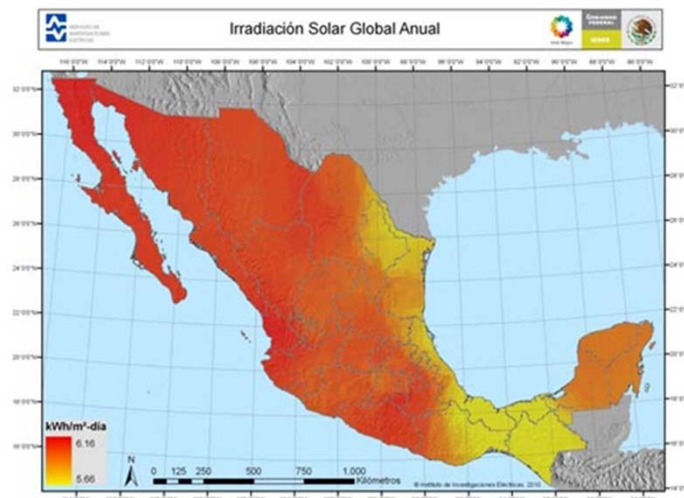
1. Wind
2. Solar radiation
3. Water motion in natural or artificial channels
4. Ocean energy (waves, currents, thermal and salt concentration gradient)
5. Geothermal
6. Biofuels/biomass
7. ...

Mexico has a tremendous potential for the use of its renewable resources...



- México has an average global radiation of 5kWhr/m²/day. This is twice the EU average.

- Oaxaca, Tamaulipas & Baja California present world-class wind sites. Estimates reach 20 GW of competitive wind with present technology.



Source: Sener with data from IIE and the industry.

Sener-DGIDTMA www.renovables.gob.mx

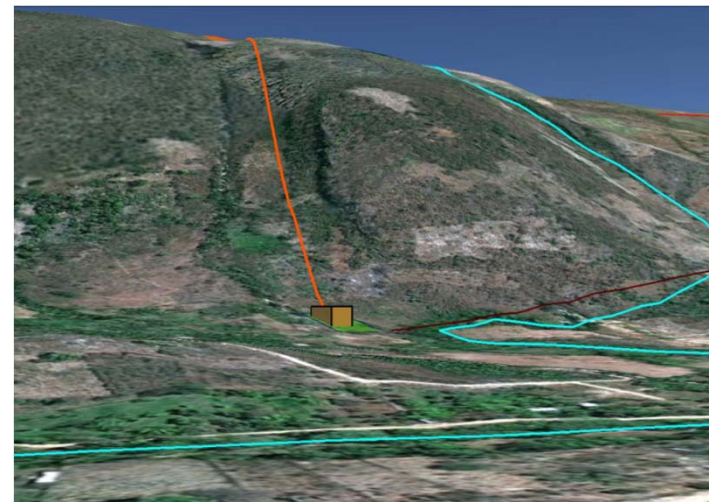
... its geographical location, orography, weather, coastline and biodiversity, are some of the key factors that improve the resource availability in the country.



- High enthalpy geothermal
- Mid-enthalpy geothermal
- Low enthalpy geothermal

- A 10,644 MWe potential is estimated for geothermal resources (low-high enthalpy).

- CFE estimates a 52 GW of hydro potential.
- There are at least 3.2 GW of small hydro potential in Veracruz and Puebla alone.



Source: Sener with data from CFE, Conuee and IDB.

Sener-DGIDTMA www.renovables.gob.mx

Recent studies size Mexico's competitive potential among several RE technologies.

	Wind	Geothermal	PV	Biomass/Biogaz (1)	CHP
Available resource [MW]	50,000.0	10,000.0	6,400.0	3,642.0	11,800.0
Competitive potential [MW]	12,000.0	2,200.0	1,500.0 (2)	1,500.0	8,000.0
Installed capacity [MW] (3)	1,009.7	889.5	32.3	34.2	3,651.2
Economic benefits if competitive potential reached					
GDP [millions of pesos]	\$ 167,000.00	\$ 95,400.00	\$ 31,400.00	\$ 37,500.00	\$ 300,000.00
Estimated investment [millions of pesos] (4)	\$ 356,400.00	\$ 117,300.00	\$ 81,000.00	\$ 53,600.00	\$ 108,000.00
Jobs	48,000	36,700	12,400	31,000	47,200
Taxes [millions of pesos]	\$ 1,100.00	\$ 8,000.00	\$ 2,600.00	\$ 3,100.00	\$ 25,000.00
Avoided emissions by 2020 [millions of t _{CO2e}]	13.0	8.4	1.4	5.4	18.0
LNG imports savings	12%	13%	NA	ND	35%
Local content		65%	65%		74%
Transmission and distribution losses reduction			2%		10%

1 Sugarcane projects included in CHP

2 Even though technology is not competitive yet with natural gas CC, the potential could be met through several competitive niches

3 Includes small scale projects

4 Source: Sener with data from studies and CRE

Legislation and regulation have been providing new tools for better assessing RE potential and favoring their position in the power sector.

- Project development by CFE and private companies (self-supply, IPP)
- Special Program that includes mandatory goals for RE
- Specific contract models that improve RE technologies economic performance
- Preferential wheeling costs for RE projects
- Externalities methodology to be included in short and long term planning of the power sector
- Preferential payment for competitive RE
- Contract design to improve projects bankability

Secretariat of Energy

¡Thank you!

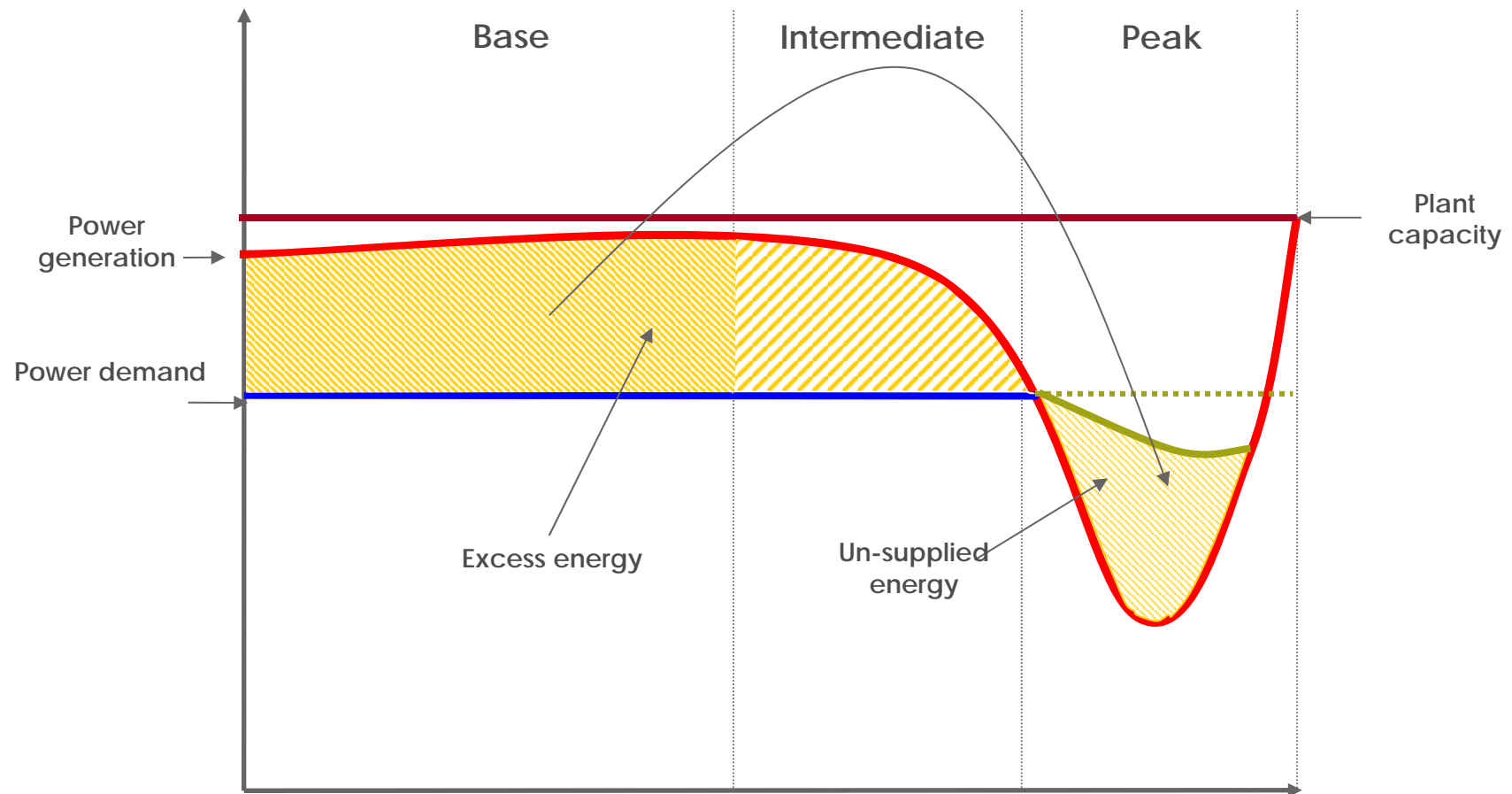
www.renovables.gob.mx

jvalle@energia.gob.mx

T (55) 5000-6000 ext. 1023



Interconnection contract “energy bank” simulation



Source: CRE

Sener-DGIDTMA www.renovables.gob.mx

The “Temporada Abierta” scheme derived on the committed development of 2,483 MW wind energy

- The installation of **new transmission lines and substations** project concluded in 2010.
- **875 MW operate** now in the area (only 2 MW in 2006) and **205 MW are committed** with the State Utility to operate in 2012.
- There are **1,277 MW private projects under development**, and 220 MW still being analyzed.



Source: Sener with data from CRE and CFE.

Sener-DGIDTMA www.renovables.gob.mx

Nowadays the Regulator works on the development of new “Open seasons”.

- On August 2011 the Regulator started a new process for the development of three new “Open seasons” in:
 - Baja California
 - Oaxaca
 - Tamaulipas
 - Puebla
- A great interest was received from developers and currently the infrastructure is being designed and the commitments are being confirmed.

Region	Number of applications	Total reserved capacity [MW]
Oaxaca	7	1,130
Tamaulipas	9	1,666.5
Baja California	8	885.5
Total	24	3,682