Energy in the California-Baja California Binational Region

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California Energy Commission Workshop

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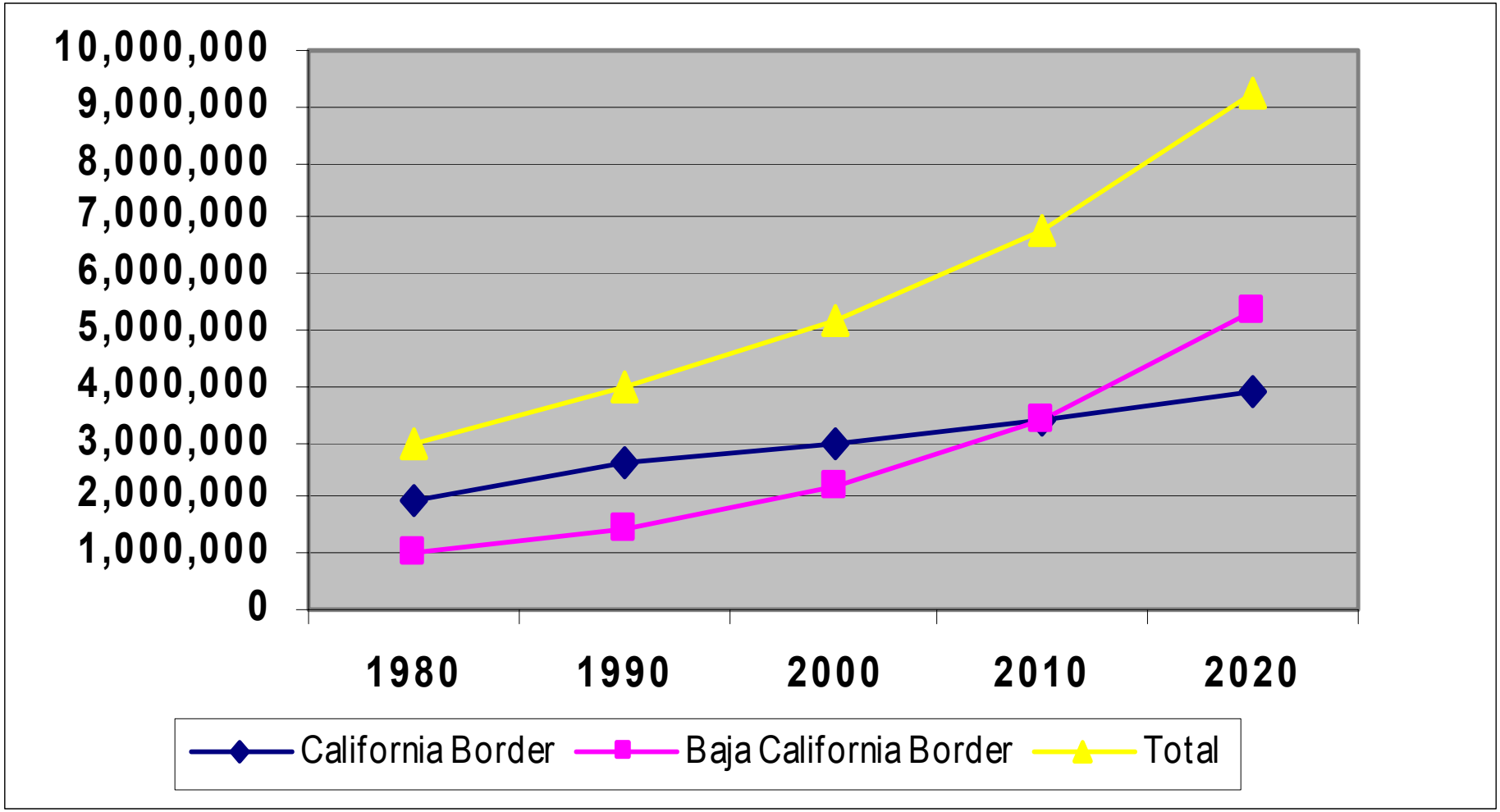
Energy in the Binational Region

- Energy features of the region.
- Energy infrastructure in the region.
- Role of renewable energy.
- Recommendations.

California-Baja California Binational Region

California-Baja California Border Population, 1980–2020



Source: *The U.S.-Mexican Border Environment: A Road Map to a Sustainable 2020*. San Diego State University Press. Paul Ganster, editor, 2000

Energy Features of the Binational Region

- **San Diego and Tijuana are almost *totally dependent* on energy resources from outside the region.**
- **Imperial and Mexicali region also heavily dependant on outside supplies. Exception is geothermal energy in the I-M Valley.**
- **Baja California is isolated from the main Mexican power and natural gas system. B.C. *is* connected to California power and gas transmission systems.**
- **Main energy resources used in region are oil, natural gas, geothermal and uranium. Very small amounts solar, wind, biomass and small hydro.**

Energy Features of the Binational Region

- **Demand for power in Baja California has been projected to grow by 6-7 % per year. *However, some recent information suggests lower growth rates, in the order of 2-3%.* San Diego forecasted demand expected to be 1.5% per year, at least for next 5-7 years**

- **Demand for natural gas in Baja California has been forecast to increase 7% annually for the next ten years. These high growth rates have also been recently questioned. In San Diego, growth in demand natural gas expected to be 1.6%.**

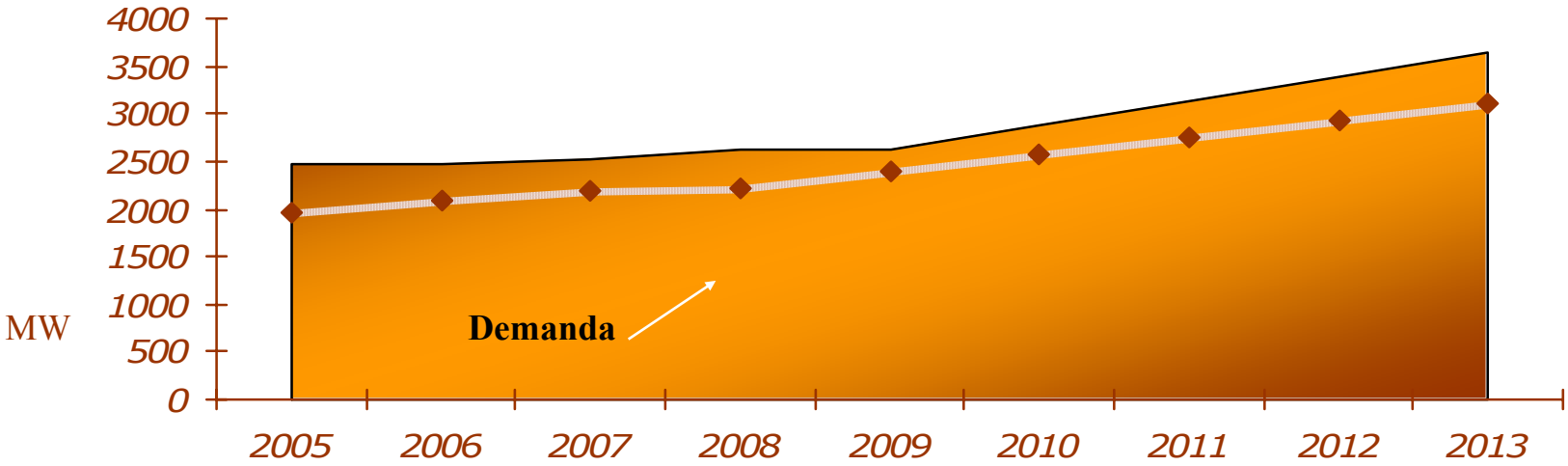
- **Power sector and fuels used for transportation are the main sources of air pollution in the region.**

- **Environmental effects of energy use are a shared problem, requiring a shared solution.**

Demand and Capacity Growth for Baja California

(October 2004)

	2005	2006	2007	2008	2009	2010	2011	2012	2013
DEMANDA TOTAL (MW)	1970	2079	2192	2228	2393	2561	2760	2940	3108
CAPACIDAD TOTAL (MW)	2465	2465	2514	2622	2622	2877	3130	3385	3635



Average annual demand growth - 7.2%

Average annual capacity growth - 5.9%

Adapted from: Ing. Jesús Moya Vázquez

Average Annual Growth Rates for Baja California (2001)

Load Forecast 2002-2007

Areas	Load Growth 1997-2002	Peak Load MW		Expected Load Growth 2002-2007
		2002	2007	
Tijuana	8.52%	530	793	8.3%
Ensenada	5.71%	141	189	6.11%
Mexicali	6.77%	843	1,190	7.14%
San Luis R.C.	4.10%	155	211	6.36%
Tecate	6.68%	30	43	7.38%
Total	**6.94%**	**1,699**	**2,426**	**7.38%**

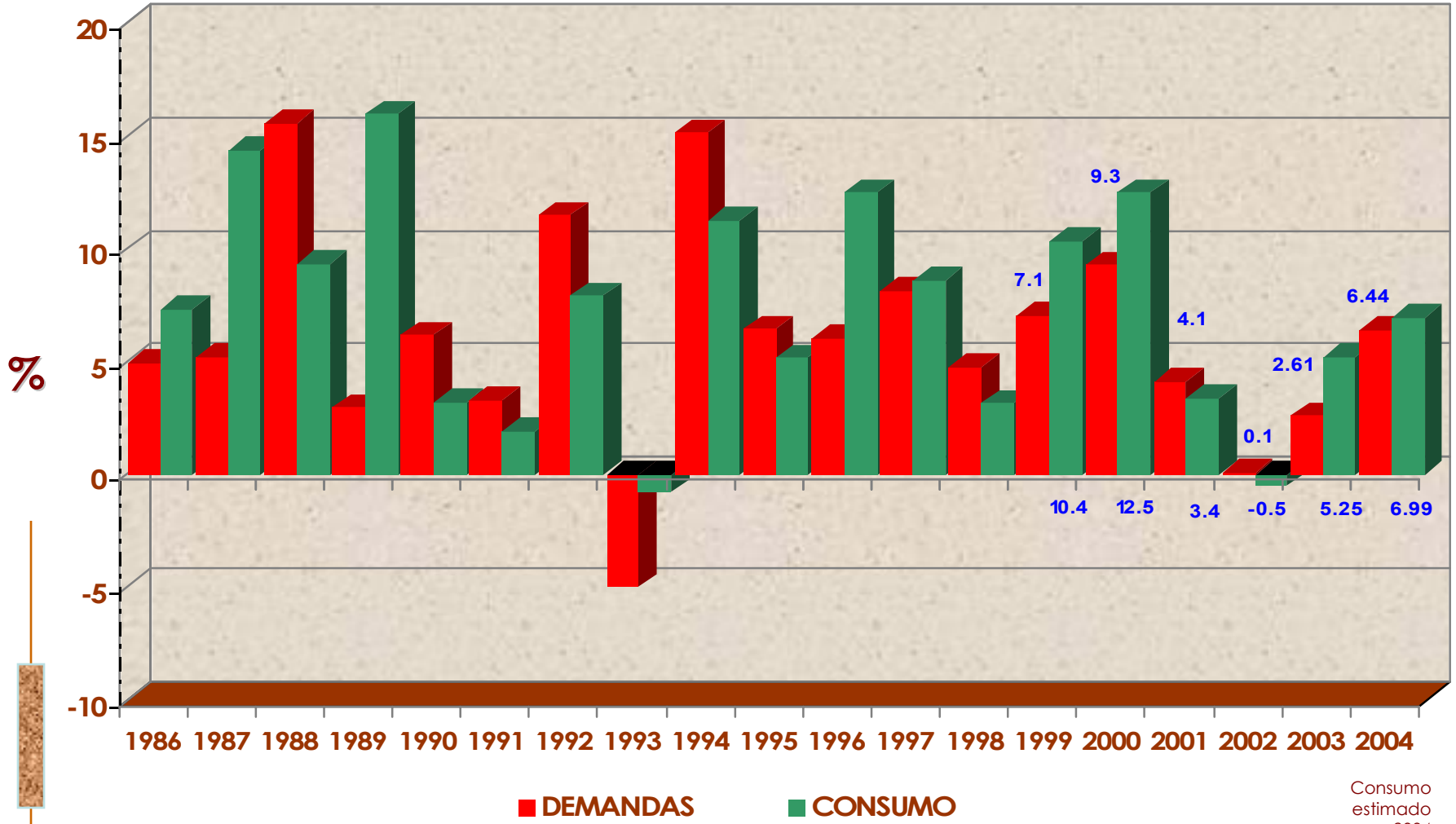
San Diego Growth: 1.5%: 2004 - 2009

CFE COMISION FEDERAL DE ELECTRICIDAD

CENACE

CRECIMIENTO DE DEMANDA Y CONSUMO DE ENERGIA 1986 – 2004

Baja California



Consumo estimado para 2004

Adapted from: Ing. Jesús Moya Vázquez

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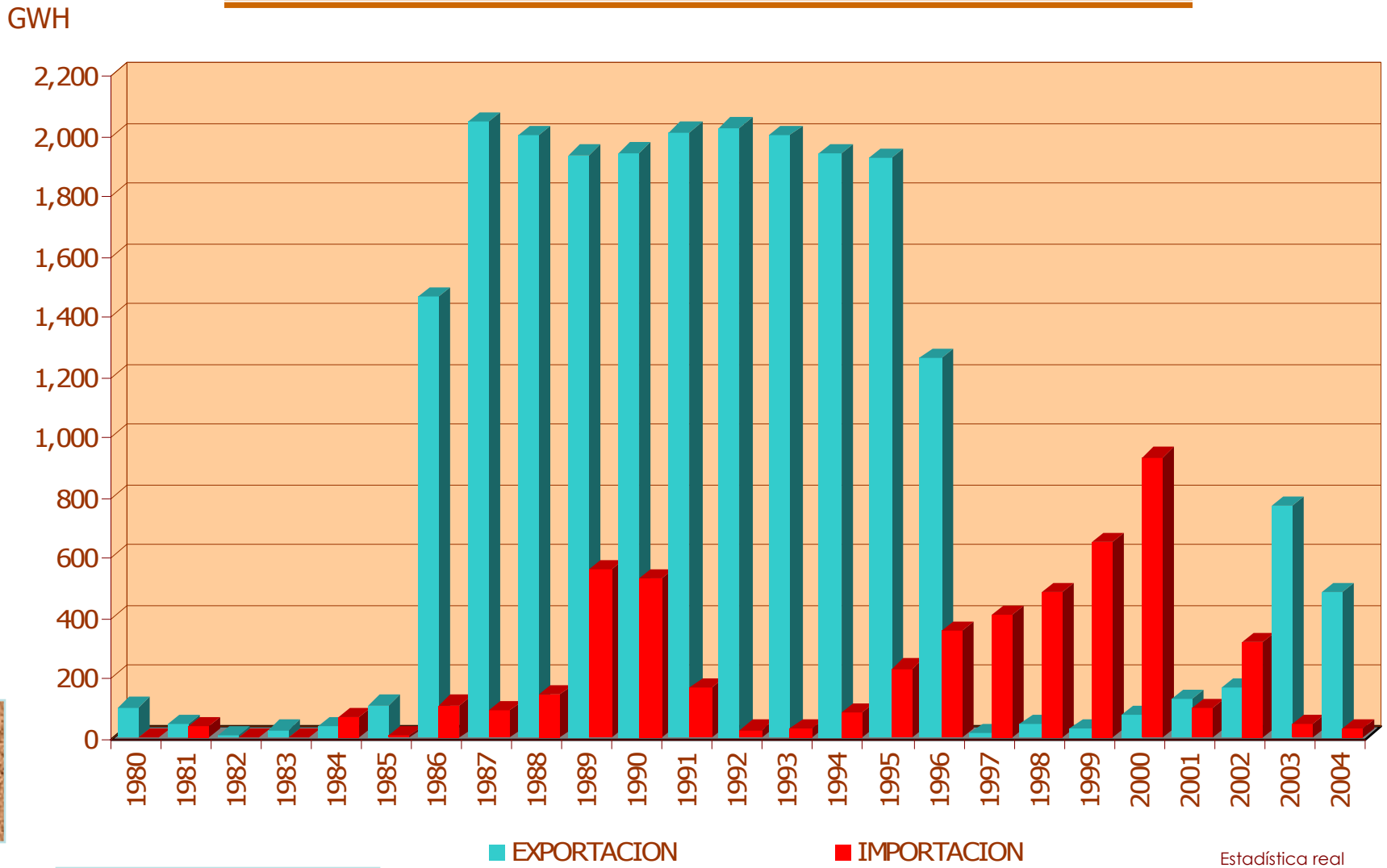
TRANSACCIONES DE ENERGIA EN EL SISTEMA B.C. 1980 - 2004



Estadística real hasta septiembre de 2004

Adapted from: Ing. Jesús Moya Vázquez

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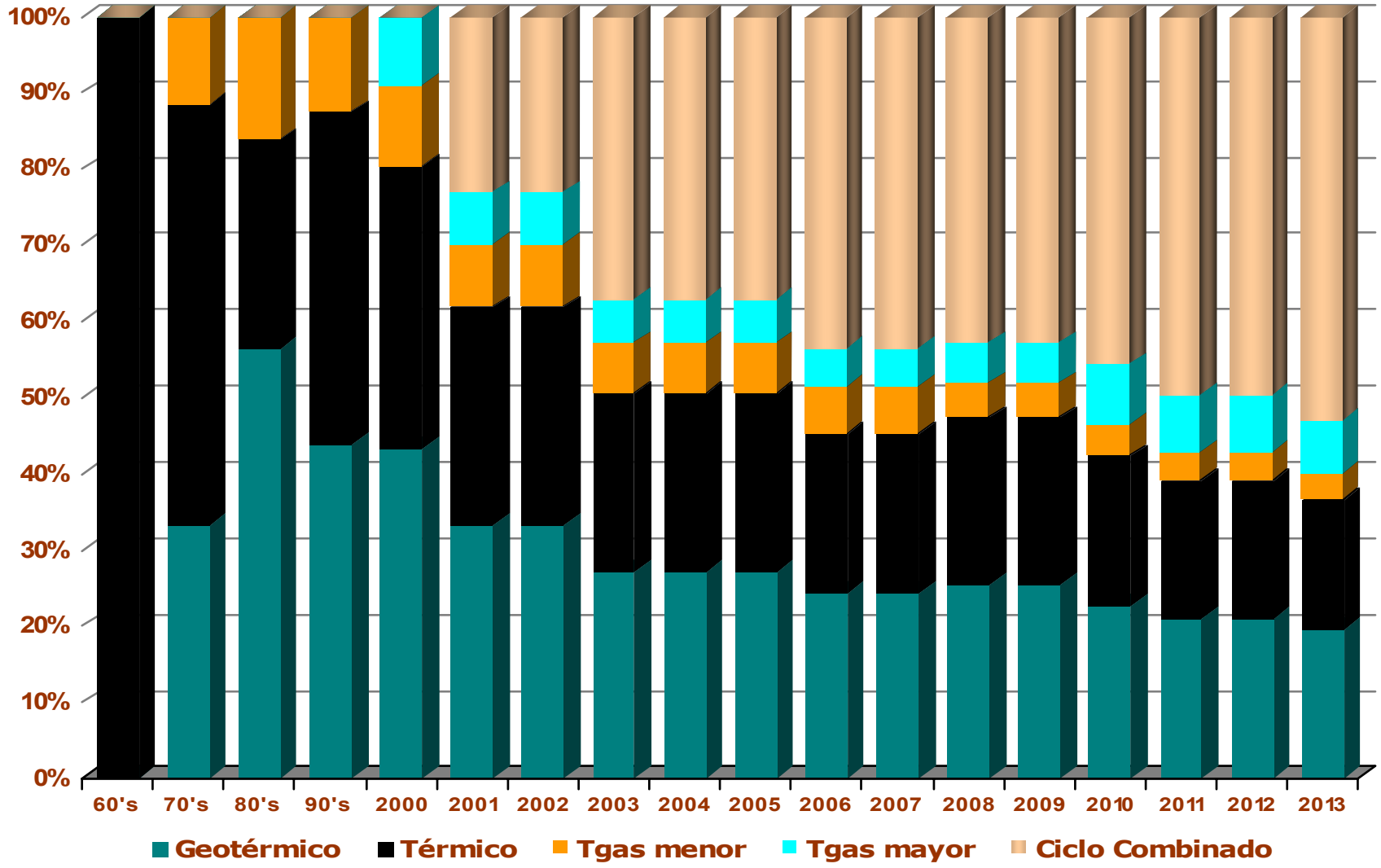
EVOLUCION DE LA EXPANSION DE GENERACION EN B.C.



Adapted from: Ing. Jesús Moya Vázquez

INFRAESTRUCTURA de TRANSPORTE de GAS

Adapted from: Ing. Jesús Moya Vázquez

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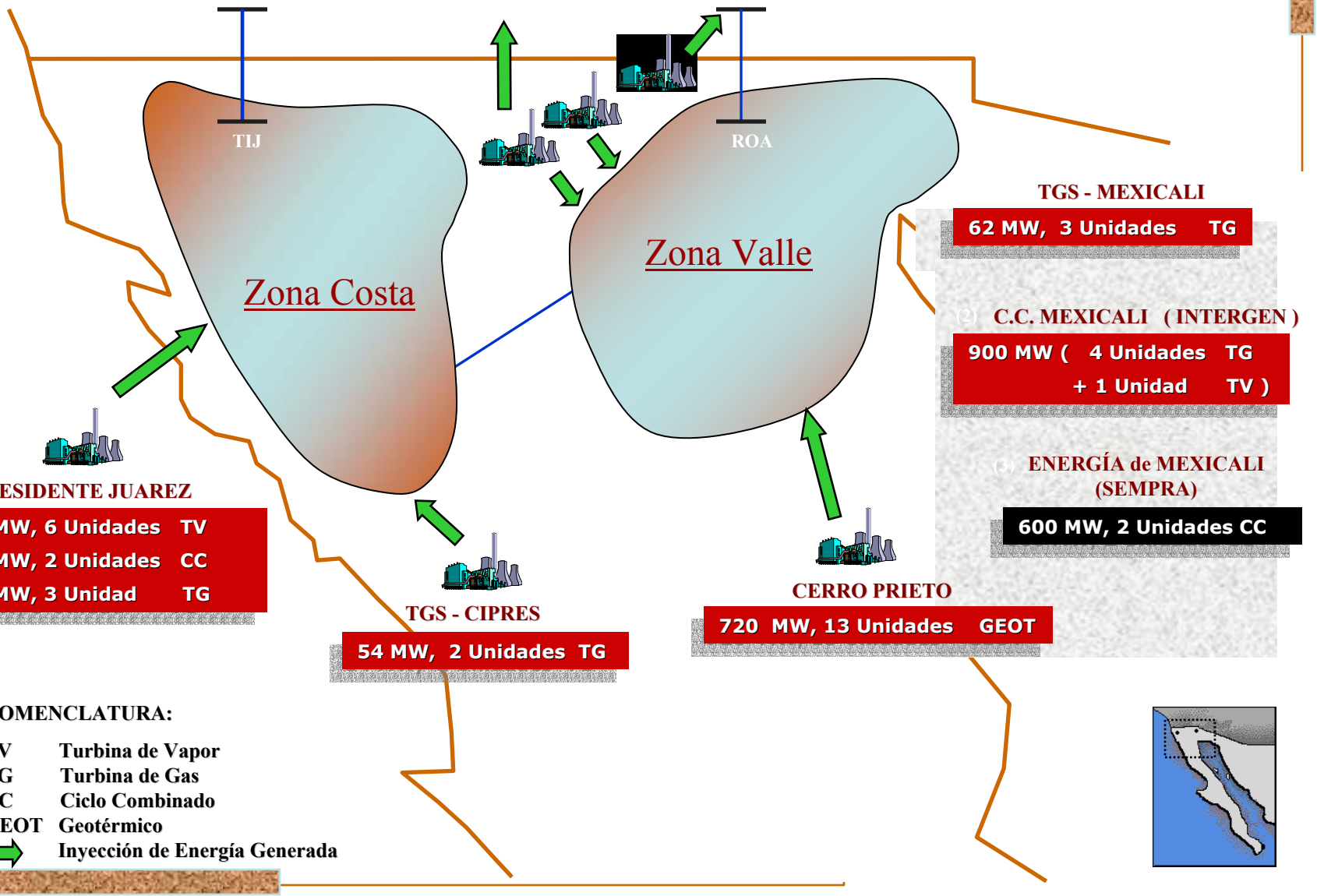
SISTEMA BAJA CALIFORNIA

CENACE

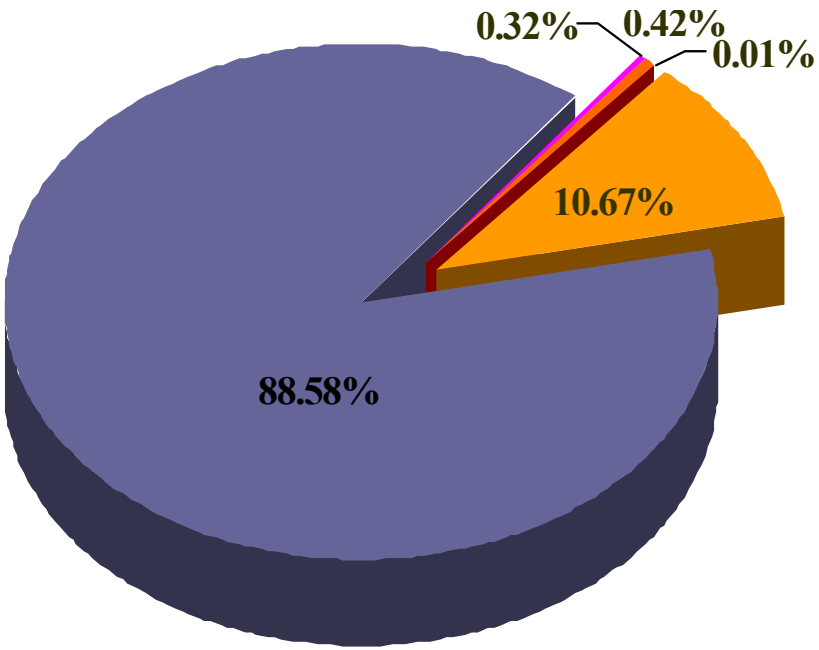


NOMENCLATURA:

TV	Turbina de Vapor
TG	Turbina de Gas
CC	Ciclo Combinado
GEOT	Geotérmico
➡	Inyección de Energía Generada

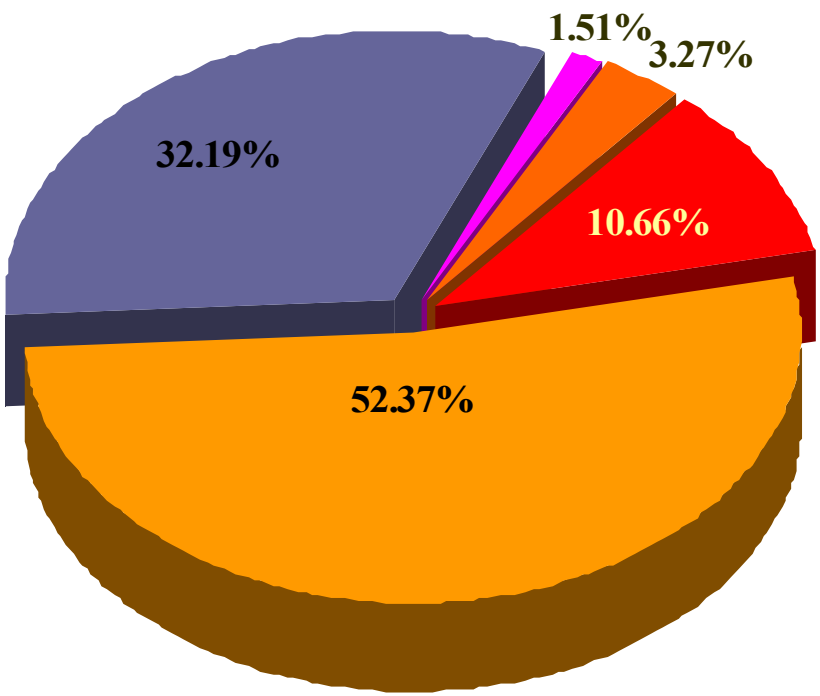
From: Ing. Jesús Moya Vázquez

INFORMACIÓN COMERCIAL DE SISTEMA BAJA CALIFORNIA 2003



- Industriales HS,HSL,HT,HTL,HT-FR
- Comerciales y pequeña industria 2,3,7,OM,HM,HMC
- Residencial 1 y DAC
- Agrícolas 9
- Municipal 5 y 6

Usuarios



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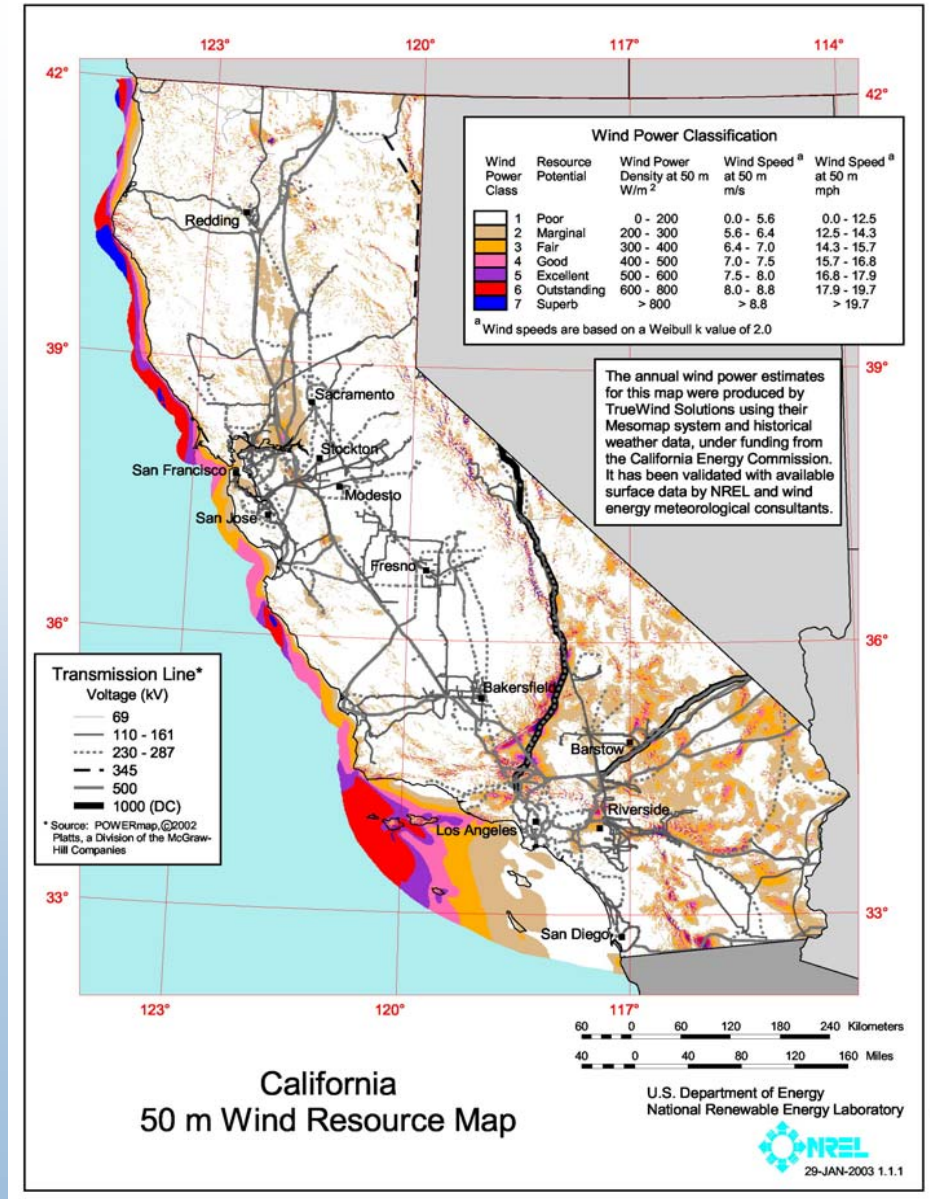
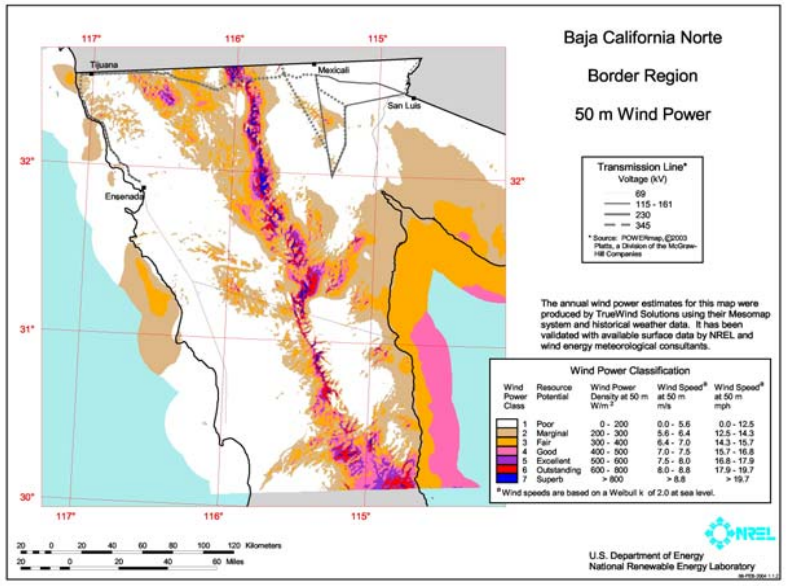
Consumo

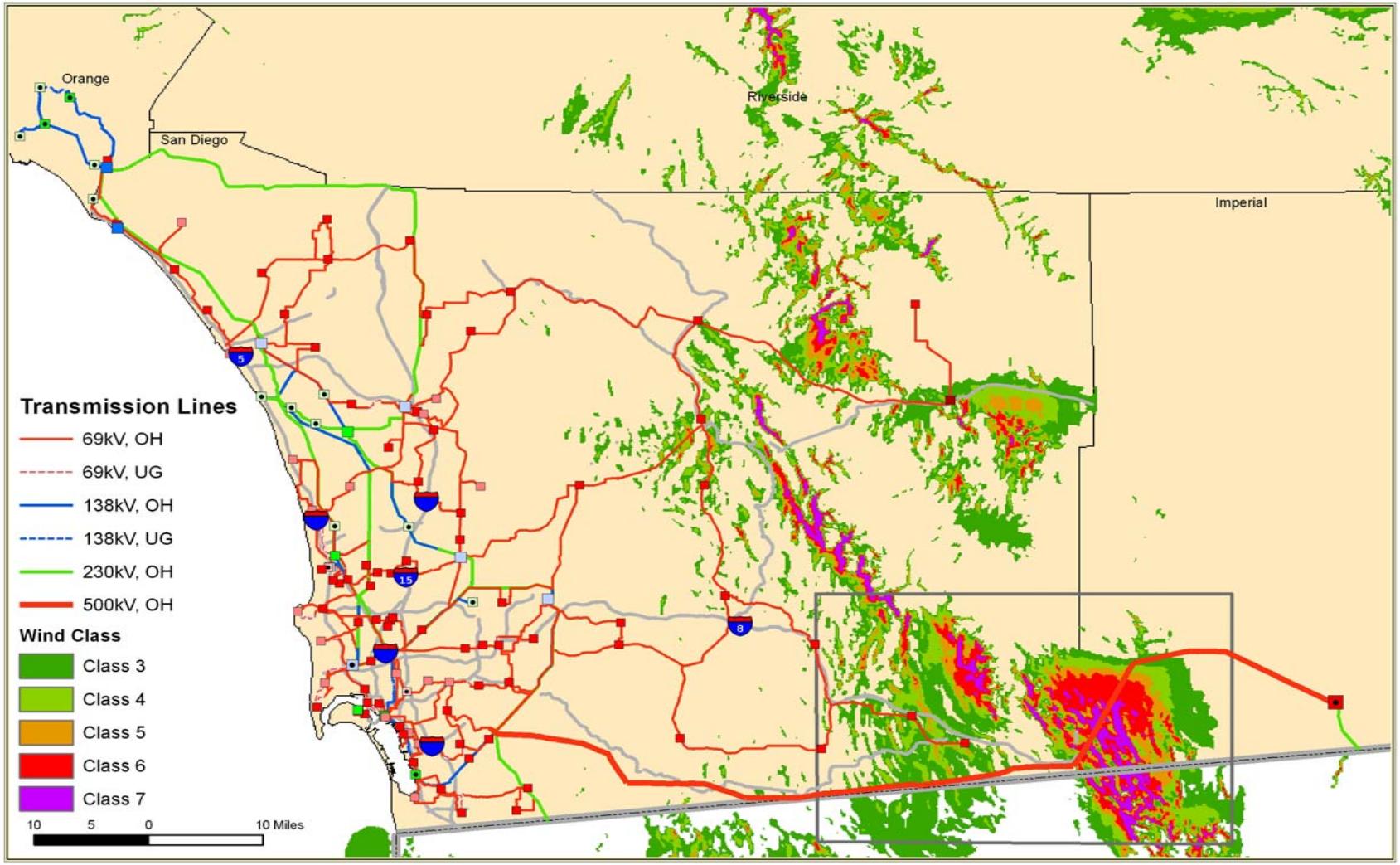
From: Ing. Jesús Moya Vázquez

Renewable Energy Resources – Wind

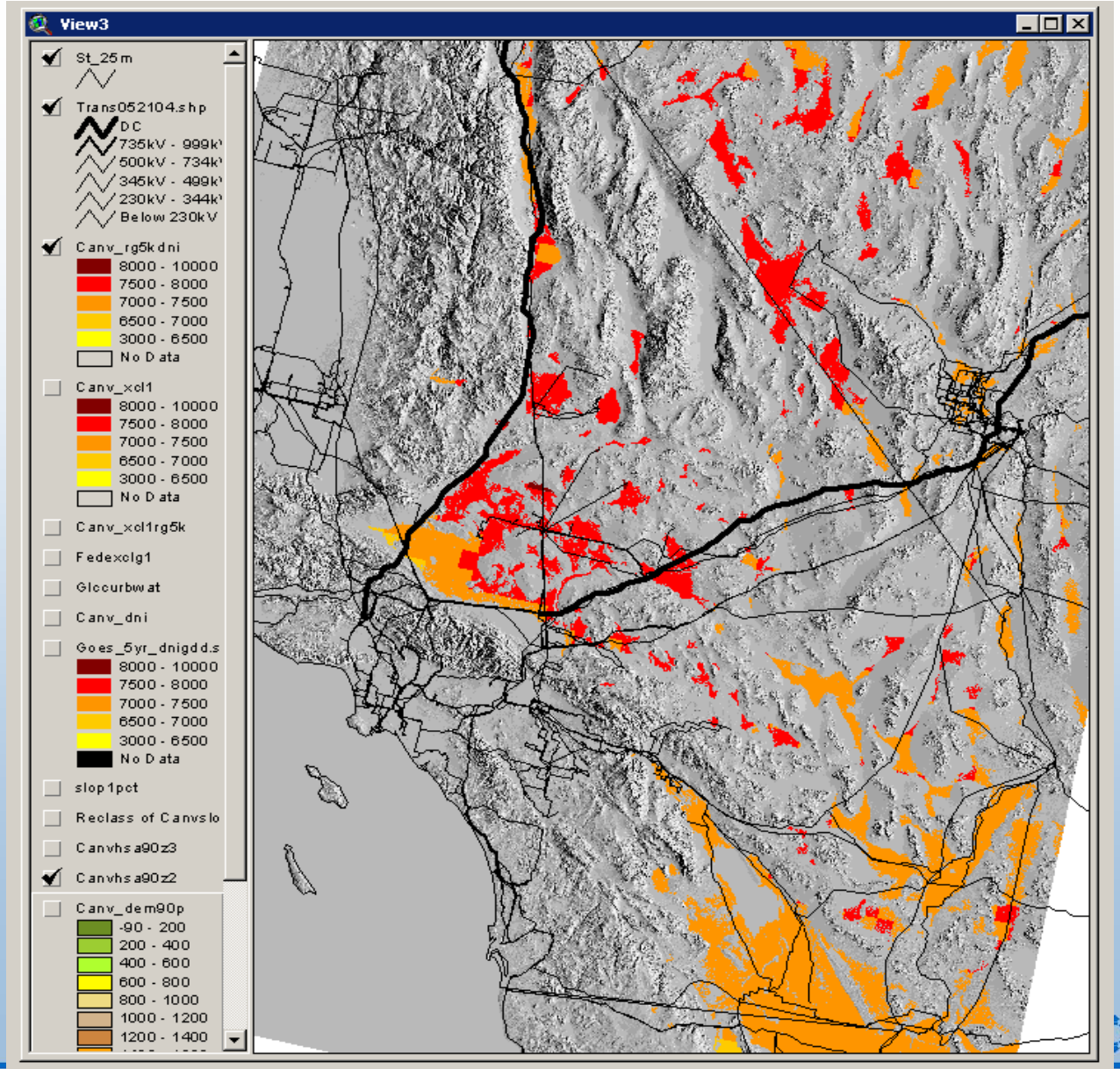




Wind Resource and Transmission Lines



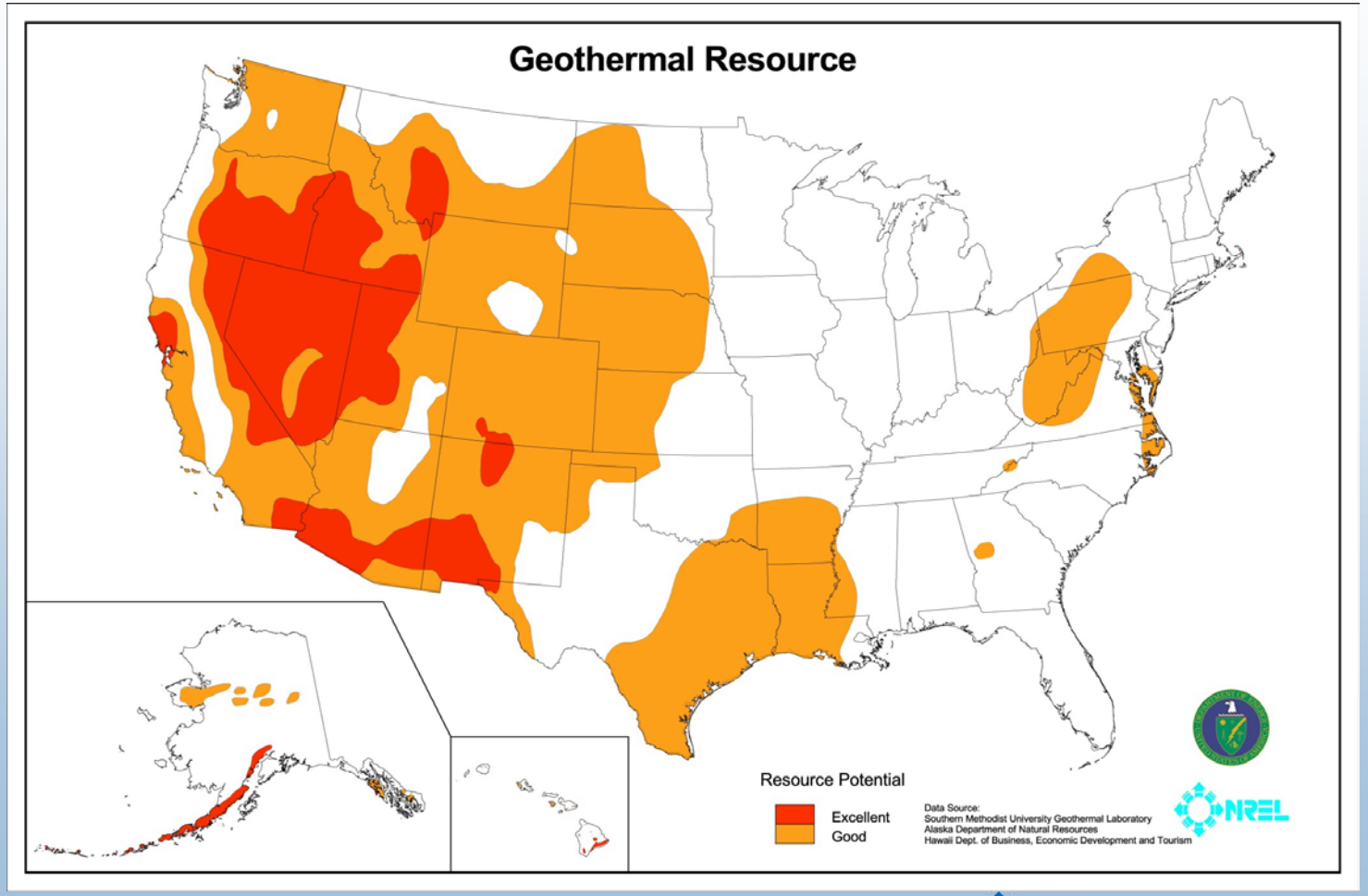
Potential Sites for Concentrating Solar Power



Southern California Screened Direct Normal Solar Resource

Resource information has been screened to eliminate urban areas, major water bodies, protected federal lands, areas with slope > 1% and areas smaller than 5 km^2.

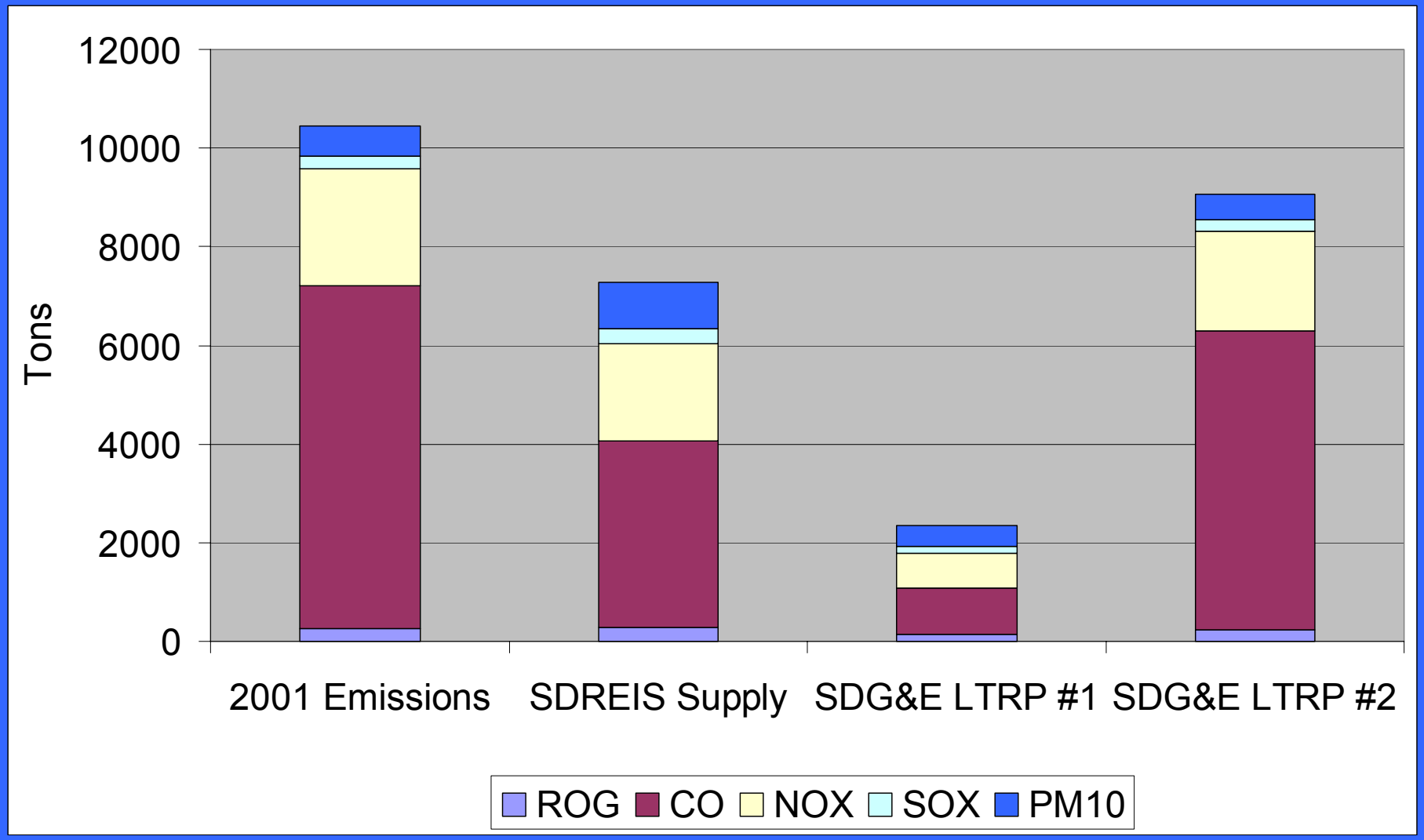
Renewable Energy Resources – Geothermal



NREL National Renewable Energy Laboratory

Geothermal Potential in Imperial Valley: 1,200 – 2,300 MW

Comparison of 2001 San Diego Power Production Air Emissions with Potential Air Emissions in 2014



Recommendations

1. To reduce dependence on far-away energy supplies, the region must make a ***concerted effort to reduce energy demand and increase indigenous renewables.***

2. Transmission planning and renewable energy development ***must be coordinated***.

3. ***Cross-border*** environmental effects must be taken into account in the energy planning process.

4. A ***binational*** energy planning process needs to be ***institutionalized.***