



Energy demands and capacity in developing economies: A case study in Cancun, Mexico

Group B

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RENKEI Summer School in Tohoku University

11-Sept-2014

Regional problems

Social

- Demographics
- Labour, migration, community
 - Culture, tradition
- Housing
- (In)equality

Environmental

- Land use (interior)
- Waste, pollution

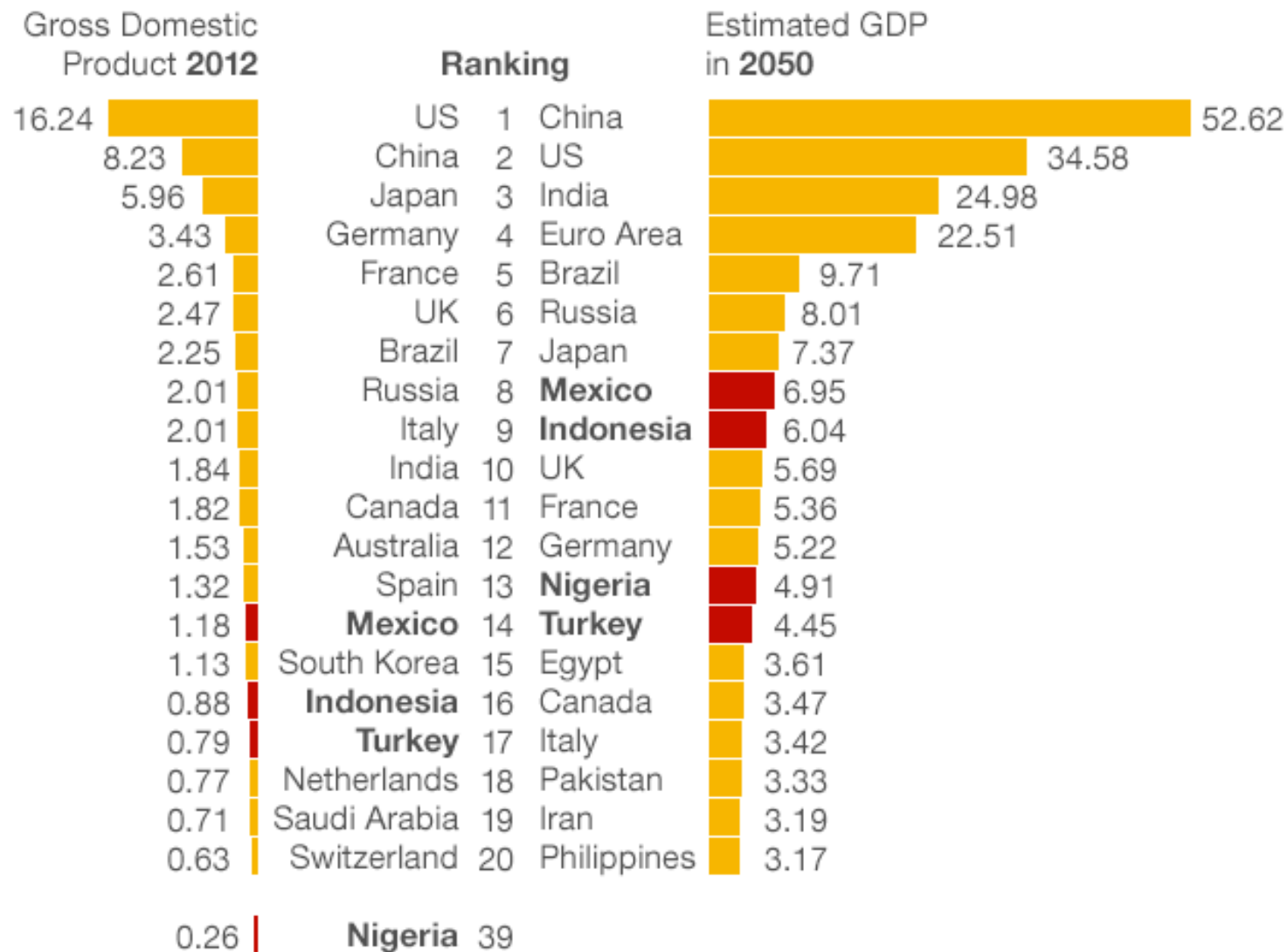
Emerging economies



Brazil, Russia, India, China and South Africa
Mexico, Indonesia, Nigeria and Turkey

Rise of the MINTs

(\$ trillions)



Source: World Bank, Goldman Sachs

United Mexican States



Area: 1,972,550 km² (14th)

Population: 118, 395, 054 (2013, 11th)

GDP: \$1.927 trillion (2014 estimate, 10th)



Cancun



Found: 1970

Location: Yucatan Peninsula, south-east coast of Mexico

State: Quintana Roo

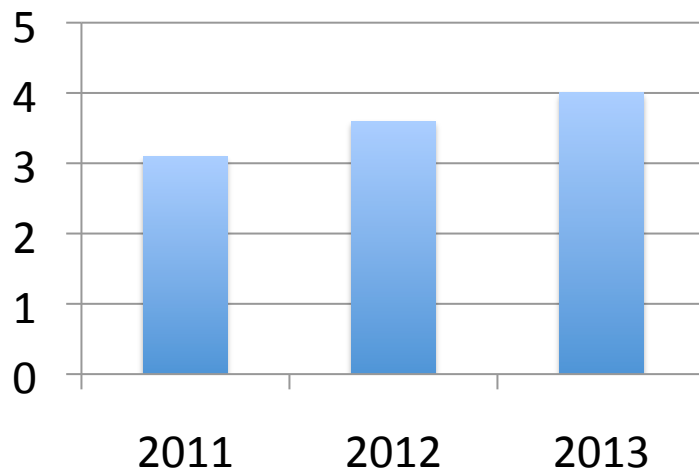
Climate: Subtropical climate, 27° C - 35° C, sunny days throughout most of the year

Population 722, 800 (2010).

UN's Cancun climate conference was held in November 2010 and "Cancun Agreements"



**International Visitors in
Cancun (million)**

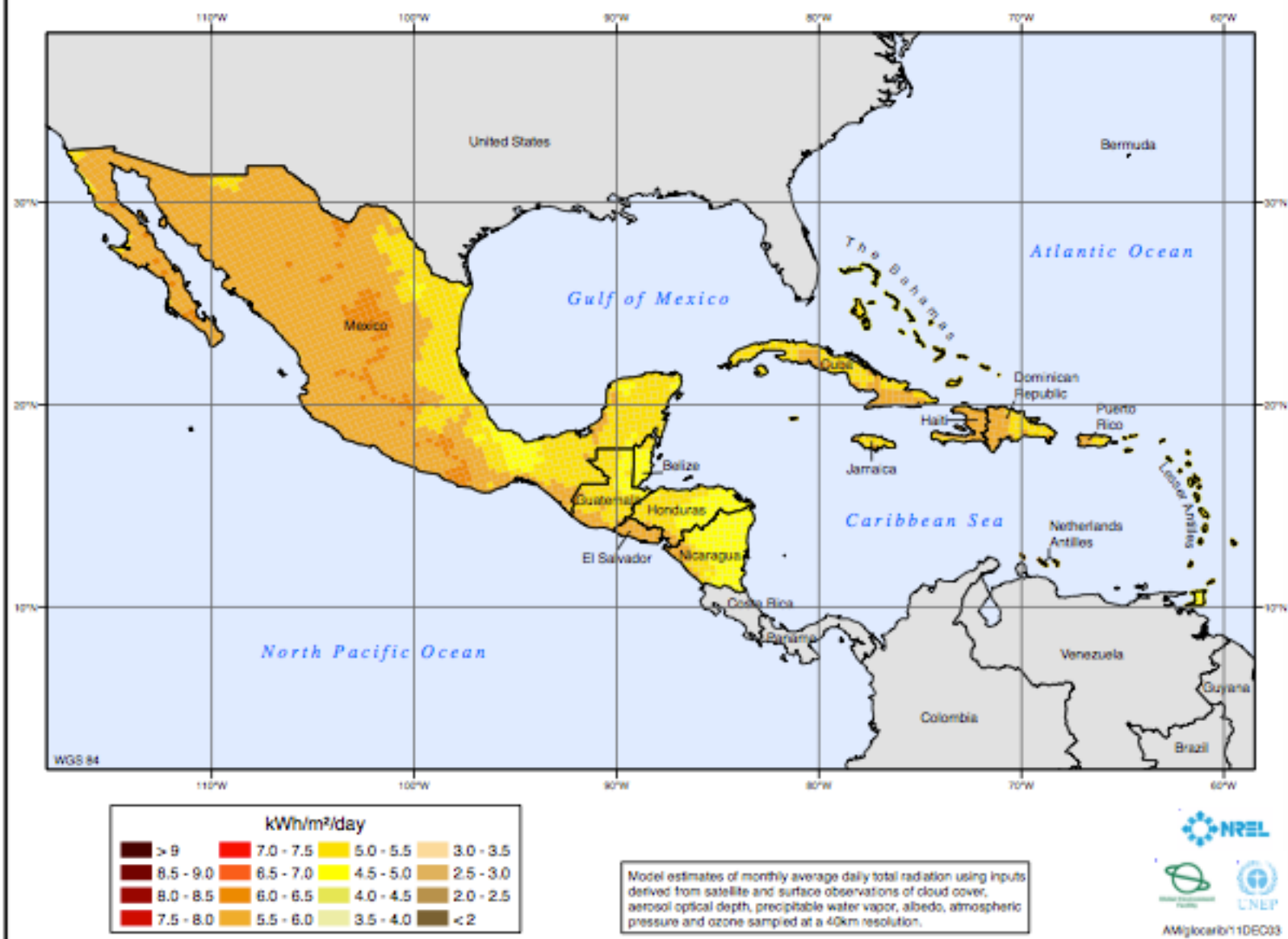


Cancun International Airport

Second largest in Mexico
15, 962, 162 passengers in 2013

Local residence: 0.72 million

Global Horizontal Solar Radiation - Annual



Direct Normal Irradiation

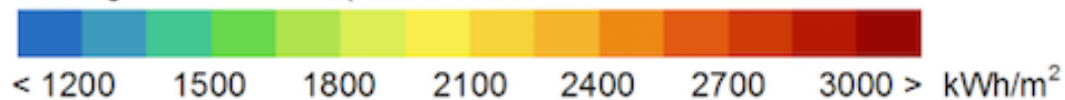
Mexico



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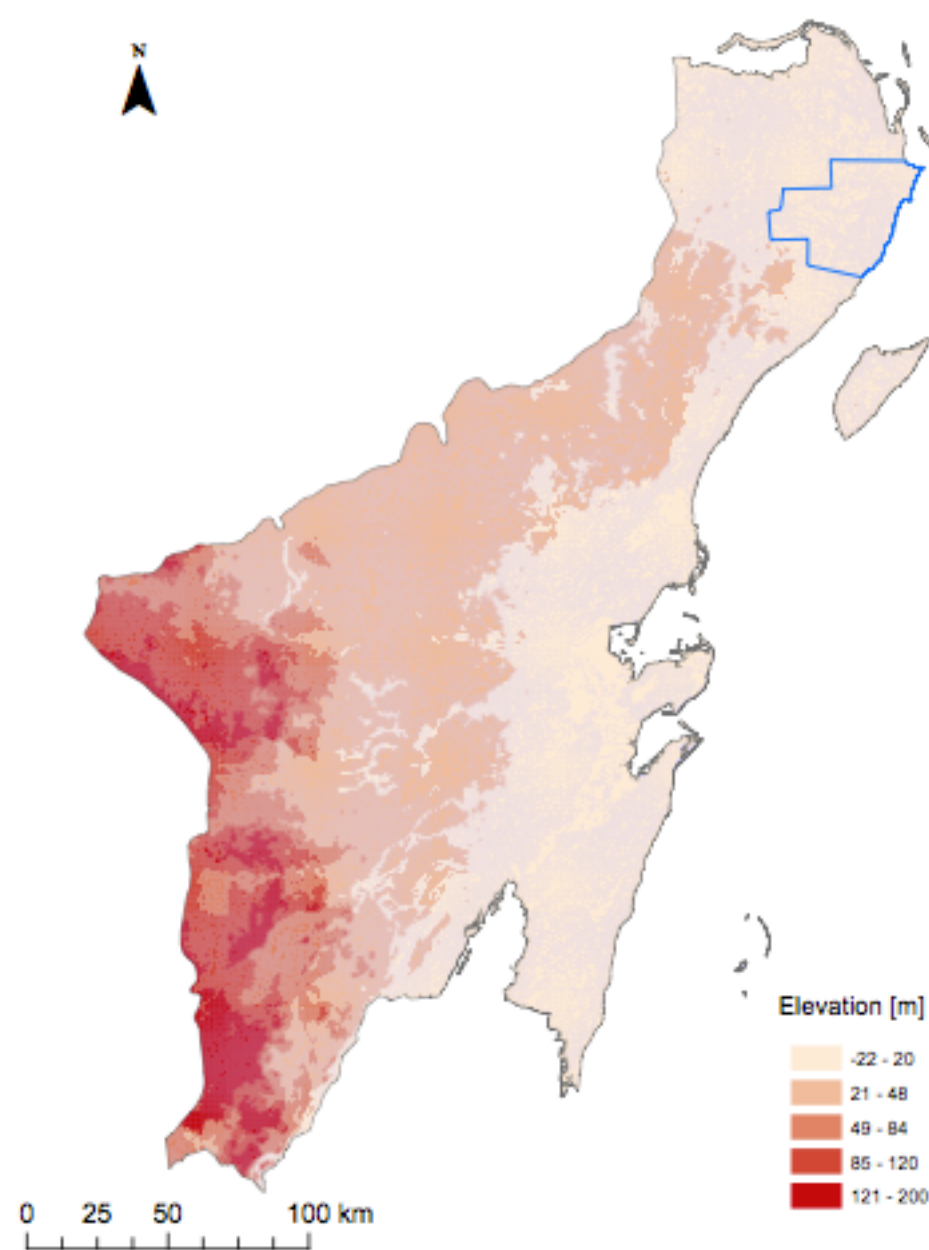
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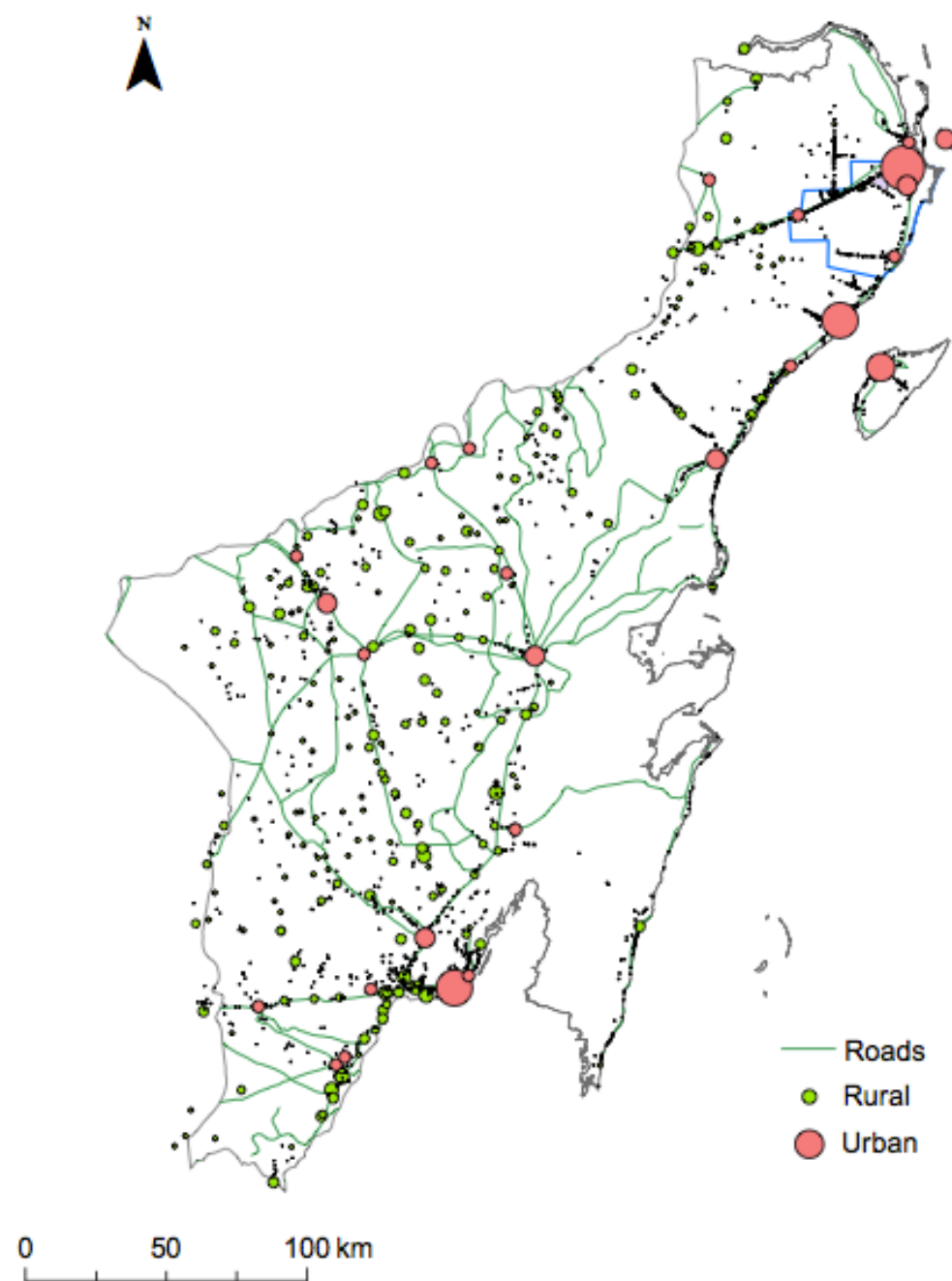
Average annual sum, period 1999-2012

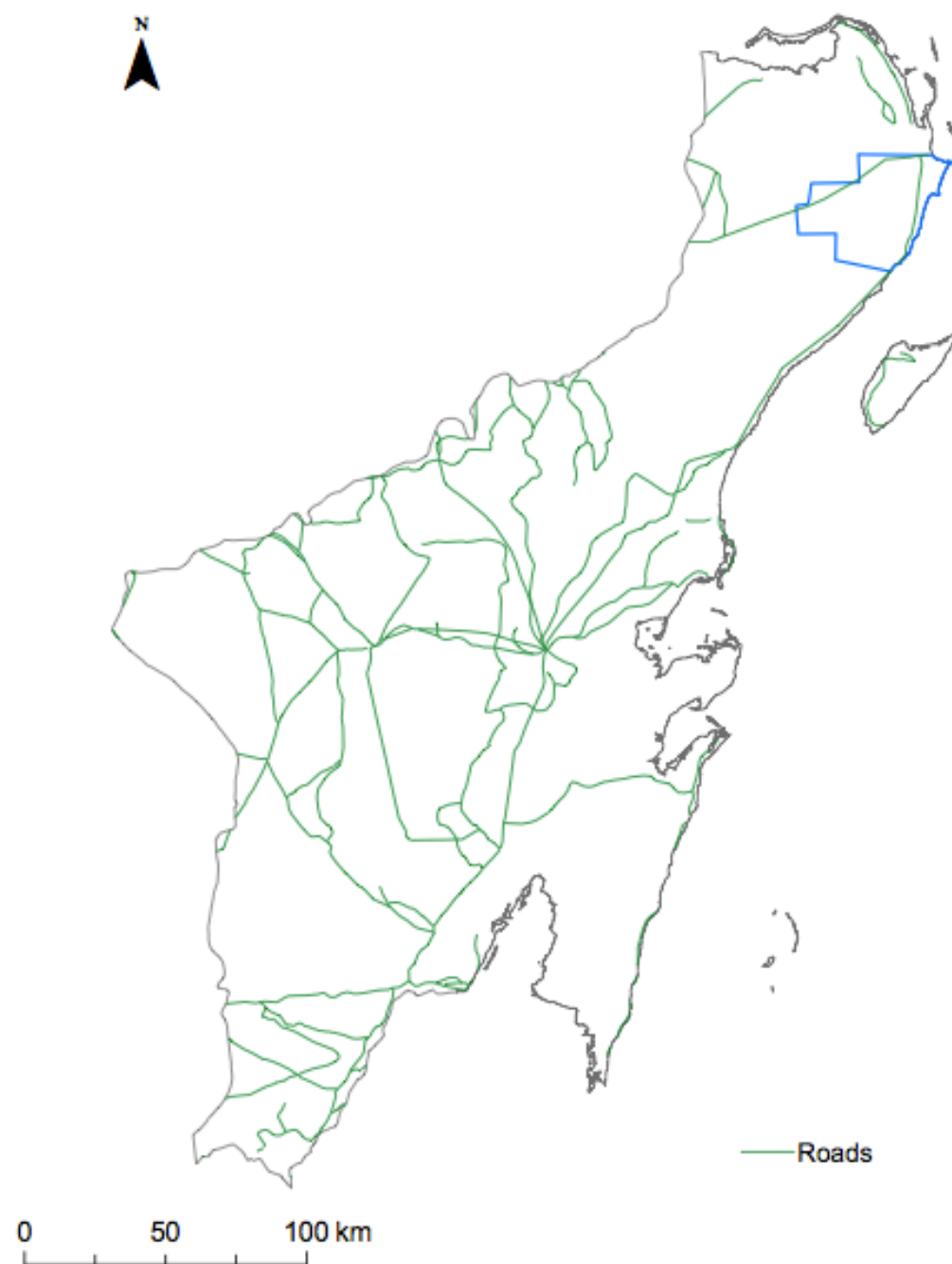


0 200 km

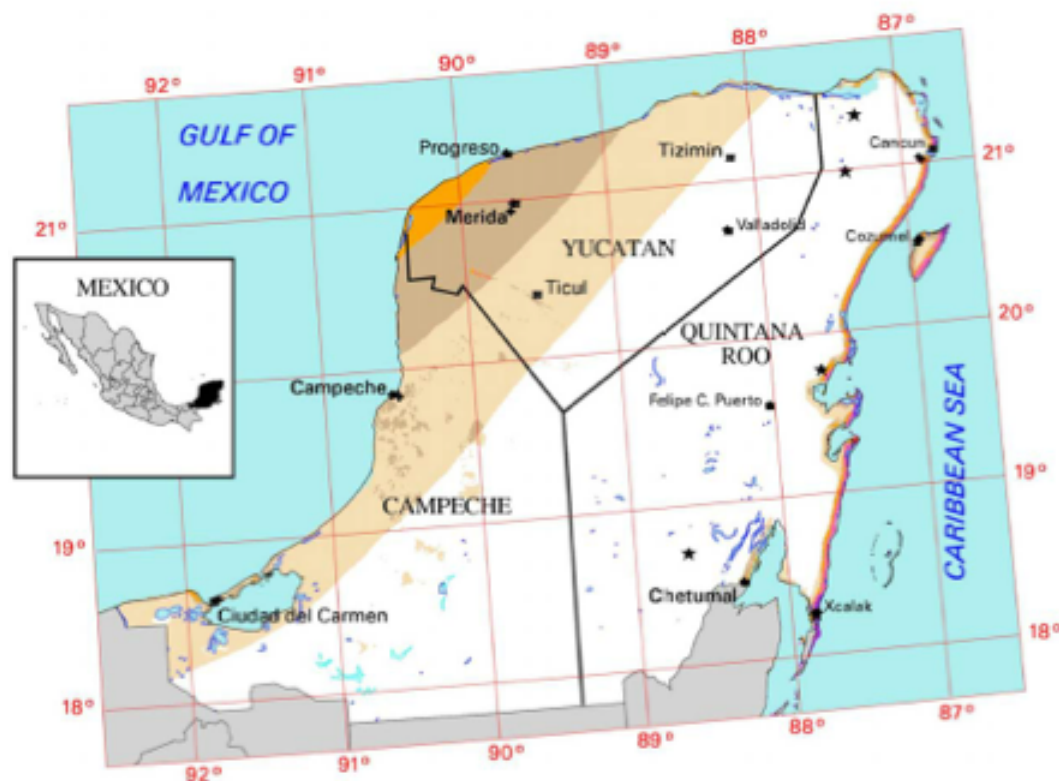
SolarGIS © 2014 GeoModel Solar







Mexico - Campeche, Quintana Roo and Yucatan Wind Resource Map



The wind resource classification is specific for both utility scale and rural applications and applies to areas with low surface roughness. Values of Weibull k in the Yucatan region vary from approximately 1.8 to 3.5, with highest values along the east coast.

50 0 50 100 150 200 Kilometers

Wind Power Classification

Resource Potential		Wind Power Density at 30 m W/m^2	Wind Speed ^a at 30 m m/s
Utility	Rural		
Marginal	Moderate	100 - 150	4.4 - 5.0
		150 - 200	5.0 - 5.6
Moderate	Good	200 - 250	5.6 - 6.0
		250 - 300	6.0 - 6.4
Good	Excellent	300 - 350	6.4 - 6.7
		350 - 400	6.7 - 7.0

^a Wind speeds are based on a Weibull k value of 2.0.

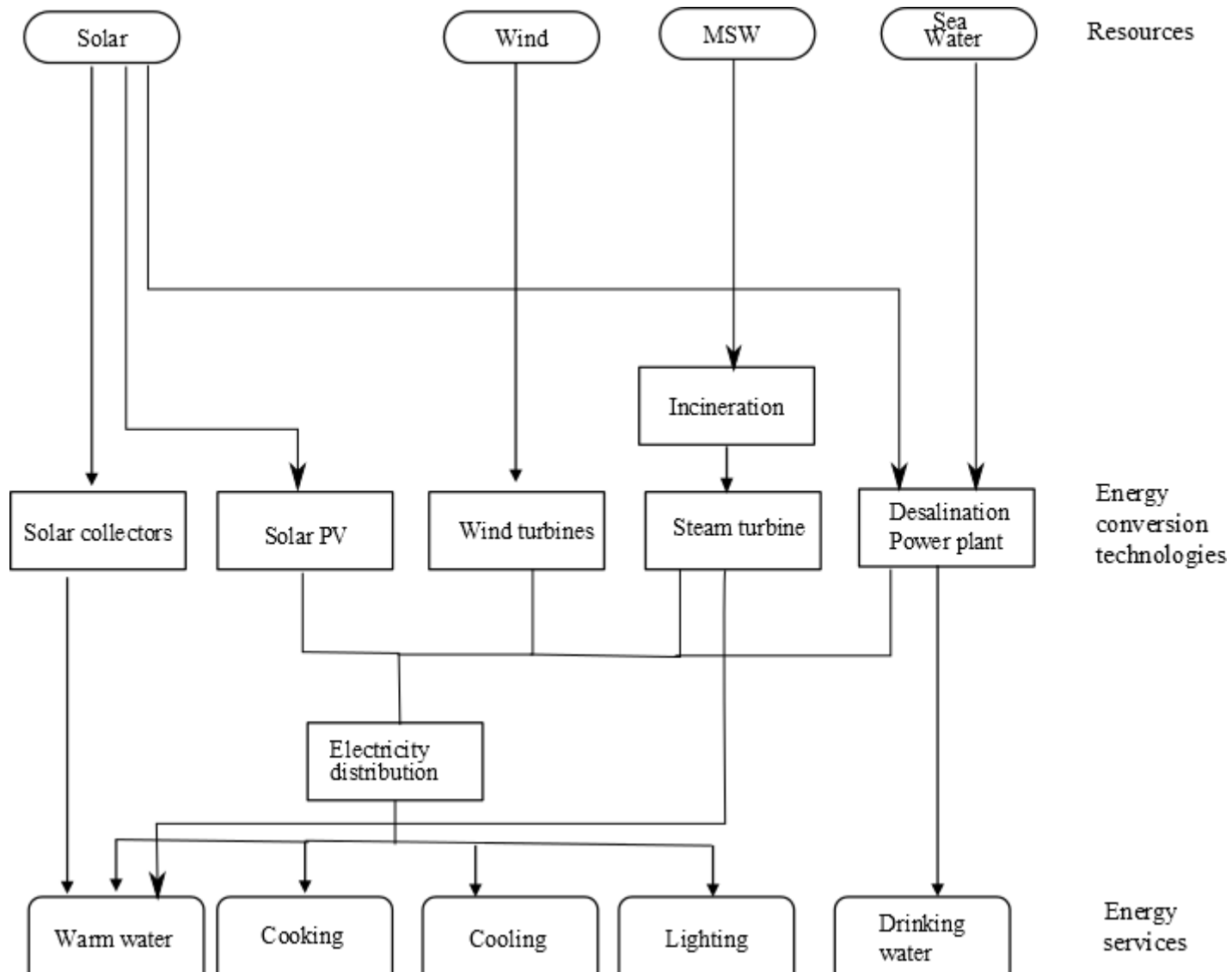
- ★ Meteorological Station with Wind Data
- ★ Additional Wind Measurement Site
- City or Village

U.S. Department of Energy
National Renewable Energy Laboratory



08-DEC-2000 1.2

Technical



Economics

- Imported diesel and oil >200USD/MWh
- New Low Carbon Technologies
 - Solar PV:100-120USD/MWh
 - Onshore Wind: 80-100USD/MWh
 - Waste Incineration: 90 – 100USD/MWh
 - Anaerobic digestion: 100 – 180USD/MWh
 - Solar collectors
- Enabling Technologies
 - Grid reinforcement: 8-10USD/MWh
 - Storage: further analysis required

Political Support

- Mexicans pay 72% more for electricity than americans
- Reforming the energy market to allow greater private investment
- Target of 35% renewable energy by 2024
- Plans to take wind to 20GW+ capacity by 2024....and solar to 8GW by 2014

News

Actis to invest \$250M in Mexican renewable energy platform

09 September 2014

Emerging market investor cites Mexico's ample natural resources, an evolving and supportive regulatory framework and a deep project finance capacity.

Actis, A global pan-emerging market private equity firm, is committing US\$250 million to establish a Mexican energy platform, Zuma Energía, which will target over 500 MW of installed capacity in the country.

Zuma Energía 1 recently completed its first acquisition and closed the financing of PE Ingenio, S.A.P.I. de C.V. (Ingenio), a 50 MW wind farm located in the state of Oaxaca. The project will be constructed by Acciona Energía

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Mexico Expected Set Record High in Renewable Energy Investments



Kevin Smead - Renewables - Aug 12, 2014

According to analysis from Bloomberg New Energy Finance, Mexico will set a record high for renewable energy investments this year beating its 2010 record of \$2.4 billion.

For the first half of 2014, investments are estimated at \$1.3 billion, which is nearing the \$1.6 billion overall for 2013. Wind and solar projects are expected to see a jump in spending in the next several years.

Mexico and Central America is expected to install roughly 1 GW of wind energy in 2014. This would top 2010's record of 757 MW. This is expected to increase in 2015 and 2016 to 1.2 GW.



IMEC - Senator Koehler at Enercon Engineering

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Mexico's Newly Opened Energy Market Attracts Renewables

Nathan Paluck, International Correspondent

May 08, 2014 | 3 Comments

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MEXICO CITY -- It is a good time to be in the renewable energy business in Mexico since landmark energy reform opened up the electricity market and prioritized renewables. The government has an ambitious 12-year goal for renewable energy production, and private equity funds and development banks have millions

THANKS FOR YOUR ATTENTION!

ありがとうございました！