



International Challenge for Promoting
Green Innovation to Realize a Low Carbon
Society Worldwide

JST
Symposium

INTERNATIONAL CHALLENGE FOR PROMOTING GREEN INNOVATION TO ACHIEVE A LOW CARBON SOCIETY WORLDWIDE

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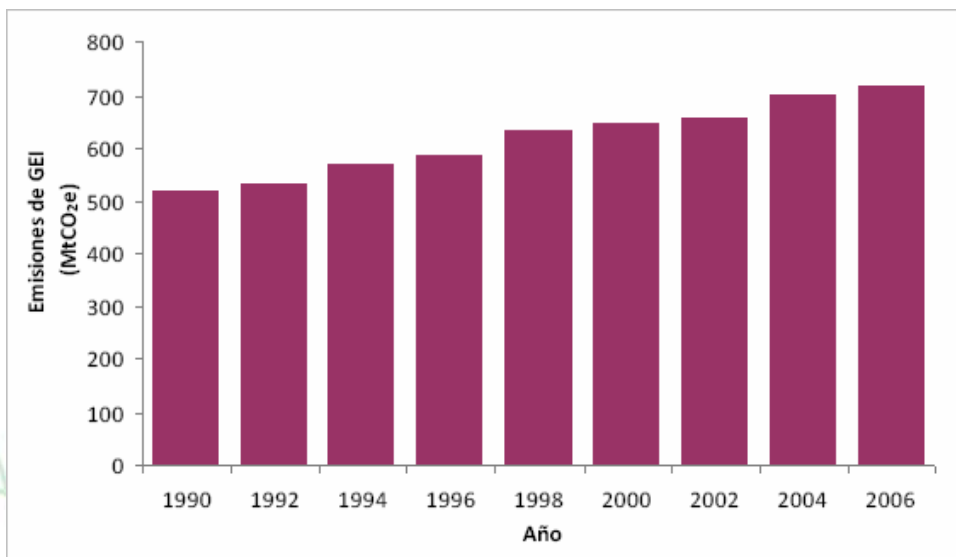
Background

- In 1992, Mexico initiates efforts by signing the United Nations Framework Convention on Climatic Change (UNFCCC).
 - Mexico, is the only developing country, which has submitted 3 National Communications to the COP/UNFCCC.
 - Mexico, is the first developing country, to update systematically its National Greenhouse Gas Inventories (GHG) emissions.
 - The Government of Mexico carries out clear and decisive actions, against the threat of global warming.
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- On May 25, 2007 the President of Mexico, presented the National Strategy on Climate Change.
 - On August 28, 2009, the Special Program for Climate Change 2009 – 2012 was published by the Mexican Government.

Current Situation

- Mexico is among the top 15, ranked countries emitting CO₂
- 1.5% of the global emissions
- In 2006, emissions *per capita* in Mexico, ascended to 6.2 t CO₂

Evolution of the GHG emissions in Mexico , 1990-2006



Source: SEMARNAT with preliminary data from the National Inventory of Greenhouse Gas (GHG) emissions ,1990-2006 / INE

Sources Responsible for the Emissions:

- 61% - energy sector
- 7% - industrial processes
- 14% - deforestation
- 8% - agriculture
- 10% - decomposition of organic waste

Energy Sector:

- 24% - electricity generation
- 8% - manufacturing sector and construction industry
- 18% - transportation
- 5% - commercial sector, residential and agriculture
- 5% - natural gas distribution and transmission

Effective Capacity Installed per Type of Energy Generation



Types of Energy Generation	Percentage
Thermal electric	45
Hydro electric	22
Carbon electric	5
Geothermal electric	2
Wind electric	less than 1
Nuclear electric	3
Thermal electric	23





Mexican Carbon Fund



The Mexican Carbon Fund (FOMECCAR) was created as a result of the joint efforts by SEMARNAT, the Mario Molina Center and BANCOMEXT. Its objective is to provide technical and financial support to national businesses and public sector entities, through the implementation of a “Clean Development Mechanism” (CDM) for projects that generate “Certified Emission Reductions” (CER’s). These carbon credits can be traded in the world carbon markets, to obtain additional income, in return. This effort, provides opportunities for sustainable development and environmental benefits to society.

Tenemos la iniciativa de apoyar
a la comunidad empresarial



CDM Projects in Mexico

COMEGEI Committee - CDM approved a portfolio of projects (through, mid October 2007, with letters of approval, without objections).

Type of Project	Number of Projects	CO2 Equivalent Reduction(s) (Ktons/year)
WASTE MANAGEMENT IN PORK STABLES	88	2,507
WASTE MANAGEMENT IN BEEF CATTLE STABLES	54	941
METHANE FROM LANDFILLS	9	1,110
WASTE WATER MANAGEMENT	1	10
WIND ENERGY	8	2,216
HYDROELECTRIC	4	161
INCINERATION HFC-23	1	2,155
MITIGATION OF N2O IN THE CHEMICAL INDUSTRY	1	103
COGENERATION AND ENERGY EFFICIENCY	9	703
FUGITIVE EMISSIONS	2	665
TRANSPORTATION	1	24
TOTAL	178	10,595

Potential effects of climate change in Mexico.



➤ An increase in the desertification in the Central and Northern regions of Mexico.



➤ Potential agricultural and vegetation reduction in many regions.



➤ Many issues and problems associated with water shortage, and many difficulties for providing water to the population.

➤ Problems associated with flooding and landscape erosion in coastal plains.



➤ An increase of extreme hydrometeorological events.

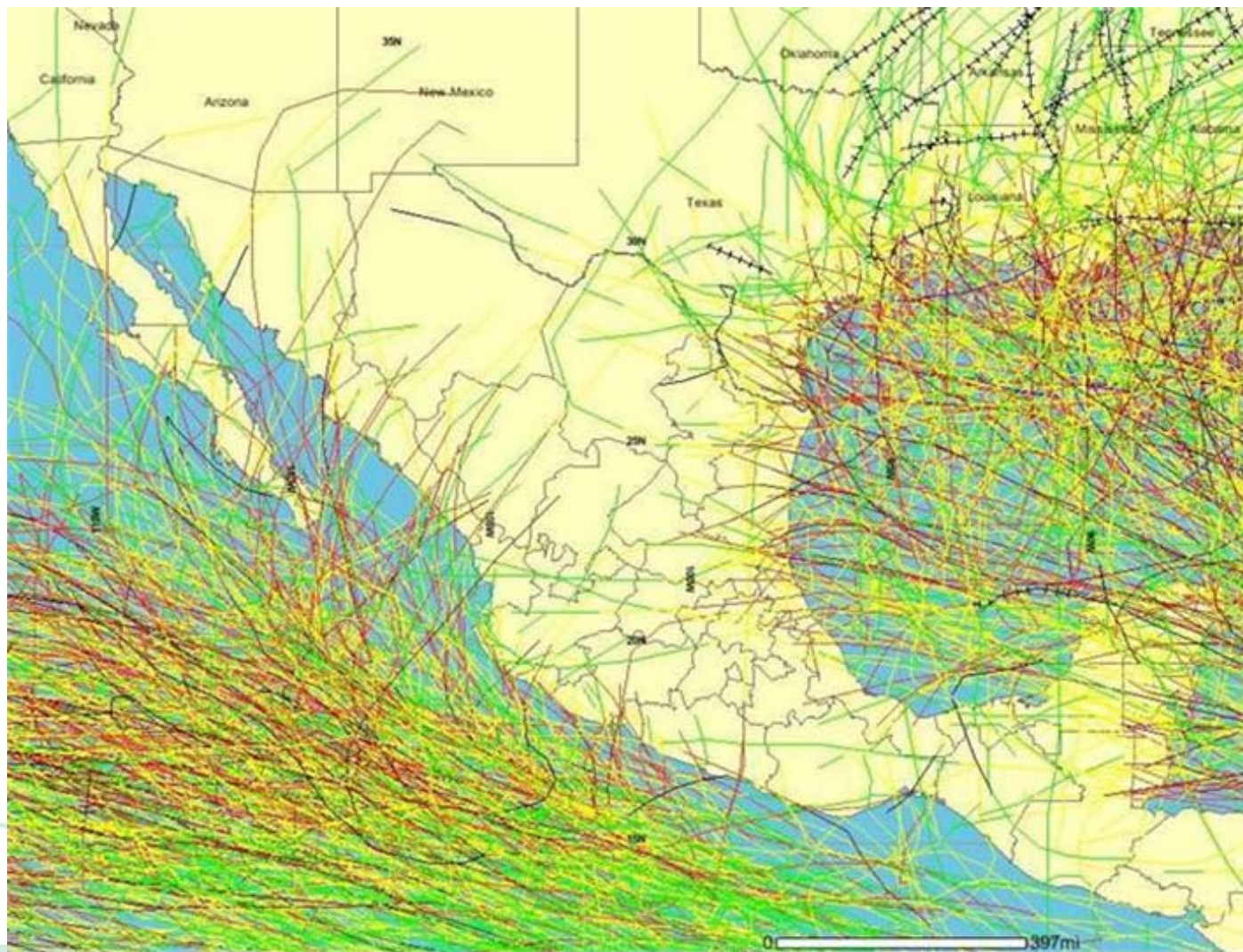
➤ Adverse issues associated with forest ecosystems (higher incidence of fires) and other hydrological issues.



➤ Loss of biodiversity, ecosystems and vegetation.

Historical trajectories of hurricanes and storms in Mexico.

Within the last 100 years



Legend

Hurricane Track

- Category 3 - 5
- Category 1 - 2
- Tropical Storm
- Tropical Depression
- Subtropical Storm
- Subtropical Depression
- Extratropical Storm
- Tropical Low
- Tropical Disturbance
- Tropical Wave
- Water Feature
- Land Feature



International Agreements

- **United Nations Framework Convention on Climatic Change (UNFCCC) and the Kyoto Protocol.**
- **Stockholm Convention on Persistent Organic Pollutants.**
- **Montreal Protocol on Substances that Deplete the Ozone Layer.**
- **United Nations Convention to Combat Desertification.**
- **Convention on Biological Diversity.**
- **Convention on International Trade in Endangered Species of Wild Fauna and Flora.**
- **United Nations Millenium Development Goals.**



Policy Documents

National Development Plan 2007-2012

CORE PRINCIPALS

1. State of Rights and Security
2. Economic Competitiveness and Employment
3. Equality and Opportunities
- 4. Environmental Sustainability**
5. Effective Democracy and Responsible Foreign Policy

ISSUES

1. Water
2. Forrest and Jungles
3. Wildlife and Biodiversity
4. Environmental Justice
5. Ecological Regulation of Territory
- 6. Climate Change**
7. Solids and Hazardous Wastes
8. Environmental Scientific Research
9. Environmental Culture and Education

OBJECTIVE

6.1

Reduce Green House Gas Emissions

STRATEGY 6.1.1 Promote energy efficiency and clean energies (renewable energies such as wind, geothermal and solar) for the generation of energy.
STRATEGY 6.1.2 Promote the efficient use of energy in domestic, industrial, agriculture and transportation.
STRATEGY 6.1.3 Promote the adoption of international vehicle emission standards.
STRATEGY 6.1.4 Promote the use of recuperating energy from residual products.

OBJECTIVE

6.2

Promote Measures to Adapt to the Effects of Climate Change

STRATEGY 6.2.1 Promote the inclusion of aspects related to the adaptation and planning of climate change in various sectors of society.
STRATEGY 6.2.2 Develop regional climatic scenarios for Mexico.
STRATEGY 6.2.3 Generate scientific strategic knowledge in order to make decisions related to impact, vulnerability, climate adaptation for different socio-economic sectors and ecological systems.



Special Program on Science, Technology and Innovation 2008-2012

The **National Development Plan 2007-2012** established 12 priorities, among them are:

- Natural environment, water and climate change.
- Energy

Mexico's **Special Program on Science, Technology and Innovation 2008-2012** in its agenda and priorities promotes 9 specific areas related to science and technology; most relevant topics are:

- Energy
- Natural Environment



Special Program on Climate Change 2009 – 2012

- Reduce green house gas emissions to the atmosphere, through the use of more efficient energy generation and less dependant on fossil fuels consumption.
- Identify research opportunities for the development and promotion of new policies, programs, energetic technologies, which will help mitigate climate change.
- Promote research and technology development related to environmental damage and mitigation.

105 objectives and 294 goals related to the adaptation and mitigation of climate change; with the following highlights:

- Reduce by 50% GHG emissions by 2050, in relation to year 2000 emissions.
- Contribute to a possible stabilization scenario of GHG concentrations in the atmosphere, to a level below 450 parts per million of carbon dioxide (CO₂), compatible with an increase in average surface temperature between 2° C and 3° C.

National Strategy on Climate Change 2007

MITIGATION OF GREEN HOUSE GAS EMISSIONS AND ITS EFFECTS

Undock the relationship between economic growth and GHG emissions growth.

ADAPTATION TO THE ADVERSE EFFECTS OF GREEN HOUSE GAS EMISSIONS

Develop adaptation abilities to adjust to climate change, variability and extreme climate conditions, with the objective of mitigating potential damages.

PRINCIPAL RESEARCH AND KNOWLEDGE FOCUS AREAS

- Potential for energetic savings and efficiency at the national, state and local levels.
- Technical, economic and environmental evaluations, production and utilization of bio-fuels.
- Study different climate scenarios to adapt different renewable energy sources.
- Research the capture and storage of geological carbon.
- Study seasonal climatic forecasting and regional scenarios.
- Characterize the vulnerabilities by type of threat and social sectors.
- Evaluate the effects of climate change with different species in various risk categories.
- Study the develop and application of forestry models, under different climate scenarios.
- Study ecological restoration in different ecological systems.
- Study the effects of different agro zones, under various climate conditions.
- Research the behavior of different pathogenic agents, in regards to changes in climate.
- Design sustainable cities, under different climate conditions and scenarios.
- Evaluate the different effects of climate change and health in regards to different social groups.

Mexico is already making progress toward becoming a low-carbon economy

Two comprehensive policy documents

- National Strategy on Climate Change (ENACC)
- Special Program on Climate Change (PECC)

Power

- Pilot for small-scale, distributed solar power

Transport

- Strict efficiency standards under revision
- “Eco-vehicles” web portal to educate consumers

Buildings

- Substitution program for inefficient home appliances
- Guidelines for energy-efficient new buildings

Industry

- Cogeneration potential assessment and projects across industries
- Pemex plan for gas injection into mature fields to reduce flaring

Agriculture

- Project for sustainable rural development and resources
- Efficiency in agriculture

Waste

- Local waste management programs

Forestry

- Program for conservation and sustainable management of forests



Opportunities related to the geographical location of Mexico

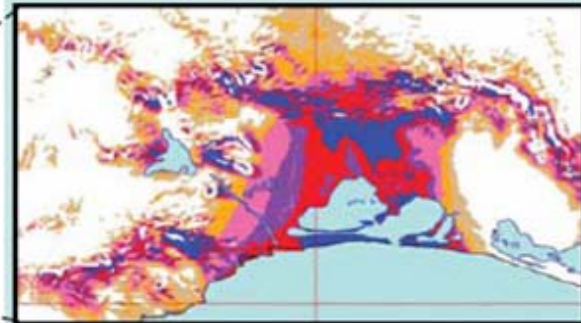
Wind power potential in Mexico

Wind Energy Projects	
Operation	202.28 MW
Construction	568.35 MW
Development	2,867.1 MW
Total MW	3,637.7 MW

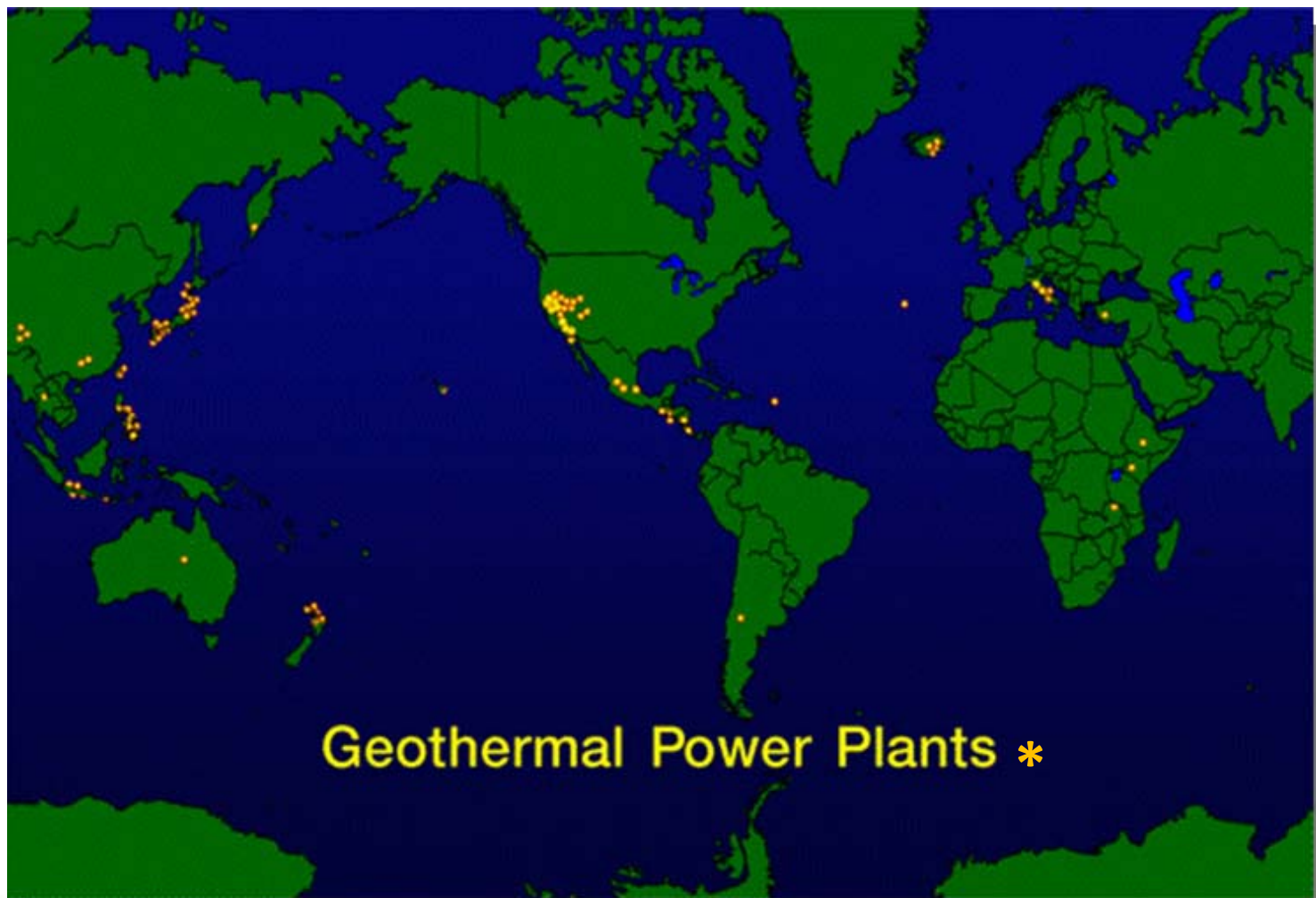


Wind conditions in the Tehuantepec Isthmus are among the best in the world

Wind Power Class	Resource Potential	Wind Power Density at 50m (W/m ²)	Wind Speed at 50 m (m/s)
1	Poor	0-200	0-5.3
2	Marginal	200-300	5.3-6.1
3	Moderate	300-400	6.1-6.7
4	Good	400-500	6.7-7.3
5	Excellent	500-600	7.3-7.7
6		600-800	7.7-8.5
7		>800	>8.5



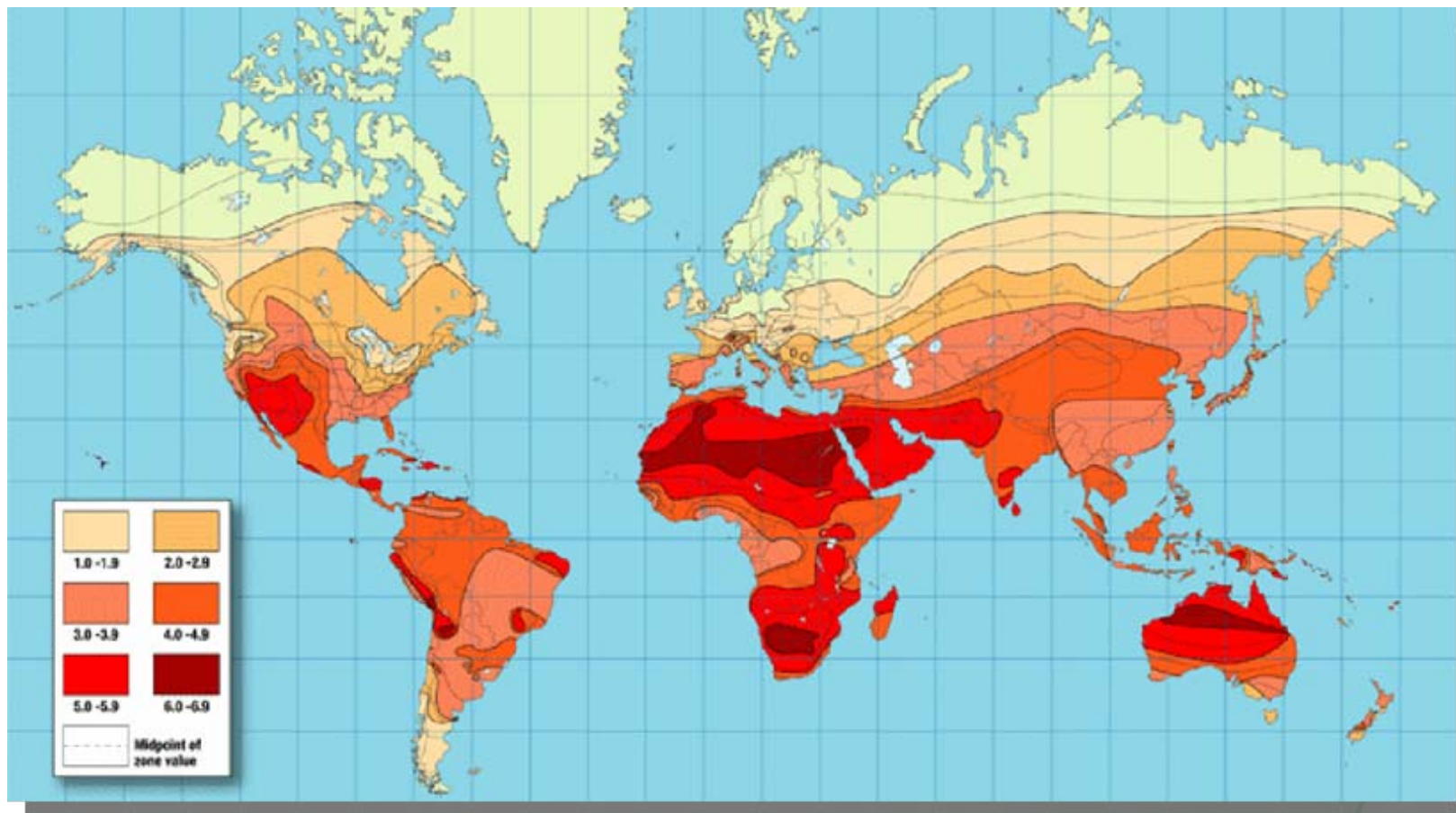
Mexico has the 3rd Greatest Geothermal Energy Production



* 2004

Solar Energy

México is located in a region with the highest isolation levels



Economic Impact related to Climate Change in Mexico



- The economic impact costs associated with climate change are greater, than the mitigation costs.
- There are unacceptable costs, such as the loss of biodiversity.
- The estimated damages to Mexico's economy is calculated between 3.5 to 4.2 GDP, for year 2050.
- Meeting this voluntary goal, represents a cost of 0.56% of GDP.



Climatic Change: Government Funding Resources for R&D

Primary Government Funding Source:

- **CONACYT “Sectorial Fund” (Fondo Sectorial) – Secretariat of Energy – Hydrocarbons**
- **CONACYT “Sectorial Fund” (Fondo Sectorial) – Secretariat of Energy – Energy Sustainability**
- **Mexican Petroleum Institute (IMP) – Scientific Research and Technology Development Fund**
- **SEMARNAT-CONACYT “Sectorial Fund” (Fondo Sectorial)**
- **Multi-Agency “Mixed Funding” (Fondos Mixtos)**
- **Innovation Funds (Fondos de Innovación)**

Potential sources of funding

Description

Private Sector

- Given right incentives and a stable regulatory framework, Mexico's businesses could begin directing capital investment
- Other studies have shown that in most sectors, most of the incremental costs could eventually be passed on to consumers.

Public Sector

- Government funding will play an important role in several ways:
 - Kick-start private sector investment (e.g. providing low interest loans for energy efficiency investments)
 - Public sector will need to invest in public goods that support the low carbon transition (e.g. upgrades to the national electricity grid to better support renewables)

Carbon Markets

- Through CDM, developed countries can contribute to their domestic abatement goals by funding abatement in developed countries, where the cost is potentially lower
- Other mechanisms like the Global Environmental Fund (e.g. Green Fund)

International Institutions

- Agencies such as the World Bank and IADB have increasingly directed funds to invest in emissions reduction in developing economies. This can be in the form of grants or low interest loans

Foreign Direct Investments

- Mexico received around US\$25 billion in private sector foreign direct investment in 2007.
- If Mexico became a leading emerging market for low-carbon products and services, it would likely attract a growing share of the rapidly growing amounts being invested in 'clean tech' (estimated at US\$150 billion this year).

Summary

- Mexico has the potential to reduce emissions by 535 Mt CO₂e, or 54 percent from reference case level, by 2030
- Reductions can be achieved with action across all major economic sectors, with significant opportunity in power, transport, waste and agriculture
- The incremental investment required is manageable, adding about US\$18 billion or 3 percent to total investment in 2030, and the economy can continue to grow at 4 percent annually
- There are significant co-benefits to reducing emissions including energy security, health and welfare, and international leadership status
- Mexico has a window of opportunity to act now – to prevent lock-in of high-carbon infrastructure, to achieve maximum benefit from energy savings, to avoid need of more drastic and costly action later, and to capture competitive advantage in low carbon technology
- Mexico can pursue a low carbon strategy across three time horizons: ‘do it now, no regrets’; ‘start now, then accelerate’; and ‘develop now, capture over time’