CLIMATE RISKS IN THE ENERGY SECTOR

THE 6TH FORUM ON THE CLIMATE-ENERGY SECURITY NEXUS

CÉSAR CONTRERAS

TECHNICAL CHIEF OF STAFF OF THE DEPUTY SECRETARY FOR PLANNING AND ENERGY TRANSITION

OTTAWA, CANADA, JUNE 7, 2016
**Overview of the Energy Sector**

**2014**
- 119 million inhabitants
- 406 cities
- 75% of the total population is located in cities
- 30.7 million vehicles using petrol and diesel

**2029**
- 137 million inhabitants
- 503 cities
- 90% of the total population will be located in cities*
- 39.8 million vehicles will use petrol and diesel
OVERVIEW OF THE ENERGY SECTOR

MEXICO: ENERGY PRODUCTION, CONSUMPTION AND ECONOMIC GROWTH
(PETAJOULES)

2013: BEFORE ENERGY REFORM

2015: AFTER ENERGY REFORM

SOURCE: ENERGY INFORMATION SYSTEM, MINISTRY OF ENERGY
CLIMATE CHANGE OVERVIEW

MAJOR HURRICANE HISTORY

TROPICAL STORMS

MAJOR HURRICANE (CATEGORY 3 AND HIGHER)

SOURCE: NATIONAL HURRICANE CENTER
## Clean Energy and Climate Policy

<table>
<thead>
<tr>
<th>Year</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
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<tbody>
<tr>
<td><strong>Climate Change Law</strong></td>
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<td><strong>Intersecretarial Commission</strong> (14 Ministries)</td>
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<td><strong>Climate Change National Strategy</strong> (10-20-40 Years Vision)</td>
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<td><strong>Energy Reform</strong></td>
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<td><strong>Special Programs:</strong></td>
<td>✓ Climate Change</td>
<td>✓ Sustainable Use of Energy</td>
<td>✓ Renewables Energies</td>
<td><strong>NDCs (March 27)</strong></td>
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<td><strong>Energy Transition Act</strong></td>
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<td><strong>CEMIE (Solar, Wind Geo, Ocean and Bio)</strong></td>
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**Clean Energy and Climate Policy**

### General Law on Climate Change (2012)

#### Objectives
- Moving towards a complete sustainable and low carbon emissions economy.
- Reduce vulnerability from adverse effects on climate change.
- Ensure coordination among all levels of federal government.

#### Goals
- Reducing emissions (baseline 2000):
  - 30% by 2020
  - 50% by 2050
- Clean energy generation:
  - 35% by 2024

#### Instruments
- Climate Change National Strategy
- Special Climate Change Program
Special Climate Change Program 2014-2018

Objetives

- Mitigation and Adaptation Targets / Actions
- Allocates responsible for each goal
- Reviewed every two years (INECC)
<table>
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<tr>
<th><strong>Mitigation</strong></th>
<th><strong>Adaptation</strong></th>
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<tbody>
<tr>
<td>▪ 61.3% of mitigation commitments.</td>
<td>▪ Optimize climate events response programs</td>
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<td>▪ Reduction of 25% of intensity of emissions per MW/h, between 2013 and 2018.</td>
<td>▪ Generate management programs on vulnerability and increase resilience of the energy infrastructure.</td>
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<tr>
<td>▪ Mitigate 18.7 MtCO$_2$E from clean energy generation.</td>
<td>▪ Reforestation and conservation programs and management of basins in hydroelectric power plants.</td>
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</table>
TRANSITION TOWARDS THE SUSTAINABLE USE OF ENERGY

GRADUAL INCREASE OF CLEAN ENERGY IN THE NATIONAL ENERGY GRID,

REDUCTION IN THE CARBON FOOTPRINT OF THE ENERGY SECTOR

ALIGNING THE MANDATE ON CLIMATE CHANGE AND THE ELECTRICAL INDUSTRY

ENERGY TRANSITION ACT

CLEAN ENERGY AND CLIMATE POLICY
C O N T E N T S

MAIN AMENDMENTS

- Federal Government
- Electrical Industry
- Academy
- ONGs

- Transition Strategy to Promote Cleaner Fuels and Technologies Use
- National Program for Sustainable Energy Use
- Special Program of Energy Transition

- Clean Energy Generation Goals:
  - 25% to 2018
  - 30% to 2021
  - 35% to 2024
CLIMATE CHANGE SCENARIOS

HYDROMETEOROLOGICAL HAZARDS
GENERATION, TRANSMISSION AND DISTRIBUTION

TROPICAL CYCLONES

PRECIPITATION > 70 MM

SOURCE: CFE, DIRECCIÓN DE PROYECTOS DE INVERSION FINANCIADA
CLIMATE CHANGE SCENARIOS

HYDROMETEOROLOGICAL HAZARDS
GENERATION, TRANSMISSION AND DISTRIBUTION

Temperature < 3°

Temperature > 35°

Source: CFE, Dirección de proyectos de inversión financiada
Average daily irradiation in Mexico is about 5.5 kWh/m²/d, and can reach values higher than 8.5 kWh/m²

Source: SENER, INERE
STUDIES TO CHARACTERIZE THE WIND RESOURCE IN REGIONS OF THE Isthmus of Tehuantepec, the Peninsulas of Yucatan and Baja California, and the Northern Region of the Gulf of Mexico...

SOURCE: SENER, INVENTARIO NACIONAL DE ENERGÍAS RENOVABLES
Geothermal resources in Mexico (°C)

Geothermal potential based on the census of more than 1.3 thousand hot spots estimated by the Federal Electricity Commission.

Source: SENER, Inventario Nacional de Energías Renovables
CURRENT COOPERATION

TASK FORCE (JOIN ACTIVITIES)

- **Appliance Standards and Labeling Technical Exchange**
  Moving forward towards alignment on residential refrigerators and electric motors standards

- **ISO 50001 for Large Energy Users**
  Cooperation towards a harmonized personal credentialing program and pilot projects in industrial and commercial facilities.

- **Power Sector Transformation**
  Greater cross-border flows of renewable energy

- **Early Warning System**

- **Reducing Methane Emission in the Oil and Gas Sector**
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