Development of GHG Emissions Inventories & Forecasts in the Border States of Mexico
Introduction

- Background information
- Objectives
- Inventory structure
Background information

- June 2007
  - CCS and the state of Sonora entered in a technical assistance agreement
- April 2008
  - Remaining border states enter into a technical assistance agreement
- August 2008
  - Sonora’s GHG Emissions Inventory and Forecast completed
- December 2008
  - Phase I Inventory development activities begin for remaining border states
  - Phase II Inventory development completed
Objective

- Develop GHG emission inventories for years 1990 to 2005 and GHG emission forecasts for the years 2006 to 2020.
- Develop technical capacity within the border states to prepare future updates to the GHG inventory forecast.
Inventory structure

- Covers the period from 1990 to 2020 and
- Includes emissions for each of the six gases recognized by the Intergovernmental Panel on Climate Change (IPCC).
- Both sources and sinks of carbon dioxide (CO₂) are included and reported in terms of their carbon dioxide equivalents (CO₂e).
- State-level emissions are categorized into the following eight sectors:
  - 1) electricity supply and use;
  - 2) residential/commercial/industrial fuel combustion;
  - 3) transportation;
  - 4) industrial processes and product use;
  - 5) fossil fuel industries;
  - 6) agriculture;
  - 7) waste management; and
  - 8) forestry and land use.
General principles

- **Transparency**
  - Open for comments and review

- **Consistency**
  - Designed to be externally consistent with current or likely future emissions reporting systems

- **Priority**
  - To local and state data sources
  - To significant sources

- **Comprehensive**
  - CO$_2$, CH$_4$, N$_2$O, SF$_6$, HFC, PFC; 1990–2020
General principles

- **Use of consumption-based estimates**
  - Relevant to the energy supply sector.
  - Approach reflects more accurately the impact of state-based policy strategies such as energy conservation.
Specific considerations

- Maintain consistency with GHG accounting methods utilized by existing climate change players in the region
Specific considerations

- References
  - IPCC: 2006 guidelines
  - INE: Mexico’s GHG emissions inventory (INEGEI)
  - EPA: U.S. GHG Inventory
  - EPA: State Inventory Tool (SIT)
  - CCS: Expertise (17 state inventories)

Methodologies
- 2006 IPCC
- EPA SIT

Identification of significant sources
- INE: INEGEI
- CCS: Expertise

Organization of results
- CCS: Expertise
## Significant sources

**Mexico GHG inventory 2002**

<table>
<thead>
<tr>
<th>Sources</th>
<th>Emissions [Gg CO2e]</th>
<th>Distribution %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>643,183</td>
<td>100%</td>
</tr>
<tr>
<td>Energy – Fuel consumption – Electricity generation</td>
<td>152,469</td>
<td>24%</td>
</tr>
<tr>
<td>Energy – Fuel consumption – Transportation</td>
<td>111,959</td>
<td>17%</td>
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<tr>
<td>Energy – Fuel consumption – Manufacturing</td>
<td>51,025</td>
<td>8%</td>
</tr>
<tr>
<td>Agriculture – Enteric Fermentation</td>
<td>37,366</td>
<td>6%</td>
</tr>
<tr>
<td>Energy – Fugitive fuel emissions – Gas and petroleum systems</td>
<td>37,020</td>
<td>6%</td>
</tr>
<tr>
<td>Energy – Fugitive fuel emissions – Petroleum refining</td>
<td>36,690</td>
<td>6%</td>
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<tr>
<td>Waste – Solide waste management</td>
<td>34,960</td>
<td>5%</td>
</tr>
<tr>
<td>Industrial Processes – Mineral products</td>
<td>30,618</td>
<td>5%</td>
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<tr>
<td>Waste – Wastewater management</td>
<td>28,566</td>
<td>4%</td>
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<tr>
<td>Energy – Fuel consumption – Other</td>
<td>25,160</td>
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<td>Industrial Processes – Metal production</td>
<td>15,322</td>
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<td>Agriculture – Agricultural soils</td>
<td>7,449</td>
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<td>Other</td>
<td>74,579</td>
<td>12%</td>
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Results

Sonora
Border States (preliminary)
Sonora

- Gross GHG Emissions by Sector, 2005
Sonora

Gross GHG Emissions by Sector, 2005

- Energia/ Energy 65%
- Agricultura/ Agriculture 17%
- Procesos Industriales/ Ind. Processes 9%
- USCUSS/ Land Use 0%
- Desechos/ Waste 8%

Gross GHG Emissions by Sector, 2005

- Energia/ Energy 63%
- Agricultura/ Agriculture 7%
- Procesos Industriales/ Ind. Processes 5%
- USCUSS/ Land Use 13%
- Desechos/ Waste 12%
Sonora

Inventory & Forecast 1990–2020

- Forest Wildfires
- Waste Management
- Other Ind. Process
- ODS Substitutes
- Agriculture
- Transportation Other
- Transportation Road/Diesel
- Transportation Road/Gasoline
- RCI Fuel Use
- Fossil Fuel Industry
- Electricity (Consumption Based)
Border States

- Methane emissions from landfills represent an important sector in the region.
- There is interest in developing landfill projects where landfill gas is either captured and flared or used as an energy source.
- Emission reduction credits can be traded in voluntary programs in North America (e.g., the Voluntary Carbon Standard)
- In the presence of a healthy carbon market, these projects could attract foreign investment, create local jobs, and mitigate GHG emissions.
Border States

- Methane emissions from the management of municipal solid waste

<table>
<thead>
<tr>
<th>Year</th>
<th>Baja California</th>
<th>Sonora</th>
<th>Chihuahua</th>
<th>Coahuila</th>
<th>Nuevo Leon</th>
<th>Tamaulipas</th>
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<tbody>
<tr>
<td>1990</td>
<td>20.5</td>
<td>20.3</td>
<td>21.3</td>
<td>21.0</td>
<td>53.9</td>
<td>26.5</td>
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<td>1995</td>
<td>24.6</td>
<td>24.1</td>
<td>24.0</td>
<td>23.3</td>
<td>60.6</td>
<td>29.5</td>
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<tr>
<td>2000</td>
<td>30.1</td>
<td>27.7</td>
<td>27.1</td>
<td>25.7</td>
<td>68.3</td>
<td>32.8</td>
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<tr>
<td>2005</td>
<td>37.3</td>
<td>31.2</td>
<td>30.2</td>
<td>28.3</td>
<td>56.6</td>
<td>37.6</td>
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<tr>
<td>2010</td>
<td>45.4</td>
<td>32.6</td>
<td>33.0</td>
<td>31.5</td>
<td>66.2</td>
<td>43.5</td>
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<tr>
<td>2015</td>
<td>52.6</td>
<td>34.1</td>
<td>36.1</td>
<td>34.4</td>
<td>74.7</td>
<td>47.4</td>
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<tr>
<td>2020</td>
<td>58.9</td>
<td>35.7</td>
<td>39.4</td>
<td>37.1</td>
<td>82.4</td>
<td>50.3</td>
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</table>
Conclusions

- Border states are gaining an understanding of important source sectors
- State I&F are important inputs to inform the types of policies and the stringency needed to meet reduction goals.
- Results are important sources of information regionally for climate change mitigation in Mexico and North America.
Questions & Answers

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