Completion of the 1999 Mexico National Emissions Inventory – Lessons Learned

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Presentation Overview

- **Objectives, Scope, Approach**
- **Results Summary**
- **Development of Model Input Files**
- **Lessons Learned:**
  - Information Gaps
  - Human Resources
  - Material/Capital Resources
- **Acknowledgements**

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1999 Mexico NEI Objectives

- **Comply with Mexican Federal Environmental Law**

- **Promote Mexican Institutional Capacity Building**

- **Provide technical basis for further air quality studies (toxics, visibility, ozone, PM)**

- **Support tri-national inventory development**

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1999 Mexico NEI Scope

- **Base year – 1999**
- **Entire country – 32 states; 2,443 municipalities**
- **Criteria pollutants**
- **Sources:**
  - Point
  - Area
  - On-road motor vehicles
  - Nonroad mobile
  - Biogenics

The Country of Mexico

State Code	State Name
1	Aguascalientes
2	Baja California
3	Baja California Sur
4	Campeche
5	Coahuila
6	Colima
7	Chiapas
8	Chihuahua
9	Distrito Federal
10	Durango
11	Guanajuato
12	Guerrero
13	Hidalgo
14	Jalisco
15	México
16	Michoacán
17	Morelos
18	Nayarit
19	Nuevo León
20	Oaxaca
21	Puebla
22	Querétaro
23	Quintana Roo
24	San Luis Potosi
25	Sinaloa
26	Sonora
27	Tabasco
28	Tamaulipas
29	Tlaxcala
30	Veracruz
31	Yucatán
32	Zacatecas

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1999 Mexico NEI Approach

- **Phase I: 1996 – 1999**
  - Planning
  - Formation of Technical Advisory Committee
  - Manuals and Models
- **Phase II: 2000 – 2003 (6 Northern States)**
- **Phase III: 2004 – 2006 (32 States)**

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Summary of the 1999 Mexico NEI (tons), by source type

Source Type	NO_x	SO_2	VOC	CO	PM_{10}	$PM_{2.5}$	NH_3
Point	494,745	2,903,265	273,239	184,800	327,678	219,269	
Area	304,461	214,479	1,921,757	2,756,593	484,081	353,037	1,430,586
On-road	480,164	26,902	631,594	5,149,744	22,622	20,724	8,346
Nonroad	290,752	3,840	38,764	169,316	41,047	39,816	
Total	**1,570,121**	**3,148,486**	**2,865,354**	**8,260,453**	**875,428**	**632,846**	**1,438,933**

NO_x: On-road motor vehicles, nonroad mobile, power plants

SO_2: Power plants

VOC: Solvent use (area source), on-road motor vehicles, fuel distribution

CO: On-road motor vehicles, other fuel combustion (area source)

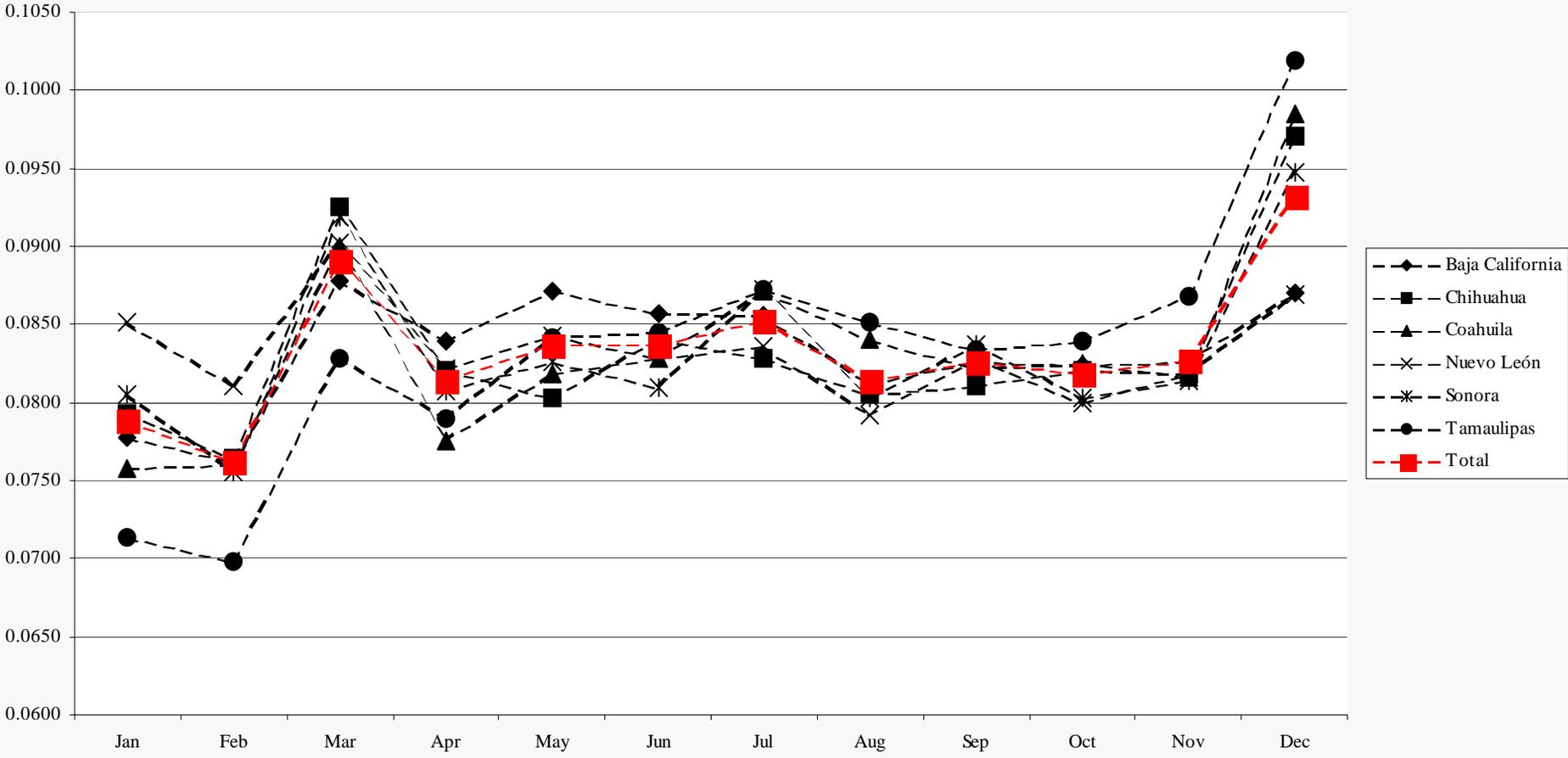PM_{10} and $PM_{2.5}$: Other fuel combustion

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SMOKE/IDA Formatting

- **WRAP Funded Development of SMOKE/IDA Files for Visibility Modeling**

- **Area, On-Road Mobile, Nonroad Sources – Very Straightforward**

- **Point Sources – Gap Filling Necessary:**
  - Centroid of municipality/locality, if coordinates were missing
  - Non-disclosure of non-Federal sources if <4 per NAICS
  - SCC-level stack data:
    - 6-digit SCC assigned based on NAICS
    - SMOKE default stack assignments
    - QA and changes by SEMARNAT

Lessons Learned – Point Sources

- **Increase number of facilities reporting emissions by *Cédulas de Operación Anual* (COAs)**
- **Require SCC/process-level of detail**
- **Require NH_3 and VOC reporting**
- **Establish format for submittals and train State Environmental Agencies**
- **Develop Mexico-specific emission factors and temporal profiles:**
  - Power Plants
  - Oil and Gas Production
  - Nonmetallic Minerals

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Monthly Distribution of Magna Gasoline Sales for 1999 – Northern Mexican States

Lessons Learned – Area Sources

- **Improve evaporative VOC estimates with better data from industry or other methods (surveys)**
- **Collect more extensive data on agricultural sources via cooperation with Secretariat of Agriculture, Livestock, Rural Development, Fisheries, and Food (SAGARPA):**
  - Fugitive Dust (tilling, feedlots)
  - Ammonia (livestock, fertilizer application)
  - Agricultural burning
- **Local data collection for estimating paved/unpaved road dust emission factors (AP-42 method) and vehicle activity**
  - Yuma/San Luis Río Colorado (Sonora)
  - Mexicali

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Lessons Learned – On-road Motor Vehicles and Nonroad Mobile Sources

- **Improve upon Mexico NEI methodology (per capita emissions and daily VKT + MOBILE6-Mexico EFs => 7 areas, extrapolated based on population):**
  - Local VKT data
  - Improved/expanded vehicle fleet information
  - More extensive vehicle emissions data for model improvement
- **Collect population and use data for other non-road equipment:**
  - Industrial/Commercial Equipment
  - Recreation Vehicles and Boats
  - Lawn and Garden Equipment
  - Oil Field and Airport Service Support Equipment
  - Logging Equipment

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Lessons Learned – Human Resources

- **SEMARNAT/INE have 7 staff people to support EI development at Federal Level**
- **On-site "interns" provided by sponsors**
- **Discovery of needs at the state/local level, training, tools**
- **Mexico NEI is a "blueprint" for international partnerships based on well-defined goals**
- **Continued support is needed (NARSTO, NACEC, U.S. EPA, WGA):**
  - Training
  - Measurements to support EF development

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Lessons Learned – Material Resources

- **>$2 million over 4 years for contractor fees and training materials**
- **$175,000 by SEMARNAT/INE for staff support**
- **$27 million needed over next 5 years:**
  - Develop and fulfill requirements for triennial updates
  - Develop and implement a communications strategy to disseminate the results
  - Build capacity among Mexican SEAs and other government agencies
  - Continue to improve the capabilities to develop emission inventories through interactions with the U.S. and Canada
  - Improve programs for emission measurements need to develop Mexico-specific emission factors and fleet characterization data for mobile sources
  - Develop a national data system

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  - Dr. Paul Miller (NACEC)
  - Dr. Adrián Fernández (INE)
- **Technical Advisory Committee:**
  - Mexico: SEMARNAT, Secretary of Energy, Universities, State Environmental Agencies
  - U.S.: States of AZ, CA, NM, TX
  - U.S. EPA Regions 9 and 6
  - WRAP, CENRAP
  - Environmental Defense

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For More Information

U.S. EPA Website: English reports and EI files

http://www.epa.gov/ttn/chief/net/mexico.html

SEMARNAT/INE Website: Spanish reports

http://www.ine.gob.mx/publicaciones/new.consulta publicacion.php

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