Michigan's Anthropogenic Mercury Emissions Inventory

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Chicago, IL

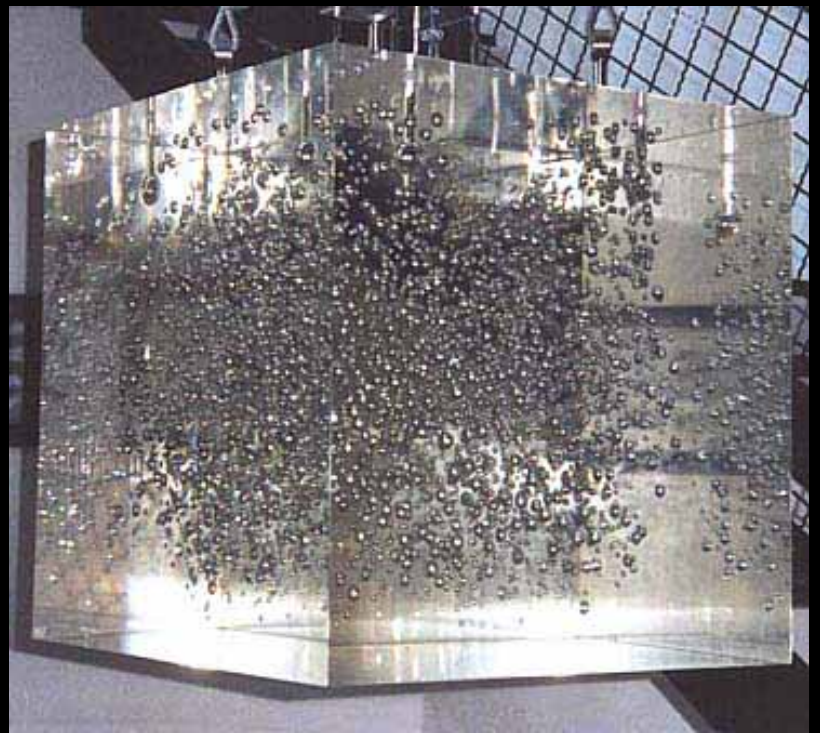
Leah Granke

Environmental Quality Analyst

Michigan Department of Environmental Quality

Overview

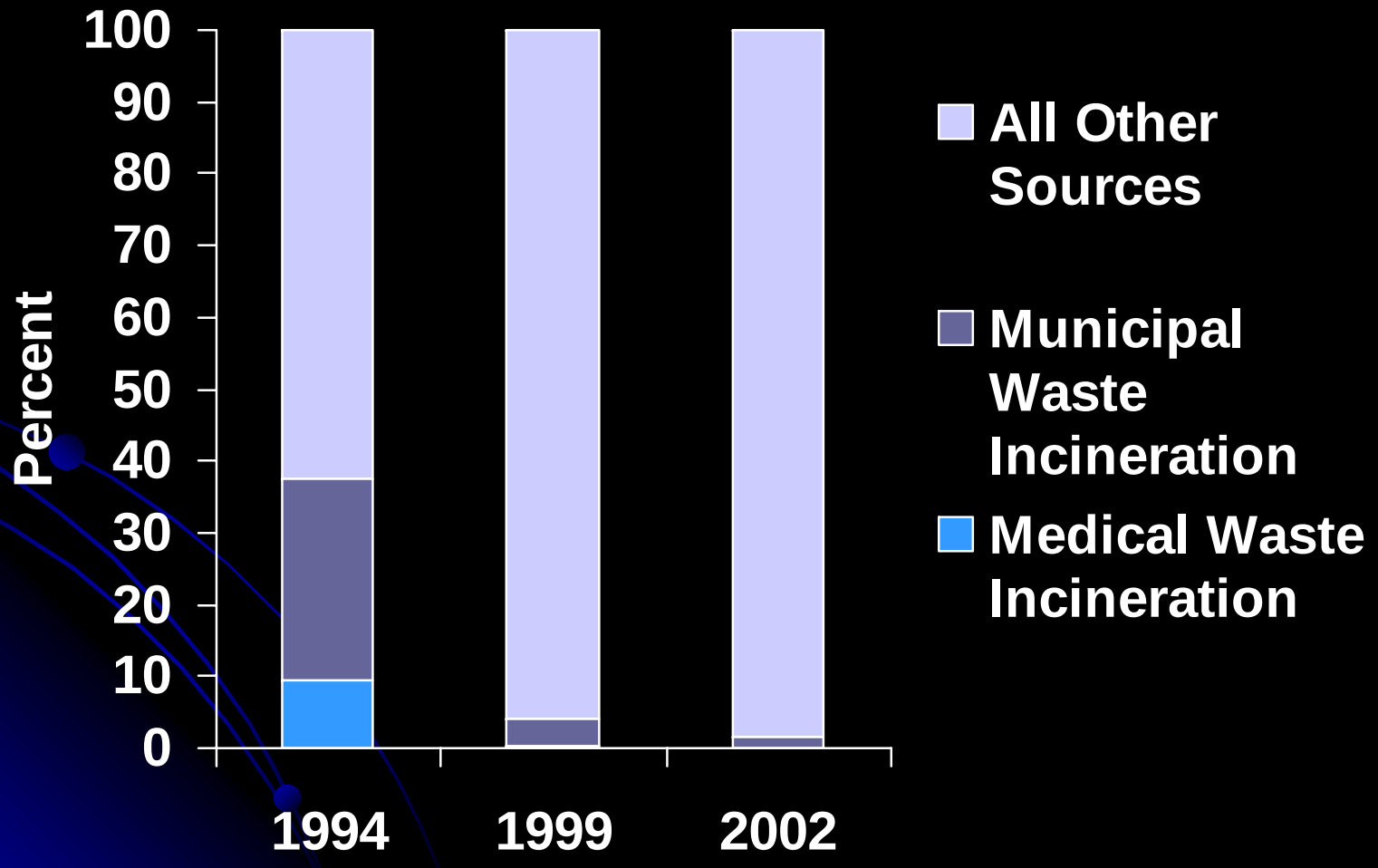
- Past Inventories
- Methods used to derive estimates
- Sources of Mercury Emissions in MI
- Planned Future Work



Brief History of Hg Inventories in Michigan

- 1989
  - Mercury in Michigan's Environment: Causes and Extent of the Problem
- 1994
  - Mercury Pollution Prevention in Michigan: Summary of Current Efforts and Recommendations for Future Activities
- 1999
  - Michigan Hg Electric Utility Report
- 2002
  - Still in draft form

Reductions in Mercury Emissions from Medical Waste & Municipal Waste Incineration



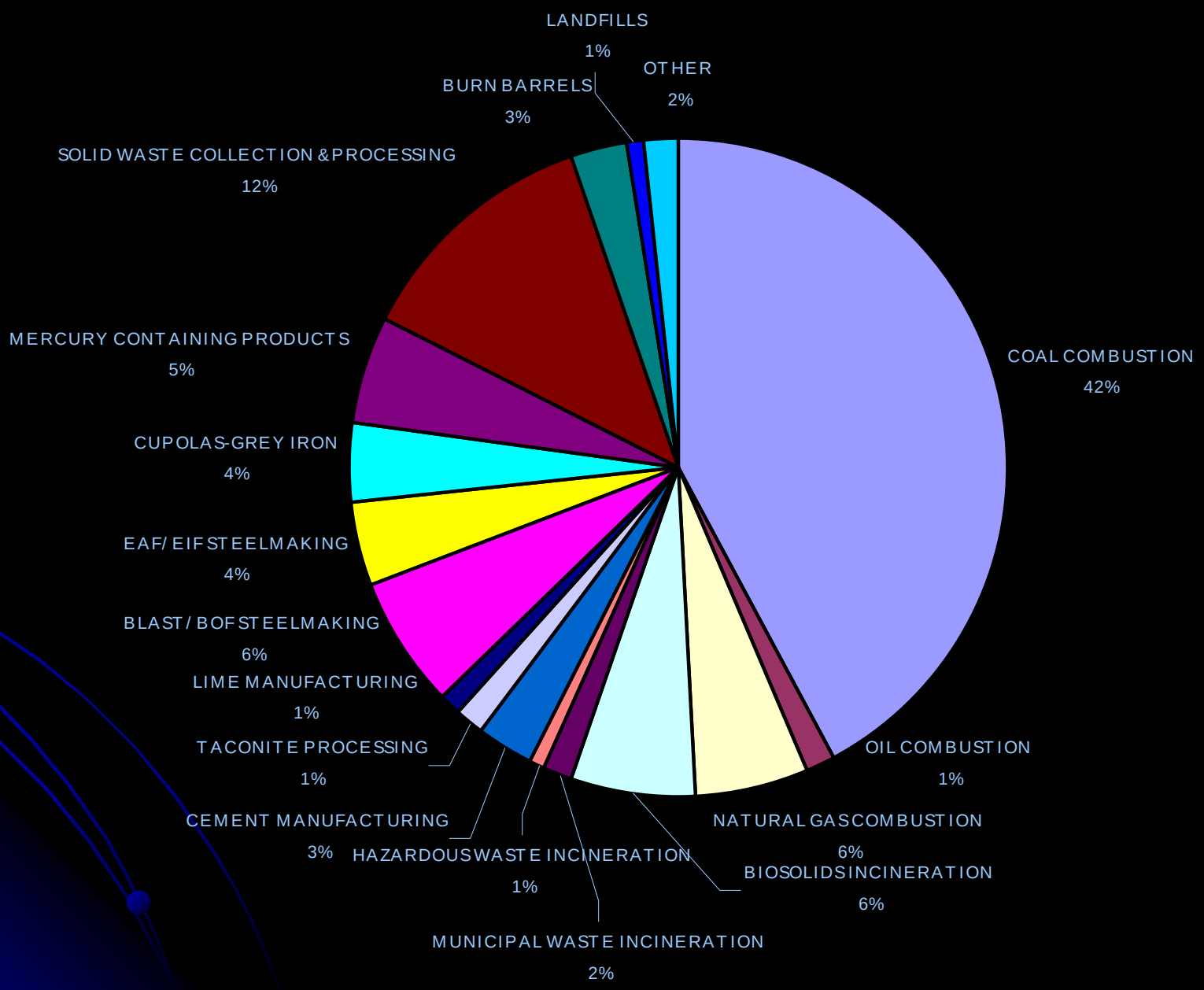
Air Rules-MDEQ actions to reduce Hg emissions

- Medical Waste Rule (Rule 933 of MI Air Pollution Control Rules)
  - Adopts federal rule by reference but sets more stringent limits for Hg (2000)
- Municipal Waste Rule (Rule 932)
  - Adopts federal rule by reference (1999)
- Air Rules
  - MI uses its base regulatory program to reduce mercury from point sources through the air permitting process.

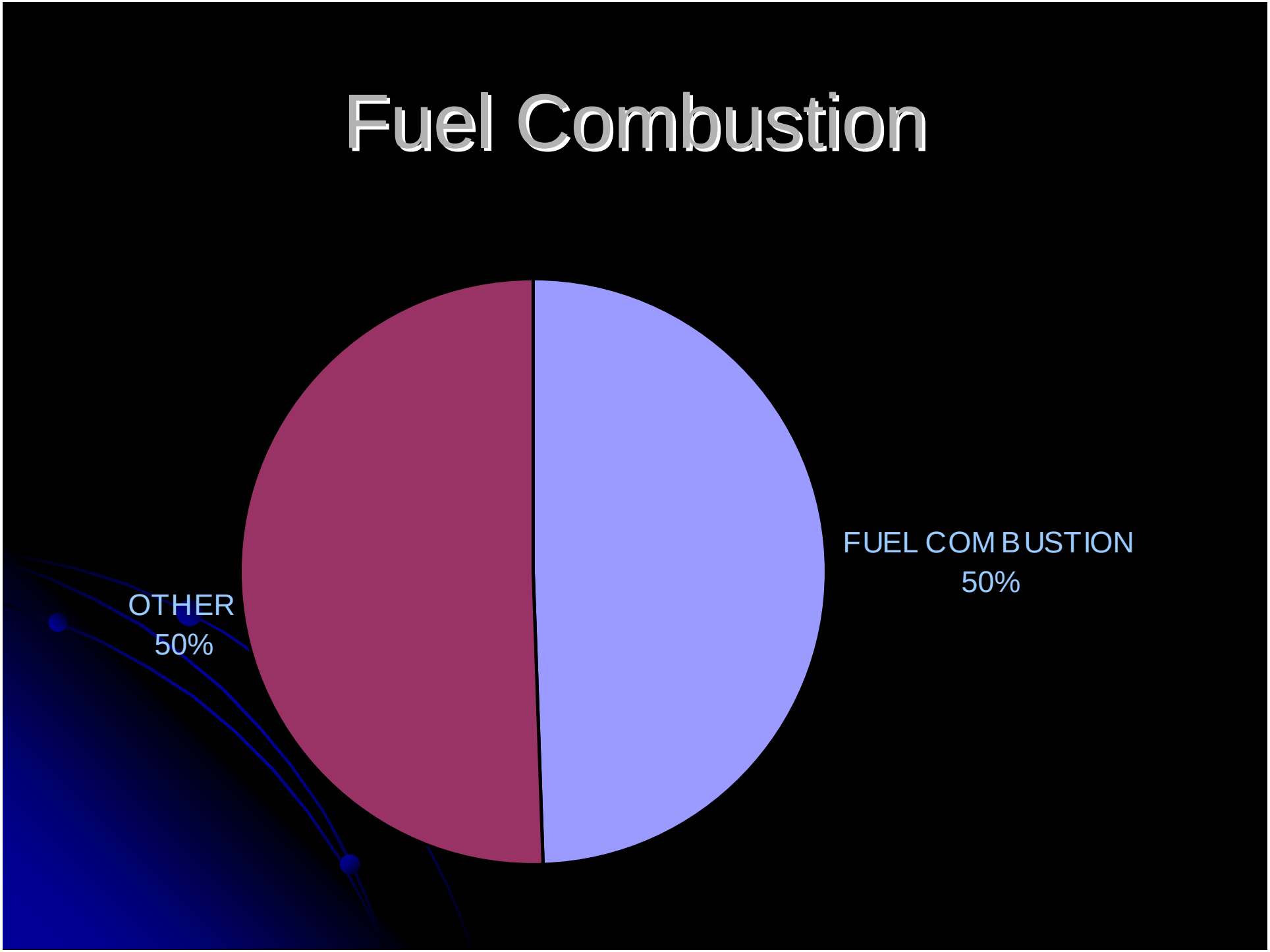
How sources are calculated

- Stack tests are preferred
- Mass balances
- TRI data
- Lumex Flux Calculations
- Emission factors
- Estimated products using a flow model
- Other methodology (ie cremation)

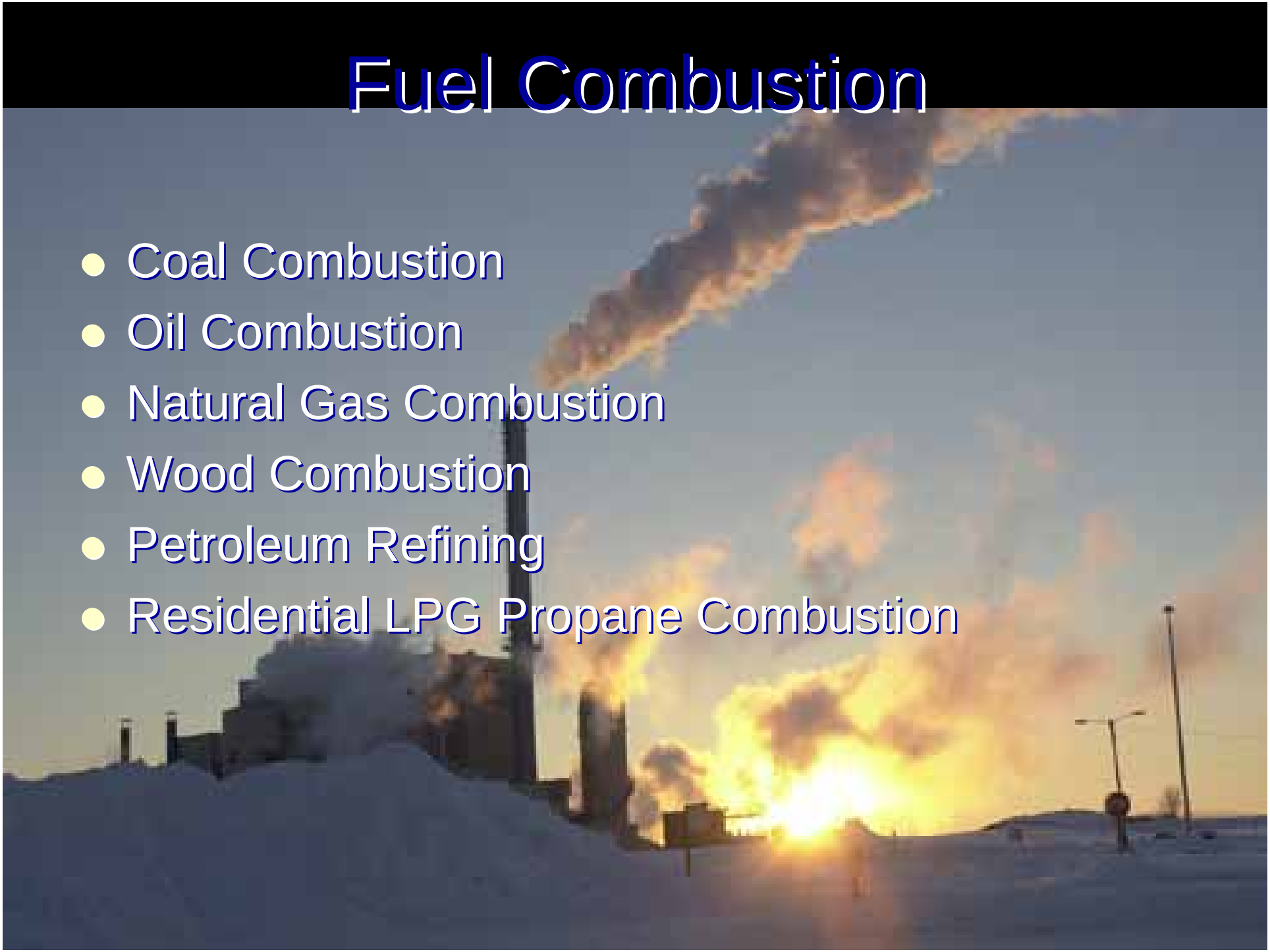
2002 Anthropogenic Mercury Emissions in MI



Fuel Combustion

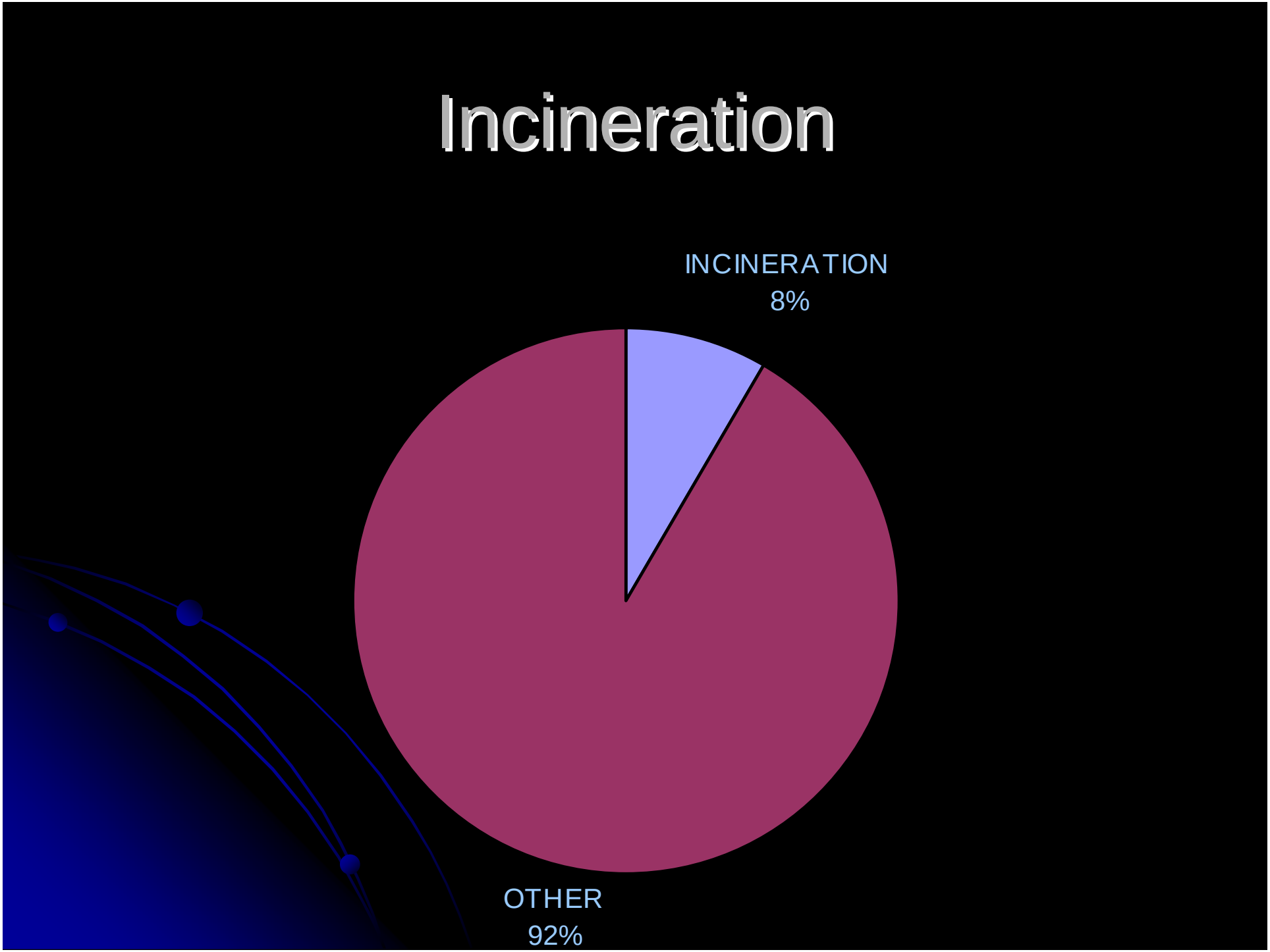


Fuel Combustion



- Coal Combustion
- Oil Combustion
- Natural Gas Combustion
- Wood Combustion
- Petroleum Refining
- Residential LPG Propane Combustion

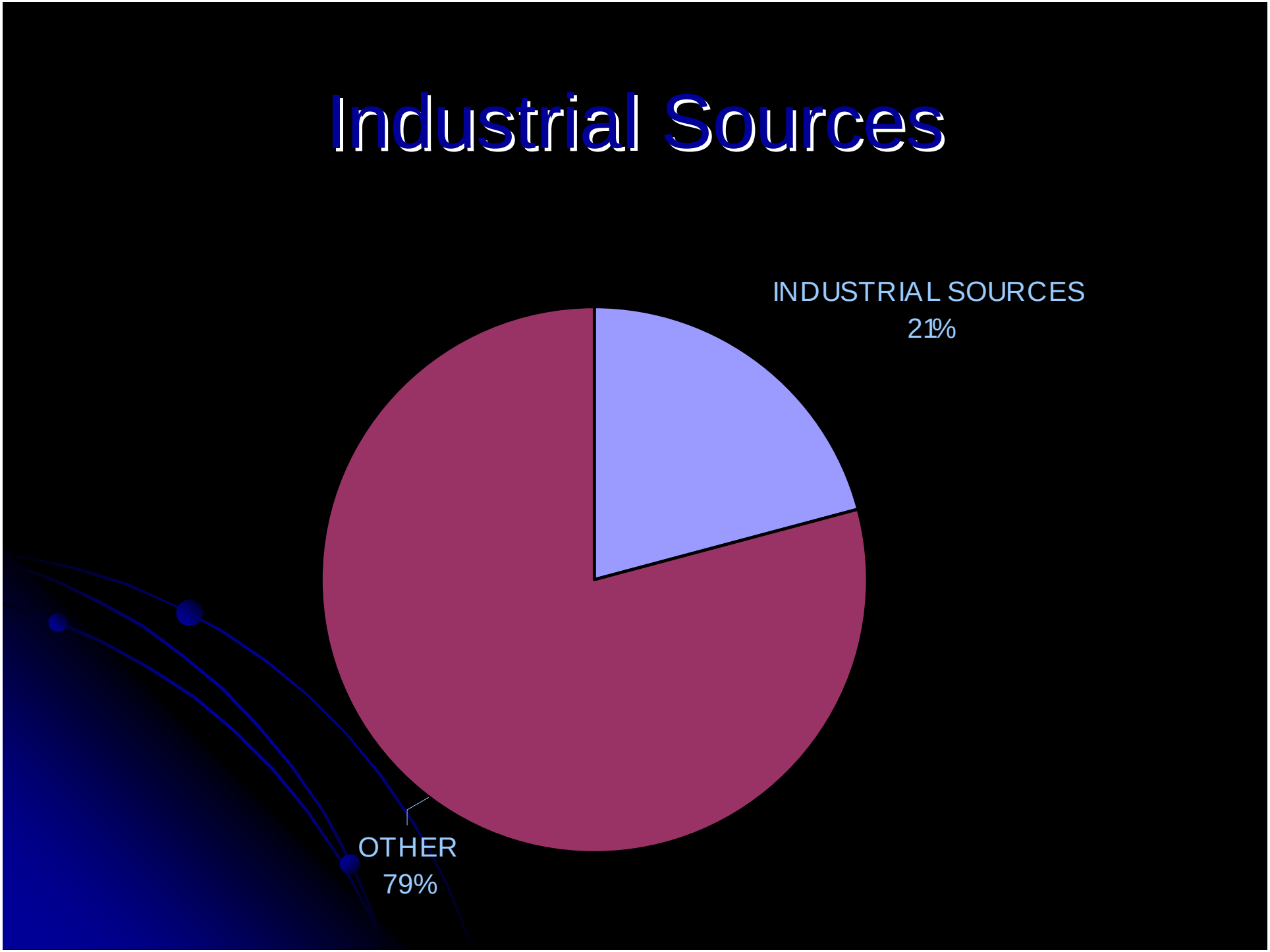
Incineration



Incineration

- Biosolids Incinerators (7)
- Municipal Waste Incinerators (4)
- Hospital Waste Incinerators (1)
- Hazardous Waste Incinerators (2)

Industrial Sources



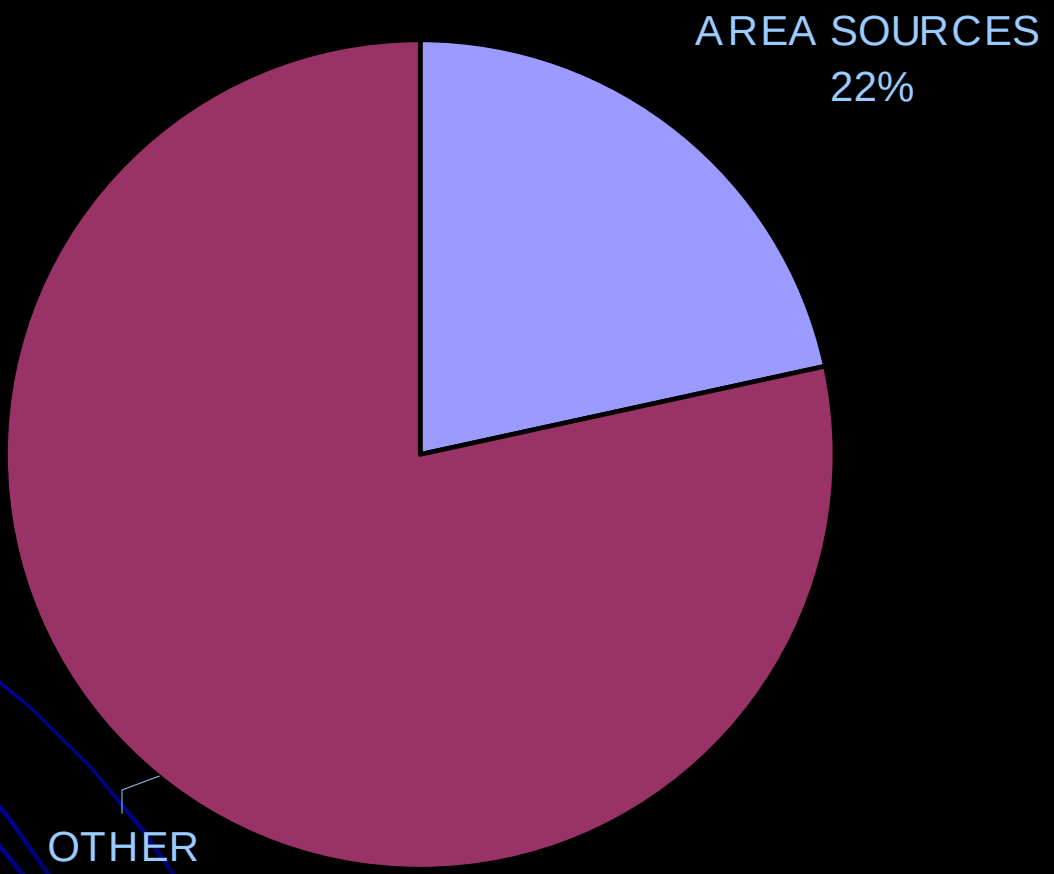
Industrial Sources

- Cement Manufacturing (3)
- Taconite Processing (2)
- Lime Manufacturing (5)
- Dental Amalgam Manufacturing (1)
- Brick Manufacturing
- Coke Production (1)
- Metals Production
  - Blast/BOFs (2)
  - EAFs & ElFs (10)
  - Cupolas (13)

Mercury Emissions Calculated Using Lumex Data

- Dental Amalgam Manufacturer
- Shredders
- Fluorescent Lamp Recycler
- Grey Iron Cupola

Area Sources



Area Sources

- Dental Amalgam
- Auto Switches-shredders (18)
- Measurement & Control Devices (incl. Thermometers)
- Consumer use of Bulk Mercury
- Thermostats
- Fluorescent Lamps (Breakage & Recycling (5))
- Non-fluorescent lamps
- Battery Recycling
- Waste Disposal

Flow Model for Products

- As part of US population:
  - Measurement & Control Devices (incl. thermometers)
  - Switches & Relays (incl. thermostats & auto switches)
  - Non-fluorescent lamps
  - Fluorescent lamps
  - Bulk Mercury

- Michigan Specific Values:
  - Dental Amalgam
  - Auto Switches-shredding

Waste Disposal

- Volatilization during solid waste collection and processing
- Landfill volatilization
- Disposal of products in burn barrels
- Cremation
- Volatilization: land application of biosolids

Mobile Sources

Vehicle Type	1999 Emission factor	2002 Emission factor
Light-duty Diesel	6,579 ng/mi	6.4-11.1 ng/mi
Heavy-duty Diesel	86,577 ng/mi	6.4-11.1 ng/mi
Light-duty Gasoline	875 ng/mi	0.3-1.4 ng/mi
Heavy-duty Gasoline	839 ng/mi	0.3-1.4 ng/mi

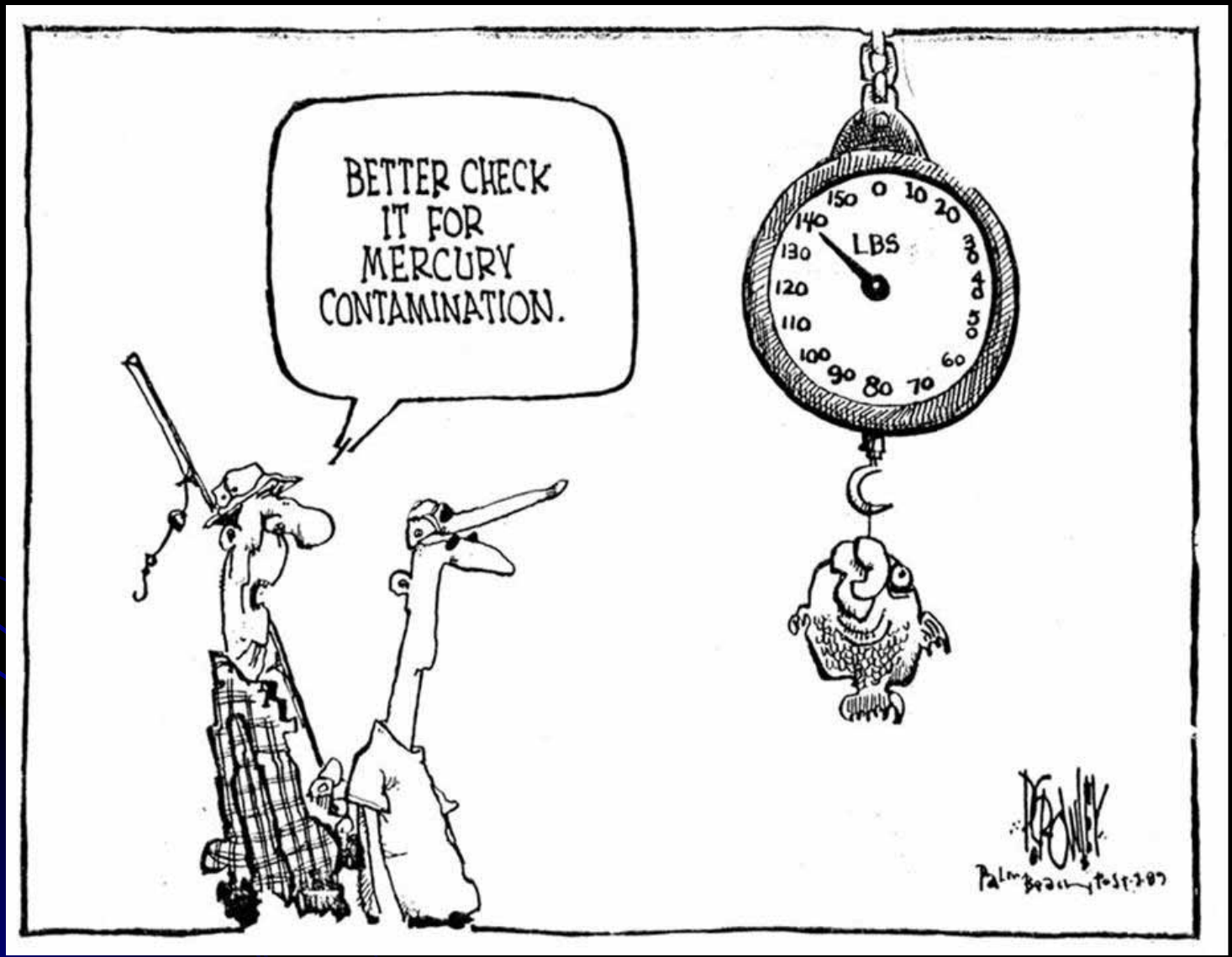
Future Work

- 2005 Inventory
- Update past inventories so that meaningful comparisons can be made
- Refine some sources
- Mercury Strategy Workgroup

Thanks to…

- Ed Swain
- Alexis Cain
- Joy Taylor Morgan, Dennis McGeen, District staff, and others at MDEQ who provided me with information and guidance

Questions


BETTER CHECK IT FOR MERCURY CONTAMINATION.
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