

# Sector-Based Pollution Prevention: Toxic Reductions through Energy Efficiency and Conservation Among Industrial Boilers

A Presentation to the  
GLPPR

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Presented by:



The Delta Institute  
Chicago, Illinois

# Introduction

- Project overview
- Data Analysis
- Designing an outreach program
- Next steps

# Project Hypothesis

Energy efficiency improvements offer significant opportunities to reduce energy consumption as well as emissions of certain toxic air emissions.



# Project Overview- Years 1 and 2

- Multi-year project funded by U.S. EPA
- Focus on Binational Toxic Strategy pollutants
- Year 1 and 2 project-related activities included:
  - On-site industrial boiler energy efficiency assessments at 8 facilities in Wisconsin
  - Analysis of toxic emissions from industrial boilers
- Conclusions
  - Industrial boilers are a significant source of toxic and criteria pollutants. Approximately 2,900 coal and residual fired boilers are the primary source of toxics.
  - Cost-saving and pollutant-reducing energy efficiency opportunities exist but are not being implemented.

# Energy Efficiency Opportunities

Category	Number of Recommendations	Average Capital Cost	Average Yearly Cost Saving	Average Efficiency Improvement
Start-up/Shut down procedures	4 (1)	\$0	\$1,500	<1%
Fuel management	9	\$77,000	\$133,800	0.8%
Water treatment	4	\$93,200	\$24,300	2%
Combustion air pre-heating	3 (1)	\$12,000 to \$75,000	\$146,700	2%
Controls	8	\$53,100	\$46,000	1.4%
Associated equipment	2	\$65,000	\$109,800	3%
Steam systems	6	\$21,300	\$313,900	9%

(1) Cost information provided for one recommendation.



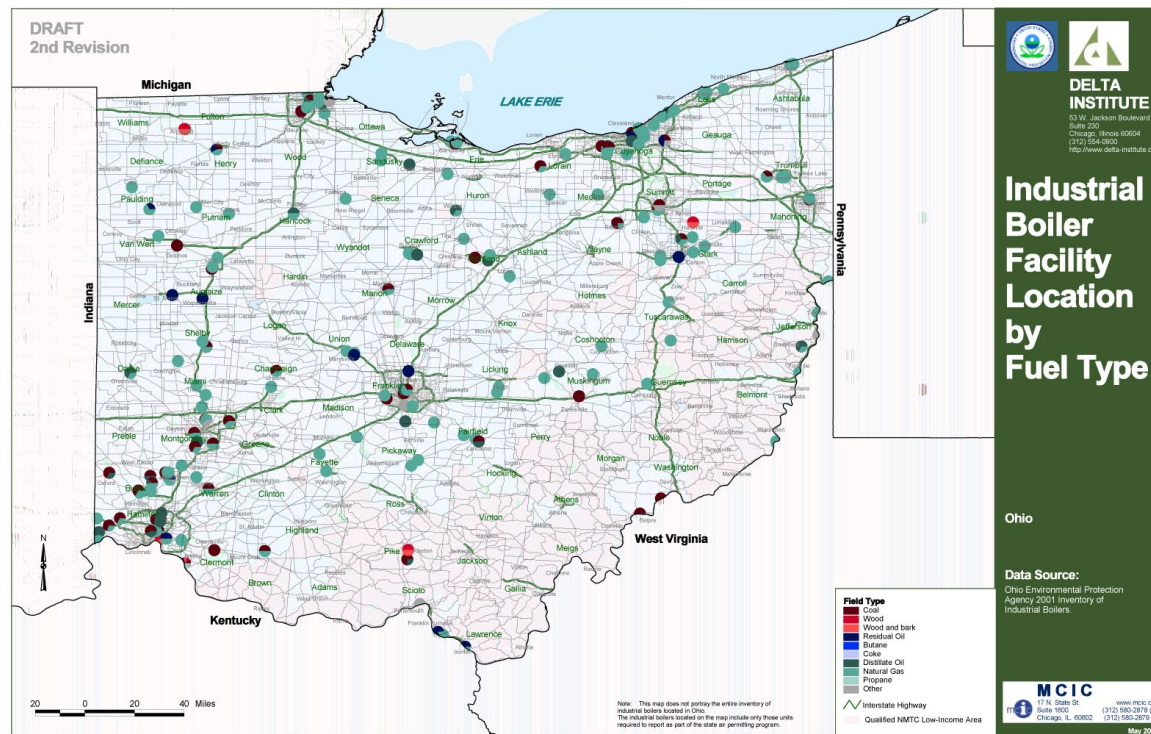
# Year 3 - Getting to scale or how to promote E2

- Analysis and mapping – focus on industrial sectors
- Meetings with states to evaluate interests, levers, and barriers
- Design a pollution prevention outreach initiative that links toxic reduction and energy efficiency and “bundles” existing federal and state programs and private tools to incentivize energy efficiency.
- Work with one or more Great Lakes states to implement an energy efficiency outreach program to industrial boiler owners.

# Data Analysis - Methodology

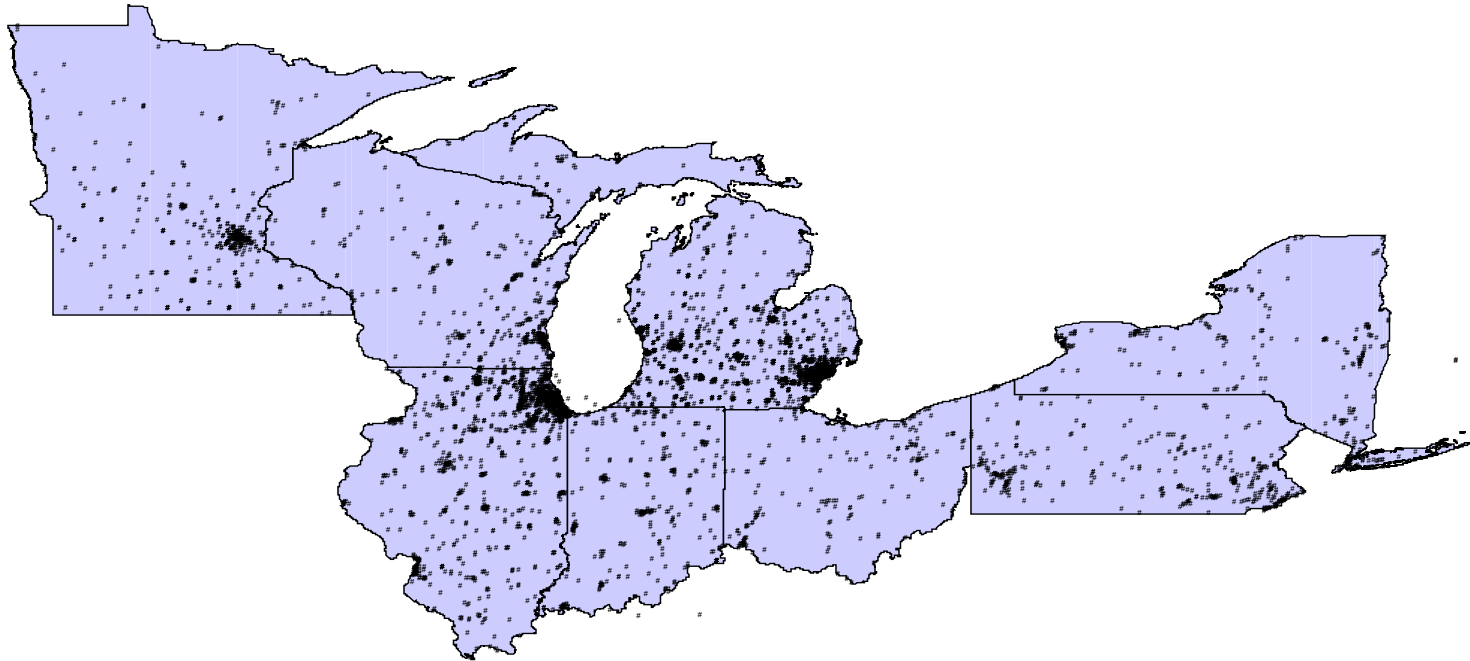
- Current – Used most recent database available for each state, formatted for analysis
- Conservative – Selected only one fuel per boiler (based on usage data)
- Comprehensive – Looked at breakdowns based on specific criteria:
  - Fuel type
  - Calculated boiler size (MMBtu/hr)
  - Sector (based on two-digit SIC Code)

# Data Analysis – Results (map)





# Great Lakes Stated Industrial Boiler Facility Locations



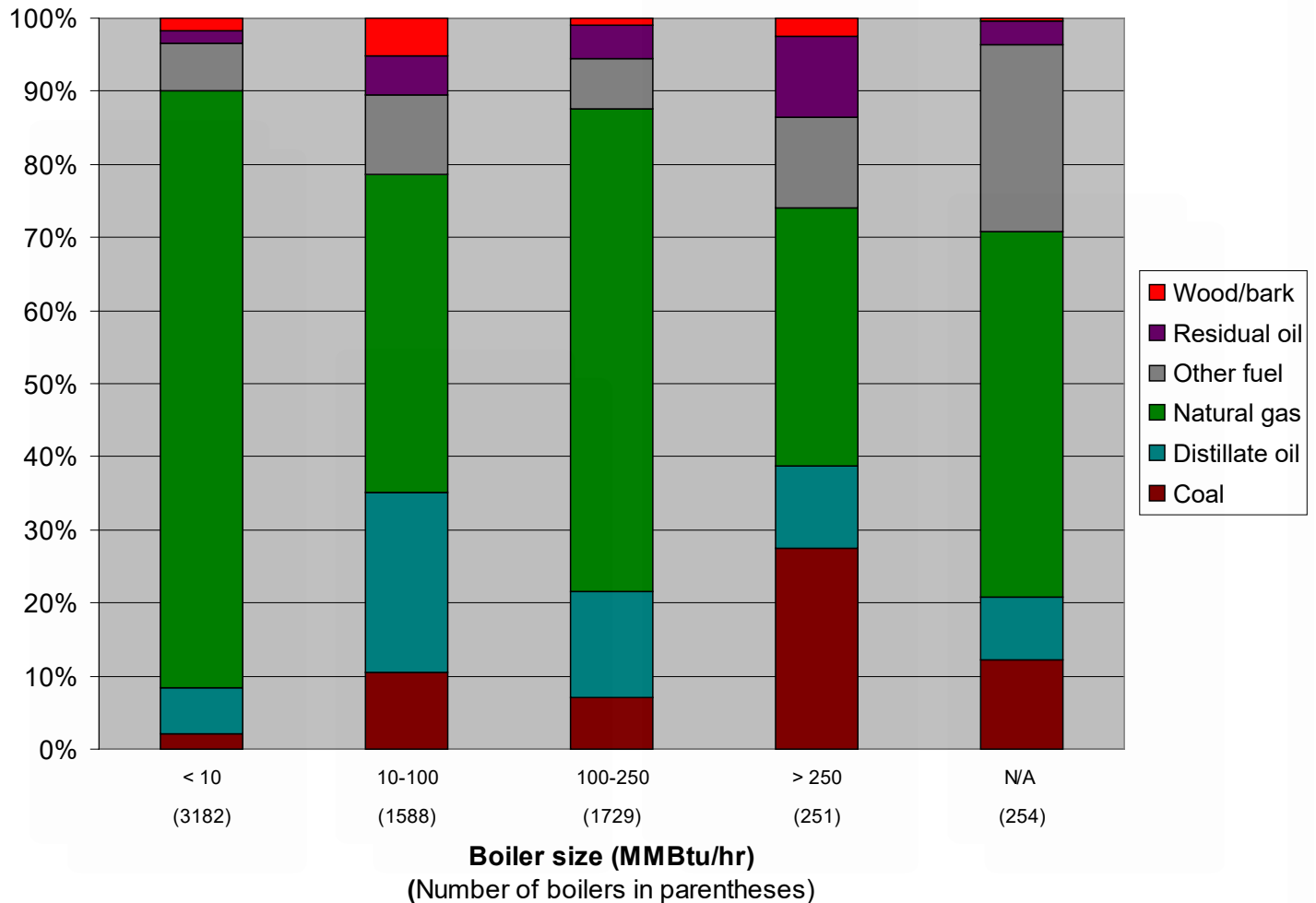
# Data Analysis - Results

<b>Breakdown of facilities and boilers by state</b>			
<b>State</b>	<b>Number of facilities</b>	<b>Number of boilers</b>	<b>Number of coal-fired boilers</b>
<b>Illinois</b>	1887	3406	148
<b>Michigan</b>	449	1197	93
<b>Ohio</b>	235	763	148
<b>Wisconsin</b>	776	1683	50
<b>Totals</b>	3347	7049	439

**NOTE:** The vast differences in the numbers of facilities and boilers included in each state's database are the result of varying reporting requirements among the states, rather than an indication that one state actually contains twice or three times as many boilers as another.

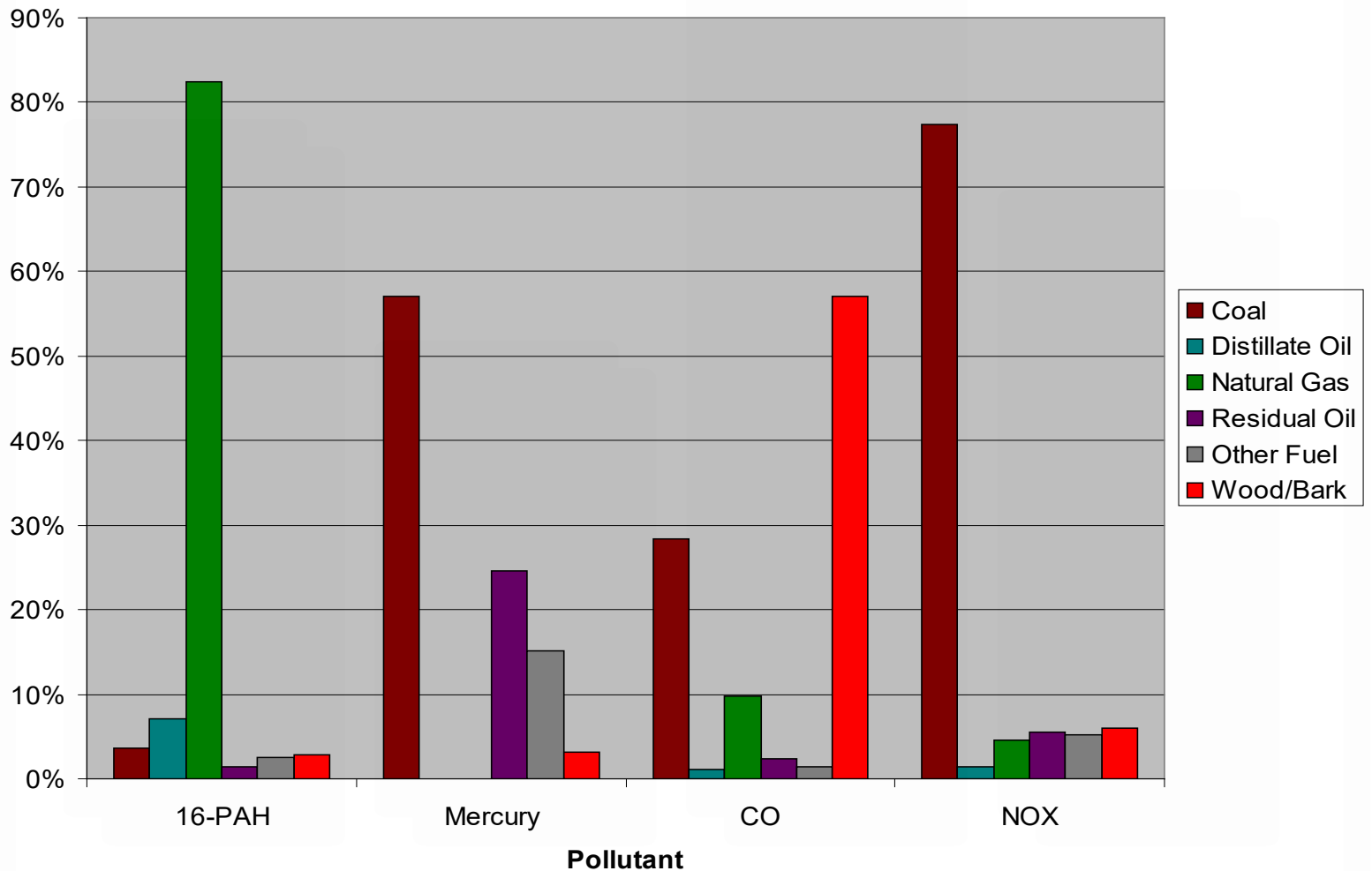
# Data Analysis - Results

## Aggregation Analysis: Fuel Use by Boiler Size



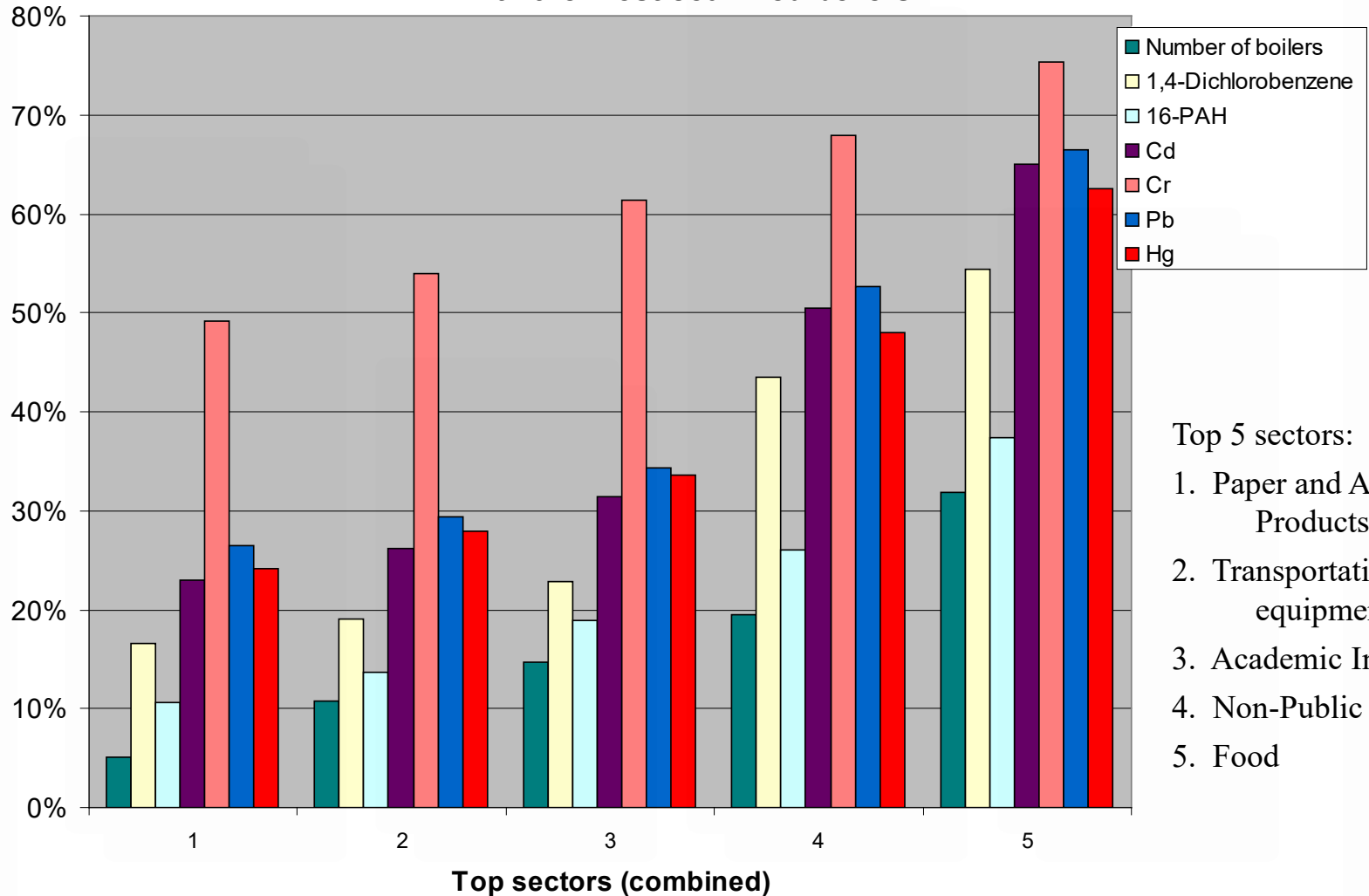
# Data Analysis - Results

Contribution to overall industrial boiler emissions, by fuel type



# Data Analysis - Results

Share of total toxic emissions from sectors with the most coal-fired boilers



# Opportunities for outreach

- Meet with states to present state industrial boiler data and identify outreach opportunities.
- Identify strategies to coordinate the resources of multiple state agencies (e.g. EPA, DNR, Department of Development, SBA, etc.). The lead agency may not be the state EPA.
- Outreach activities will either be sector-based or geographic-based.
- Work with two states (Ohio and Michigan) to identify best outreach “levers” and design a strategy.

# Agency interests

## OHIO

- NOx trading program
- Industrial and commercial boiler MACT
- Tax benefits

## MICHIGAN

- NOx and criteria pollutants
- Industrial and commercial boiler MACT
- Multi-pollutant programs
- Energy efficiency for state and university facilities

## Ohio

### Opportunities to Leverage Existing Programs

- Ongoing pollution prevention outreach with top boiler sectors (e.g. food, chemicals, metals)
- Mercury Challenge
- NOx Open Market Trading Program – opportunity to aggregate emissions from smaller sources
- Department of Development Energy Programs
- Ohio Air Quality Development Authority tax exemption programs
- Other private partners such as industry trade associations, chambers of commerce, private foundations, and loan funds



## Michigan

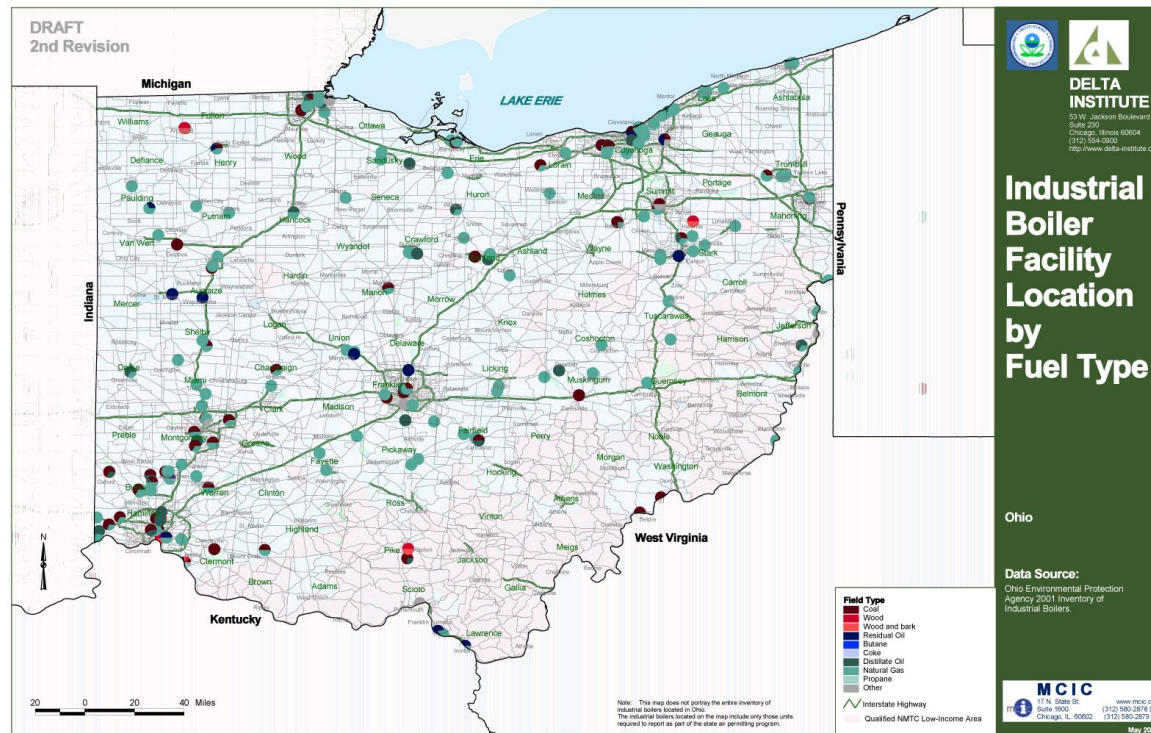
### Opportunities to Leverage Existing Programs

- Ongoing pollution prevention outreach with top boiler sectors (e.g. food, chemicals, metals)
- Retired Engineer Technical Assistance Program (RTAP)
- Michigan Open Market Trading Program
- Consumer and Industry Service boiler safety inspection program (including insurance company inspectors)
- Performance contracting
- Correlate job creation with energy efficiency
- Other private partners such as industry trade associations, chambers of commerce, private foundations, and loan funds

# Regional approach

- Outreach strategy based on fuel type (e.g. coal, residual oil)
- Utilizes local resources such as the Regional Air Agencies in Ohio
- Addresses local issues such as non-attainment
- Potentially focus on a predominate industrial sector within the region

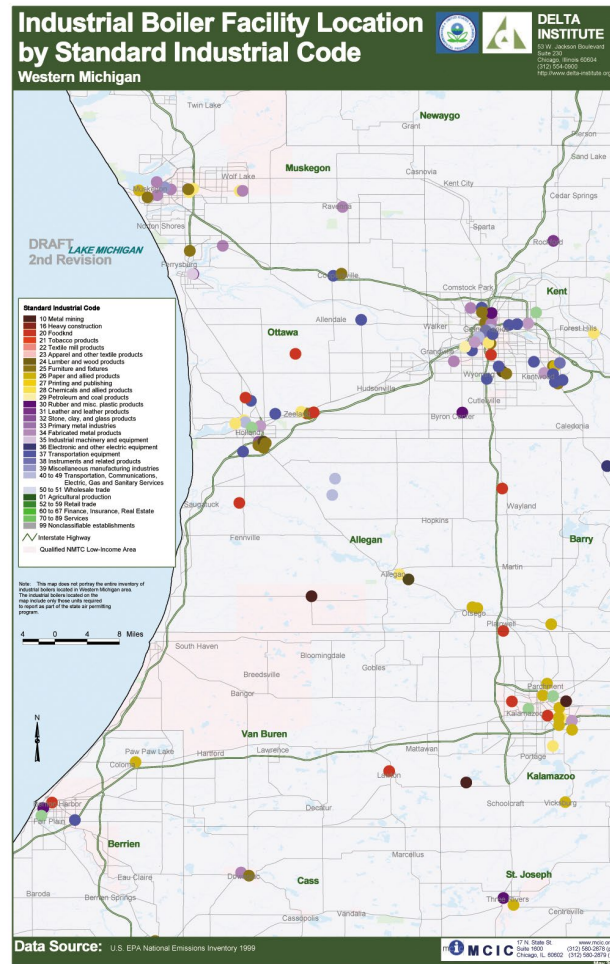
# Regional approach (map)



# Sector-based approach

- Targeted to an industrial sector
  - Top sectors using industrial boilers include: paper and allied products; transportation equipment; academic institutions; non-public utilities; food; chemicals
- Trade associations and industry are partners
- Addresses sector-specific issues such as MACT and NOx trading

# Sector-based approach (map)



# Next Steps

- Continue to work with Michigan and Ohio to develop an industrial boiler outreach strategy.
- Facilitate “bundling” of state and private programs (e.g. Ohio tax exemption program with a P2/E2 loan fund)
- With industry input, develop a list of energy efficiency practices that can be promoted to regions/industrial sectors as part of an outreach program
- Work with the states to implement a pilot outreach program
- Quantify the results!
- Ramp up the program state-wide and regionally

# Acknowledgements

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