

Addressing Wood, Leaf
and Refuse Combustion
in Asthma Programs:
Answers to Your
Burning Questions



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Presentation Objectives

- Provide a rationale for addressing burning-related issues as part of an asthma program
- Identify and describe resources for addressing the issue
- List related concerns and organizations that may help identify potential partnerships

What's the Issue?

- The routine burning of trash, leaves and wood remains common, especially among rural populations
- Poorly-controlled combustion causes the production of particulate matter (PM) and irritant gases which can be asthma triggers





Types of Burning (Trash & Leaves)

- Open fires
- Burn barrels
 - Reduced risk of uncontrolled fire
 - More concentrated smoke plume

Why Are These Practices Common?

- Backyard burning is inexpensive
- Rural capacity for refuse and recycling collection is still developing
- Local ordinances may exist, but are difficult to enforce
- Burning may still be the cultural norm

Wood Burning

- Most fireplaces and indoor wood stoves are not problematic if properly vented
- Outdoor wood-fired boilers (OWBs)
 - Growing phenomenon on rural landscapes
 - Potential to pose health hazard in reasonably compact neighborhoods





<http://www.centralboiler.com/applications.php>

OWBs vs. Other Wood Systems

- PRO:
 - Low cost fuel
 - Renewable energy
 - Long burn time
 - Reduced fire hazard
- CON:
 - High-cost furnace
 - More difficult installation
 - More complex operation
 - ***SMOKE!***

Comparison of Emissions from Indoor Heating Sources

| Source | Particulate matter, PM_{2.5} (grams/hour) | PAHs, (grams/hour) |
|---|--|-------------------------------|
| OWB | 72 | 0.96 |
| Conventional indoor wood Stove | 19 | 0.36 |
| EPA-certified stove | 6 | 0.15 |
| Oil furnace | 0.07 | N/A |
| Gas furnace | 0.04 | N/A |

Typical OWB Applications

- Rural farmstead
- Well away from neighbors
- May serve multiple buildings centrally



Example: Rhineland, WI

- OWB about 30 feet from city library
- Outdoor readings ranged from 0.01 to 0.685 mg/m³
- Strong odors
- Long history of problems

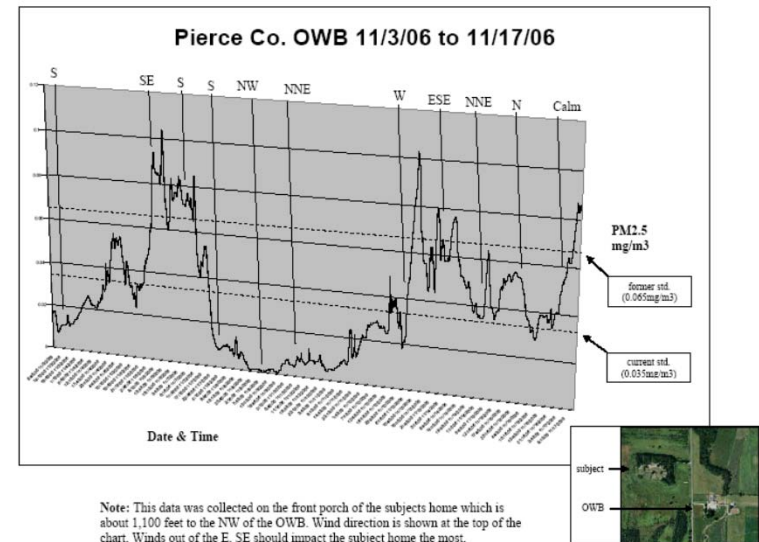


Example: Monona, WI

- OWB in City of Monona
- About 25' from neighbor along fenceline
- Chimney discharges at floor level of MBR walk-out porch
- Entire 8 day ave. = $56 \mu\text{g}/\text{m}^3$
- Highest 24 hr. ave. = $83 \mu\text{g}/\text{m}^3$ (Unhealthy)



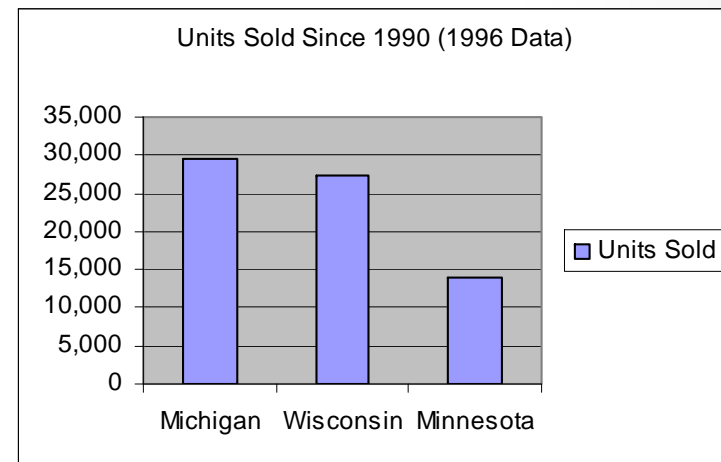
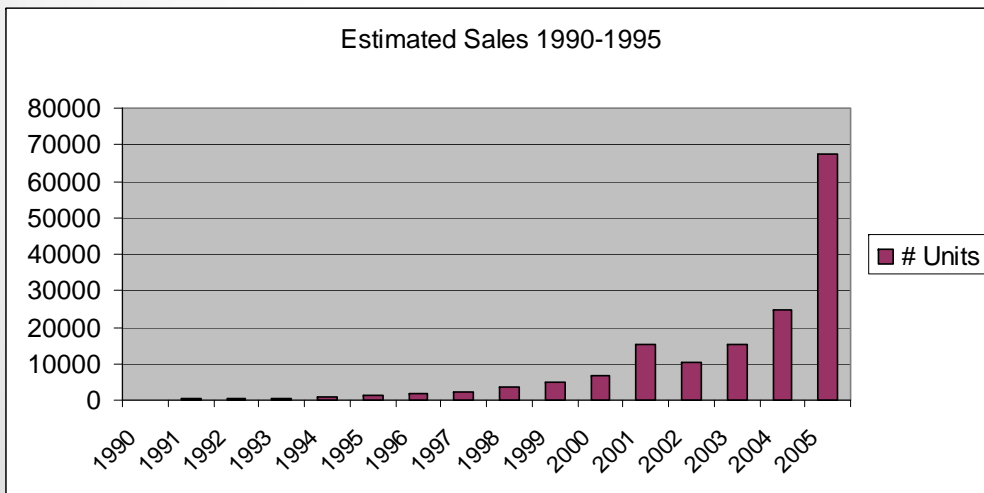
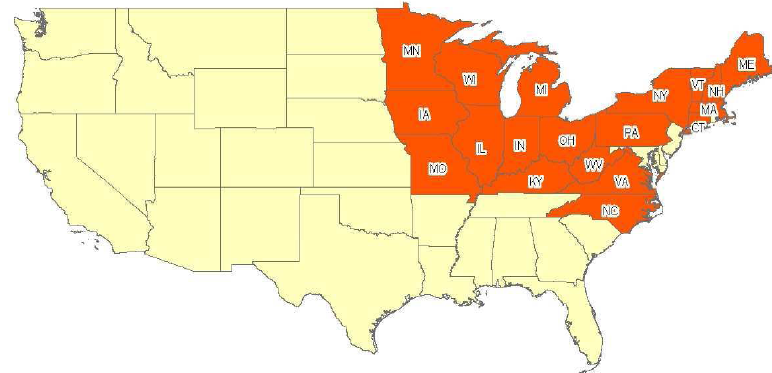
Example: Pierce County, WI



Sales Data

- Increasingly Popular
- 155,834 sold since 1990
- MI, WI, MN top three

Figure 3-1. States representing 95% of the OWBs sold



Source: Assessment of Outdoor Wood-fired Boilers, NESCAUM
(Northeast States for Coordinated Air Use Management) March 2006

Symptoms of Exposure

- Irritation of eyes, nose, and throat
- Coughing
- Chest tightness
- Shortness of breath

Many of these symptoms are experienced by neighbors of OWBs.

Sensitive Populations

- Children
- Elderly
- Individuals with Chronic Respiratory Disease
 - Asthma
 - Chronic Obstructive Pulmonary Disease
 - Bronchitis
 - Emphysema

How Can These Issues Be Addressed?

- Informational Campaigns
- Establish Partnerships
- Local Ordinances

Informational Campaigns

- EPA-sponsored materials are available
- Example: Western Lake Superior Sanitary District (www.wlssd.com)
- Bernie the Burn Barrel (reformed burner)



Graphic: Western Lake Superior Sanitary District

Potential Organizations for Partnership

- U.S. EPA and state natural resources agencies
- American Lung Association
- Local fire departments and districts
- Sanitary districts
- Environmental advocacy groups

Other Pollutants of Concern

- Dioxins
- Sulfur Dioxide
- Carbon Monoxide
- Volatile organic compounds (VOCs)
- Polycyclic Aromatic Hydrocarbons (PAHs)
- Hexachlorobenzene

Ash from Garbage Burning

- Can have elevated levels of lead, mercury, arsenic and chromium
- Ash disposal in gardens not uncommon
 - may accumulate in garden vegetables
 - pose ingestion hazard for kids
 - may lead to surface water contamination

Trash Burning and Injury

- Wibbenmeyer et al (2003)
 - 12-year chart review (194 events)
 - Responsible for 20% of flame-related injuries
 - Males (25-45; 16-24) most at risk
 - Associated with accelerant use
 - Median cost: >\$9000

Secondary Effects of PM

- Effects on vegetation and natural ecosystem integrity
- Effects on visibility
- Effects on man-made materials
- Implications of atmospheric PM on climate change

Guidance for Health Professionals

State of Wisconsin
Division of Public Health
Bureau of Environmental and Occupational Health

Outdoor Wood-Fired Furnaces (Water Stoves)

Guidance for local government and public health officials on the use and regulation of outdoor wood-fired furnaces (OWFFs).

Public health hazards can result from excessive smoke produced when outdoor wood-fired furnaces are improperly placed and operated. Local health departments have the authority to address public health hazards and health nuisances under Wisconsin State Statute 254. This fact sheet summarizes current Wisconsin Department of Health and Family Services recommendations for best-management practices of outdoor wood-fired furnaces.

What is an Outdoor Wood-Fired Furnace?

An outdoor wood-fired furnace (OWFF) is any furnace, stove, or boiler designed to burn wood, where the unit is not located within a building intended for habitation by humans or domestic animals. OWFFs, or water stoves, typically look like a small utility building with a smoke stack. OWFFs provide heating and/or hot water to a single residence.

The basic design of an outdoor wood-fired furnace (OWFF) includes a firebox enclosed in a water jacket, surrounded by insulation, and vented through a chimney stack. The combustion of wood heats the water in the reservoir. Heated water is carried through underground pipes to heat a home, farm building, swimming pool, hot tub, or to produce domestic



WI DNR Model Outdoor Burning Ordinance

- Sections address:
 - outdoor burning, open burning of debris and refuse. No trash burning in OWBs!
 - exemptions, permits, liability
 - enforcement
- Ordinance adoptable by section.
- OWBs: recommended minimum setback (300-500 ft.) and stack height (15 ft.).

Local Regulations on OWBs

- WI local ordinance regulating outdoor burning, open burning and burning of refuse:

<http://dnr.wi.gov/environmentprotect/ob/modelOrdinance.htm>

Summary

- Smoke from trash, leaf and wood burning can pose a health risk for people with asthma
- Identify alternate disposal resources
- County and municipal OWB ordinances may be considered
- Tap into existing partnerships!