Outdoor Woodburning Furnaces/Boilers

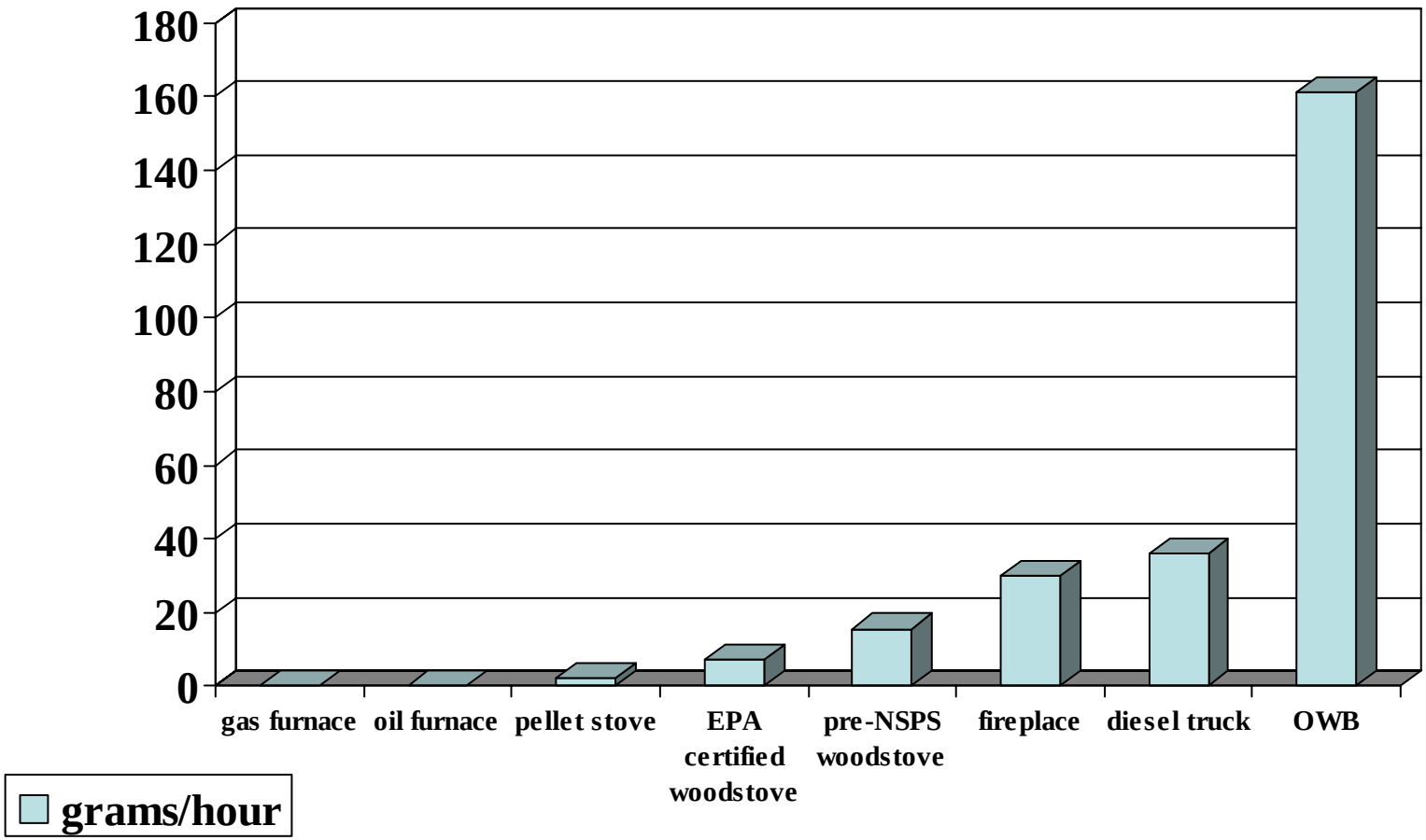
Unique OWB issues

- Good idea but bad implementation
  - Design Parameters
    - four-season utility, “8760” days/year for hot water
    - poor combustion design, 02-starved smolder low temp burn
    - Unlike EPA-certified residential wood stoves, OWBs to are not designed for complete combustion
    - Short stack height, generally <12 ft, results in poor dispersion
    - Generally no combustion controls and lack retrofit or add-on air pollution controls
    - 100,000 to 3,200,000 maximum btu/hr output (500,000 btu unit most common)
  - Fuel use
    - Large firebox can hold almost anything (average 60 ft^3)
    - Enforcement programs identified residents burning tires, garbage, landscape waste, and railroad ties

Scope of the problem

- NSPS not applicable, EPA exempted these units from the wood stove regulations and does not intend to develop federal regulations at this time
- Limited emissions data, no protocol or accepted test method, however ASTM working on draft test method that may be final by April 2007
- NESCAUM believes that existing PM test methods may be applicable.
- Installation of outdoor wood boilers (OWB) is growing significantly.
  - NESCAUM estimates that there are approximately 155,000 units nationwide in place since 1990 but recent MARAMA inventory estimates
  - Sixty-eight percent of the units put in place in the last three years
  - Manufacturers anticipated 200-350% growth in sales in 2005 and 128% in 2004
  - NESCAUM estimates 500,000 units could be in place by 2010.
  - NESCAUM estimates OWBs emitted over 233,000 tons of fine particulate matter in 2005
  - Left unchecked believe PM emissions could reach over 850,000 tons annually by 2010.
  - Manufacturers estimate that fifty percent of units replacing indoor units
  - Sales concentrated in nineteen states (CT, IN, IL, IA, KY, ME, MA, MI, MN, MO, NH, NY, NC, OH, PA, VT, VA, WV and WI)

Comparing Particulate Emissions (g/hr)



Ambient Monitoring Findings

- NESCAUM conducted ambient monitoring study in March 2005 and found…
  - periodic PM2.5 values >1,000 µg/m3
  - Frequent values >400 µg/m3
  - Elevated levels were found at all sampled distances
  - Values upwards of 4,000 µg/m3 were recorded over distances of 50, 100, and 150 ft.
  - A maximum value of 8,880 µg/m3 was observed at 50 ft.
- Results indicate that residences located in proximity to OWBs can experience elevated ground-level concentrations of PM2.5 dominated by submicron aerosols. [

The Future

- Vermont proposed emission standard
- NY legislature introduced bill in March 2006 to set emission standards
- Environment Canada investigating regulations
- Other States investigating regulatory development
- NESCAUM workgroup working on ASTM test method and working on voluntary and regulatory initiatives.