Outdoor Wood Boilers

'An Overview of State Regulations'

Presented to the Hancock County Planning Commission

As a part of the

'Striking a Balance in Hancock County" workshop series

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Chronology

- June 2007: OWB law enacted
- November 2007: OWB regulation effective
- April 2008: Legislature amends OWB rule and establishes Replacement Fund
- July 2008: Amended rule effective
- October 2008: BEP hearing on pellet boilers amendment and Replacement and Buy Back Program

OWB Rule Overview

- Uncertified Boiler: Sale prohibited after April 1, 2009
  - Setback from Prop. Line/Neighbor: 250/270 ft
- Phase 1 OWB April 1, 2009
  - Emission: 0.60 lb/MMBtu input
  - Setback from Prop. Line/Neighbor: 100/120 ft
- Phase 2 OWB April 1, 2010
  - Emission: 0.32 lb/MMBtu output
  - Setback from Prop. Line/Neighbor: 50/70 ft

OWB Rule Overview

- Fuel restricted to wood and pellets
- Limitations on smoke opacity
- EPA certification required
- Consumer information requirement
- Nuisance provision
- Home rule provision

Implementation

- DEP Outreach;
  - Fact Sheet, web page and operating practices
  - Instate/Out of state dealers & manufacturers
  - Code Enforcement Officer training

Implementation

- Enforcement Tools
  - Visible Smokestack Opacity Observation
    - Maximum 30% opacity
    - Official US EPA Method 9
    - Uses trained and certified observer
    - Timing is problematic
      - Restricted to daylight
      - Response time

Implementation

- Enforcement Tools
  - Visible Nuisance Smoke Observation
    - 12 minutes impact in an hour
    - Official US EPA Method 22
    - Any observer and/or video record
    - Time consuming
  - Emergency shutdown authority

Time-lapse Video camera

Nuisance Smoke Emissions Factors

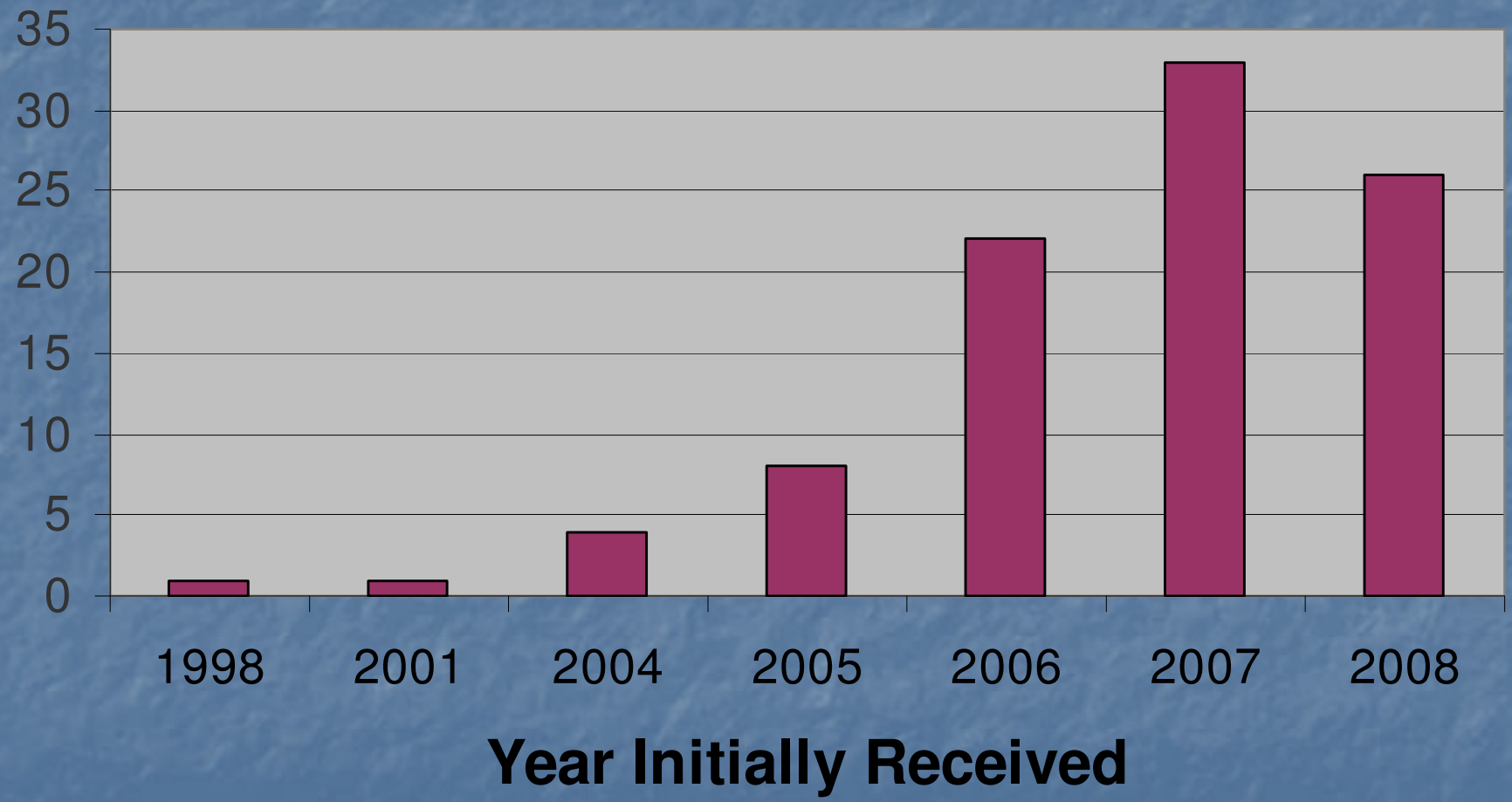
Installation x Types of Fuel x Operation = Nuisance Conditions

- Installation
  - siting, sizing, & set-up
- Types of fuel
  - Dry vs. wet; cord wood vs. slabs, hardwood vs. softwood
- Operation
  - Full load vs. partial load
  - Full O_2 vs. O_2 starved

Summary of OWB Complaints

- Dec. '07 total = 54
- Jan. '09 total = 96
  - 64 active cases
  - 26 closed cases
  - 6 inactive cases

Number of OWB Complaints



Survey of Complainant

- 29 volunteered responses to our survey
  - 11 reported improvement since regulation
  - 20 reported smoke and odor impact in 2008
  - 20 households reported respiratory or cardiac diagnoses
  - 4 reported doctor visits or hospitalization
  - 2 respondents were trying to sell house because of OWB

Technology and Emission Limits

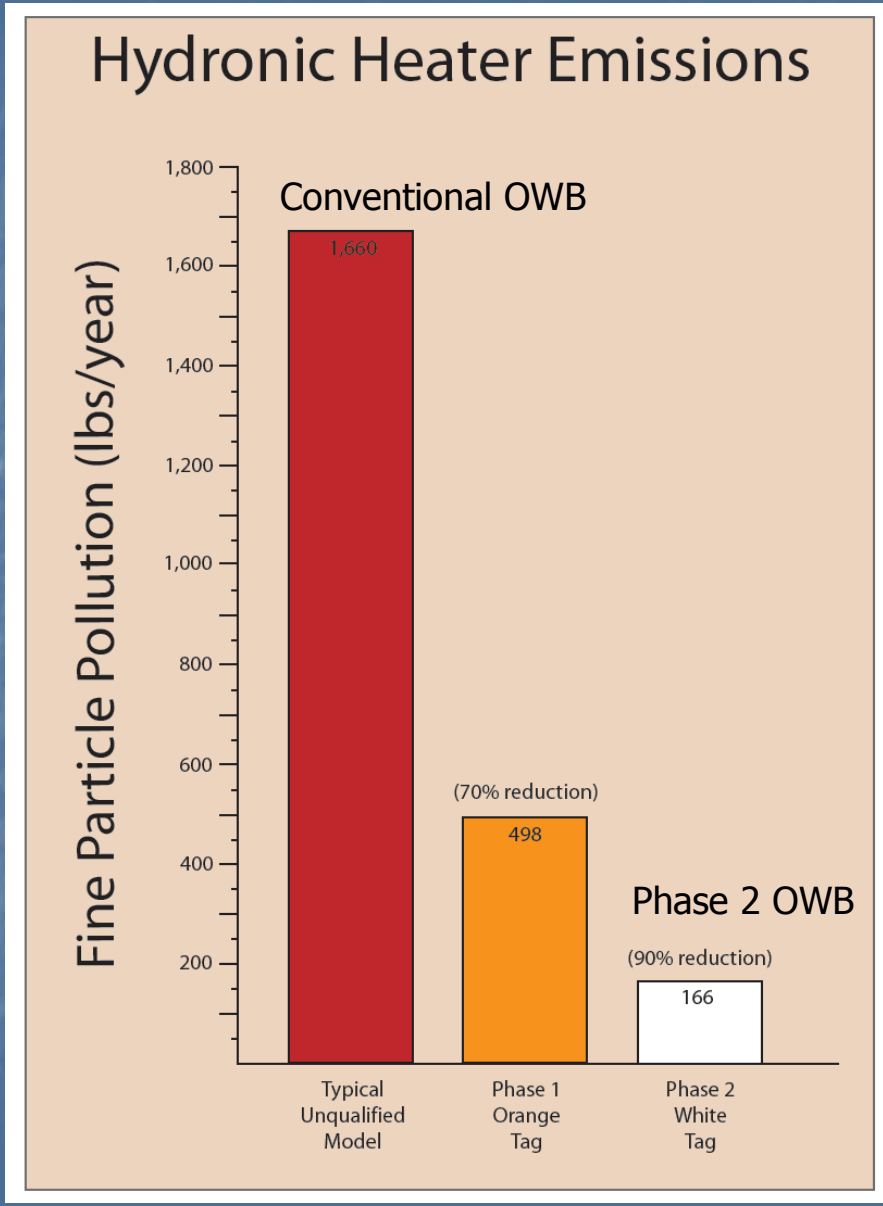
- Phase 1 Boilers (0.60 lb/MMBtu *input*)
  - 6 models EPA certified and available in Spring 2008 *(included 2 early Phase 2)*
- Phase 2 Boilers (0.32 lb/MMBtu *output*)
  - 6 models EPA certified in Oct. 2008
  - 18 months before required date
  - PM emissions: 0.06 - 0.31 lb/MMBtu
  - Annual average efficiency: 49% - 87%
  - 3 cordwood and three pellet boilers

Technology and Emission Limits

- 10 certified OWB currently on the market
- 11 manufacturers agree to produce Phase 2 OWBs by 2010
- Effort concentrated on improved combustion technology
  - Better air control
  - Separate primary and secondary combustion
  - More efficient heat exchange

Improvements in OWB

- Conventional OWB can emit 1,660 lbs. of particulates matter each year.
- New EPA Phase 2 OWB emit 90% less particulate matter.



Source: US EPA

EPA Certified Phase 2 Boilers

Manufacturer	Model Name & Number	Fuel Type	Heat Output Rating	Annual Average Efficiency	Annual Average PM Emission Level
Central Boiler	Maxim M250	Pellets	212,453 BTU/hr	87.20%	0.06 lbs/MMBTU output
Central Boiler	E - Classic 2300	Cord Wood	160,001 BTU/hr	64.30%	0.31 lbs/MMBTU output
Greenwood Technologies, LLC	Aspen 175	Cord Wood	66,290 BTU/hr	67.50%	0.27 lbs/MMBTU output
Hardy Manufacturing Co., Inc.	KBP 270	Pellets	120,000 BTU/hr	report not available	0.20 lbs/MMBTU output
Northwest Manufacturing, Inc. (Woodmaster)	AFS 900	Pellets	107,069 BTU/hr	49.2 %	0.20 lbs/MMBTU output
Silverwinds Metals (Wood Doctor)	WD-HE8000	Cord Wood	112,655 BTU/hr	report not available	0.26 lbs/MMBTU output

As of 1/13/09

Other Heating System Efficiencies and Emissions

Appliance	Typical Efficiency Range	Assumed Efficiency	Fuel Use	Units	Annual Fuel Cost	PM lb/year	SO2 lb/year	CO2 lb/year
Older (20+ yrs) Oil-fired Furnace	56 to 70%	60%	1,114	Gallons	**$2,674** [a]	3.3	46	25,029
New Energy Star Oil-fired Furnace	83 to 95%	85%	786	Gallons	**$1,887** [a]	0.3	33	17,668
Older Conventional Wood Stove	40 to 60%	50%	13.6	Tons	**$2,863**	426	5	0[b]
New EPA Certified Wood Stove	60 to 80%	63%	10.8	Tons	**$2,272**	130	4	0[b]
New EPA Certified Pellet Stove	78 to 87%	80%	7.0	Tons	**$1,334**	46	3	0[b]
European high efficiency, low emission wood pellet boiler	85 to 95%	85%	6.6	Tons	**$1,256**	6	3	0[b]

a. Based on fuel oil at $2.40/gallon

b. CO2 emissions from wood are carbon neutral only if the wood is harvested in a sustainable manner and burnt cleanly

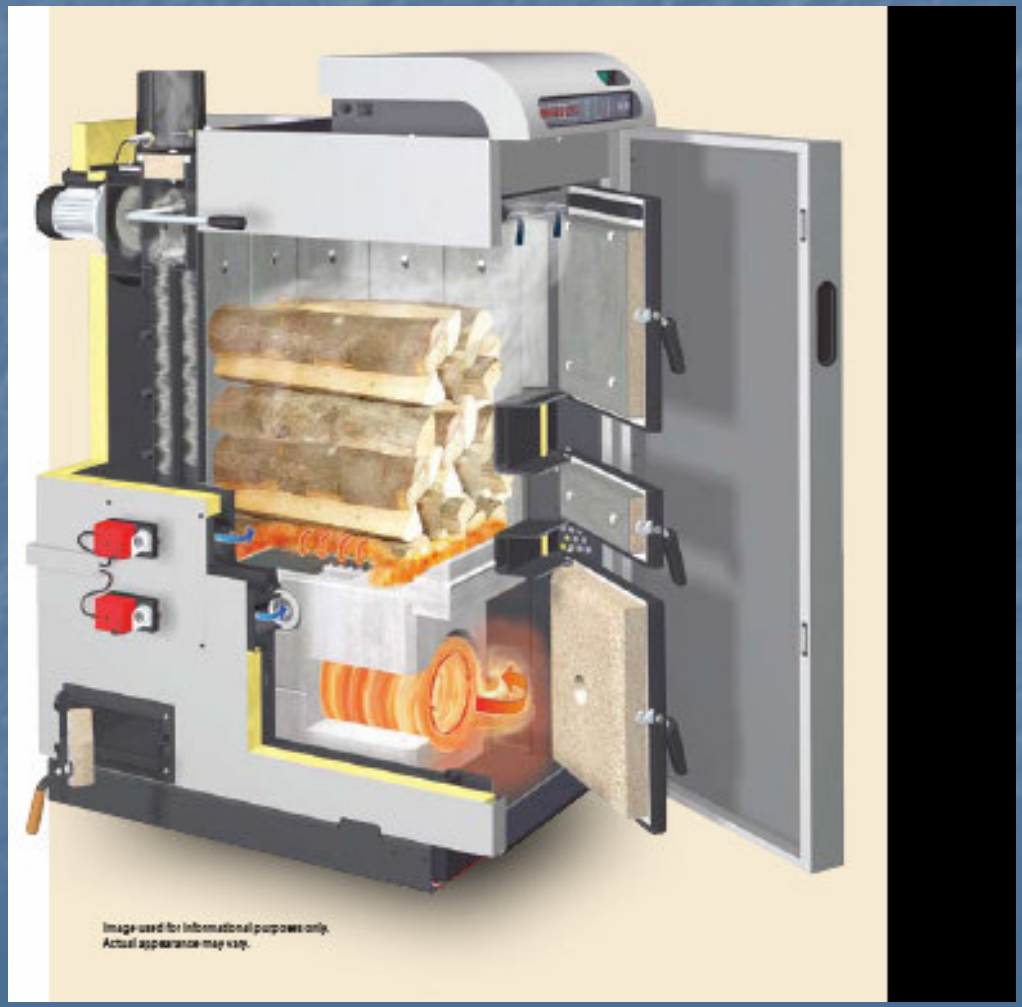
European Boiler Technology

Example:

Froling Boiler

From BioHeatUSA

A heat storage unit is an excelle addition to any home heating solution.



Current Activities

- Ongoing regulation development
  - Pellet OWBs
  - Nuisance OWB Buyback Program
- Legislative considerations
  - Unintended consequences report
  - Technology review
- USEPA voluntary program
  - Expected: voluntary to regulatory in the next few years

OWB Regulation in Other States

- Vermont
  - Emission limit of 0.44 lb/MMBtu (*input*)
  - 0.32 lb/MMBtu (*output*) under consideration
- New Hampshire
  - Phase 1 after 1/1/2009;
  - Phase 2 after 4/1/2010
- Massachusetts
  - Phase 2 after 12/26/2008

OWB Regulation in Other States

- Connecticut
  - Siting, stack height and fuel criteria
  - No PM emission standard
- Rhode Island
  - Siting, stack height, opacity and fuel criteria
  - No PM emission standard
- New Jersey
  - Comply with indirect heating appliance reg.
    - i.e. no visible smoke except 3 min. in any 30-min. period

OWB Regulation in Other States

- Washington State
  - Complete ban of all OWBs
- New York
  - Pending

Parting Message

- Despite numerous OWB complaints in the past and present, the future of OWBs looks good because of the emerging OWB technologies;
- New technology equals improved air emissions, thermal efficiencies, and less fuel;
- New regulations are technology forcing; and
- New regulation provides public health safeguards
- Questions? E-mail James.P.Brooks@Maine.gov