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# Residential Wood Heaters

New Source Performance Standards (NSPS)  
Current Draft Revisions

March 2, 2011  
Biomass Central Heating Symposium  
Point of Contact: Gil Wood

# EPA Points of Contact

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# Background

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- Current rule requires manufacturers to design new residential wood heaters to meet particulate emission (PM) limits, have representative heaters (per model line) tested by EPA-accredited lab, and attach EPA label after EPA approval
- Current rule requires operation according to owner's manual
- Originally promulgated February 1988
- Proposal was the first regulatory negotiation by EPA (included industry, laboratories, states, consumer advocates)
- Not substantively reviewed until now

# Perspective: Wood Smoke PM<sub>2.5</sub> Emissions Are Significant

■ 2008 National Emission Inventory:	2,449,000 tons
■ 2008 Residential Wood Combustion:(~13%)	318,323 tons
■ Fireplace: general	51,132
■ Woodstove: fireplace inserts, non-certified	54,286
■ Woodstove: fireplace inserts, certified, non-catalytic	12,017
■ Woodstove: fireplace inserts, certified, catalytic	4,245
■ Woodstove: freestanding, non-certified	71,424
■ Woodstove: freestanding, certified, non-catalytic	15,092
■ Woodstove: freestanding, certified, catalytic	7,911
■ Woodstove: pellet-fired, general	1,798
■ Furnace: indoor, cordwood-fired, non-certified	36,213
■ Hydronic Heater: outdoor	50,427
■ Outdoor Wood Burning Device	7,105

Note: Wood smoke emissions also include other pollutants. Nationally, residential wood combustion accounts for 44 percent of total stationary and mobile polycyclic organic matter (POM) emissions and 62 percent of the 7-polycyclic aromatic hydrocarbons (PAH), which are probable human carcinogens and are of great concern to EPA.

## Perspective: Wood Smoke Can Cause Significant Health Effects

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- In a number of communities, residential wood smoke increases particle pollution to levels that cause significant health concerns (e.g., asthma attacks, heart attacks, premature death).
- Several areas with wood smoke problems either exceed EPA's health-based standards for fine particles or are on the cusp of exceeding those standards.
- For example, residential wood smoke contributes 25 percent of the wintertime pollution problem in Keene, New Hampshire.
- In Sacramento, California, and Tacoma, Washington, wood smoke makes up over 50 percent of the wintertime particle pollution problem.

# Many State, Local, and Tribal Officials Want Updated, Stringent, and Revised NSPS

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- Wood smoke programs are very important in numerous areas
- Programs include wood-burning bans and changeouts
- Some State and local emission limits are more stringent than NSPS
- Some States are not allowed to be more stringent than EPA
- Numerous letters and meetings requesting NSPS revisions
  - For example, April 29, 2008 joint letter from NESCAUM and WESTAR requesting:
    - “review and revision of the current residential wood heater/ indoor wood stove NSPS to capture the broader suite of RWD (residential wood heating devices)”
    - “fireplaces, masonry heaters, pellet stoves, and indoor and outdoor wood boilers, furnaces, and heaters... we urge EPA to develop standards...”

# Many Requests for NSPS for Hydronic Heaters

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- Petition from 6 northeastern states plus Michigan and NESCAUM
- Request from the Hearth, Patio, and Barbecue Association (HPBA) Outdoor Wood-fired Hydronic Heater (OWHH) Caucus
  - Their concerns were “black eye” on industry and proliferation of local bans and state rules with differing requirements
- Huge number of calls and emails from neighbors and others concerned about health effects

# Key Dates

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- Small Business Regulatory Enforcement Fairness Act (SBREFA) Panel Final Report expected March 2011
  - Convened August 2010
  - 30 Small Entity Representatives (SERs)
- Proposal of NSPS – June 2011
- Final NSPS – July 2012

# Overview of Key Draft\* Proposals

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- Strengthen emission limits to reflect today's Best Demonstrated Technology (BDT)
- Close “loopholes”, reduce exemptions
- Include pellet stoves explicitly
- Include wood “boilers” (hydronic heaters) and furnaces
- Revise test methods as appropriate
- Expand options in certification process by transitioning to International Standards Organization (ISO) bodies plus compliance affirmation

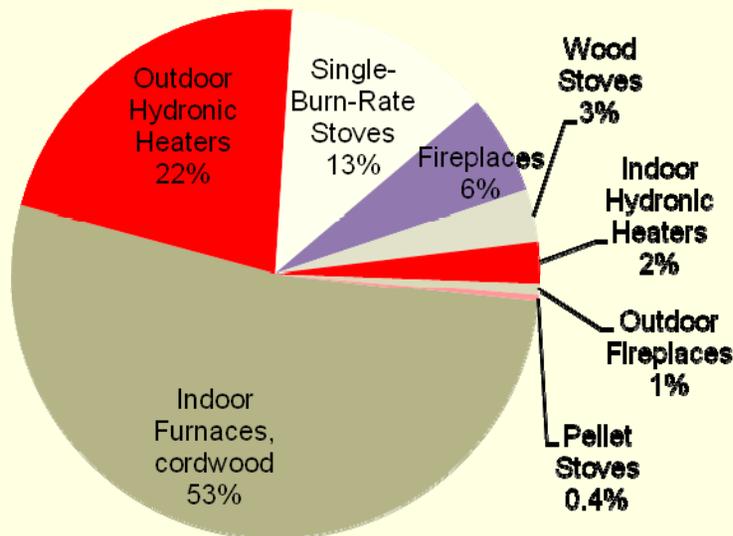
\* All options are draft and are subject to change pending EPA Administrator's review and signature on rulemaking proposal in Federal Register for public comment

# Draft Analysis of Health Benefits in 2017

Total Monetized Benefits in 2017 (billions of 2008\$)*			
	3% discount rate	7% discount rate	Non-Monetized Benefits
Level I	\$2.2 to \$5.3	\$2.0 to \$4.8	36,667 tpy CO, HAPS
Level II	\$2.3 to \$5.6	\$2.1 to \$5.1	40,607 tpy CO, HAPs

Reductions in Health Incidences in 2017*		
	Level I	Level II
<b>Avoided Premature Mortality</b>		
Pope et al.	240	260
Laden et al.	620	660
<b>Avoided Morbidity</b>		
Chronic Bronchitis	180	180
Acute Myocardial Infarction	400	420
Hospital Admissions, Resp	57	60
Hospital Admissions, Cardio	120	130
Emergency Room Visits, Resp	180	190
Acute Bronchitis	410	430
Work Loss Days	35,000	36,000
Asthma Exacerbation	4,500	4,800
Minor Restricted Activity Day	200,000	220,000
Lower Respiratory Symptoms	4,900	5,100
Upper Respiratory Symptoms	3,700	3,900

**Monetized Benefits Breakdown by Category**



\*All estimates are for the implementation year (2017), and are rounded to two significant figures so numbers may not sum across columns. All fine particles are assumed to have equivalent health effects, but the benefit per ton estimates vary because each ton of precursor reduced has a different propensity to become PM<sub>2.5</sub>. These benefits incorporate the conversion from precursor emissions to ambient fine particles.

# Key Messages for Central Heating Symposium

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- EPA intends to explicitly regulate new residential wood-fired central heating systems at emission levels reflecting best demonstrated technology (BDT)
- EPA intends to explicitly regulate outdoor and indoor hydronic heaters and forced-air / warm-air furnaces
- EPA intends to require pellet appliance certification tests and operation with industry-certified pellets
  - Emission data show excellent performance potential with premium wood pellets
  - Pellet fuel quality standards are necessary to ensure both good appliance performance and lower emissions
  - EPA has worked with the Pellet Fuels Institute to encourage their development of a fuel certification program (more on next slide)
- EPA intends to require energy audits and encourage heat storage to potentially greatly reduce emissions by reducing over-sizing and reducing frequency of operation at typical dirty low burn rates

# Pellet Fuel Certification Program Needs

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- EPA has worked with the Pellet Fuels Institute to encourage pellet manufacturers and appliance manufacturers to agree on a certification program with grades of necessary characteristics
- Limits on bark, dirt, sand, construction and demolition materials\*, chemicals, etc.
- Tailored QA/QC plans, training, transparency
- Testing frequency tailored to results
- Not just 3<sup>rd</sup> party analyses but also 3<sup>rd</sup> party inspections, approval of QA/QC plans, sampling, auditing, corrective actions, certification of conformity, reporting of results
- Mutual Goal: pellets that consumers, manufacturers, and Congress can consistently depend upon as they consider decisions to buy and/or support biomass and as EPA regulates heater emissions

\*PFI is still working on requirements to ensure absence of construction and demolition materials. EPA suggests testing for lead as an indicator.

# Compliance & Enforcement Aspects

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- Expand options for certification process --- transition to ISO-accredited labs and ISO-accredited certifying bodies, develop electronic system for submittals and preliminary QA checks
- Improve compliance assurance --- inspections of labs and manufacturers, random audits, monitor websites and trade shows and fairs, alert foreign companies
- Make consumer-friendly --- Burn Wise website, spreadsheets of certifications ranked by emissions, tested efficiency, output
- Require emission tests on each certified type of fuel that manufacturer specifies/warrants for use

# Hydronic Heater (HH) Draft Options

- Exempt from 1988 NSPS
- Typical emissions: >4 lb /mmBTU heat output
- EPA 2010 Phase 2 Voluntary Program Qualifying Level
  - 0.32 lb / mmBTU heat output
  - 23 EPA-qualified models already
- Typical State 2010 regulatory level
  - 0.32 lb / mmBTU heat output
- Many local jurisdictions ban HH or have setbacks and stack heights
- Draft NSPS limits for PM
  - 0.32 lb / mmBTU heat output for outdoor HH in 2013 and indoor in 2014
  - 0.15 lb / mmBTU heat output for both outdoor and indoor HH in 2016
    - 7 EPA-qualified models already
    - ~100 models qualified by EN 303-05 are estimated to meet this level
- Draft NSPS limits for CO
  - 1000 mg / m<sup>3</sup> at 12% O<sub>2</sub> in 2013/2014
  - 650 mg / m<sup>3</sup> at 12% O<sub>2</sub> in 2016
- Draft NSPS limit for Visible Emissions
  - 6 minutes per hour in field

# Forced-Air / Warm-Air Furnace Draft Options

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- Exempt from 1988 NSPS
- Canadian B415.1-10 level
  - 0.93 lb / mmBTU heat output
- Draft NSPS limit for PM
  - 0.93 lb / mmBTU heat output in 2014
  - Ask for comments on whether limit should be same as for hydronic heaters to avoid competitive imbalance
- Draft NSPS limit for CO
  - 1000 mg / m<sup>3</sup> at 12% O<sub>2</sub>
- Draft NSPS limit for Visible Emissions
  - 6 minutes per hour in field

## **A Common Wood-fired Hydronic Heater**

