

Wood Stove Changeout and Fireplace Retrofits



Program Overview

U.S. EPA Office of Air Quality Planning and
Standards

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www.epa.gov/burnwise

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What's in wood smoke?



“Ah, the sweet smell of wood smoke” - but
what makes it so sweet?

- CO, NO_x, SO_x, and Fine Particles (PM_{2.5})
- Toxics, including:
 - Benzene
 - Toluene
 - Aldehyde gases
 - Polycyclic organic matter
 - Dioxin

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Why do we care about residential wood smoke?



- Nationally RWC accounts for 62% of 7-PAHs
- GHG Emissions: Methane, Black Carbon and CO₂

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- Low stacks

- Poor dispersion



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Masonry and Manufactured Fireplace



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Old "Conventional" Wood Stoves Built before 1990



EPA - Certified Woodstoves (after 1990)



Slide from Wood Heat Organization Inc

How to Identify an EPA – certified Wood Stove



U.S. ENVIRONMENTAL PROTECTION AGENCY
Certified to comply with July, 1988 particulate emissions standards.

Date of Manufacture

2002	2003	2004	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

DO NOT COVER OR REMOVE THIS LABEL Made in U.S.A. 3300-626

Goal – No Visible Smoke



Old Stove

EPA-Certified Wood Stove

What is The Great American Wood Stove Changeout?



- A voluntary effort to encourage people through education and financial incentives to replace or “changeout” their inefficient wood stoves and fireplaces with cleaner-burning technologies such as:
 - Gas stoves
 - Wood pellet stoves
 - EPA-certified wood stoves

Summary Wood Stove Changeout Community Benefits



- Reduces PM2.5 and toxics pollutants
- Improves the health of children, elderly and your community
- Improves visibility

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Summary of Benefits to the Home Owner



- **Cleaner Burning Technologies:**
 - 70% less PM2.5
 - 50% more energy efficient, use 1/3 less wood
 - Save time and money
 - Reduces risk of chimney fires

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Summary of Libby, MT Wood Stove Changeout Pilot Project



- June 2005, Libby, MT
 - Significant reduction of indoor PM2.5
 - From 53ug/m3 to 15 ug/m3 (U. of Montana Study)
 - 7.5 ug/m3 PM2.5 winter time reductions
 - Being redesignated from “non-attainment” to attainment for PM 2.5 annual standard
 - Helped keep Libby from being designated non-attainment for the PM2.5 24 hour standard

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Other Projects: 44 Wood Stove or Fireplace Retrofit Programs Implemented



- Bay Area, CA
- Butte Co., CA
- Shasta Co., CA
- Sacramento, CA
- San Joaquin, CA
- Cache Valley, ID
- Pinehurst, ID
- State of Michigan
- Ravalli Co., MT
- Keene, NH
- Questa, NM
- Greater Dayton, OH
- Washington Co., OH
- Klamath Falls, OR
- Oakridge, OR
- Christiansburg, VA
- State of VT
- Whatcom/Island Co., WA
- Swinomish Tribe, WA
- Tacoma, WA
- Yakima, WA
- Makah Tribe, WA
- Oneida Nation, WI
- Sublette Co., WY

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Progress To Date, 2005-09



- 44 communities have implemented or are implementing woodstove changeouts
- Over 13,000 old stoves and fireplaces changed out/retrofitted
- 248 tons of PM_{2.5} reduced/year from changeouts
- 41 tons of hazardous air pollutants reduced per year
- Resulting in more than \$84 million in annual health benefits

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Benefits of changing out all the old wood stoves in the U.S.

Health Effect	Avoided Cases per year	Cost Saving per year
Mortality (adult)	5,000 to 13,000	\$32 to \$82 Billion
Non-fatal heart attacks	8,000	\$870,000
Chronic Bronchitis	3,400	\$1.5 Billion
Work Loss Days	660,000	\$100 Million
Asthma Exacerbation	87,000	\$5 Million
Hospital Admissions, Cardiovascula	1,200	\$68 Million
Hospital Admissions, Respiratory	2,500	\$6 Million
Total	NA	\$35 to \$86 billion

Note: OAQPS has conducted health benefits analysis for State/locals, e.g., OR, WA, SW PA and Sacramento area

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Tools Available



- Brochures, Posters, Case Studies, Example Presentations, Photos, Videos
- Wood Stove Changeout “How to Guide”
- Wood Stove Changeout Emissions Guidance for State Implementation Plans
- Wood Stove Changeout Emissions Calculator
<http://www.epa.gov/woodstoves/Library.html#2air>
- County-level Wood Smoke Emission Inventory Calculator

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Partners



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Funding of Voluntary Programs



- Federal and some state tax credits
 - 30%, up to \$1,500 through 2010
 - >75% efficiency
- Federal Funds
 - HUD: Block Grants for Tribes
 - USDA: Rural Development Grant/Loans
 - Wood stoves and hydronic heaters
 - HHS: Low-income Home Energy Assistance Program
 - State of MT have instituted a wood changeout program
 - DOE: Low-income weatherization

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Federal Funding: Legislation



- DOE Stimulus Funds:
 - Puget Sound Clean Air Agency
 - “Neighborhood Energy and Wood Smoke Program”
- Home Star Program: Cash for Caulkers Proposed
 - 50% of purchase up to \$1000 rebate
- Waxman-Markey Energy Security Act
 - Includes total of \$20 million for 2010 -2014

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Funding Options



- Voluntary Environmental Improvement Bonds (VEIBs)
 - Low interest loan program for homeowners
 - Small municipal bonds issued, proceeds are lent to finance environmental improvements
 - Homeowner repays loan over 20 years via property tax bill
 - Use property as collateral for a loan to:
 - Upgrade to a cleaner burning appliance like a pellet wood stove, heat pump or solar panel more affordable
 - City of Berkley CA has piloted

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Voluntary Environmental Improvement Bonds (VEIB)

- Provides favorable financing terms
- No upfront cost
- Low monthly payments
- May require state enabling legislation
- Can work for many environmental improvements:
 - Insulation
 - Solar panels
 - Geothermal loops
 - Permeable pavement
 - Failing Septic Systems

3/30/2010

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Funding Options



- DOE has VEIB-like program, PACE (Property Assessment Clean Energy)
 - Energy Efficiency only
 - Program recently launched, look for future funding opportunities
- State Revolving Loan Programs

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Wood Stove Changeout SEPs/Mitigation Projects



- \$2,015,000 in funds negotiated to pay for clean stoves
 - 2 in Ohio: Dayton \$75K, Washington Co., \$245K
 - 8 in WA State: 6 in Bellingham area, 2 in Spokane \$530K, 1 in Butte Co., CA 75K
 - 1 in NM: Questa \$100K, 1 in VA: Christiansburg \$45K, 1 in AZ: St. Johns \$750K
- 492 stoves replaced with SEP funds provides over \$5 M in annual health benefits

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Strategies for Reducing Residential Wood Smoke Document

Document includes information on:

- Education and Outreach Tools
- Regulatory Options and Examples
 - Burn bans, opacity limits, removal of old unit upon sale of home
- Wood Stove and Fireplace Changeouts
- Funding Options
- Hydronic Heaters and Fireplace Programs
 - Partnerships
- Emissions and Air Quality Improvements

To review or download the document go to:

www.epa.gov/ttn/oarpg/t1/memoranda/strategies-doc-8-11-09.pdf

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Summary/Questions

We believe this effort:

- Is a very effective tool for addressing PM and toxics, indoors and out
- Wood as an alternative source of fuel is likely to increase
- Likely a positive for climate change, more research needed
- Tools are available to address RWC, but financial incentives are a challenge;

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