



Lightning Talk

Residential Wood Combustion (RWC) Emissions

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How EPA Estimates Emissions for the Residential Wood Combustion (RWC) Sector in NEI



Room heaters: Stoves and Inserts



Central heaters: Hydronic heaters and Furnaces



Residential Outdoor wood burning



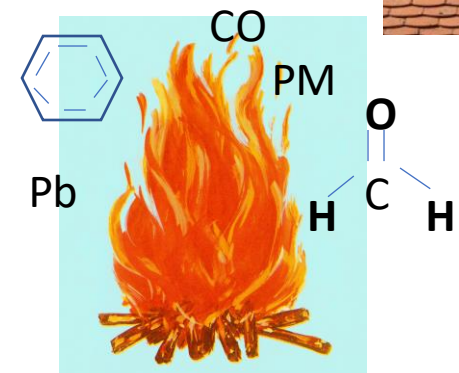
Fireplace



Firelogs

Statistics

- Residential Energy Consumption Survey-2020 (Energy Information Administration)
 - 1.8% of homes use wood for primary heat (2.2 million homes)
 - 7% of homes use wood for secondary heat (8.8 million homes)
- PM2.5
 - RWC contributed 8% of total annual in 2020 NEI, 485,000 tons of PM2.5 annually
 - Wintertime contribution 28%
- Other Pollutants emitted
 - Other combustion products – carbon monoxide, nitrogen oxides
 - VOC and VOC HAP – formaldehyde, benzene
 - Metal HAP

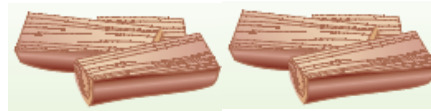


15 Source Classification Codes (SCCs) covered by the EPA's RWC tool

SCC	SCC Level 3 & 4 Description	
2104008100	Wood; Fireplace: general	fireplace SCC
2104008210	Wood; Woodstove: fireplace inserts; non-EPA certified	Several woodstove/ insert SCCs.
2104008310	Wood; Woodstove: freestanding, non-EPA certified	
2104008220	Wood; Woodstove: fireplace inserts; EPA certified; non-catalytic	
2104008320	Wood; Woodstove: freestanding, EPA certified, non-catalytic	
2104008230	Wood; Woodstove: fireplace inserts; EPA certified; catalytic	
2104008330	Wood; Woodstove: freestanding, EPA certified, catalytic	
2104008400	Wood; Woodstove: pellet-fired, general (freestanding or FP insert)	One pellet stove SCC
2104008510	Wood; Furnace: Indoor, cordwood-fired, non-EPA certified	2 furnace SCCs
2104008530	Wood; Furnace: Indoor, pellet-fired, general	
2104008610	Wood; Hydronic heater: outdoor	2 logwood hydronic heaters and one pellet
2104008620	Wood; Hydronic heater: indoor	
2104008630	Wood; Hydronic heater: pellet-fired	
2104008700	Wood; Outdoor wood burning device, NEC (fire-pits, chimineas, etc)	Outdoor recreational
2104009000	Firelog; Total: All Combustor Types	firelogs

Overall approach- to generate county level emissions for each pollutant and SCC

$$E_{\text{poll,SCC,county}} = \text{Wood burned}_{\text{County,SCC}} \times EF_{\text{SCC,poll}}$$



Where:

- $E_{\text{poll,SCC,county}}$ is the pollutant-specific emissions (county level)
- $\text{Wood burned}_{\text{County,SCC}}$ is computed based the number of housing units (census), appliance fraction (survey data, and several regression variables such as heating degree days and home heating fuel), and wood consumption by appliance type (also survey data/regression), distribution factor, and adjustments
- $EF_{\text{SCC,poll}}$ is the emissions factor in lbs of pollutant emitted per ton of dry wood burned comes from a variety of sources including the EPA's repository of emission factors, the literature, reports, conference papers from previous years of this conference

Emission Factors are variable and uncertain

- Could be a wide range of emission factor that depends or could depend on many factors, including
 - What appliance is used and deterioration
 - How the appliance is used
 - The species of wood burned and its moisture content
 - The chimney and conditions outside



Amount of wood burned is also variable and uncertain

- What appliance is used and deterioration, efficiency
- How appliance is being used
- The species of wood burned and its moisture content
- Geographic location; weather



Studies can help fill data gaps and improve emissions estimates

- Come to the RWC Session to learn about what is being done!
- Participate in a discussion to prioritize data needs (4pm)

Thursday, 10am, **Eliza Anderson Amphitheater**

Also visit the Burn Wise Program's exhibit booth and poster, at the poster session Today and Wednesday!