

State Laws on Residential Wood Heater Emissions

By: David Dickerson, Legislative Analyst II
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Issue

Do other states limit residential wood heater emissions? Can wood stoves be retrofitted to reduce emissions?

Summary

With the help of the National Conference of State Legislatures (NCSL), we identified at least eight states with statutes or regulations on various types of residential wood heaters. Generally, these laws and regulations adopt federal regulatory emission and certification requirements. Some also impose additional requirements for certain types of wood heaters, including requiring that they (1) burn clean fuel, (2) maintain certain size stack heights, and (3) be set back from neighboring properties.

According to a 2022 International Energy Agency (IEA) report, wood stoves can be retrofitted in a number of ways to reduce emissions. Commercially available technologies include oxidation catalysts, designed to remove unburnt combustion products, and electrostatic particle removers, designed to remove particles from the flue gas. The IEA also highlights experimental technology which may be used in the future to reduce nitrogen oxide emissions. In general, the IEA reports the key to reducing wood stoves emissions is in how the devices are designed and operated ([IEA Bioenergy, Design of Low Emission Wood Stoves – Technical Guidelines, October 2022](#)).

Overview: Residential Wood Heaters

Types of Wood Heaters

According to the U.S. Environmental Protection Agency (EPA), residential wood heaters are enclosed, wood-burning appliances that consumers use for residential space heating and domestic water heating. They may be freestanding, incorporated into existing fireplaces, or built into walls. They can be used as primary or secondary heating sources and have lifespans of 20 or more years. Figure 1 below briefly describes the various types of residential wood heaters, also referred to as “solid-fuel heating appliances.”

Figure 1: Types of solid-fuel heating appliances

Fireplaces	<ul style="list-style-type: none">• Intended to be used primarily for aesthetic enjoyment and not as a space heater.• Not regulated by the EPA's New Source Performance Standards for residential wood heaters.
Wood stoves	<ul style="list-style-type: none">• Made of cast iron, steel, or stone.• Can be freestanding or inserted into existing fireplaces.• Can be used as a primary or secondary source of heat.
Hydronic heaters	<ul style="list-style-type: none">• Designed to use pressurized or unpressurized fluid to produce heat.• Known as wood boilers, pellet boilers, outdoor boilers, and outdoor water stoves.
Forced-air furnaces	<ul style="list-style-type: none">• Designed to burn cord wood, wood pellets, or wood chips to heat an entire residence.
Pellet stoves	<ul style="list-style-type: none">• Designed to be an enclosed device that burns pellets or chip fuel.• Intended for residential space heating and domestic water heating.

Source: [EPA Office of Inspector General](#)

Federal Standards for Wood Heaters

New residential wood heaters must meet applicable emission standards and other requirements set in EPA regulations to be EPA-certified. These regulations, known as [New Source Performance Standards \(NSPS\) for Residential Wood Heaters](#), (1) set emission limits for air pollutants emitted by these devices and (2) require manufacturers to participate in a certification program and have their wood heaters tested in an EPA-approved laboratory to verify that they meet the required emission standards ([40 CFR Part 60](#)). This EPA [website](#) provides fact sheets and summaries of the requirements for the various types of wood heaters.

As the EPA [explains](#), smoke from wood heaters may contain fine particulate matter (otherwise known as PM_{2.5}) and other pollutants, including carbon monoxide, volatile organic compounds, black carbon, and air toxics like benzene. The emission requirements are designed to make wood

heaters more efficient and less polluting. The requirements were phased in over time to allow manufacturers time to adapt emission control technologies to their model lines.

In [2020](#), the EPA [published](#) the final amendments to the [2015 New Source Performance Standards for New Residential Wood Heaters, New Hydronic Heaters, and Forced-Air Furnaces](#). Among other things, the amendments (1) removed certain pellet fuel minimum requirements that were duplicative, and (2) clarified requirements regarding the use of unseasoned wood in pellet fuel production.

The EPA provides a [database](#) of EPA-certified wood stoves that users can sort by emission rates and carbon monoxide values, among other things. You may also be interested in [this](#) 2023 Office of the Inspector General (OIG) report concerning the effectiveness of the EPA standards and the EPA's [response](#), as well as this subsequent 2024 OIG [report](#) highlighting concerns with the program's effectiveness.

Federal Wood-Burning Changeout Campaign

The Burn Wise program, operating from 2009 to 2025, incentivized the replacement of older wood-burning appliances with cleaner home heating, such as (1) EPA-certified wood and pellet stoves; (2) qualified hydronic heaters; and (3) fireplace retrofits, gas, or electric appliances. The EPA [website](#) maintains a historical record of the program.

State Laws and Regulations on Wood Heater Emissions

Based on research compiled by NCSL, we identified at least eight states (Colorado, Indiana, Massachusetts, New Hampshire, Oregon, Pennsylvania, Vermont, and Washington) with statutes or regulations on residential wood heaters. Table 1 below briefly describes these statutes and regulations, which generally incorporate federal emission standards and certification requirements and establish additional requirements on certain devices. The requirements vary based on the type of devices (e.g., wood burning stoves or outdoor hydronic heaters). Table 1 provides hyperlinks to the full text of these laws.

Table 1: Select State Laws on Residential Wood Heaters

State	Statute/Regulation	Brief Description
Colorado	5 Colo Code Regs. § 1001-6:B(II.A.) & (VII.D)	Bans advertising, selling, and installing new wood-burning stoves unless they meet federal emission standards and certification requirements; also bans operating stoves and other wood-burning devices during high pollution days unless otherwise exempt (e.g., if the stove is used as a primary heat source)

Table 1 (continued)

State	Statute/Regulation	Brief Description
Indiana	326 Ind. Admin. Code 4-3-1 et seq.	<p>Bans selling, distributing, or installing outdoor hydronic heaters unless they are certified to meet federal emissions standards; requires existing heaters that do not meet federal standards to follow specified stack size requirements and prohibits their operation during certain summer months</p> <p>Requires all outdoor hydronic heaters to burn clean fuel, follow smoke opacity limits, and be compliant with any applicable state and federal laws and local ordinances; requires sellers to give buyers a notice of these rules</p>
Massachusetts	310 Mass Code Regs. 7.26(50)	<p>Requires certain outdoor hydronic heaters to, among other things, be certified for federal emission standards, comply with size-based setbacks, meet minimum stack height and smoke opacity limits, and burn only clean or approved fuels</p> <p>Units installed before December 26, 2008, are generally allowed if they meet certain additional requirements, including stack height, seasonal, and setback requirements</p>
New Hampshire	N.H. Rev. Stat. Ann. § 125-R	<p>Bans the sale, installation, or relocation of outdoor wood-fired hydronic heaters unless they meet federal emission standards and comply with setback, stack height, and fuel restrictions, with certain exceptions; heaters installed before August 10, 2008, are not subject to these requirements as long as they are not relocated</p> <p>Authorizes municipalities to adopt more restrictive rules, but not on emission limits, testing requirements, monitoring, certification, or fuel specifications; prohibits municipalities from unreasonably limiting or hindering the operation of these heaters</p>
Oregon	Or. Rev. Stat. Ann. § 468A.465 et seq.	<p>Bans selling and advertising new solid fuel burning devices unless they meet certain state and federal emission performance standards, are labeled properly, and burn approved fuels</p>
Pennsylvania	25 Pa. Code § 123.14	<p>Requires certain outdoor wood-fired boilers to (1) meet setback and stack height requirements; (2) burn clean fuel; and (3) operate in compliance with applicable state, county, and local laws and regulations</p>

Table 1 (continued)

State	Statute/Regulation	Brief Description
Vermont	Vt. Admin. Code 16-3-100:5-201 et seq.	Requires certain wood heaters purchased in Vermont to be federally certified and burn approved fuel; also requires all wood heaters installed to follow all applicable laws, regulations, ordinances, and operating and maintenance instructions
		Requires uncertified outdoor hydronic heaters to meet setback and stack height requirements, and all units must be at least 100 feet from the nearest unserved residence, school, or healthcare facility
Washington	Wash. Rev. Code Ann. § 70A.15.3530 & Wash. Admin. Code 173-433-100	Requires solid fuel burning devices to meet certain federal emission standards

Retrofitting Wood Stoves

According to a 2022 report produced for the IEA, an international energy policy and advocacy organization of which the United States is a member, there are technological ways to reduce wood stove emissions, but the key to reducing emissions is in how the devices are designed and operated. ([IEA Bioenergy, Design of Low Emission Wood Stoves – Technical Guidelines, October 2022](#)).

Generally, emissions can be minimized by either increasing the efficiency of the device and lowering emissions at the combustion stage, or by utilizing a device that converts or removes harmful compounds after they have been formed. The report also describes specific technologies that can be used to retrofit stoves and are commercially available, which we outline below.

Oxidation Catalysts

Oxidation catalysts, which can be integrated or retrofitted into existing machinery, remove unburned combustion products like carbon monoxide (CO), hydrocarbons, and soot. According to the IEA, catalysts are generally most efficient at removing CO (90%) and less efficient at removing hydrocarbons (50-70%). Catalysts require high temperatures to function optimally; retrofitted catalysts are generally located further away from combustion and may degrade more slowly than integrated catalysts.

Particle Removers

A range of technologies can remove harmful particles from smoke, but according to the IEA, electrostatic precipitators are generally preferred for flue gas (e.g., wood stove produced smoke).

Other technologies, such as textile filters and scrubbers, are not generally used for wood stoves, and ceramic foam filters have no significant effect on particle emissions.

Electrostatic precipitators work by applying high voltage between an electrode in the gas stream and the grounded flue gas duct to ionize particles. This causes the charged particles to “fall out” of the smoke and collect on a grounded surface, allowing for mechanical removal. In ideal conditions, this can remove up to 87-97% of targeted particles, but this can decrease greatly depending on conditions and requires regular cleaning.

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