



STATE OF MAINE  
DEPARTMENT OF ENVIRONMENTAL PROTECTION



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September 7, 2018

Mike Koerber  
Environmental Protection Agency  
109 T.W. Alexander Drive  
Mail Code: C401-01  
Research Triangle Park, NC 27709

Re: Review and updates to the Residential Wood Heater New Source Performance Standards (NSPS),  
40 CFR Part 60, Subpart AAA

Dear Mr. Koerber,

The Maine Department of Environmental Protection (DEP, "Department") applauds the EPA's efforts to revise the 2015 Residential Wood Heater New Source Performance Standards (NSPS). The Department supports regulations that result in more efficient and environmentally beneficial wood-burning devices with the goal of reducing the amount of air pollution from residential wood heaters. Maine also strongly supports emission reductions based on sound, scientifically proven certification testing methods for such wood burning units. The Department supports the EPA's current focus on amending the 2020 Step 2 wood heater emission standards to ensure they are based on real-world reproducible cord wood testing methods and strongly encourages the EPA to set reasonable emission standards for each type of wood heating appliance, differentiating between technologies such as catalytic, non-catalytic, and pellet-burning devices and considering lifetime emissions from real-world, in-home operation.

### **Cordwood test method**

The Department was impressed to learn of EPA's reconsideration of the 2020 Step 2 wood heater emission standards as well as their involvement in selecting and developing a reliable, accurate test method based on cord wood. Maine continues to be extremely concerned about the imprecision and uncertainty of the test methods and resulting data from which the current 2020 standards were originally derived. Maine considers it inappropriate and unacceptable to base a standard on data obtained using one set of test methods, and then require compliance to be based on new test methods not yet identified, vetted, or verified. As EPA works through the process of selecting and vetting a cord wood test method from which the new Step 2 emission standards for catalytic and non-catalytic stoves will be based, Maine stresses the importance of ensuring tests are reproducible from lab to lab within statistically relevant tolerances. Maine appreciates the complexity of such a task given the inherent variability of cord wood by species, by region, and even from one load to the next, yet this complexity must be factored into such testing to develop appropriate emission standards. This same rationale extends to the test method developed for pellet-burning devices.

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### Catalytic, non-catalytic, and pellet-burning device considerations

Wood, as a renewable and plentiful energy resource for home heating, is an important part of Maine's energy portfolio. Maine residential consumption of wood fuel amounted to 12,473 billion BTU in 2015, which was 18% of Maine's total residential energy consumption (see Figure 1).<sup>1</sup> With the high number of Maine residents relying on wood heaters as their primary source of heating, the Department has spent considerable time conducting outreach and education to ensure retailers and consumers are aware of the requirements outlined in the residential wood heater NSPS. In 2017, Department representatives made in-person visits to over 50 retailers of wood stoves. In 2018, Department representatives have made in-person visits to over 80 facilities so far. Throughout these visits, retailer concerns have been consistent: Retailers and consumers prefer the easier operation and lower cost of non-catalytic stoves. Less than 10% of wood heaters sold in Maine are catalytic. Retailers explain that non-catalytic stoves are the consumer choice because of their ease of operation, years of maintenance-free durability, minimal draft sensitivity, and lower purchase and installation costs. Retailers admit they prefer selling non-catalytic stoves because the designs are reliable, and customers don't often call back after a sale with operational or mechanical issues that may require a field service visit. Non-catalytic stoves are the retailer and consumer preference, yet the current 2020 (Step 2) emission standards favor catalytic stoves because they initially have lower particulate matter emissions when run optimally by a professional in a lab with a fresh catalyst. Such a bias may drive manufacturers to produce more wood heaters with catalysts, the real-world, in-home operation of which will likely result in no air quality benefit and no reduced emissions of air pollutants over the lifetime of these units. This causes serious concerns for Maine.

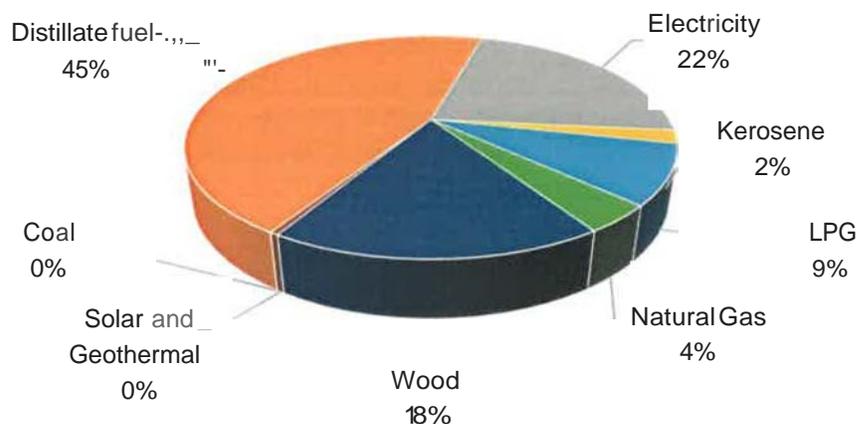


Figure 1. Maine residential energy consumption (2015)<sup>2</sup>

### Unique standards for different wood-burning technologies

The current NSPS does not differentiate between catalytic stoves, non-catalytic stoves, and pellet-burning devices, requiring the same particulate matter standard be met for these three very different technologies. Maine strongly encourages EPA to reconsider this piece of the regulation and appropriately differentiate

<sup>1</sup>Data Source: EIA State Energy Data System (<https://www.eia.gov/state/seds/seds-data-complete.php>, file name: use\_all\_btu.csv)

<sup>2</sup> Ibid.

between these types of wood burning appliances. The grouping together of these categories is not logical, as the different categories are designed to operate differently and control emissions differently. Additionally, such groupings are not consistent with EPA's practice of establishing other NSPS and National Emission Standard for Hazardous Air Pollutants (NESHAP) standards and requirements. NSPS and NESHAP regulations applicable to boilers, for example, differentiate between different fuels and various combustion unit designs. The major HAP source Boiler MACT regulation specifies 21 different subcategories of boilers and process heaters and specifically identifies standards for each. In accordance with EPA's established precedents, we consider it appropriate to evaluate each of these three residential wood heater categories individually and identify unique emission standards for each.

EPA previously recognized the significant difference between catalytic and non-catalytic stoves and set an emissions limit for catalytic stoves at about half of that set for non-catalytic stoves in the 1988 regulations (4.1g/h and 7.5 g/h respectively). This before-sale testing limit considered the lifetime emissions of such devices, acknowledging that catalytic stoves' emissions are lower when the catalyst is new, engaged, and well maintained, yet as catalytic stoves age, if they are not serviced and maintained properly, their particulate matter emissions are often significantly higher than emissions from non-catalytic stoves. Non-catalytic stoves may not meet the initial low particulate matter emissions of a catalytic stove run optimally by professionals in the lab; however, over the life of the device in a residence, these non-catalytic wood heaters likely emit much less particulate matter.

All catalysts degrade over time, typically needing to be replaced within five years, yet the Department's survey of retailers and informal questioning of stove owners confirmed that more than 80 percent of home operators do not have their stoves serviced and do not change their catalyst. Reportedly, such maintenance is both expensive and time consuming. In fact, retailers shared that many home operators simply bypass catalysts or remove them completely regardless of the age or effectiveness, operating catalytic stoves in the dirty-burn, low-efficiency mode without the catalyst engaged because they don't understand the draft sensitivity issues. Wood stoves can effectively heat homes when not run optimally or efficiently, or with the catalysts bypassed or removed, but they produce much higher emissions. The current NSPS limits are set for new devices and do not consider the operational variability of such devices over the lifetime of the stove. Maine urges EPA to consider emissions from real-world in-home operation of wood heating devices over the lifetime of the units and set unique emission standards for different technologies as it has in previous wood heater regulations.

Maine reiterates the inappropriateness of identical emission standards for units of different technologies and fuels. In the February 3, 2014 Standards of Performance for New Residential Wood Heaters proposed rule<sup>3</sup>, EPA referenced a small controversial study funded by the Catalytic Hearth Coalition (CHC)<sup>4</sup> to justify setting a similar emission limit for both catalytic and non-catalytic stoves. This controversial study was based on only two models of stoves, and only two of each model, not an adequate sample size on which to base firm conclusions. Maine urges EPA to thoroughly review the details of any studies used as support for

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<sup>3</sup>Standards of Performance for New Residential Wood Heaters, New Residential Hydronic Heaters and Forced-Air Furnaces, and New Residential Masonry Heaters; Proposed Rule. Federal Register / Vol. 79, No. 22 / Monday, February 3, 2014 / Proposed Rules. <https://www.gpo.gov/fdsys/pkg/FR-2014-02-03/html/2014-00409.htm>

<sup>4</sup>The Interim Wood Stove Catalytic Combustor Longevity Study, Prepared for the Catalytic Hearth Coalition by L. Pitzman et. al., OMNI Environmental Services. January 4, 2010.

developing emission standards to ensure the methods are valid, robust, and reproducible. In this case, the CHC study itself warns, "More testing is needed before conclusive statements can be made."

#### Economic and operational considerations

Maine advocates for overarching considerations in this regulation such that newer, cleaner wood stoves are a benefit to the consumer – with no compromise to heating ability, no increase in difficulty of operation or on-going maintenance, and which are not prohibitively expensive – so that the air pollution reduction and health benefit goals of this NSPS can be realized. The goal of the NSPS and its particulate matter standards is to reduce the amount of air pollution from residential wood heaters. Replacing non-EPA-certified stoves with today's modern stoves reduces both particulate matter emissions and the health risks from exposure to air pollution from residential wood heaters. Older, non-certified stoves are likely the highest emitters, and swapping out these older stoves for newer models should be incentivized; however, the high purchase and maintenance costs coupled with more complicated operation of catalytic stoves are deterrents to residents considering an upgrade.

U.S. wood heater manufacturers produce many high-efficiency, low-emitting wood heating devices and continue to develop improvements with a focus on increasing efficiency and decreasing emissions. These higher efficiency units save money for consumers, many of whom are from low-income households, by lowering total fuel costs.

At \$11.36 per million BTU on July 30, 2018, cord wood is currently the lowest cost heating fuel in Maine, making wood burning devices the most affordable home heating option.<sup>5</sup> Wood pellets are costlier at \$16.24 per million BTU, and heating oil is almost twice as expensive as cord wood at \$19.61 per million BTU. The U.S. Energy Information Administration (EIA) assessed the percentage of households using wood by income.<sup>6</sup> As illustrated in Figure 2, lower income households across the country use more wood, which suggests lower income households are more likely to use wood as their primary heat source compared to higher income households that may use wood as a supplemental heat source. These numbers may also imply that lower income residents are using older, less efficient wood stoves that consume more wood fuel.

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<sup>5</sup> MaineBiz "By the numbers." Source: Maine Governor's Energy Office (weekly heating fuel price survey, July 30, 2018).

<sup>6</sup> U.S. Energy Information Administration. Increase in wood as main source of household heating most notable in the Northeast. March 17, 2014. <https://www.eia.gov/todayinenergy/detail.php?id=15431>

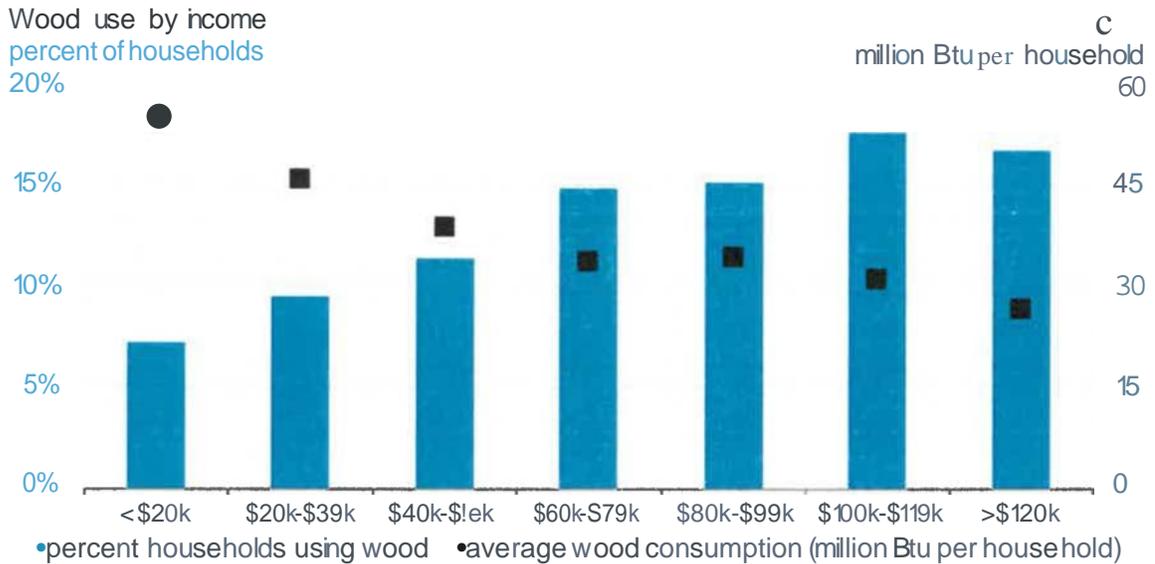


Figure 2. Wood use by income illustrates lower income households burn more wood.

Catalytic stoves are more expensive than non-catalytic stoves on average, and this cost difference may reduce the number of older stoves swapped out for new, more efficient models used in lower-income households. Maine's survey of wood stove retailers suggests catalytic stoves cost \$300 - \$1,000 more per unit compared to non-catalytic stoves. Increased expenses related to catalytic stoves extend past the initial purchase to regular maintenance costs, the cost to replace catalysts at regular intervals (\$250 - \$500), and the likely cost of chimney modifications related to the different draft requirements of catalytic stoves. (Note: The precious metals used in wood heater catalysts, platinum and palladium, are subject to market volatility, and the cost of these components is more likely to go up than down in the future.)

Catalytic stoves require more draft than non-catalyst stoves to overcome the resistance caused by the additional filter (the catalyst) in the exhaust path; thus, a catalytic stove is more draft-sensitive. This could require homeowners to add onto their chimneys to create proper draft for catalytic stoves to operate properly, which would be an additional expense for the homeowner. As required by regulation, the owner's manual for a unit must specify the appropriate installation parameters for the stove, including chimney and draft requirements which differ for different wood stove technologies. In the absence of a requirement for installation by a certified installer, catalytic stoves may be improperly installed, further diminishing their air quality benefits.

Pellet-burning devices are an alternative to catalytic and non-catalytic cord wood burning stoves. These devices are automated, extremely easy to operate, require very little maintenance, and are often cheaper to install than cord-wood burning stoves. While the ease of operation is appealing to home operators, the average initial purchase price of these devices is higher than most non-catalytic stoves, and the associated wood pellet fuel costs are higher than cord wood. Non-catalytic stoves are currently the most affordable home heating option in Maine.

The goal of reducing air pollution from residential wood heaters will be more quickly realized as more non-certified stoves are replaced with certified stoves, either catalytic, non-catalytic, or pellet-burning;

however, the higher cost and complexity of catalytic stoves is a likely deterrent for the low-income households most in need of an upgrade. If stringent yet achievable emission standards are set individually for the different technologies of wood heaters, manufacturers will continue to provide the lower cost non-catalytic stoves as an affordable option for low-income homeowners relying on wood as their primary source of heat.

Maine supports technology-forcing standards; however, such tactics should not eliminate alternatives that provide superior long-term environmental benefit and must be strongly founded on accurate, robust, and scientifically proven certification testing methods that are reproducible from lab to lab within statistically relevant tolerances. Maine urges EPA to set standards that inspire manufacturers to develop wood heaters that produce lower emissions over a lifetime of real-world in-home operation. The current 2020 Step 2 emission standards focus on passing a before-sale, in-lab emissions test under professional operation, a scenario which does not represent lifetime real-world use and its actual emissions.

In summary, catalytic stoves cost more to purchase and maintain, they are more complicated to install, they are more complicated to operate, and the emissions results in the lab under professional operation are significantly lower than the average emissions over the lifetime operation of the devices in a residence. Maine considers lifetime emissions, installation costs, ease of operation, necessary maintenance, and affordability very important factors in determining which stoves will help best meet the goal of reduced wood burner emissions. The Department urges EPA to focus on the goal of reduced air pollution from residential wood heaters. In doing so, EPA should consider the emissions from real-world operation of these different wood heating technologies over the lifetime of the units and use this knowledge to set stringent yet attainable emission standards for each type of device.

Sincerely,



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Bureau of Air Quality, Director  
Maine Department of Environmental Protection

cc. Bill Wehrum, Assistant Administrator, Environmental Protection Agency  
Clint Woods, Deputy Assistant Administrator, Environmental Protection Agency  
Paul Mercer, Commissioner, Maine Department of Environmental Protection