



January 18, 2023

U.S. Environmental Protection Agency  
EPA Docket Center, OAR, Docket EPA-HQ-OAR-2022-0876  
Mail Code 28221T, 1200 Pennsylvania Avenue NW  
Washington, DC 20460

Re: Docket ID No. EPA-HQ-OAR-2022-0876, Funding to Address Air Pollution – Non-Regulatory Docket for Public Input

Dear Administrator Regan,

Thank you for taking the time to consider WESTAR's comments regarding the use of funds in the Inflation Reduction Act for emissions from wood-heating devices. NESCAUM presented a straw proposal to EPA and will submit it to EPA's non-regulatory docket requesting information regarding Funding to Address Air Pollution – Emissions from Wood Heaters [60105(d)]. A draft of the proposal is attached to this letter along with an explanation of how the proposal addresses the questions posed by EPA in their Request for Information. WESTAR fully supports NESCAUM's proposal as an effective way to increase the effectiveness of woodstove changeout programs across the Western states and the rest of the country. Some of the important points from NESCAUM's proposal that will help reduce emissions include funding for independent testing of residential wood heaters to assist state, local, and tribal air agencies in developing programs that reduce exposure to residential wood smoke. The test results would be used as a supplement to EPA's certification program. Testing will occur in certified labs with a new test method that is more representative of real-world emissions and harder to manipulate than the test methods used under EPA's current certification program. It is also important to WESTAR that the independent testing program will be governed through a transparent process by a multi-agency committee as outlined in the proposal. Part of this transparent process is making the data publicly available to inform state/local/tribal agencies and consumers. Finally, WESTAR is supportive of the estimated total cost of the independent testing program at \$9.7 million with an estimated timeline of 3-5 years.

An independent wood-heating device testing program would be timely due to findings from Alaska's and NESCAUM's recent review and study of EPA wood-stove certifications and test methods.<sup>1</sup> The final report showed that emissions from the 7 retested EPA-certified stoves ranged from 2.4 times higher than EPA-certified to 27.7 times higher than EPA-certified for an average across the 14 retests of 7.5 times higher than EPA's


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<sup>1</sup> Assessment of EPA's Residential Wood Heater Certification Program Test Report Review: Stoves & Central Heaters. NESCAUM. March 2021. Accessed Jan. 3, 2022, at: <https://www.nescaum.org/documents/nescaum-review-of-epa-rwh-nsp-certification-program-rev-3-30-21.pdf>

certified emission tests.<sup>2</sup> It is important for state/local/tribal agencies who implement wood heater changeout programs to ensure that the new stoves being installed will decrease emissions. An independent testing program, with results that are publicly available, will allow agencies to use accurate data to decide which wood-heating devices should be included in their program. The \$15 million in the Inflation Reduction Act is directed toward states to assess wood heaters currently on the market because EPA's wood heater certification program is not sufficient to identify clean wood heaters suitable for changeout programs in PM2.5 nonattainment areas. EPA should not rely on this one-time funding to address deficiencies within their own certification program where they have been responsible for over 30 years of oversight.

Many agencies use wood stove changeout programs to help nonattainment areas reach attainment. Some of those areas are more heavily impacted by smoke from wood heating than from mobile or point sources. Thank you for considering this public comment. WESTAR supports using up to \$10 million of the IRA funding for addressing emissions from wood heaters for NESCAUM's proposal to implement an independent testing and emissions analysis of wood heating devices.

Sincerely,

  
Ali MIRZAKHALILI (Jan 19, 2023 13:46 PST)

Ali Mirzakhali, President  
Western States Air Resources Council

Attachment: NESCAUM's draft straw proposal for wood stove testing.

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<sup>2</sup> Broadly Applicable Alternative Test Methods; Withdrawal, 84 Federal Register 3532 (Jan. 24, 2022). Docket ID EPA-HQ-OAR-2021-0951-0001, Accessed at: <https://www.regulations.gov/docket/EPA-HQ-OAR-2021-0951>.

**Attachment: NESCAUM's draft straw proposal for wood stove testing and response to docket**

January 17, 2023

U.S. Environmental Protection Agency  
Office of Air Policy and Program Support

Attention: Docket ID EPA-HQ-OAR-2022-0876 (Docket 4)

*Re: Request for Information – Docket 4: Funding to Address Air Pollution [60105, 60106]*

The Northeast States for Coordinated Air Use Management (NESCAUM) offers the following comments in response to the U.S. Environmental Protection Agency's (EPA's) *Docket 4: Request for Information – Funding to Address Air Pollution [60105, 60106]* issued on November 4, 2022. These comments focus on section 60105(d) *Emissions from Wood Heaters*.

NESCAUM is the regional association of air pollution control agencies representing Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont. Our member agencies have the primary responsibility in their states for implementing clean air programs that achieve the public health and environmental protection goals of the federal Clean Air Act. Strong federal programs limiting hazardous emissions and criteria air pollutants are essential to fulfilling that mission.

Residential wood heating (RWH) emissions contribute heavily to increased ambient particulate matter concentrations. They are a primary reason for the federal PM<sub>2.5</sub> non-attainment status for many areas throughout the country and a public health concern. Studies estimate that RWH air pollutant emissions account for 10,000 – 40,000 premature deaths annually in the U.S.<sup>1</sup> In cold mountainous and valley regions, PM<sub>2.5</sub> from woodsmoke can contribute 80 to 90 percent of the mass and be the primary source of elevated PM<sub>2.5</sub> concentrations. Residential wood heating is also a major source of air toxics, especially in rural areas where many disadvantaged communities exist. Wood heating appliance change-out programs have significant potential for reducing emissions from this source category, but the outcomes from past programs have been mixed.<sup>2</sup>

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<sup>1</sup> Penn, S.L., Arunachalam, S., Woody, M., Heiger-Bernays, W., Tripodis, Y., Levy, J.I. Estimating state-specific contributions to PM<sub>2.5</sub>- and O<sub>3</sub>-related health burden from residential combustion and electricity generating unit emissions in the United States, *Environ. Health Perspect.* 125:324–332 (2017), <http://dx.doi.org/10.1289/EHP550>; Ciaizzo, F., Ashok, A., Waitz, I.A., Yim, S.H.L., Barrett, S.R.H. Air pollution and early deaths in the United States. Part I: Quantifying the impact of major sectors in 2005, *Atmospheric Environment* 79:198-208 (2013), <https://doi.org/10.1016/j.atmosenv.2013.05.081>.

<sup>2</sup> See, e.g., Aparicio, S., Grythe, H. Evaluating the effectiveness of a stove exchange programme on PM<sub>2.5</sub> emission reduction, *Atmospheric Environment* 231 (2020) 117529, ISSN 1352-2310, <https://doi.org/10.1016/j.atmosenv.2020.117529>; California Air Resources Board. Portola Wood Stove Change-Out 2021 Progress Report (March 30, 2022), [https://ww2.arb.ca.gov/sites/default/files/2022-04/portolawoodstove\\_2021progrpt.pdf](https://ww2.arb.ca.gov/sites/default/files/2022-04/portolawoodstove_2021progrpt.pdf); Mardones, C. Ex-post evaluation and cost-benefit analysis of a heater replacement program implemented in southern Chile, *Energy* 227 (2021) 120484, ISSN 0360-5442,

Wood smoke is an unaddressed environmental justice problem. The pollution burden from solid-fuel combustion directly impacts disadvantaged communities using older, less efficient, and dirtier wood-burning devices, disproportionately exposing them to harmful levels of particulates and air toxics. Identifying the cleanest stoves for use in these areas benefits those most in need. Local, tribal, and state regulatory agencies and industry voiced mutual concerns in 2014 that current test methods did not correctly identify stoves that would operate cleanly in actual use.<sup>3</sup> State and local air quality agencies rely on standards and testing through the EPA’s emission certification program under the 2015 Residential Wood Heater New Source Performance Standards (NSPS) to reduce emissions from new wood-burning devices to protect public health and attain and maintain the NAAQS for PM<sub>2.5</sub>. Replacing an uncertified stove with an NSPS Step II certified stove should be able to net around 90% PM<sub>2.5</sub> emission reduction per installation. However, NESCAUM’s lab testing of a number of Step II stoves under expected “in-use” conditions indicates that not all Step II stoves would achieve the desired reductions.<sup>4</sup> EPA has conducted little research in this sector over the last 20 years, and should prioritize funding to expand research beyond the 15 million dollars provided in the Inflation Reduction Act (IRA). With this context, NESCAUM is proposing to EPA the following independent assessment framework aimed at informing the questions the Agency raises specific to “Funding to Address Air Pollution – Emissions from Wood Heaters [60105(d)]” in EPA’s Request for Information issued on November 4, 2022.

### Independent Assessment Framework

With funding allocated under the Inflation Reduction Act (IRA) section 60105(d), NESCAUM recommends that EPA provide funding to a centralized group of state, tribes, and local governments that will support additional independent testing and emissions data analysis to inform the development of effective programs to reduce exposure to residential wood smoke. This program is not intended to replace EPA’s certification program but rather to provide supplemental data that uses new testing approaches to assess appliance performance.

EPA’s current efforts to revise test methods and develop new regulations to address shortcomings in the current regulatory program may take more than ten years to complete. An

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<https://doi.org/10.1016/j.energy.2021.120484>; Pinna Sustainability. BC Wood Stove Exchange Program: Program Evaluation (2008 to 2014) Final Report (August 15, 2015), [https://www2.gov.bc.ca/assets/gov/environment/air-land-water/air/reports-pub/wsep\\_evaluation.pdf](https://www2.gov.bc.ca/assets/gov/environment/air-land-water/air/reports-pub/wsep_evaluation.pdf); Ward, T.J., Palmer, C.P., Houck, J.E., Navidi, W.C., Geinitz, S., Noonan, C.W. A Community Woodstove Changeout and Impact on Ambient Concentrations of Polycyclic Aromatic Hydrocarbons and Phenolics, *Environ. Sci. Technol.* 43:5345–5350 (2009), <https://doi.org/10.1021/es8035253>.

<sup>3</sup> Consensus Positions of WESTAR, NESCAUM, and HPBA, “Proposed Standards of Performance for New Residential Wood Heaters, New Residential Hydronic Heaters and Forced Air Furnaces, and New Residential Masonry Heaters,” August 4, 2014, <https://www.hpba.org/Portals/26/Documents/Government%20Affairs/NSPS%20Members/StateIndustryNSPSRecommendationsPresentedtoEPA8414.pdf>.

<sup>4</sup> Ahmadi, M., Minot, J., Allen, G., Rector, L., Investigation of real-life operating patterns of wood-burning appliances using stack temperature data, *Journal of the Air & Waste Management Association*, 70:393-409 (2020), <https://doi.org/10.1080/10962247.2020.1726838>; see also Special Issue on Residential Wood Combustion, *Journal of the Air & Waste Management Association*, Vol. 72, Issue 7 (2022), <https://www.tandfonline.com/toc/uawm20/72/7>.

independent assessment will provide needed data in the immediate future. The additional information in the near-term will benefit not only state, tribal, and local programs but also EPA's certification program improvement efforts.

#### Assessment Framework Goals

- Conduct rigorous testing to obtain data beyond certification test data to create information for local, state, and tribal entities that can be used to identify cleaner-burning and more energy-efficient wood-burning heaters in actual in-use conditions for a variety of different programs.
- Develop data to inform the selection of replacement devices eligible for local, regional, tribal, and state funding as part of woodstove change-out programs.
- Provide more realistic data for estimating emission reductions from change-outs for use in air quality modeling and demonstrating attainment of the PM<sub>2.5</sub> NAAQS as part of State Implementation Plans (SIPs).
- Obtain data that could inform the development of new emission factors for state, tribal, academic, or federal activities.
- Provide data within a 2–4 year timeframe to assist both EPA and local program decision-making.

#### Proposed Governance

- Funding for testing would be provided through a central entity with oversight by a multi-agency committee to ensure fair and balanced testing with full transparency.
- Program development: An existing Residential Heating Task Force facilitated by NESCAUM would approve the overarching program structure. Current membership includes the following agencies (note that additional agencies could be added at a later date):
  - Alaska Department of Environmental Conservation
  - California Air Resources Board
  - Connecticut Department of Environmental Conservation
  - Fairbanks North Star Borough
  - Massachusetts Department of Environmental Protection
  - Maine Department of Environmental Protection
  - Minnesota Pollution Control Agency
  - Monterey Bay Air Resources District
  - National Association of Clean Air Agencies
  - Nez Perce Tribe
  - New Hampshire Department of Environmental Services
  - New Jersey Department of Environmental Protection
  - New York State Department of Environmental Conservation
  - New York State Energy Research and Development Authority (NYSERDA)
  - Northeast States for Coordinated Air Use Management (NESCAUM)

- Oregon Department of Environmental Quality
- Puget Sound Clean Air Agency
- Rhode Island Department of Environmental Management
- Vermont Department of Environmental Conservation
- Washington Department of Ecology
- Western States Air Resource Council (WESTAR)
- Program Implementation:
  - Work to be overseen by a group of technically capable participants from various interests, including federal, state, local, and tribal agencies. The Task Force could consider the role of additional outside organizations.
  - A Technical/Review Workgroup with expertise in residential wood heater testing facilitated by NESCAUM would perform the following:
    - Meet monthly
    - Approve workplan and decision documents
    - Review work products
    - Receive regular project updates

#### Proposed Testing approach

- Appliance category prioritization
  - First tier
    - Cordwood stoves
      - The most significant area of concern
      - Seek to keep cordwood stoves as a viable option in non-attainment areas
  - Second tier
    - Pellet stoves
    - Central heaters
- Appliance selection
  - The workgroup would develop a matrix to prioritize appliances, ensure equity in appliance selection, and represent multiple emission control technologies.
  - Elements to be considered for prioritization efforts include:
    - Emission control type
    - Sales
      - Mass market vs. specialty retailers
      - Top selling models
    - Use in change-out programs – based on analysis of change-out data
    - Design technology representation – reflect multiple technologies and models versus focusing on market-leading models by a few manufacturers
    - Manufacturer representation – reflect multiple manufacturers rather than focusing on a few manufacturers

- Price distribution
- Firebox size
- Stove availability
- Obtaining appliances
  - Appliance purchased from a retailer
    - It is important to devise a strategy to donate these stoves in an equitable manner and ensure that only those stoves that operate cleanly in actual use are donated. Appliance donation may be viable and could be combined with the second option of developing a long-term program to assess appliance performance degradation over time. Stoves could be installed with the contingency that these stoves must be available for periodic testing to develop information on appliance performance degradation rates. The post-testing use of these stoves represents an opportunity to track degradation during real-world usage.
  - Only test units from production, no prototypes
- Testing
  - Process
    - Testing at a research lab to complete appliance conditioning and develop lab instructions to guide testing
    - Testing conducted by EPA-approved laboratories
      - The workgroup could consider single or multiple labs based on needs and timelines
  - Test Methods
    - Operational protocol: Integrated Duty Cycle (IDC) Test Methods as docketed by EPA
    - Fueling: The selection of a national default fuel is important to establish consistency in testing since it is impossible to assess a large variety of wood species with this funding. However, eventually, the EPA should assess the impact of wood species. The Task Force workgroup should consider if it has the resources to assess species or moisture content impacts. This project represents a unique opportunity to assess species and moisture impacts if implemented with sufficient resources.
      - Fueling type
        - Focus on a common fuel across all testing. We propose the following, but a final decision would come from the project workgroup:
          - Cordwood stoves/boilers/furnaces
            - Three replicate runs with common cordwood fuel at 20-24% moisture content



- If funding allows, one run to assess performance with higher moisture content fuel or different wood species as determined by the workgroup
    - Pellet stoves/boilers/furnaces – to be determined by the multi-agency committee
  - Measurements
    - PM: Filter and TEOM
    - CO and CO<sub>2</sub> – NDIR (nondispersive infrared sensor)
    - Efficiency per IDC
- Reporting
  - Working with EPA, develop a reporting framework over the course of the assessment
    - EPA progress reports
    - Periodic meetings with EPA on findings
  - Final report data
    - Provide EPA with final test reports prior to posting
- Post Testing Appliances
  - Working with EPA, develop an appliance strategy after testing. Possible options could include:
    - Donate devices to change-out programs
    - Develop a long-term program to assess appliance performance degradation over time with normal use.

#### Proposed QA/QC Procedures/data availability

- Create a single standard reporting format to automate reporting and expedite review.
- Review reports ensuring accuracy and conformance to testing results.
  - Requires hiring technical staff to review test reports
- Present results and original reports of the technical reviews to a technical workgroup that meets routinely to review and assess data
- Work with EPA to finalize QA/QC procedures

#### Proposed Outreach

- Provide monthly updates and summary of test report reviews to the workgroup
- Create a website to post summary data and test reports
- Create information to inform technology selection for consumers, incentives, and change-out programs
  - Need to determine if data will be released when all testing is completed or as they become available

- As this research project is expected to take 3-5 years, it may be best to release data as it becomes available for states and consumers to utilize in decision-making. Saving this data until the entire project is complete may not be in the consumer's or change-out agency's best interests. The Task Force workgroup directing this proposed project should consider whether data could be released quarterly or on a semi-annual basis.

### Funding Proposal

- 100% funds through a single grant with a 3 – 5-year timeline/work plan
- Prefer funding not requiring a state match
- Reserve some funding for additional stoves coming to the market
- The following are rough estimates of funding needed to conduct an independent assessment:
  - Estimated cost to conduct independent testing on cordwood stoves: \$6.5 million dollars (estimate for 160 stoves)
  - Estimated cost to conduct independent testing on pellet stoves: \$2 million dollars (estimate for 100 stoves)
  - Estimated cost to conduct independent testing on central heaters: \$1.5 million dollars (estimate for 30 central heaters)

### Questions to be addressed

This framework would seek to address the questions posed by EPA in the Request for Information in the following ways:

1. Beyond measuring for particle emissions from these appliances, what other air pollutants are essential to measure from residential wood heating appliances?

EPA has conducted little analysis/research in this sector over the last 20 years. Most of EPA's research on outdoor wood boilers and alternative pellet fuels used state funding from NYSERDA to support that work. EPA must prioritize funding to expand research beyond the 15 million dollars provided by IRA to assess this important source of particulate matter, ultrafine particulate matter, air toxics, and greenhouse gas emissions. The IRA funding was directed to state, local, and tribal efforts to assess the impacts of residential wood heating, and therefore, the bulk of the funding should go to those efforts. While air toxics and greenhouse gas emissions are important, requiring measurements for these should be considered outside the scope of this current funding. However, we support the use of other EPA funding sources to obtain new data on emissions beyond PM.

Carbon monoxide and carbon dioxide, which are already being measured during certification testing but not assessed or regulated by EPA, should be better utilized. EPA's focus for carbon monoxide should be on standard setting rather than emissions

characterization to provide public health protection. To ensure accurate characterization of carbon monoxide emissions, we recommend that EPA focus efforts on improving test methods or to improve measurements for in-use stove efficiencies in order to help reduce operating costs in lower-income communities.

Air toxics information is needed for assessing public health impacts in rural and E.J. areas. However, there is new data coming from NESCAUM and Canada that will provide additional information on air toxics and greenhouse gas emissions. With this new information, EPA should be able to improve existing AP-42 and emission factor data. Greenhouse gas information, specifically black carbon, methane, and nitrogen dioxide emission factors, is important for greenhouse gas modeling.

Obtaining information about residential wood heaters is not simple or straightforward. Wood heater testing for air toxics requires method development work because sampling typically occurs in a dilution tunnel at conditions closer to ambient conditions. Stack sampling methods are typically developed for larger stacks and sources that operate continuously at steady state and do not have the method sensitivity to obtain robust measurements in a dilution tunnel. Certain appliances emit at such high levels that testing in the dilution tunnel is necessary. If EPA embarks on a research project for air toxics and greenhouse gas emissions measurement, it should consult with researchers outside of EPA who have recently completed air toxics/GHG testing to ensure the effective use of these dollars.

2. What benefits to public health and air quality management are gained by improving the testing methods EPA uses to address emissions from wood heaters?

Air quality management requires successful implementation of control measures to reduce ambient air pollution. Most control measures for residential wood stoves that actually reduce particulate emissions are wildly unpopular with the regulated community, for example, curtailment programs. Forcing unpopular programs on an unaccepting community consumes resources and is not effective at reducing emissions. Wood stove change-out programs are the one exception that are popular with the community. However, EPA has never conducted studies to determine the effectiveness of these programs in delivering emission reductions. It is unclear if all or only some of the wood heating technologies provide emission reductions. It is also unclear how change-out programs impact consumer behavior. There has also been universal agreement among EPA and industry that EPA certification values do not correlate with in-field performance. In field performance can be impacted by technology, installation, and homeowner operation. Test methods must be modified so that the EPA certification

program provides relevant data to drive emission reduction programs, which it currently does not do.

The key benefit will be a more comprehensive understanding of real-world performance of Step 2 wood appliances that will maximize limited change-out program resources by identifying appliances capable of achieving the greatest emission reductions in conjunction with improved efficiencies after home installation. Industry and regulators agree that certification testing, as currently performed, cannot distinguish best performers under typical in-use conditions.<sup>5</sup> A key success will be identifying the best-performing heating devices for change-out programs in disproportionately impacted communities that will provide lower operating costs and higher health benefits over the lifetimes of the devices. Additionally, regulatory agencies need accurate emission factors to develop analysis and modeling that provides accurate information on what activities are needed to meet or maintain compliance with National Ambient Air Quality Standards. These data are used for SIP modeling and curtailment program forecasting.

3. What value do you place on data and emissions information related to cord wood fuel species burned in your area(s)?

Regulatory agencies need information that better reflects real-world emissions, first and foremost, with a national default fuel. Once that data has been obtained, variability in those values can be modified with data on how species and moisture content impact emission outcomes.

Regionally different species burned by consumers are good to know. However, given the limited funding, priority should be given to developing a robust and complete test method and data set that can serve as a national default value for fuel. Once that foundational work has been completed, EPA should build upon that work to create data that supports the use of tree species and moisture content correction factors that agencies can use to create localized assessments. We do not support the use of IRA funds to assess the impact of species but would support an assessment using other program funds.

4. Do you feel that it is important for EPA to research the impact of flue draft on particulate matter emissions in relation to residential wood heating?

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<sup>5</sup> See, e.g., Consensus Positions of WESTAR, NESCAUM, and HPBA “Proposed Standards of Performance for New Residential Wood Heaters, New Residential Hydronic Heaters and Forced Air Furnaces, and New Residential Masonry Heaters” (August 4, 2014), <https://www.hpba.org/Portals/26/Documents/Government%20Affairs/NSPS%20Members/StateIndustryNSPSRecommendationsaspresentedtoEPA8414.pdf>; see also KUAC, “Stove Standards,” (November 18, 2022), <https://fm.kuac.org/local-news/2022-11-18/stove-standards>.

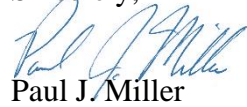
Flue draft has an impact, but like wood species and moisture, should not be a required measurement for exploration with this IRA funding source. Priorities for this funding should be testing all appliances using the IDC method to meet the goals of the assessment. Fine tuning future test method development by exploring the total impacts of draft should be considered using other funding sources. This is not a high priority item at this time.

5. Are there other technological advances that EPA should be considering to address air emissions from wood heaters?

DOE is providing funding on this issue. Other technological advances should be considered outside the scope of this funding. To meet the goals of the assessment of testing current appliances, expanding to other technologies is not recommended or needed with this funding.

Thank you for the opportunity to provide this information as EPA plans its investment strategy to achieve the goals of the Inflation Reduction Act. Please do not hesitate to contact me ([pmiller@nescalum.org](mailto:pmiller@nescalum.org)) if you have any questions or would like additional information.

Sincerely,



Paul J. Miller  
Executive Director

cc: NESCAUM Directors  
Lynne Hamjian, Cynthia Greene, EPA R1  
Rick Ruvo, Kirk Wieber, Matthew Laurita, EPA R2