



Emissions From Wood Heaters Grant Funding Under the Inflation Reduction Act

Grant Guidance

United States Environmental Protection Agency
Office of Air and Radiation

November 2023

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I. Program Overview

Section 60105(d) of the Inflation Reduction Act provides funding for “grants and other activities authorized under subsections (a) through (c) of section 103 and section 105 of the Clean Air Act (42 U.S.C. 7403(a)–(c), 7405) for testing and other agency activities to address emissions from wood heaters.” Residential wood heating (RWH) emissions contribute heavily to increased ambient particulate matter (PM) concentrations. They are a primary reason for the federal PM_{2.5} 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 United States.¹ In cold, mountainous and valley regions, PM_{2.5} from woodsmoke can contribute 80 to 90 percent of the mass and be the primary source of elevated PM_{2.5} concentrations. Residential wood heating is also a major source of air toxics, especially in rural areas where there are many disadvantaged communities overburdened by environmental pollution.

The United States Environmental Protection Agency (EPA) has elected to issue a single assistance agreement non-competitively to the North-East States for Coordinated Air Use Management (NESCAUM) who is leading a consortium of eligible air pollution control agencies under Clean Air Act (CAA) Section 103. These funds will be used by NESCAUM to develop an emissions hierarchy among the existing suite of wood heaters available at retail stores in the United States, allowing state, local, and tribal air agencies to make informed decisions regarding which wood heating appliances to rely upon for emissions reductions when included in appliance change-out programs in their jurisdictions. The

¹ Penn, S.L., Arunachalam, S., Woody, M., Heiger-Bernays, W., Tripodis, Y., Levy, J.I. Estimating state-specific contributions to PM_{2.5}- and O₃-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>.

development of the emissions hierarchy will also be supported through independent testing and emissions data analysis funded under this grant.

II. [Assistance Listing](#)

66.034 – Surveys, Studies, Research, Investigations, Demonstrations, and Special Purpose Activities Relating to the Clean Air Act.

III. [Statutory Authority](#)

Section 60105(d) of the Inflation Reduction Act provides funding for “grants and other activities authorized under subsections (a) through (c) of section 103 and section 105 of the Clean Air Act (42 U.S.C. 7403(a)–(c), 7405) for testing and other agency activities to address emissions from wood heaters.” The statutory authority for this action is the Clean Air Act Section 103, which authorizes “the coordination and acceleration of, research, investigations, experiments, demonstrations, surveys, and studies relating to the causes, effects (including health and welfare effects), extent, prevention, and control of air pollution.”

IV. [Selected Entity](#)

EPA has elected to issue a single assistance agreement of \$8.8 million non-competitively to NESCAUM and a consortium of eligible air pollution control agencies under Clean Air Act Section 103. NESCAUM is a regional association of air pollution control agencies representing Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont. Their 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.

Participants in NESCAUM’s consortium represent not just Northeastern states, but all areas of the country where use of wood heaters is high. The list of state, local, and tribal air agencies involved in this consortium is still growing, but current members include the following:

- Alaska Department of Environmental Conservation
- California Air Resources Board
- Connecticut Department of Environmental Conservation
- Fairbanks North Star Borough
- Idaho Department of Environmental Quality
- 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
- 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)

- Nez Perce Tribe
- 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)

For more information on the origin of the program and NESCAUM’s proposed grant activities and objectives, please see Appendix.

V. Eligible Activities

NESCAUM may use these funds for wood heater emissions testing and associated activities to address emissions from wood heaters as eligible under CAA Section 103.

Examples of eligible activities include, but are not limited to, the following:

- Development of, and updates to, Level 1 Quality Assurance Project Plans (QAPPs) related to qualifying data collected through emissions testing of residential wood heating appliances. Data uses include 1) ranking appliance emissions, per appliance category, from best to worst performance and 2) providing this information to the public for actionable purposes (e.g., informing wood heating appliance change-out programs).
- Procurement and purchase of necessary appliance models, fuel, services, and supplies needed to conduct emissions sampling.
- Modeling of air pollution improvements through data gathered from testing efforts, including greenhouse gases and potential reductions under varying wood heater emissions control technologies, and strategies resulting from test data gained through use of these Inflation Reduction Act funds.
- Testing, analysis, and reporting of particulate and gaseous pollutants emitted from residential wood heating appliances, specifically those appliances that appear to be good candidates for change-out programs based on their particulate emissions as measured during an EPA certification test and/or that have been selected for use in change-out programs since 2015:
 - Filterable particulate emissions to be measured via EPA Method 5G-3 or ASTM E-2515
 - Gaseous emissions to be measured via EPA Method 10 (CO), EPA Method 7E (NO_x - optional), and EPA Method 3A (O₂ / CO₂)
- Assessment of the impact of residential wood heating on low-income and disadvantaged communities within the air pollution control agency’s jurisdiction.
- Research or piloting of new or experimental technologies, methods, or approaches for the measurement and control of air pollution, including particulate emissions and greenhouse gases generated from residential wood heaters.

VI. Program Goals and Objectives

With the funding allocated under the Inflation Reduction Act for this opportunity, EPA seeks to achieve these objectives:

- Conduct particulate emissions testing and data analysis on wood heaters available at retail stores in the United States;
- Create a ranked listing of appliance performance based on the outcomes of the testing; and
- Provide the emissions hierarchy to state, local, and tribal air agencies to enable them to make informed decisions regarding the change-out program in their jurisdictions.

Strategic Plan Linkage

The activities to be funded under this grant support EPA's Fiscal Year (FY) 2022-2026 Strategic Plan, Goal 4: Ensure Clean and Healthy Air for All Communities, Objective 4.1: Improve Air Quality and Reduce Localized Pollution and Health Impacts. For more information see [EPA's FY 2022 - FY 2026 EPA Strategic Plan](#).

Outputs

The term "output" means an environmental activity, effort, and/or associated work product related to an environmental goal and objective that will be produced or provided over a period of time or by a specified date. Outputs may be quantitative or qualitative but must be measurable during an assistance agreement funding period.

Expected outputs from the activities to be funded under this grant include, but are not limited to:

- Electronic reports (ERT) of test measurements, results, demonstrations, models, or analyses of wood heater emissions;
- Identifying the specific models of residential wood heaters tested and numbers of each model if multiples of a single model are included in the study;
- New or updated emissions results on available wood heaters that can be used to identify cleaner burning and more energy-efficient wood heaters in actual in-use conditions for a variety of different programs; and
- Publicly available website postings of test results, ranked by appliance type, such that the best performing appliance models are easily identified for use by air agencies and/or consumers.

Outcomes

The term "outcome" means the result, effect or consequence that will occur from carrying out an environmental program or activity that is related to an environmental or programmatic goal or objective. Outcomes may be environmental, behavioral, health-related, or programmatic in nature, but must also be quantitative. They may not necessarily be achievable within an assistance agreement funding period.

Expected outcomes from the activities to be funded under this grant may include, but are not limited to:

- More informed policy and decision making by local/state agencies due to enhanced wood burning appliance test data and air monitoring data;
- Increased state, local, and tribal community awareness of the best performing residential wood heating appliances;
- Increased access to information so that communities have a better understanding of residential wood burning impacts on air quality in their community;
- Improved public access to reliable wood heater air emissions data;
- Improved air quality in communities experiencing harmful levels of particulates and air toxics, especially in those communities where residential wood heating is implicated as an issue with PM National Ambient Air Quality Standards (NAAQS) attainment concerns; and
- Improved Federal ability to establish informed emissions standards in an updated New Source Performance Standards (NSPS) rulemaking.

VII. Reporting Requirements

Semi-annual progress reports and a detailed final report will be required. Semi-annual reports summarizing technical progress, planned activities for the next six months, and a summary of expenditures are required. The final reports shall be electronically submitted to EPA within 120 calendar days of the completion of the five-year period of performance. The final report must include a summary of the project or activity, advances achieved, and costs of the project or activity. The report must include tabulated results for each residential wood heater tested and copies of the Quality Assurance Project Plan. It is expected that NESCAUM will share their report openly with their research consortium partners, and EPA will also publicly post the report upon receipt, so that all impacted states, localities, and tribes have access to that information.

VIII. Appendix

Copy of NESCAUM's comments to the EPA's [non-regulatory docket](#) seeking comment on IRA Section 60105(d), see next page.

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_{2.5} 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.¹ In cold mountainous and valley regions, PM_{2.5} from woodsmoke can contribute 80 to 90 percent of the mass and be the primary source of elevated PM_{2.5} 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.²

¹ Penn, S.L., Arunachalam, S., Woody, M., Heiger-Bernays, W., Tripodis, Y., Levy, J.I. Estimating state-specific contributions to PM_{2.5}- and O₃-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>.

² See, e.g., Aparicio, S., Grythe, H. Evaluating the effectiveness of a stove exchange programme on PM_{2.5} 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; 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.³ 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_{2.5}. Replacing an uncertified stove with an NSPS Step II certified stove should be able to net around 90% PM_{2.5} 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.⁴ 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

<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; 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>.

³ 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>.

⁴ 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_{2.5} 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 CO₂ – 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.⁵ 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?

⁵ 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@nescaum.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