Appliance Standards Awareness Project
Natural Resources Defense Council

April 26, 2022

Ms. Julia Hegarty
U.S. Department of Energy
Office of Energy Efficiency and Renewable Energy
Building Technologies Office, EE-5B
1000 Independence Avenue SW
Washington, DC 20585

RE: Docket Number EERE–2019–BT–TP–0041/RIN 1904–AE57: Notice of Proposed Rulemaking for Test Procedure for Commercial Warm Air Furnaces

Dear Ms. Hegarty:

This letter constitutes the comments of the Appliance Standards Awareness Project (ASAP) and Natural Resources Defense Council (NRDC) on the notice of proposed rulemaking (NOPR) for test procedure for commercial warm air furnaces (CWAFs). 87 Fed. Reg. 10726 (February 25, 2022). We appreciate the opportunity to provide input to the Department.

We support DOE's efforts to establish a new metric that would address more than just the performance of the gas burner but encourage the Department to evaluate the potential use of the forthcoming CSA P.8 revised standard. The current metric used to calculate the efficiency of CWAFs is "thermal efficiency," which only accounts for flue losses and does not capture other factors that can significantly impact overall efficiency. Under the current test method, manufacturers have little incentive to adopt technologies that would increase efficiency outside of the gas burner. We believe that DOE's proposal in the NOPR to incorporate jacket losses and part-load operation in a new efficiency metric, "thermal efficiency 2" ("TE2"), would better reflect a representative average use cycle and would encourage design changes that could reduce energy consumption.

However, we encourage DOE to evaluate the potential to incorporate the test method and metric from the forthcoming CSA P.8 revised standard. While we agree with DOE that a new metric that incorporates more than just flue losses is crucial, we believe that CSA P.8 Edition 3 will more accurately represent the overall efficiency of a CWAF. The current CSA P.8 standard outlines the rating methodology for thermal efficiencies of commercial gas-fired packaged furnaces, but an upcoming revision of the standard could modify the test method and calculations to better reflect the real-world operation of the equipment. This updated standard would introduce a new metric ("total heating season coefficient of performance" or "$TCOP_{HS}$") which would calculate the efficiency of a CWAF using a more holistic approach. Although the updated standard has not yet been released, we understand that the $TCOP_{HS}$ metric would

incorporate factors such as burner efficiency, total enclosure heat losses, fan energy consumption, and heat gains from heat recovery.[1]

As an example of the more holistic approach, the new $TCOP_{HS}$ metric would capture the losses associated with the total enclosure, not just the jacket. Increased insulation has considerable potential to reduce energy consumption; the Northwest Energy Efficiency Alliance (NEEA) found that increased enclosure insulation could reduce energy consumption by up to 11%.[2] $TCOP_{HS}$ would also capture the efficiency gains resulting from heat recovery components (e.g., heat recovery ventilators and energy recovery ventilators). NEEA found that the addition of heat recovery components can result in energy savings of up to 55%.[3] Therefore, capturing the impact of features such as improved insulation and heat recovery components would result in a better representation of the overall energy consumption of CWAFs and could help uncover significant energy savings opportunities.

In summary, we believe DOE is moving in the right direction by proposing to incorporate more than just burner performance into a new metric for CWAF efficiency. However, we encourage DOE to investigate the potential application of CSA P.8 Edition 3 since it would more fully reflect overall CWAF efficiency and capture additional features that have the potential to significantly reduce energy consumption.

We encourage DOE to further explore how to best capture the impacts of part-load operation of multi-stage CWAFs. To incorporate part-load operation, DOE is proposing to require CWAFs that have two or more stages of heating to be tested at the maximum and minimum input rates. The two measurements would then be averaged to produce a final efficiency metric. As noted above, we believe that capturing part-load operation of CWAFs would provide a more representative efficiency calculation. However, we encourage DOE to further investigate alternative weighting values for full-load and part-load operation that may be more representative of average use. In the NOPR, DOE cites a comment from NEEA stating that CWAFs spend about 10-20% of their time operating at full load, but the Department tentatively concluded that the climate regions used for developing the NEEA estimate are not representative of the U.S.[4] However, we understand that while total operating hours will vary significantly based on climate region, the percentage of time spent at full load is relatively constant across climate regions. Therefore, we encourage DOE to reconsider the NEEA estimate.

[1] https://betterbricks.com/uploads/resources/Efficient-RTU_SystemRequirements.pdf.
[2] Energy Modeling of Commercial Gas Rooftop Units in Support of CSA P.8 Standard: Thermal Efficiencies of Industrial and Commercial Gas-Fired Furnaces. https://neea.org/img/documents/Energy-Modeling-of-Commercial-Gas-Rooftop-Units-in-Support-of-CSA-P.8-Standard.pdf. p. 16.
[3] Ibid. p. 19.
[4] The estimate referenced by NEEA was based on climate regions represented by Winnipeg, Montreal, and Toronto.

Thank you for considering these comments.

Sincerely,

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Appliance Standards Awareness Project

Joe Vukovich
Energy Efficiency Advocate
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