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Ms. Daken,

Northeast Energy Efficiency Partnerships (NEEP) appreciates the opportunity to provide comments to ENERGY STAR regarding its proposed Light Commercial HVAC Specification. These comments are in regards to the proposed cold climate category for light commercial heat pumps—specifically, VRF air-cooled heat pumps.

NEEP launched a regional market transformation initiative for air-source heat pumps (ASHP) in 2013. One of the tools that came out of our initiative was the development of the cold climate air-source heat pump ([ccASHP Specification](#)) and [product list](#). The specification development and evolution has been stakeholder driven and is now on version 3.1, with version 4.0 in development. NEEP is working on aligning version 4.0 with ENERGY STAR version 6.1.

In 2021, NEEP launched a process to expand the scope of the current specification to include a cold climate specification for VRF systems. We would like to provide insights from this ongoing process. As we see great opportunities to strategically align cold climate specification for ASHPs, we have similar hopes for the VRF category. We are currently envisioning a NEEP cold climate VRF specification as “ENERGY STAR plus,” with products meeting ENERGY STAR cold climate specification, plus additional requirements and reported data. The benefit of additional performance data is particularly useful below the AHRI reporting limit of 17°F. NEEP has successfully required performance at 5°F, and more recently the “Lowest Cataloged Temperature,” with manufacturers reporting performance data at their lowest guaranteed outdoor dry bulb temperature. NEEP would like to disseminate a cold climate specification representative of VRF performance in cold climates, and lead the way for AHRI 1230 to require more representative cold climate testing.

NEEP looks forward to working towards alignment with ENERGY STAR. Based on stakeholder feedback, please consider the following recommendations:

1. Align system capacity with AHRI 1230

- a. Remove units below 65,000 Btu/h. All references to systems less than 65,000 Btu/h have been removed from AHRI 1230-2021, *Performance Rating of Variable Refrigerant Flow (VRF) Multi-Split Air-Conditioning and Heat Pump Equipment*. Heat Pumps with capacities less than 65,000 Btu/h are rated to AHRI Standard 210/240. NEEP’s ccASHP spec requires AHRI 210/240, and ccVRF spec requires AHRI 1230.



- b. Include units above 240,000 Btu/h. Failure to include units above 240,000 Btu/h will create confusion in practice. Larger modules and smaller modules are commonplace together on jobs, and there should be no disincentive for larger modules.

2. Reduce COP requirements to reflect cold climate VRF performance

Through engagement with a number of VRF manufacturers, we received feedback on appropriate COP requirements for cold climate VRF systems. Manufacturers consistently communicated that setting COP levels at the current proposed levels will eliminate many VRF systems that they view as industry leading cold climate performers. Based on this specific feedback we recommend the following adjustments to the COP requirements:

| | Current Proposal | Recommended shift | Current Proposal | Recommended shift |
|-------------------|------------------|-------------------|------------------|-------------------|
| Capacity (MBtu/h) | COP at 47°F | COP at 47°F | COP at 17°F | COP at 17°F |
| ≥65 and <135 | 3.6 | 3.4 | 2.5 | 2.25 |
| ≥135 and <240 | 3.6 | 3.25 | 2.5 | 2.07 |
| ≥240 | N/A | 3.20 | N/A | 2.05 |

3. Increase IEER requirements to reflect cold climate VRF performance

Through engagement with a number of VRF manufacturers, we received feedback on appropriate IEER requirements for cold climate VRF systems. Manufacturers consistently communicated that the current IEER were below where most of their cold-climate marketed systems performed. Based on this specific feedback we recommend the following adjustments to the IEER requirements:

| | Current Proposal | Recommended shift | Current Proposal | Recommended shift |
|-------------------|------------------|-------------------|-------------------|-------------------|
| Capacity (MBtu/h) | IEER (ducted) | IEER (ducted) | IEER (non-ducted) | IEER (non-ducted) |
| ≥65 and <135 | 17.4 | 18.9 | 17.4 | 23 |
| ≥135 and <240 | 16.4 | 18 | 16.4 | 21 |
| ≥240 | N/A | 17 | N/A | 17 |

4. Remove EER requirement for Cold Climate category

- a. We believe removing EER requirements for the cold climate category appropriately recognizes the inherent tradeoff between heating and cooling performance in heat pumps and reflects a recognition that the cold climate category specification should focus on differentiating systems optimized for heating performance and efficiency.
- b. ENERGY STAR version 6.1 removed the EER requirement, and US DOE replaced EER with IEER in its 2023 standard for commercial packaged units.



- c. IEER is more representative of heat pump operation in cold climates, where units spend less time operating at 95°F. IEER includes a weighted roll up of performance across a range of operating conditions (2% of the COP at 95°F, 61.7% of the COP at 81.5°F, 23.8% of the COP at 68°F, and 12.5% of the COP at 65°F), a more reflective measure of cooling performance for systems in cold climates.

5. Remove capacity maintenance requirement for Cold Climate category

- a. While the intention of the proposed capacity maintenance requirement is reasonable, we believe there are a couple of details that make the proposed requirement ineffective at differentiating cold climate performers.
 - i. VRF design and sizing practices in cold climates do not rely on capacity at 47F. Units are selected on the basis of meeting the building load at the design temperature, which are likely below 17F, and in some case well below 17F. Having transparency and insight into low temperature performance (capacity and efficiency) is far more useful than a comparative ratio involving capacities at 17F and 47F.
 - ii. NEEP raised similar issues related to the usefulness of capacity maintenance in previous comments to the Central AC/Heat Pump specification development process. Please reference:
<https://www.energystar.gov/sites/default/files/ENERGYSTAR%20ASHPV6Draft2CommentsNEEP.pdf> .

In closing, NEEP recommends performance requirements for ducted and ductless systems to include IEER, COP at 47°F, 17°F, and 5°F, as well as reporting requirements across a range of temperatures for cooling and heating, including the Lowest Cataloged Temperature, for the cold climate category. We understand that ENERGY STAR wishes to only reference data reported per AHRI, for which we recommend ducted and ductless IEER, COP at 47°F, and COP at 17°F.

Thank you for offering the opportunity to provide comment to the Light Commercial HVAC Specification. ENERGY STAR must continue to serve in a leading role in recognition of high performing energy efficient products, and NEEP looks forward to continuing to support ENERGY STAR's efforts into the future. Please don't hesitate to contact us with any follow up questions or clarifications.

Sincerely,

A handwritten signature in black ink that reads "David Lis".

David Lis
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