



375 Alabama St UNIT 220,  
San Francisco, CA 94110

415.767.8962

**December 23, 2024**

Holly Tapani  
U.S. Environmental Protection Agency  
ENERGY STAR HVAC Program

Dear Ms. Tapani,

Treau Inc. (DBA Gradient) respectfully submits the following comments to ENERGY STAR regarding its Room Air Conditioner Specification Version 6 and Version 7 (November 2024).

Gradient is an industry leader in developing and manufacturing window heat pumps<sup>1</sup>, having released the first-ever window heat pump with a variable-speed compressor in 2022. We are advancing this innovation by developing a cold-climate version slated for release at the end of 2024, designed in alignment with the New York City Housing Authority (NYCHA) Clean Heat for All Challenge<sup>2</sup>. This second-generation product, marketed as the All-Weather 120V™ Window Heat Pump (model # CCHP11), was recently certified by ENERGY STAR as the highest-efficiency window AC on the market<sup>3</sup>.

Room heat pumps are poised to transform heat pump accessibility by eliminating the need for costly and extensive building modifications. This innovation will drive electrification in underserved markets, particularly in large-scale multifamily housing and buildings like those managed by NYCHA. Gradient welcomes ENERGY STAR's

---

<sup>1</sup> Also classified as room heat pumps or room air conditioners (ACs) with reverse cycle.

<sup>2</sup><https://www.nyserda.ny.gov/About/Newsroom/2022-Announcements/2022-08-02-Governor-Hochul-and-Mayor-Adams-Announce-Clean-Heat-for-All>

<sup>3</sup> <https://www.energystar.gov/productfinder/product/certified-room-air-conditioners/results>



development of a specification for room air conditioners as a critical next step in ENERGY STAR's longstanding efforts to encourage the development and deployment of energy-efficient products. We offer the following comments in response to the proposed specification levels in Version 6.0 and Version 7.0:

## Version 6.0

### Key Product Criteria

**Recommendation: Given ENERGY STAR's and CEE's longstanding commitment to aligning efficiency standards and ensuring consistency across rating platforms, we recommend that ENERGY STAR align with CEE's Tier 2 requirements.**

| Organization                     | Product Class | Size Range (Btu/h) | CEER | HEER | COP at 5°F | COP at 17°F | Capacity at 5°F/47°F | Capacity at 17°F/47°F |
|----------------------------------|---------------|--------------------|------|------|------------|-------------|----------------------|-----------------------|
| ENERGY STAR                      | 11            | < 20,000           | 13.2 | 6.8  | 1.5        | -           | 70%                  | -                     |
| CEE Tier 2 (Gradient Suggestion) | 11            | < 20,000           | 14.4 | 7.0  | N/A        | ≥1.75       | -                    | ≥70%                  |

### Product Life

*Assumptions: (1) 9.3-year product lifetime, per the DOE Technical Support Document, published March 2023*



**Recommendation:** Emerging room air conditioners with reverse air cycles share more similarities with central ductless heat pumps than with traditional RACs with reverse air cycle, particularly in design, functionality, and component quality. These advanced systems employ variable-speed compressors, high-efficiency fan motors, and robust heat exchangers—key technologies also found in ductless heat pumps. Given these parallels, it is reasonable to argue that their effective useful life (EUL) should align more closely with the 14-year EUL typical of ductless systems<sup>4</sup>, rather than the current estimate of 9.3 years for traditional RACs. Updating the EUL for emerging RACs would better reflect their long-term value, improve cost-effectiveness assessments, and support market adoption by acknowledging their enhanced reliability and efficiency.

#### Cost and Payback

*To conservatively calculate the payback for ENERGY STAR V6.0 room heat pumps, the installed cost of a 2014 DOE minimum CEER, product class 11, reverse-cycle room air conditioner was used as the baseline.*

**Recommendation:** We recommend ENERGY STAR adopt a baseline technology cost that more accurately reflects payback periods for emerging technologies in this product category. Previous reverse cycle room air conditioners are not representative of these advancements and should not be used as the baseline for comparison.

---

<sup>4</sup> Air-Conditioning, Heating, and Refrigeration Institute (AHRI). (n.d.). *CEE directory: Air conditioning and heat pump efficiency 101*. Retrieved December 23, 2024, from <https://www.ahrinet.org/certification/cee-directory/air-conditioning-and-heat-pump-efficiency-101>



## Test Methods for ENERGY STAR Certification

HEER, Cut-in Temperature, Cut-out Temperature

**Question:** Could you clarify whether room heat pumps are exempt from testing by the NRTL during certification testing, while still being subject to verification testing, in alignment with ENERGY STAR's original intent?

## Version 7.0

Gradient respectfully recommends delaying the finalization of Version 7.0 of the ENERGY STAR specification for window air conditioners with reverse air cycle. Additional time is needed for manufacturers to adequately respond to the proposed requirements and ensure alignment with broader industry frameworks. Gradient's preliminary comments are provided below:

### Key Product Criteria

**Recommendation: Align with CEE Tier 2 to ensure consistency across rating platforms.** Historically, CEE Tier 2 has aligned with ENERGY STAR, while CEE's Advanced Tier typically corresponds to ENERGY STAR Most Efficient. Maintaining this relationship is critical for industry consistency and effective program implementation. The current proposed efficiency levels for Version 7.0 would result in ENERGY STAR aligning with CEE's Advanced Tier which is typically reserved for ENERGY STAR Most Efficient.

### Product Labeling Requirements

*The EPA is interested in proposing a labeling requirement to graphically depict the room heat pump type (1-4), such as a thermometer with different highlighted sections to correlate the operating temperature ranges with the types, and welcomes feedback on this approach.*



**Recommendation:** Gradient supports the EPA’s proposal to introduce a labeling requirement graphically depicting room heat pump types (1–4), such as a thermometer with highlighted sections to indicate operating temperature ranges. To ensure successful implementation, we recommend providing manufacturers with a minimum of six months to comply and maintain open communication to address challenges and ensure alignment.

*Version 7.0 low ambient temperature performance requirements would bring the ENERGY STAR RAC specification in alignment with the ENERGY STAR Cold Climate air source heat pump requirements, reflecting adequate cold climate performance widely recognized by the industry.*

**Recommendation:** Given that the performance of ENERGY STAR RACs would align with ENERGY STAR Cold Climate Air Source Heat Pumps, we recommend extending the same ENERGY STAR Cold Climate designation to qualified cold climate RACs with reverse cycle. Aligning cold climate room heat pump designations with current designations for Cold Climate ASHPs would reinforce widely recognized and adopted performance benchmarks, providing a standardized approach to evaluating and certifying cold climate capabilities. This consistency simplifies messaging for stakeholders and utility programs, ensuring clear differentiation of products designed for high performance in colder regions.

## Product Life

*Assumptions: (1) 9.3-year product lifetime, per the DOE Technical Support Document, published March 2023*

**Recommendation:** Emerging RACs share more similarities with central ductless heat pumps than with traditional RACs with reverse air cycle, particularly in design, functionality, and component quality. These advanced systems employ variable-speed compressors, high-efficiency fan motors, and robust heat exchangers—key



technologies also found in ductless heat pumps. Additionally, Version 7.0 has stated that the low ambient temperature performance requirements would bring the ENERGY STAR RAC specification in alignment with the ENERGY STAR Cold Climate air source heat pump requirements, reflecting adequate cold climate performance widely recognized by the industry.

Given these parallels, it is reasonable to argue that their effective useful life (EUL) should align more closely with the 14-year EUL typical of ductless systems<sup>5</sup>, rather than the current estimate of 9.3 years for traditional RACs. Updating the EUL for emerging RACs would better reflect their long-term value, improve cost-effectiveness assessments, and support market adoption by acknowledging their enhanced reliability and efficiency.

#### Cost and Payback

*To conservatively calculate the payback for ENERGY STAR V7.0 room heat pumps (reverse cycle room air conditioners), the installed cost of a 2026 DOE minimum CEER, product class 11, reverse-cycle room air conditioner was used as the baseline.*

**Recommendation:** We recommend ENERGY STAR adopt a baseline technology cost that more accurately reflects payback periods for emerging technologies in this product category. Previous reverse cycle room air conditioners are not representative of these advancements and should not be used as the baseline for comparison.

---

<sup>5</sup> Air-Conditioning, Heating, and Refrigeration Institute (AHRI). (n.d.). *CEE directory: Air conditioning and heat pump efficiency 101*. Retrieved December 23, 2024, from <https://www.ahrinet.org/certification/cee-directory/air-conditioning-and-heat-pump-efficiency-101>



## Test Methods for ENERGY STAR Certification

HEER, Cut-in Temperature, Cut-out Temperature

**Question:** Could you clarify whether room heat pumps are exempt from testing by the NRTL during certification testing, while still being subject to verification testing, in alignment with ENERGY STAR's original intent?

Other

Tested Basic Connected Model (TBCM): A basic model that has been tested to validate it meets Demand Response criteria in section 4.G.

**Comment:** Tested Basic Connected Model (TBCM) is referenced in the Definition section but is not referenced in the remainder of the specification. We recommend removing it if it is no longer relevant.

We appreciate the opportunity to provide our comments on ENERGY STAR's proposed specifications for Version 6 and 7 and look forward to the finalization of the room heat pump specification. If you have any questions about our comments in this letter, please feel free to reach out to us.

Best regards,

**Sam Lamos**

Public Policy Manager