

June 22, 2023

Ann Bailey  
Director  
ENERGY STAR Product Labeling  
Office of Air and Radiation  
United States Environmental Protection Agency  
Washington, D.C. 20460

**RE: ENERGY STAR Residential Central Air Conditioners Sunset Proposal**

Dear Director Bailey,

Thank you for the opportunity to comment in support of the Central Air Conditioners (CACs) Sunset Proposal. The undersigned participate in a Hybrid Heat Coordination Group, which advocates for decarbonizing heat, cost effectively, by replacing one-way CACs with air source heat pumps. The proposal will advance heat decarbonization by clearly preferencing heat pumps, which are superior to CACs across the vast majority of climates and installation scenarios.

Members of our group had previously commented on August 15, 2022, requesting that EPA withdraw the ENERGY STAR Most Efficient designation from CACs. Most of our previous comments outlining the benefits of heat pumps over CACs apply here. We will briefly summarize these benefits, while also addressing how the CAC-to-heat pump switch meets the goals of the broader ENERGY STAR program, and dispel some potential concerns that may be raised by other stakeholders.

This set of comments does not address the simultaneous proposal to sunset the Furnace Specification. Members of our group may be submitting separate comments on that topic.

### Benefits of Switching from CACs to Heat Pumps

Heat pumps provide the same cooling function as CACs, but can also run in reverse, providing heat in the colder months. The incremental cost for reversible functionality is small.<sup>1</sup> This small upfront cost provides enormous benefits because the heat pump can displace a significant portion of the legacy heat generated by inefficient heat sources such as boilers, furnaces, or electric resistance, or replace them entirely given sufficient capacity and cold-temperature performance.

CLASP's 2021 hourly, census-tract level modeling<sup>2</sup> found that households that replace

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<sup>1</sup> DOE estimated it at \$131 in parts costs in 2015 for a 3-ton 15 SEER unit. U.S. Department of Energy, "Technical Support Document: Energy Efficiency Program for Consumer Products: Residential Central Air Conditioners and Heat Pumps", December 2016, pp. 5-21, 5-23.

<sup>2</sup> Stephen Pantano, Matt Malinowski, Alexander Gard-Murray, and Nate Adams, *3H 'Hybrid Heat Homes' An Incentive Program to Electrify Space Heating and Reduce Energy Bills in American Homes*, CLASP, 2021, <https://www.clasp.ngo/research/all/3h-hybrid-heat-homes-an-incentive-program-to-electrify-space->

their CACs with a heat pump but continue to use a legacy fossil fuel furnace or boiler as backup below 41 °F, would displace 39% of their fossil fuel use on average, resulting in 11% reduction in CO<sub>2</sub> emissions and costs. Total reductions of switching all CACs to heat pumps were 49 million tons of CO<sub>2</sub> over 10 years, along with \$27 billion in heating bill savings, and an additional \$80 billion in societal benefits due to the following improvements in health from cleaner air:

- 1000 fewer premature deaths,
- 1000 fewer emergency room visits,
- 1000 fewer nonfatal heart attacks,
- 25,000 fewer asthma exacerbations,
- 37,000 fewer respiratory and acute bronchitis incidents,
- 571,000 fewer minor restricted activity days, and
- 98,000 fewer lost workdays.

CLASP estimated this under conservative assumptions of:

- 15 SEER/9 HSPF heat pump, which will be the minimum standard in 2023,
- Standard temperature performance (not a cold climate heat pump), and
- Switchover to fossil fuel backup below 41° F/5°C.
- (ENERGY STAR heat pumps will likely generate even greater impacts)

#### CAC-to-Heat Pump Switch Is a Natural Fit for ENERGY STAR Program

The ENERGY STAR program seeks to reduce greenhouse gas emissions by removing barriers to adoption of energy efficient products. We outlined the greenhouse gas benefits of heat pumps over CACs above, while the barriers to adoption are related to insufficient information, insufficient financial incentive, concerns with quality, and an established status quo.

The ENERGY STAR program can reduce these barriers as follows:

- **Informational:** clearly informing customers of the benefits of heat pumps through campaigns and manufacturer advertising;
- **Financial:** shifting utility incentives from CACs to heat pumps, thereby reducing

their higher up-front costs;

- **Quality:** promoting quality installation through branded guides, programs, and apps;
- **Status-quo:** through the sunset, CACs will no longer be the default choice, causing installers and building officials that require ENERGY STAR to consider heat pumps.

Furthermore, the CAC-to-heat pump switch would meet the ENERGY STAR guiding principles,<sup>3</sup> summarized below:

1. **Significant energy savings can be realized on a national basis:** 39% average fossil fuel reduction;
2. **Product performance can be maintained or enhanced with increased energy efficiency:** heat pumps provide the same function as air conditioners when running in cooling mode;
3. **Purchasers will recover their investment in increased energy efficiency within a reasonable period of time:** 11% average cost reduction;
4. **Energy-efficiency can be achieved through one or more technologies such that qualifying products are broadly available and offered by more than one manufacturer:** all CAC manufacturers also offer heat pumps;
5. **Product energy consumption and performance can be measured and verified with testing:** benefits of heat pumps are clearly visible with even single-speed units; further test method improvements can more fully capture the benefits of variable-speed heat pumps, further increasing the benefits;
6. **Labeling would effectively differentiate products and be visible for purchasers:** this criterion is not as important for a business-to-business product such as CAC and heat pumps; however, ENERGY STAR certification does drive utility incentives, which are visible to purchasers.

### Despite Clear Benefits, Concerns Persist

Despite the clear benefits of heat pumps over ACs and the appropriateness of

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<sup>3</sup> While the Guiding Principles document also lists some potential criteria for a sunset (insufficient efficiency gains, stringent Federal standard, or product discontinuation), these are less applicable. There continue to exist efficient ACs that will reduce energy use and save people money. It's just that heat pumps will do all that and then continue doing it during winter. US Environmental Protection Agency, "ENERGY STAR® Products Program Strategic Vision and Guiding Principles", May 2012. [https://www.energystar.gov/sites/default/files/asset/document/ENERGY\\_STAR\\_Strategic\\_Vision\\_and\\_Guiding\\_Principles.pdf](https://www.energystar.gov/sites/default/files/asset/document/ENERGY_STAR_Strategic_Vision_and_Guiding_Principles.pdf)

incentivizing this switch through sunseting the CAC specification, some stakeholders may have concerns. We would therefore like to conclude our comments by addressing these potential concerns one-by-one, thereby clarifying a path forward for the ENERGY STAR program.

1. **Do all homes need a heat pump?:** While there are plenty of places in the United States that are characterized as hot and humid, most do in fact experience cold weather. Only 2% of US homes do not have any heat at all.<sup>4</sup> Therefore, the vast majority of potential customers can use the heat pump for heating, and CLASP modeling found that states that do not experience extreme cold see the greatest benefit, as heat pumps are more efficient at warmer temperatures. For example households heating with methane gas in California, Texas, Florida, and Louisiana would find 30–35% CO<sub>2</sub> reductions by replacing CACs with heat pumps, with 15–54% annual heating bill savings.<sup>5</sup>
2. **What will utilities do without ENERGY STAR CACs for peak demand reduction?:** Because heat pumps are more expensive than CACs, they would require a higher rebate to drive efficiency; however, many utilities have not traditionally been able to justify a higher rebate as they could not claim the heating fuel reductions. However, 18 states plus the District of Columbia are permitting fuel switching,<sup>6</sup> while at least one utility in a non-fuel switching state (Texas) has been successfully using heat pumps to replace ACs and electric resistance.<sup>7</sup> We also expect heat pump tax credits provided through the Inflation Reduction Acts to equalize the playing field in the amount of rebate required to incentivize heat pumps versus CACs.

As ENERGY STAR is a voluntary specification, any remaining customers and utilities that need a CAC will still be able to purchase one. Already, many utilities tie their incentive programs to Consortium of Energy Efficiency tiers, and these programs could continue where necessary, while the majority of consumers would still benefit from a clear signal that heat pumps are the efficient choice.

3. **Are heat pump installers ready?:** Utility program administrators and others have

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<sup>4</sup> Data includes all US states, plus Puerto Rico and District of Columbia. U.S Census Bureau, “Home Heating Fuel”, *American Community Survey*, 2020. As reported by Atlas Public Policy, “Market Factors: Demographics”, *Buildings Policy Hub*, accessed June 6, 2023. <https://atlasbuildingshub.com/market-data/market-factors/>

<sup>5</sup> Matt Malinowski, Max Dupuy, David Farnsworth, Dara Torre, Combating High Fuel Prices with Hybrid Heating: The Case for Swapping Air Conditioners for Heat Pumps, CLASP, 2022, <https://www.clasp.ngo/research/all/ac-to-heat-pumps/>

<sup>6</sup> American Council for an Energy Efficient Economy, “State Policies and Rules to Enable Beneficial Electrification in Buildings through Fuel Switching,” Policy Brief, July 2022, [https://www.aceee.org/sites/default/files/pdfs/state\\_fuel-switching\\_policies\\_and\\_rules\\_7-21-22.pdf](https://www.aceee.org/sites/default/files/pdfs/state_fuel-switching_policies_and_rules_7-21-22.pdf).

<sup>7</sup> CenterPoint Energy. Austin Pooley and Steve Wiese, “Achieving High Impacts in Low-Income Multifamily Housing” (ACEEE Hot Water and Hot Air Forum, San Diego, CA, USA, March 7, 2023).

complained about the lack of qualified installers. We believe this is due to lack of experience in regions that have not traditionally used heat pumps, rather than an issue inherent to heat pumps. In contrast, in the Southeast, heat pump penetration is between 19–41%,<sup>8</sup> strongly suggesting that installers can promote heat pumps when the conditions are right.

4. **Will heat pumps provide sufficient dehumidification?:** Heat pumps that are sized for a large heating load may be oversized when cooling, leading to too-high sensible heat ratios. The result is insufficient dehumidification, leading to mold growth. The ENERGY STAR program can address this by highlighting equipment that provides sufficient dehumidification performance and also providing sizing and installation guidance.

We would expect that a dedicated ENERGY STAR heat pump specification, with associated program focus, more incentives, and installation training would help with addressing the above potential concerns more than the status quo.

5. **Will heat pumps work in the cold?:** While heat pumps have traditionally been used in the Southern US, and the penetration of heat pumps in colder climate remains low (below 1% in some Northern states), experiences from recent winters are positive, with news stories from Oregon<sup>9</sup> and New England<sup>10</sup> revealing satisfactory performance at below-freezing temperatures for both full-cold climate and hybrid systems. Similarly, a survey of full cold-climate and hybrid heat pump owners in New York and Massachusetts found an average 8.5/10 satisfaction with their heating performance.<sup>11</sup>
6. **Will heat pumps be more expensive?:** CLASP’s modeling found that standard-efficiency, 15 SEER/9 HSPF, CAC-replacement heat pump used in a hybrid configuration above 40 °F would result in 12% lower heating bill costs across the contiguous US states and the District of Columbia<sup>12</sup> compared to a standalone methane furnace. The costs increased in six states characterized by electricity

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<sup>8</sup> US Energy Information Administration, “2020 Residential Energy Consumption Survey” as reported in Kim Latham, “Residential Building Characteristics,” Atlas Buildings Hub, accessed June 6, 2023, <https://atlasbuildingshub.com/market-data/residential-building-characteristics/>.

<sup>9</sup> Gosia Wozniacka | The Oregonian/OregonLive, “Oregonians’ Experiences with Heat Pump Installations,” oregonlive, May 28, 2023, <https://www.oregonlive.com/environment/2023/05/oregonians-experiences-with-heat-pump-installations.html>.

<sup>10</sup> “Heat Pumps Had Their First Major Local Test Last Weekend. Here’s How It Went. - The Boston Globe,” accessed June 7, 2023, <https://www.bostonglobe.com/2023/02/08/science/heat-pumps-had-their-first-major-test-last-weekend-heres-how-it-went/>.

<sup>11</sup> Cadmus, “Residential CcASHP Building Electrification Study: Final Report,” 12–13, [https://cadmusgroup.com/wp-content/uploads/2022/06/Residential-ccASHP-Building-Electrification-Study\\_Cadmus\\_Final\\_060322\\_Public.pdf](https://cadmusgroup.com/wp-content/uploads/2022/06/Residential-ccASHP-Building-Electrification-Study_Cadmus_Final_060322_Public.pdf).

<sup>12</sup> No data for Alaska.

rates more than 4 times higher than those for methane.<sup>13</sup>

However, the operating costs are sensitive to the efficiency of the heat pump, local climate, switchover temperature, and any future changes in utility rates. For example, our modeling showed that a switch from methane gas to full-cold climate resulted in smaller national average heating bill savings, and more states with negative savings. Several field studies have also found negative savings compared to methane.<sup>14</sup> In contrast, using heat pumps to replace or displace electric resistance, oil, or propane results in huge savings. ENERGY STAR could help provide guidance on those points to ensure that switching to a heat pump results in comparable utility bills for the majority of customers.

While heat pumps cost more up-front than comparable CAC's, Inflation Reduction Act tax credits and forthcoming rebates should help defray that cost.

7. **Will heat pumps be powered by coal and lead to higher emissions?:** CLASP's modeling found that standard-efficiency, 15 SEER/9 HSPF, CAC-replacement heat pump used in a hybrid configuration above 40 °F would result in 6–35% lower emissions across the contiguous US states and the District of Columbia compared to a standalone methane furnace. These reductions were even greater with a full cold-climate replacement, at 18–80%. This analysis took into account the generation mix in each state and limited methane leakage. The emission reductions will be impacted by efficiency of the heat pump, local climate, and the switchover temperature, as well as the amount of methane leakage.
8. **Is government picking winners and losers?:** While we agree that it is preferable to take a technology-neutral approach, we stress that CACs and heat pumps use the same technology and perform the same function (cooling). Heat pumps additionally perform heating, and once that heating energy is also counted and compared against the energy that would be used to heat in a home with a CAC, total annual energy consumption will be reduced.

In addition, replacing CACs with heat pumps adds consumer choice. In a hybrid installation, the heat pump can provide resilience in case of furnace failure and flexibility in case of rising fuel prices.

## Conclusion

While not a complete electrification solution, shifting central air conditioners to heat

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<sup>13</sup> Idaho, Michigan, New Jersey, Rhode Island, Vermont, and Wisconsin

<sup>14</sup> Cadmus, "Residential CcASHP Building Electrification Study: Final Report," 30; James Williamson and Robb Aldrich, "Field Performance of Inverter-Driven Heat Pumps in Cold Climates," August 2015, tbl. 13, [https://www1.eere.energy.gov/buildings/publications/pdfs/building\\_america/inverter-driven-heat-pumps-cold.pdf](https://www1.eere.energy.gov/buildings/publications/pdfs/building_america/inverter-driven-heat-pumps-cold.pdf); RDH Building Science, "BC Cold Climate Heat Pump Field Study," November 9, 2020, tbl. 12, <https://www.rdh.com/wp-content/uploads/2021/01/BC-Cold-Climate-Heat-Pump-Study-Final-Report.pdf>.

pumps can take advantage of a low-barrier path to emissions and cost reductions that can run in parallel to fossil fuel heating replacements. It can also significantly increase the sales of heat pumps, familiarizing consumers and installers, thereby enabling full electrification.

Completely shifting the housing stock from central air conditioners to heat pumps would reduce US CO<sub>2</sub> emissions by 67 million tons/year with hybrid heating and by 223 million tons/year with full electrification using cold-climate heat pumps. Even a portion of this, motivated by the ENERGY STAR program and a shift in utility incentives, would be a win for the climate, air quality, and household budgets.

For all the above reasons, we urge you to sunset the ENERGY STAR specification for central air conditioners and unequivocally support heat pumps.

Respectfully,

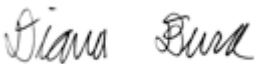


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