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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460



OFFICE OF AIR AND
RADIATION

December 21, 2018

Dear ENERGY STAR® Brand Owner or Other Interested Party:

The U.S. Environmental Protection Agency (EPA) is pleased to announce the selection of Residential Air-to-Water Heat Pumps as a 2019 ENERGY STAR Emerging Technology Award category. EPA is proposing [performance criteria](#) for these products with the goal of recognizing the best available air-to-water heat pumps that help protect the environment while offering the consumer new ways to save energy.

Overview of the Emerging Technology Award

Launched in 2011, the ENERGY STAR Emerging Technology Award raises the profile of innovative technologies that have the potential to significantly reduce greenhouse gas emissions once more widely adopted. The annual Award recognizes promising technologies that may not yet meet key principles associated with categories eligible for the ENERGY STAR label (e.g., broadly available, cost effective to the consumer) or may represent large improvements in existing ENERGY STAR product categories. As products become more mainstream, Award categories may become candidates for ENERGY STAR specification development. For more information on the Award, visit www.energystar.gov/emergingtech.

Technology Overview – Air-to-Water (ATW) Heat Pumps:

Typical air source heat pumps take heat from outside air using a refrigerant. ATW heat pumps transfer this heat to a fluid outdoors – typically water or a mix of water and glycol – and transport this fluid into a home to provide space heating through hydronic distribution (e.g., radiant floor, radiator, or baseboard water circulation systems). These systems can also be used in a cooling mode creating chilled fluid and running it through an air coil to distribute air conditioning to a home or business. While the ATW heat pump market is small in the U.S., it is well established in Europe and China, with a global market of about 1.7M units/year¹.

ATW heat pumps have numerous applications with advantages over traditional hydronic systems in new and existing homes, and advantages over forced air systems in new construction. Compared to a typical gas condensing boiler system, ATW heat pumps can offer energy savings up to 47%² with a seasonal Coefficient of Performance (COP) of 1.7 - 3.0. ATW systems also demonstrate superior performance at low outdoor temperatures when compared with traditional air source heat pumps, making them appropriate for use throughout the United States, including cold regions. In addition to energy savings, ATW heat pump systems can provide the following benefits:

- Since the system heats water, adding a storage tank to the system will provide homeowners with efficient domestic water heating. This eliminates the need for a separate water heater and can save thousands of dollars for a homeowner.³

- All fans are located outside the home, providing quiet operation.
- Allows a retrofit to provide cooling in hydronically-heated homes, without running extensive ducts through the home.

In new construction, ATW heat pumps provide all the advantages of a hydronic system while also providing efficient electric heat, using up to 70% less electricity than electric baseboard heat. These advantages include:

- Easy zoning configurations: providing desired temperature in each room, or zone, of the home separately (e.g., the kitchen may not need to be heated as much as a bedroom)
- No space needed for large air ducts in the house design

As a result, ATW heat pumps can save energy, even in cold climates where many air-to-air heat pumps perform poorly, provide space conditioning and hot water heating, as well as several other benefits for the consumer.

Draft Criteria for Review

Interested stakeholders are encouraged to provide feedback on the proposed recognition criteria to emergingtech@energystar.gov by **January 18, 2019**. Depending on the comments received, EPA may release a subsequent draft for stakeholder review prior to finalizing the criteria. Once final, manufacturers of products that meet the Award criteria will be able to submit information and data to EPA for review. Upon EPA approval, manufacturers will be able to use the ENERGY STAR Emerging Technology Award logo to promote the product.

Additional Technology Categories for 2019: EVO-Capable Room Air Conditioners

EPA is extending recognition of the 2018 Award category – EVO-Capable Room Air Conditioners – into 2019. EPA changed the required test method to reference a DOE-approved test procedure waiver. Correspondingly, EPA has adjusted the energy-efficiency criteria to now require a model to outperform the U.S. DOE Federal Minimum Combined Energy Efficiency Ratio by at least:

- 35% for models with a capacity greater than or equal to 14,000 BTU/hour
- 25% for models with a capacity less than 14,000 BTU/hour

This update ensures alignment with the recent actions from DOE, reduces test burden for applicants, and simplifies the messaging for the 2019 Award. Please see the [ENERGY STAR Emerging Technology Award for Industry Stakeholders webpage](#) for award criteria and instructions for new submissions.

If you have any questions about the Award or the criteria development process, please contact me, Peter Banwell, at banwell.peter@epa.gov and (202) 343-9408, or Emmy Feldman at emmy.feldman@icf.com and (202) 862-1145.

Best Regards,



Peter Banwell
ENERGY STAR Program

Enclosures:

[Criteria for EVO-Capable Room Air Conditioners](#)
[Draft Criteria for Air to Water Heat Pumps](#)

¹ Siegenthaler, John. "Air-to-Water Heat Pumps for Low Energy & Net Zero Houses", 2018 New York Regional Home Performance Conference & Trade Show, 2/14/2018.

² Typical condensing boilers are approximately 90-98.5% efficient (measured using AFUE), while ATW heat pumps are at least 170% efficient at 5 degrees F, (measured using COP).

³ Comparable ENERGY STAR heat pump water heaters cost between \$1200 and \$2000 at retail, not including installation.

For more information, visit: www.energystar.gov

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