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NYSERDA Comments on the EPA ENERGY STAR ENERGY STAR Residential Boilers Discussion Guide

Dear Ms. Daken:

The following comments are submitted on behalf of the New York State Energy Research and Development Authority (NYSERDA). NYSERDA is a public benefit corporation that offers information and analysis, innovative programs, technical expertise, and support to help New Yorkers increase energy efficiency, save money, use renewable energy, and reduce reliance on fossil fuels. NYSERDA's mission is to advance clean energy innovation and investments to combat climate change, improving the health, resiliency, and prosperity of New Yorkers and delivering benefits equitably to all. NYSERDA works to help implement New York's nation-leading climate agenda, which is the most aggressive climate and clean energy initiative in the nation; New York is advancing an orderly and just transition to clean energy that creates jobs and continues fostering a green economy.

Thank you for the opportunity to submit comments to the Environmental Protection Agency (EPA) on the ENERGY STAR Residential Boilers Discussion Guide. NYSERDA appreciates and strongly supports EPA's important efforts to evolve the ENERGY STAR program. We have reviewed the discussion guide and are providing answers to several of the questions.

> **Question 1: Is the name "ENERGY STAR Heat Pump Boilers" for the new specification preferable to "ENERGY STAR Air-to-Water Heat Pumps"? Is there another name that would better align with customer expectations of the product?**

In the Department of Energy (DOE)'s April 2023 consumer boilers test procedure final rule, DOE indicated that "hydronic air-to-water and water-to-water heat pumps meet the definitional criteria to be classified as a consumer boiler."[1] EPA has recognized this determination in the Discussion Guide, proposing a definition that draws from the 10 CFR 430.2 definition for "furnace." However, the proposed definition does not explicitly cite the definition under 10 CFR 430.2, which means that certain elements of that definition--for example, the reference to single-phase electric current, or the capacity limitations--are not explicitly incorporated. Further, the proposed definition includes a reference to "low pressure steam" and then specifies the attributes of hot water boilers, without explicitly limiting the definition to those

[1] DOE Final Rule at page 16, https://www.regulations.gov/document/EERE-2019-BT-TP-0037-0027

products. NYSERDA recommends that EPA revisit the proposed definition to clarify which aspects of 10 CFR 430.2 are covered under the scope of this proposed product category.

From a regulatory perspective these products are considered "boilers" as discussed above. However, during the public meeting commenters noted that the term "boiler" might be confusing in the market as that term is generally used to denote products that can provide hot water to hydronic systems at temperatures of 160°F or greater. Consumers may expect an ENERGY STAR "boiler" to function as a drop-in replacement to their existing equipment, which may not be practicable in many applications. Ultimately the market will require education regarding the attributes of these products regardless of the nomenclature. NYSERDA encourages EPA to not only carefully consider the name chosen to this product category, but the outreach and education components necessary to ensure consumers understand the attributes of the products in this category.

Question 2: Are there broadly accepted industry definitions of air-to-water heat pumps or heat pump boilers?

NYSERDA is currently aware of the definitions set forth in Table 1 for the products under the scope of this discussion guide. Since the intent of the specification to follow from this discussion guide is to address performance metrics related to space heating, space cooling, and domestic water heating, NYSERDA has also included definitions and scope of coverage recently communicated by DOE in two separate test procedure rulemakings.

Table 1. Definitions and Scopes of Coverage Based on Test Procedures and Regulations

Test Procedure or Regulation†	Definitions and Scopes of Coverage
ISO/CD 19967-3[2] and ISO/DIS 19967-2[3]	*air to water heat pump*: Heat pump which consists of one or more factory-made assemblies which normally include at space side refrigerant to water heat exchanger (load side), electrically driven compressor(s), and outdoor-side air-to-refrigerant heat exchanger(s) (source side), including means to provide hygienic hot water and space heating and/or space cooling functions.
ISO/DIS 21978	*air to water heat pump for space heating*: air to water heat pump with electrically driven compressor(s) with or without supplementary heater for space heating purpose.
California Title 20[4]	*Heat pump water-heating package* means a factory-made package of one or more compressors, condensers, and evaporators designed for the purpose of heating water. Where such equipment is provided in one or more than one assembly, the separate assemblies are designed to be used together. The package is specifically designed to make use of the refrigerant cycle to remove

[2] https://www.iso.org/standard/84410.html
[3] https://www.iso.org/standard/83678.html
[4] California Code of Regulations, 20 CCR § 1602

Test Procedure or Regulation†	Definitions and Scopes of Coverage
	heat from an air or water source and to reject the heat to water for heating use. This unit may include valves to allow for reverse-cycle (cooling) operation.
AHRI Standard 550/590-2023[5,6]	*Heat Pump Water-heating Package*: A factory-made package designed for the purpose of heating water. Where such equipment is provided in more than one assembly, the separate assemblies are to be designed to be used together, and the requirements of rating outlined in this standard are based upon the use of matched assemblies. It is a package specifically designed to make use of the refrigerant cycle to remove heat from an air or water source and to reject the heat to water for heating use. This unit can include valves to allow for reverse-cycle (cooling) operation.
Pre-published DOE test procedure final rule on consumer water heaters and residential-duty commercial water heaters[7]	*Split-system heat pump water heater*. A heat pump-type water heater in which at least the compressor, which may be installed outdoors, is separate from the storage tank.
DOE test procedure final rule on consumer boilers[8]	Hydronic air-to-water heat pumps and water-to-water heat pumps meet the definitional criteria to be classified as a consumer boiler under the furnace definition in 10 CFR Part 430.2 (i.e., an electric boiler or low-pressure steam / hot water boiler).[9] But the boiler test procedure does not measure performance at different leaving water temperatures *and* entering air conditions, which are necessary for AWHPs.

† ISO = International Standards Organization; CD = Committee Draft; DIS = Draft International Standard stage

[5] Per Section 3.2.17.2 of AHRI Standard 550/590-2023

[6] AHRI Standard 550/590-2023 does not incorporate an energy efficiency metric for domestic water heating. AHRI Standard 550/590-2023 excludes the following: a). water-to-water heat pumps with a Capacity less than 135,000 Btu/h (covered by the latest edition of ASHRAE/ANSI/AHRI/ISO Standard 13256-2); and b) Air-to-water units designed exclusively to heat potable water as covered by the latest edition of ANSI/AHRI Standard 1300.

[7] DOE's pre-published final rule can be accessed here. Sections 2.2.2 and 2.8 of Appendix E prescribe mandatory and optional test conditions for split-system heat pump water heaters.

[8] April, 2023: https://www.regulations.gov/document/EERE-2019-BT-TP-0037-0027

[9] DOE also concluded these products utilize only single-phase electric current, are designed to be the principal heating source for the living space of a residence, and are not contained within the same cabinet with a central air conditioner whose rated cooling capacity is above 65,000 Btu/h. In addition, electric heat pump boilers meet the definition of an electric boiler. As such, these products meet the criteria of "furnace" as defined in 10 CFR 430.2.

Question 3: Is there any need to distinguish boilers that are used with hydronic coils in a forced-air distribution system from those used with hydronic distribution? Are the same products used in both situations?

Yes, there are significant differences in systems used with hydronic coils and those in forced-air distributions. In particular, there is a need to address fan energy provisions to distinguish forced-air distribution systems from hydronic distribution systems. For example, forced-air systems such as furnace fans embedded in residential furnaces are currently subject to fan energy rating (FER) provisions in addition to annual fuel utilization efficiency, whereas consumer boilers are not subject to FER provisions. ISO/CD 19967-3 prescribes metrics for combined hot water supply with space heating and/or space cooling. The standard accounts for the energy consumption due to a variety of conveying devices for ensuring transport of the heat transfer media inside the unit, i.e., via an integral pump with fan, fan with no integral pump, integral pump with no fan, or no fan unit and no integral pump.

NYSERDA's review of manufacturer product literature suggests that both split-system and monobloc configurations of such systems can be combined with a variety of options such as under floor heating, fan coil units and low temperature radiators.[10] There are outdoor units that can be used for either hydronic distribution or forced-air distribution options.

Regarding the split-system configuration referenced in the above manufacturer product literature and the corresponding domestic hot water function, such a system could potentially meet the newly defined "Split-system heat pump water heater" in the DOE test procedure final rule for consumer water heaters and residential-duty commercial water heaters, and the provisions set forth in Appendix E to Subpart B of 10 CFR Part 430 (Appendix E).[11]

Consumer boilers and air-to-water heat pumps are used for hydronic space heating systems, regardless of the type of hydronic heating element (i.e., an air-to-water coil or radiator). Some air-to-water heat pumps used for domestic water heating are much different and cannot be used for space heating due to the limits on entering water temperatures (entering temperature must be under 90°F).

Question 4: EPA believes that products that can serve as domestic water heaters or as air-to-water heat pumps for space heating could simply be tested and rated for each use. Is there any need for a definitional distinction between heat pump water heaters and air-to-water heat pumps for space heating? If so, what would the distinction be?

Combination boilers can provide both hydronic heating and domestic hot water and these products can be tested to both AFUE and UEF accordingly. However, heat pump water heaters and air-to-water heat pumps are not necessarily directly analogous to these existing combination products. Most notably, air-to-water heat pumps may also be able to provide cooling, as opposed to heat pump water heaters which do not have this capability. Furthermore, heat pump

[10] See pages 6 and 7 of this brochure for the range of product applications.
[11] Sections 2.2.2 and 2.8 of Appendix E within the pre-published final rule prescribe mandatory and optional test conditions for split-system heat pump water heaters.

water heaters may have different configurations, such as integrated units that rely on indoor or semi-conditioned ambient air, as opposed to split-systems that may include an outdoor unit. Finally, certain products such as some CO_2 water heaters require relatively low inlet water temperatures to operate efficiently, making them more suited for domestic hot water applications where the incoming water temperatures are based on groundwater temperature, as opposed to hydronic systems which often have higher return loop temperatures. Therefore, NYSERDA recommends a definitional distinction between these products to avoid further market confusion and misapplication of products. Definitions could include the minimum allowable entering water temperatures and whether units are designed to heat water to high temperature (eg 130-160°F) in a single pass.

NYSERDA also recommends that EPA consider the incorporation of a classification table within the specification that takes into account the wide variety of indoor and outdoor arrangements,[12] and staggered functions depending on the basic model offered for sale by a manufacturer.

Question 5: EPA is interested in additional information about dual fuel boilers particularly market, cost, and performance information.

NYSERDA is aware of dual fuel products pairing air-to-water heat pumps with condensing boilers.[13] The following metrics are applicable to such products based on a review of manufacturer literature: Coefficient of Performance (COP) for space heating via the heat pump, Energy Efficiency Ratio (EER) for space cooling via the heat pump, space heating efficiency of the boiler, and domestic hot water heating efficiency.

NYSERDA recommends EPA consider the following metrics for dual-fuel systems:

- Part-load space cooling metric based on condenser operation.‡
- Part-load space heating metric based on condenser operation.‡
- Energy efficiency metric for domestic hot water heating based on condenser operation.
- Energy efficiency metric for space or domestic water heating under boiler operation mode.
- Measured power input to the equipment and the associated efficiency metric (I.e. COP) for all published sensible and latent heating and cooling data that's provided for HVAC design. (I.e. COP at 95°F, 75°F, 47°F, 17°F, 5°F, -5°F)
- If part-load operation is applicable to the design, then at least a 50% load operating case should also be measured and published.

‡ Including the energy consumption due to a variety of conveying devices for ensuring transport of the heat transfer media inside the unit (e.g., fan or integral pump).

[12] See Tables 1 and 2 in AHRI Standard 210/240-2023 here for example classification tables that are generally well recognized within industry for other space conditioning products.
[13] See page 7 of the product catalog here for the illustration of a gas condensing boiler attached to a heat pump indoor unit.

Question 6: As the evaporators are likely to be located outdoors, what range of outside air conditions are most representative to determine overall performance?

Of the 9.3 million US homes that utilize a boiler as the primary heat source, approximately 5.4 million are located in the "Cold/Very Cold" climate regions, while a further 3.6 million are located in the "Mixed-humid" region.[14] These designations closely reflect the geography of New York, where hydronic systems are common in Climate Zones 4, 5 and 6 as approximately 43% of existing New York single-family homes rely on a central boiler for heating, as do 15% of newly constructed homes.[15] NYSERDA encourages EPA to consider outdoor temperature ranges that reflect the current distribution of residential boiler systems where these products are most likely to be installed. Further, while NYSERDA agrees with EPA that monobloc products exist where both the compressor and hydronic parts are packaged and installed in an outdoor environment, several split-system configurations are also possible. Split-system configurations rely on pieces of equipment that are located outdoors and indoors.[16]

To determine performance in these climate zones, the range of outdoor conditions should be similar to air source heat pumps. A fractional bin hours approach similar to the approach taken for the Heating Seasonal Performance Metric 2, would be appropriate.[17] Additionally, a credit for an outdoor air reset strategy with lower hot water temperatures at milder outdoor conditions would capture the benefits of this design approach, and may be considered using a bin analysis. NYSERDA has determined that annual energy savings from reset are approximately between 10 and 20%.

Question 7: At very low outside temperatures, the compressors for ATWHPs and dual fuel HPs may no longer provide useful efficient heat. We assume ATWHPs will include backup heating for this circumstance. Ideally, the test method would capture this behavior and incorporate it into an estimate of annual energy use. What is the best way to include backup heat in the test method? What other testing considerations should be evaluated for performance in cold climates?

Backup heating can be incorporated into a seasonal model, based on an assumed load line as is done with the Heating Seasonal Performance 2 metric (HSPF2). (California's Title 20 regulations currently reference full load cooling and heating metrics rated in accordance with AHRI Standard 550/590.) The heating building load line is much more discretionary however with ATWHPs compared to central air-source heat pumps. While the heating building load line for central air-source heat pumps is based on cooling capacity, the cooling application for air-to-water heat pumps that

[14] EIA RECS 2020

[15] Residential Building Stock Assessment, 2019, page 17. https://www.nyserda.ny.gov/About/Publications/Evaluation-Reports/Building-Stock-and-Potential-Studies/Residential-Building-Stock-Assessment

[16] See page 1-18 of this service manual for technical specifications of indoor unit incorporating the evaporator section. The manufacturer has also stated on page i of this service manual that the indoor unit is designed for indoor installation. Specific installation, service space and illustrations are shown on pages 1-15 and 1-16 of the service manual. Additionally, the manufacturer has stated on page 1 of this installation manual that the domestic hot water tank for the air-to-water heat pump system is designed for only indoor installation.

[17] Per the procedures set forth in Appendix M1 to Subpart B of 10 C.F.R. part 430.

provide space cooling depends heavily on whole-system design, and not just the equipment. Some designers may prefer 100% backup heat in case of failure while others comfortably design for 100% of the design heating load – decisions are made based on climate and equipment selection. Air-to-water heat pump applications are heavily design-dependent partly because they are an emerging technology in North America. Design of residential and small-commercial central air-source heat pumps has been driven by decades of common practices used in selecting and installing systems where the air-conditioning application historically dominates the design process. No such history and common practice exists for ATWHPs, and it is not a simple translation of plumbing and heating (hydronics) practices. Air-to-water heat pumps tend to have lower circulating water temperatures and the need for outdoor reset. Central ASHP practices because of the distribution systems, and the fact that it's generally driven first by the heating rather than cooling application.

Question 8: How often are air-to-water heat pumps applied in combination systems that also provide domestic hot water? For these applications, can they use the test and metric for domestic hot water delivery efficiency found in 10 CFR Part 430 Subpart B Appendix E? Would this test fully capture the performance of the product in space and water heating modes?

There are very few air-to-water heat pumps currently providing hydronic heating in New York and nationally, so information regarding combination systems may be somewhat anecdotal. However, combination systems are relatively common in New York for legacy boiler systems, as approximately 18% of single-family residences use a space heating boiler to provide hot water in combination with either a separate tank or coil.[18]

NYSERDA is aware of at least one data source that confirms the following for the European Union:[19]

- Nearly 1 million air-to-water heat pumps were installed in 2021.
- At least 246,000 sanitary hot water heat pumps were installed in 2021. The market for sanitary hot water heat pumps has steadily increased since 2009.

Per a Codes and Standards Enhancement Initiative report issued for the 2022 California Energy Code cycle, the outdoor units of certain air-to-water heat pumps contain the compressor and a refrigerant-to-water heat exchanger that transfers energy to a hydronic loop for space conditioning (and for some systems, water heating).[20] NYSERDA's review of

[18] RBSA page 23. https://www.nyserda.ny.gov/About/Publications/Evaluation-Reports/Building-Stock-and-Potential-Studies/Residential-Building-Stock-Assessment
[19] See slides 81 and 82 here.
[20] See page 6 of this report.

a variety of manufacturer-based literature suggests that domestic hot water tanks are offered as options for air-to-water heat pump installations.[21,22,23]

NYSERDA is aware of at least one DOE decision and order granting a waiver to an air-to-water heat pump manufacturer.[24] DOE appeared to take the following positions in the decision and order:

- If the manufacturer were to characterize product performance as a stand-alone water heater, the manufacturer must test and rate the product per Appendix E, or submit a petition for waiver if the product cannot be tested as such.
- Regarding space conditioning performance, DOE concluded that the test procedure in Appendix M to Subpart B of 10 C.F.R. part 430 (Appendix M), did not include any provisions to account for the operational characteristics of an air-to-water heat pump, or any heat pump with an integrated domestic hot water component. In accordance with the manufacturer's petition to DOE, the decision and order required testing and rating of the models in accordance with EN 14511 except that the test operating and test condition tolerances in certain tables of Appendix M would remain applicable. The manufacturer was also required by DOE to rate full load heating and cooling performance (excluding the domestic hot water contribution) using the COP and EER metrics.

Question 9: Air-to-water heat pump systems can be designed to offer load shifting in addition to their other functions. Are there products offered that are specific to such applications? In other words, are systems that provide these functions designed and assembled on site using any air-to-water heat pump, or is there something specific about the product as it leaves the factory that enables this? Are there metrics appropriate for evaluating these capabilities in a product?

A storage tank and controls are normally included with an ATWHP system intended to be used for load shifting, and sometimes are offered as an integrated product. The storage is added to limit heat pump cycling and it could offer limited load shifting capabilities depending on the size of the tank. This storage also helps with very cold periods. These ATWHPs often defrost into the storage tank, so the “cold blow” from defrost with ASHPs is eliminated. Longer time frames for load shifting would require a larger storage tank than is typically needed to limit system design. The tanks are referred to as “buffer” rather than “storage” tanks. Because these are systems designed with numerous separate components, a load shifting rating or credit would be difficult to apply to the heat pump equipment itself. NYSERDA

[21] See pages 1 and 2 of this installation manual for the offering of a domestic hot water tank as an option.
[22] See page 6 of this installation manual for a variety of possible configurations with the domestic hot water tank being part of one out of three configurations.
[23] See page 7 of this installation manual for a “with storage tank and pump” and “with pump” versions of product offerings. The limited warranty and registration language on page 13 of this installation manual states that a storage tank is offered as an accessory.
[24] The DOE waiver can be accessed here for reference.

recommends aligning with existing standards on load shifting such as AHRI 1380 and AHRI Standards 1380 and 1430, or existing ENERGY STAR specifications such as consumer water heaters.

Question 11: Do air-to-water heat pumps generally use multiple speed, variable speed, or inverter-driven compressors? For these products, do part-load tests in AHRI 550/590 reflect field operation?

NYSERDA's review of the products that have been offered for sale in the U.S. market suggests that air-to-water heat pumps use the following types of compressors:

- Variable-speed scroll, rotary, or swing compressors[25,26]
- Enhanced vapor injection compressors[27]
- Two-stage scroll compressors[28]
- Single-speed compressors[29]

NYSERDA is aware of the following studies on air-to-water heat pumps:

1. Central Valley Research Homes: Phase 2 Assessment of Residential Radiant Ceiling Panel Space Conditioning Systems[30] – the report provided the following findings and recommendations:
    a. The standby energy use of the single-speed system was unexpectedly high in comparison to the standby energy use of the evaluated variable-speed system. Buffer tank sizing had a large impact on system energy use. Under sizing of the buffer tank caused excessive short cycling of the single-speed system. The buffer tank also introduced a secondary pump and increased energy use. The radiant system using the variable-speed system without a buffer tank performed best for energy use.
    b. There are no standards or testing and certification requirements in the United States for radiant panels. It is difficult to find data concerning panels and then very difficult to compare the performance of different brands.
2. Central Valley Research Homes: Field Assessment of Residential Radiant Ceiling Panel Space Conditioning Systems[31] – the report provided the following findings and recommendations:
    a. During the cooling season the evaluated air-to-water heat pump consumed considerably more energy daily than the reference air conditioner. The difference was attributed to lower full load cooling performance of the air-to-water heat pump, and partly to significant overcooling due to lack of zoning of the radiant system.

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[25] Per page 4 of this marketing brochure and page 3 of this data sheet.
[26] Per pages 17, 49, 80, and 85 of this engineering data manual. The term "inverter driven" is also used in manufacturer literature to address systems with variable-speed compressors. Some systems are hermetically sealed.
[27] Per pages 4, 6, 11, 13 and 16 of this brochure.
[28] Per page 2 of this brochure.
[29] Per page 11 of this report.
[30] Id.
[31] The report can be accessed here.

During heating tests, the full load heating performance of the air-to-water heat pump and zoning of the radiant system resulted in more comparable performance relative to the reference system.

b. Additional testing was recommended for products rated to ANSI/AHRI Standard 550/590. The recommendation was to evaluate how zoning can facilitate higher cooling water temperatures and reduce condensation potential, and to develop correlations between water temperature and heat pump performance.
c. The air-to-water heat pump system yielded similar results as conventional air-to-air heat pumps. The following were identified as important factors: zoning capability, pump power, buffer tank heat loss, heating and cooling water temperature (which affects heat pump performance), and dehumidification.
d. Hydronic systems have the advantage that it is relatively simple to incorporate chilled water storage for off-peak cooling, demand response, and demand flexibility. The size of buffer tanks frequently used in designs can be expanded to provide this storage. It is technically feasible to control radiant panel cooling systems using demand response signals from utilities or demand response aggregators to prevent operation of condensers during peak periods, much as this is currently done with air systems. Thermal storage allows negative comfort impacts to be avoided, and customers can profit from favorable time-of-use rates.

The above studies were noted in the Codes and Standards Enhancement Initiative report issued for the 2022 California Energy Code cycle, and it was determined that fixed speed air-to-water heat pump systems were not found to perform as well as the variable-speed air-to-water systems in the field monitoring studies. A comparison of monitored variable-speed air-to-water system and an air-source heat pump was performed in both cooling and heating modes, and the total energy use of the air-to-water system was lower in most daily average outdoor air temperatures. [32]

Question 12: If units are sized for design conditions, what does that mean for their part-load heating performance? What have users' experiences been in the field?

Regarding the Central Valley Research Homes reports summarized in our response to question 11, the Air Conditioning Contractors of America (ACCA) Manual J was used to determine the room-by-room heating and sensible cooling load using the desired indoor temperature and design outdoor temperature. ACCA Manual RS and ASHRAE Standard 55 were used to quantify and compare the ability to maintain setpoint and maintain temperature and relative humidity within the comfort ranges.

NYSERDA conducted detailed monitoring and testing at five homes in upstate New York. The results showed that overall measured performance implied part-load losses were in the order of 20-30% relative to published performance data by manufacturers. We theorized that the observed difference in performance was due to defrost and part-load cycling

[32] See pages 61 and 62 of the report here.

losses. The New York Technical Resource Manual[33] has added factors to account for these losses. In theory, variable speed air-to-water heat pumps should have lower part-load losses.

Question 13: This test defines performance with 110°F leaving water temperature. This will not provide sufficient heat when used in legacy heat exchangers, typically designed for 160-180°F water. Do manufacturers recommend using these products in retrofit situations? If so, is there anything special they recommend making sure residents have enough heat?

NYSERDA supports EPA establishing performance criteria that can help the 43%[34] of existing New York single-family residences upgrade their existing fossil-fuel boilers to a low carbon alternative. To support this transition, replacement air-to-water heat pumps will need to work with existing heat distribution systems that require water temperatures well above the 110°F temperature specified in the test procedure. While 110°F is an ideal condition for in-floor heating in new construction, as of 2019 only 15% of new homes in New York currently install hydronic heating.[35] EPA should provide performance results at higher temperature conditions that will be used in retrofit applications with different heat emitters.

While there are very few products on the US market that currently operate effectively with legacy distribution systems, NYSERDA encourages EPA to adopt test procedures and performance criteria that will help advance the market for products suited for this large retrofit market. These solutions may require electric resistance backup, dual fuel, or other emerging technology options. NYSERDA encourages ENERGY STAR to help drive competition and innovation through the development of this product category.

Question 14: Many hydronically-heated homes are located in cold climates in the US. Is there a need for separate criteria for cold climate ATWHPs?

As noted previously, the vast majority of hydronic systems in the US are located in Cold/Very Cold or Mixed-humid climate zones. Therefore, NYSERDA recommends that test procedures reflect the reality of this market and address performance under cold climate conditions. NYSERDA would recommend against a separate cold-climate criteria and instead require all products be tested under ambient conditions of the climate zones where hydronic products are currently purchased and installed.

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[33] https://dps.ny.gov/technical-resource-manual-trm

[34] Residential Building Stock Assessment, 2019, page 17. https://www.nyserda.ny.gov/About/Publications/Evaluation-Reports/Building-Stock-and-Potential-Studies/Residential-Building-Stock-Assessment

[35] Id.

Question 15: Would it be useful for EPA to define connected criteria for air-to-water heat pumps, given that they can be deployed in systems that offer load shifting? How would the needed criteria compare to those in AHRI 1380 or AHRI 1430?

NYSERDA is not aware of performance data related to air-to-water heat pumps providing load shifting capabilities, as noted in the response to Question 9, the general design requirements are understood, but a load shifting rating or credit would be difficult to apply to heat pump equipment. As this is a nascent market in New York, NYSERDA encourages EPA to consider performance specifications that prioritize product performance in providing space conditioning comfort for consumers. To the extent EPA incorporates demand-response or load-shifting criteria, NYSERDA recommends alignment with established industry definitions and standards criteria.

Thank you for the opportunity to provide comments on this ENERGY STAR discussion guide. NYSERDA seeks to be a strong partner of the EPA as we work together to advance state and national decarbonization priorities. Please do not hesitate to reach out to discuss any of these matters further.

Sincerely,

Chris Corcoran
Team Lead – Codes, Products, & Standards
New York State Energy Research and Development Authority (NYSERDA)