Advanced Heat Pump Coalition – Workgroup #2

Q4 2021 Heat Pump Manufacturer Engagement Calls

Dec 16, 2021

Context

Workgroup #2 (WG2) of the Advanced Heat Pump Coalition (AHPC) consists of approximately 30 energy efficiency professionals from utilities, non-profits, cities, and research organizations from across the US and Canada (EE orgs). WG2 is co-chaired by Christopher Dymond (NEEA) and Abigail Daken (EPA). The goal of this group is to foster collaboration between energy efficiency organizations and manufacturers on product features and capabilities that are beneficial to utilities and help meet broader energy efficiency policy objectives.

The first task WG2 undertook was to develop a "roadmap" document of heat pump technology capabilities and features that would be valuable to utility and energy efficiency organizations (EE orgs). A draft roadmap was completed in early 2021 and is posted on the AHPC website. This was followed by a survey of energy efficiency organizations and AHPC members on their opinions of the document.

The second task of WG2 was to collaborate with manufacturers. During the second half of 2021 WG2 arranged and conducted 90-minute discussions with heat pumps manufacturers of the roadmap. Each of these discussions were held with only one manufacture at a time and were neither recorded nor under NDA limitation. WG2 members met with a total of over 50 manufacturer staff participating from nine major manufacturers to get feedback to prioritize what technology and/or market research is needed to help accelerate market adoption of top priority features and capabilities.

> **Action:** Heat Pump Manufacturer Engagement Calls
> **Intention:** Inform manufacturers, gain better understanding of manufacturer perspective
> **Objective:** Identify areas of potential collaboration

The following describes what we heard from manufactures and the key observations and take-aways from these conversations. WG2 will use this information to revise the roadmap document based on what we learned and identify potential areas of emerging technology support.

Manufacturer Perspective (*WG2 clarifications in green italic*)

General

- Many of the manufactures want to collaborate with utilities and EE orgs on new product capabilities and features (but path forward is unclear).
- Incentives are important market influencers.
- Utilities and EE orgs don't speak with a consistent voice – frustrated by different specifications
- Several "Future" items are not currently under consideration by manufacturers (e.g. integrated storage, automatic connection to utility demand response). For these to be impactful, we need to provide much more clarity of vision and value proposition.
- Unit sales drive a lot of decisions – forecasting future demand is hard by key to the product development decision making.
- Product development decisions are made using classic business criteria such as ROI, CapEx, and exploiting some kind of competitive edge. Additional considerations include supply chain capabilities, influencing standards and staff limitations. Many of the manufacturers are more of

a sales and support role in North America, with primary product decisions being made in Asia for a global market.

- Need for validation/verification of proper operation is not a high priority for manufacturers. This was generally viewed as the responsibility of the contractor.
- The term “near term” means something much different to a manufacturer than it does to a utility, near term for a utility is likely not sooner than 3-5 years. Product development cycles are typically 2-5 years depending on complexity.
- The definition of a cold climate heat pump is uncertain and confusing? There are too many subtle variations between utility programs. Because manufactures can trade off performance against capacity this designation risks being influenced by product marketing – a “cold climate” version could be the same product with better low temp capacity but at a reduced COP.

Performance

- All manufacturers are working to improve equipment performance.
- Max and Min Capacity figures are not governed by AHRI and not generally considered as trustworthy by folks like CEE.
- Improved turn down ratio may not be achievable without compromising lubrication flow and consequently the compressor life.

Grid Response

- Manufacturers are hesitant to implement AHRI 1380 and CTA 2045 until there is a broad demand for demand management (consumer or manufacturer financial drivers)
- General support for AHRI 1380 and Open ADR, many requested to help narrow options down to one.
- What does integrated thermal storage really mean for a heat pump? (*Use the thermal capacitance of the building to shift or reduce peak power consumption)*

Integrated Controls

- Configuration of controls, no matter how sophisticated, will largely depend on the system configuration/design and the contractor. Automatic integration with other (preexisting systems) is not on manufacturers’ radar.

Refrigerants

- All manufacturers will be ready to meet federal requirements on refrigerants. Some expressed surprised to hear that refrigerant choice was something utilities cared about. (Utilities are being asked by regulators to meet carbon reduction goals as well as efficiency and renewable energy goals)

Monitoring and Feedback

- This concept remains vague, and the customer value proposition is weak or non-existent.
- Manufacturers did not reveal what they are doing but most have some form of planned customer or contractor communication solution that is evolving.
- There are considerable concerns and worries about authority and data security
- These capabilities need to be valued for global platforms, not just North America – this presents a challenge for the manufacturers.
- The idea of confirming that a system is installed and operating according to manufacturer specifications is not a huge lift for some, but there was a sense that the devil is in the details and if confirmation is a feature. (*As described in the document, we hope to leverage what is already being done by manufacturers who collect system information during setup and commissioning to provide confirmation of installation*)

WG2 Team Observations and Take-Aways

- AHPC should change the name from "Roadmap Specification” to “Roadmap” as the word specification implies a requirement, which is not the intent of the document. The intent is collaboration, not compliance.
- AHPC interests seem to be seen by the manufacturers as custom feature/capability requests for only the parties in the AHPC. AHPC would like for manufacturers to see the collaboration between our interests and the manufacturer's goals.
- Some of the features and capabilities are not supported by utilities until they are available, but manufactures may not add them until utilities provide incentives. AHPC needs to find a way to convey meaningful market need.
- AHPC needs to start with trust building – taking baby steps to collaborate and show that if we say there is something we need it will be supported when it becomes available.
- The manufacturers, if they are showing their cards, see their equipment in most cases as a comfort tool for homeowners but not yet energy management tools for newer emerging market forces/interests.
- More than one manufacturer felt they added product features because utility claims they were needed but were not sufficiently supported. This is a big gap and risk to future collaboration if not addressed.
- We need to find a better way to inform technical utility folks about new features and capabilities. Utility program staff likely have a lagging understanding of the products they are incentivizing.
- Utility and EE org market research on contractors and consumers would be valuable to manufacturers as they may provide a new “voice of the customer” for manufacturers that they normally don't hear.
- Aggregating regional goals and expected unit sales needs would be powerful. While DSIRE database has information, it is not organized in a “heat pump” focused fashion nor does it have priorities or indications of interest. Refinement of DSIRE database may be helpful to manufacturers.
- AHPC could work on regarding installation and commissioning verification is to help define a “test mode” or how what a test mode tells a contractor.
- AHPC can help broaden manufacturer understanding of who the customer is beyond federal standards, contractors, and customers for new features and capabilities.

Next Steps

- Meetings in February at the 2022 AHR Expo in Las Vegas
- Update Roadmap doc based on feedback
- Provide manufacturers with a list of utilities and EE orgs that have specific interests and funding to support a desired feature or capability in order to build utility readiness to support or differentiate products with these features or capabilities.