Regional Portfolio Advisory Committee

DATE: Tuesday, August 29, 2023

TIME: 10:00am – 3:00pm Pacific

LOCATION: Virtual only

WEBINAR: MS Teams – See link in calendar invite or register here

AGENDA (All Times Pacific)			**Packet Page #**
10:00-10:20 *(20 min)*	**Welcome, Introductions and Agenda**	All	**1-2**

10:20-10:35 *(15 min)*	**Housekeeping and Looking Ahead**
	• Announcements:
	  ○ Leadership Awards
	  ○ Fans Market Characterization
	• Update: HPWH Marketing Campaign Timing
	• Update: 2024 Operations Planning
	• Update: Business Planning
	
	Desired Outcome: Committee aware of recent developments and upcoming topics for engagement.
		Alisyn Maggiora
		Britt Cutsforth Dawkins
		Emily Moore
		Becky Walker
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10:35-11:35 *(60 min)*	**Market Transformation Refresher (continued from Q2)** • A brief review of market transformation basics and a chance to discuss topics for future RPAC sessions if desired. *Desired Outcome: Increased understanding of the fundamentals of market transformation.*	Jeff Harris	**3**
55 min	*LUNCH*	ALL	
12:30-12:40 *(10 min)*	**Refresher: RPAC Voting Process** *Desired Outcome: RPAC members are clear on process for casting milestone votes, including scenarios where unanimous consent is not achieved.*	Alisyn Maggiora	**4**
12:40-1:30 *(50 min)*	RPAC VOTE: Advanced Heat Pumps (AHP) 'Program Advancement' *(formerly "Variable Speed Heat Pumps")* • What does a 'yes' vote mean? • AHPs overview and summary of feedback • Discussion and vote *Desired Outcome: RPAC understands proposed next steps for AHPs and supports advancing it into Market Development phase.*	Emily Moore Suzi Asmus	**5-20**
10 min	*BREAK*	ALL	
1:40-2:35 *(55 min)*	**RPAC Round Robin** • Big changes (programs/personnel) • Current challenges, lessons learned • How utility activities relate to NEEA's • Sharable tools/materials • Equity, hard-to-reach markets • Findings, filings, IRPs	RPAC Members	--

2:35-2:50 *(15 min)*	**Work Groups Update** • Federal Funding Coordination (RPAC) • Dual Fuel Product (NGAC) • Dual Fuel Measurement Methodology (CEAC) *Desired Outcome: Committee aware of latest progress with various active workgroups.*	Jonathan Belais Peter Christeleit Ryan Brown	**21-22**
2:50-3:00 *(10 min)*	**Public Comment, meeting debrief and adjourn**	Alisyn Maggiora	--

Informational updates on items not currently requiring agenda time:

- **Page 23:** HPWH Consumer Consideration Campaign
- **Page 24:** Manufactured Homes Update
- **Page 25-26**: Q2/Q3 Committee Updates

Additional materials:

- **Programmatic Updates:**
  - Q2 2023 Market Progress Report (Gas + Electric Programs)

- **Committee Meeting Materials & Charters:**
  - Advisory Committees
    - Q2 2023 RPAC meeting packet, slides and notes
    - Q2 2023 Cost Effectiveness and Evaluation Advisory Committee packet, slides, and notes (forthcoming)
    - Q2 2023 Regional Emerging Tech Advisory Committee packet, slides and notes
  - Coordinating Committees
    - Q2 2023 Products Coordinating Committee packet, Day 1 slides, Day 2 slides, notes (forthcoming)
    - Products Coordinating Committee 2023 Annual Work Plan
    - Q2 2023 Integrated Systems Coordinating Committee packet, slides and notes
    - Integrated Systems Coordinating Committee 2023 Annual Work Plan
  - Charters: RPAC, ISCC, PCC, CEAC, RETAC

- **Newsletters:**
  - Q2 2023 Market Research & Evaluation Newsletter
  - Q2 2023 Codes, Standards and New Construction Newsletter
  - Q2 2023 Emerging Technology Newsletter

Memorandum – *Agenda item*

August 22, 2023

TO: Regional Portfolio Advisory Committee (RPAC)

FROM: Jeff Harris, Chief Transformation Officer

SUBJECT: Market Transformation Foundations Overview Part 2

Our Ask of You: For information only.

Recap and update: At the Q2 RPAC meeting, we began a high-level overview on basic concepts of market transformation but ran out of time before we could cover all the material. At the Q3 RPAC meeting we will pick up where we left off and address the remaining key concepts as well as go through some practical examples. We will try to leave enough time for questions and answers.

The following is an overview of the complete course including what we covered at the Q2 meeting as well as what will be covered in Q3.

Brief Overview: While NEEA delivers value to the region through several streams of work, the core of NEEA's regional value delivery results from a portfolio of market transformation programs. NEEA's working definition of market transformation is **the strategic process of intervening in the market to create lasting change**.

For NEEA, market transformation represents a comprehensive paradigm to remove market barriers and create lasting change that increases the adoption of energy efficiency innovations. Though NEEA undertakes market interventions throughout the adoption curve, most of our activities are aimed at removing mid and upstream barriers early in the product lifecycle, when regional leverage is most critical, and locking in savings with codes and standards changes to increase the full market potential. The planning, implementation and evaluation of our market transformation work is the foundation for the portfolio of initiatives reviewed by RPAC and managed through the initiative life-cycle process.

At the upcoming RPAC Q2 2023 meeting we will walk through a high-level overview of market transformation theory, practice and implications for RPAC. We will leave some time for questions and answers as well as identification of future topics for more in depth discussion at a future RPAC meeting if desired.

Please contact **Jeff Harris** jharris@neea.org if you have questions about the market transformation and NEEA's practices.

Memorandum – *Agenda item*

August 22, 2022

TO: Regional Portfolio Advisory Committee (RPAC)

FROM: Alisyn Maggiora, Sr. Stakeholder Relations Manager

SUBJECT: RPAC Vote on Advanced Heat Pumps* (AHP) 'Program Advancement'

Our Ask of You:
Please review this refresher on the RPAC voting process and come to the August 29 RPAC meeting prepared to vote on the AHP 'Program Advancement' milestone, which marks the program's transition from the Program Development phase to the Market Development phase.

Refresher on RPAC Voting Process:
The process is detailed in Addendum A of the RPAC Charter; in summary:

- A roll-call vote will be taken at RPAC and full consent must be reached by those casting votes for a NEEA program to advance.

- An RPAC Member may register his/her vote as follows:
  - A 'Yes' vote may be registered during the meeting by the RPAC member or an appointed delegate, or may be submitted in writing to NEEA staff in advance of the meeting.

  - A 'No' vote must be registered during the meeting by an RPAC member; an RPAC member voting 'No' shall identify their concern and propose a solution they feel addresses the concern as well as the viability of the NEEA market transformation effort.

  - Other:
    - 'Abstain' – An RPAC Member may choose to abstain as a means of registering a neutral opinion or dissent without voting 'No'.
    - 'Present, Not Voting' – An RPAC Member who is present may choose not to vote as a means of remaining neutral on a program's advancement.

For any questions on the voting process, please contact Alisyn (AMaggiora@neea.org, 503-688-5430).

For any questions on the AHP Program Advancement milestone document, sent to RPAC on July 18 and follows this memo, please contact Suzi Asmus (SAsmus@neea.org, 503-688-5407).

**(program formerly called Variable Speed Heat Pumps; name change July2023)*

Advanced Heat Pumps:

Program Advancement Proposal

Table of Contents:

Executive Summary

The Advanced Heat Pump Program (or AHP, and formerly the Variable Speed Heat Pump Program) will transform the residential space heating market by moving it toward more efficient heat pump systems that deliver more reliable savings and customer comfort in both mild and colder climates.

Heat pumps now dominate the market for electrically conditioned homes, far outpacing electric resistance (ER) and electric forced air furnace (EFAF) sales in both new construction and retrofits. With increases in federal and utility incentives, code and legislation activity, and heightened consumer interest, these trends are expected to continue. However, heat pumps have repeatedly failed to live up to their nominal efficiency ratings in field studies. Heat pumps are complex systems that are impacted by many factors and operating conditions including climate, ducts, envelope, installation, and operation preferences. This complexity has created challenges for energy efficiency. In addition, the drivers for more efficient performance are not well understood or differentiated in the market.

In response to these challenges and the increased pace of adoption, and because many heat pumps today are not installed to displace or replace existing electric heat, NEEA has identified a need to redirect this wave of heat pump adoption towards more efficient heat pumps. This will help reduce new system load, new peak load, and will help stabilize the grid by improving the efficiency of new installed heat pumps.

To achieve these goals, NEEA has helped lead the development of new a load-based heat pump test procedure, conducted lab and field studies, and analyzed performance data, market research and input from leading manufacturers. Through this work, NEEA identified a set of ten efficiency features or system capabilities ("improvements") that have the potential to meaningfully increase installed heat pump system efficiency. Better yet, available data and expert opinions estimate that most improvements will have minimal to no incremental cost over comparable systems without these improvements.

The system complexities won't be solved with these improvements alone but there is significant opportunity to build greater efficiency into out-of-the-box systems over time. The program's ultimate goal is to promote systems with these improvements in the Northwest so that by 2030, average installed efficiency of residential-size heat pumps is 30% more efficient than 2017 average.

During the Market Development phase (the next phase in NEEA's initiative lifecycle), the primary strategy for this program is to work upstream with manufacturers and national partners to clearly differentiate products with these improvements and to accelerate broader adoption of the improvements to deliver greater efficiency for all installed heat pumps. NEEA aims to:

(1) Validate energy savings, establish metrics to identify qualifying products for each improvement, and develop clear value propositions for all partners.
(2) Build support among manufacturers and regional and national efficiency program partners for incorporating recommended improvements into specs and standards, enabling manufacturers and the market to differentiate the best performing products, creating competitive advantage.
(3) Leverage existing regional and national training and marketing delivered by manufacturers, distributors, and efficiency ~~and decarbonization (where applicable)~~ programs ~~training and marketing~~ to disseminate improvements to contractors and consumers with contributed content, data, specifications, and information on product identification~~to drive contractor and~~

~~consumer awareness and education, driving increased availability and adoption of higher efficiency systems~~.

The program design includes a set of improvements that are currently at various stages of validation. This document provides both a program overview and specific examples, where applicable, to illustrate expectations for the first improvement – low load efficiency – to move through the program design.

Annual funding requirements for the program are approximately $700,000 in direct costs, plus NEEA staff time of approximately 2.0 FTE.

1 - Background

1.1 – Program Overview and Objectives

Starting in 2015, NEEA's Ductless Heat Pump Program and the Next Step Home Program findings helped to expose the variability of heat pump systems' efficiency and performance regardless of seasonal energy efficiency ratio (SEER), heating seasonal performance factor (HSPF) or energy efficiency ratio (EER) ratings. In response, NEEA began working with bi-national partners to study and develop a load-based test and rating procedure for residential air-source heat pumps and air conditioners. This work, along with NEEA's observation that the residential heat pump market was quickly maturing and expanding into centrally ducted, multi-head and packaged terminal systems, led NEEA to begin assessing the opportunity for a new residential heat pump program.

In February 2021, the Regional Portfolio Advisory Committee (RPAC) approved the program for Concept Advancement. At the time of this milestone, the envisioned program strategy included accelerating adoption of variable speed heat pumps in electric space heating replacements and improving installation best practices to ensure savings.

Since then, the residential heat pump market has continued to be rapidly reshaped by product advancements and economic, environmental, and political trends. Concurrently, NEEA's product assessment work led NEEA to refocus program strategy on technology improvements rather than accelerating market adoption or focusing on installer training.

Further, NEEA's product research more definitively showed the variability of installed efficiency and performance based on variability in product features and capabilities. Since then, bolstered by key learnings outlined in Section 1.3 below, the team further adjusted program focus in three important ways:

- **Focus on product efficiency improvements, rather than product adoption:** While other market dynamics are fueling an overall increase in market adoption, NEEA will focus on product differentiation and awareness of system attributes that deliver greater efficiency. NEEA's focus will also be on low- or no-cost features, capabilities and rating methods that consistently improve installed efficiency and can be identified in a product or system specification. The desired result will be systems that deliver greater efficiency with reduced reliance on contractor design and installation choices. Because the focus is on increasing average efficiency over baseline heat pumps, savings will not overlap with the Ductless Heat Pump program diffusion, where the savings come from displacement of electric heat.
- **Broader product range:** Since many of the improvements span multiple residential-scale heat pump configurations (central ducted, single- and multi-head ductless, window units and packaged thermal heat pumps), the program scope expanded from only variable speed heat pumps to include all applicable multi-speed heat pumps.

- **Structure a rolling timeframe:** Since each improvement can be incorporated and deliver savings independently of the others, the team borrowed from NEEA's past experience to structure a program that opportunistically adds improvements as we identify them in the market. The impact is a rolling series of improvements that each get baked into permanent changes to product manufacturing and/or federal standards.

Considering the evolving market and product landscape, NEEA's primary objectives for Market Development of this program are:

1) An improved test procedure and rating system for residential heat pumps that enables clear and accurate differentiation of higher-efficiency products.
2) Standard inclusion of identified system efficiency improvements (e.g. low load efficiency, advanced supplement heat controls, connected diagnostics) that meaningfully increase installed, real-world efficiency.

Ultimately, NEEA aims to lock in heat pump efficiency above current standards through improvements to the federal test procedure and minimum standards across all residential multi-speed heat pump applications.

1.2 – Outcomes (evidence that the program strategy is working)

NEEA has been building bi-national support and investment in advancing heat pump efficiency through research, advocacy, and manufacturer outreach. Some of the outcomes and successes of this work to-date include:

- With a heavy-lift of contribution and leadership from NEEA since 2015, the Canadian Standards Association (CSA) has investigated and continued to advance a new load-based heat pump test procedure. In 2023, CSA published the latest update as the CSA SPE07:23, bringing it one step closer to adoption into Canadian standards.
    - This work, along with additional NEEA market engagement, has helped spread understanding in the HVAC and energy efficiency communities about the limitations of current heat pump performance metrics which are based on static testing. Evidence for this includes:
        - 2022 U.S. Department of Energy Request for Information soliciting input on criteria development for a new test procedure, specifically referencing new load-based testing learnings.
        - 2022 formation of American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Technical Committee (TC) 8.11 to investigate how to improve rating representativeness of unitary and room air conditioners & heat pumps. NEEA a member of this TC.
        - The International Organization for Standardization (ISO) TC86 committee has initiated investigation into load-based test procedure as a possible candidate for global market harmonization of heat pump ratings. (NEEA is a member)
- In response to NEEA's input, Northeast Energy Efficiency Partnerships (NEEP) has included functionality to filter for ENERGY STAR and ENERGY STAR cold climate qualified products, and has incorporated advanced sizing functionality that points to, among other load calculators, NEEA's HVAC Sizing Tool.
- First convened as a one-time workshop in 2018, NEEA has since partnered with the Midwest Energy Efficiency Alliance to more formally organize and regularly convene the Advanced Heat Pump Coalition (AHPC). This group of subject matter experts convenes as a forum for discussion

and alignment on heat pump improvements and has developed a product roadmap to more efficient heat pumps.

- Taking into consideration NEEA and other aligned party recommendations, ENERGY STAR 6.1 program requirements for Product Specification for Central Air Conditioner and Heat Pump Equipment published in 2022 for the first time included optional "Installation Capabilities". This is an important signal to manufacturers which direction they should be moving with their product research and development and provides recognition that automated commissioning capabilities are important to energy efficient product performance.
- NEEA brought the idea to American Council for an Energy-Efficient Economy (ACEEE) and co-founded the first Hot Air Forum. This took place in 2023 and like the ACEEE Hot Water Forum, provides a national venue for socializing Market Transformation strategy, sharing research and lessons learned, and building collaboration around heat pump improvements. Building these partnerships and alignment is essential to building this program influence beyond the borders of the Northwest.

1.3 – Key Learnings

At Concept Advancement (the first milestone vote), the program planned to focus on replacement of electric forced air furnaces (EFAFs) and air source heat pumps (ASHPs) and to remove barriers to adoption for central ducted heat pump systems. However, NEEA has since pivoted based on four fundamental learnings:

1. Heat pump adoption rate is higher than expected

   - Awareness and adoption rates of all residential heat pumps is much higher than we expected back in 2020 with VSHPs showing a 18% regional market share of all air source heat pump sales in 2021[1].
   - The supply chain has high confidence the heat pump market will continue to grow.
   - With the new federal tax credits, rebates and decarbonization-motivated programs in some parts of the region, substantial investments are going to push this market for at least the next ten years.

2. Load-based test procedure provides valuable performance differentiation[2]

   - The load-based test methodology reveals complex equipment behavior that is not revealed in the conventional lab test procedures.
   - Load based testing uncovered:
     1. substantial impacts controls algorithms have on variable speed heat pump performance (which is the basis for low load performance) and;
     2. evidence that such performance can be achieved at little or no cost through better controls software.

3. Products with performance improvements exist ~~Undifferentiated products exist~~ in the market today[3] but are undifferentiated by current standards and metrics.

   - Modeling and lab data have revealed that not all equipment performance gains are captured with simple SEER and HSPF metrics. For example: some products have more than 50% better performance during low load conditions, some cold climate heat pumps that

[1] Momentum Savings/2016-2021 Res HVAC Market Model Presentation (bpa.gov)
[2] Purdue University 2022, NEEA 2022
[3] MN CEE 2021

have the same rated size can deliver twice as much heat at 5 degrees than others~~,~~. ~~or~~ ~~m~~Manufacturers have commissioning diagnostic tools that can substantially eliminate initial faults and help new contractors avoid errors.

4. Utility needs are shifting

   - The need and value of HVAC demand response/reduction is expected to increase for future utility planning.[4]
   - Replacement of air conditioners with heat pumps will result in shifting shoulder season heating load to the grid. This will add substantial load during cool but not cold hours in the fall when hydro system may be drier. Heat pumps featuring low load efficient (LLE) performance will be increasingly valuable to utilities.

In response to these key learnings, NEEA refined its program approach to shift the focus away from accelerating heat pump adoption and towards identification and adoption of improvements to residential heat pumps that increase, and can ultimately lock in, greater efficiency for every installed heat pump.

2 - Program Description

2.1 – Market Transformation Theory

Heat pumps operate under, and are impacted by, a complex system (climate, ducts, envelope, installation, controls, operation preferences) and this creates challenges for efficiency. Current efficiency ratings (HSPF, SEER) also do not accurately represent real world efficiency, and there is a general lack of awareness, even among manufacturers, contractors, and efficiency programs regarding which improvements (features, capabilities, rating methods) deliver additional efficiency and comfort. As a result, heat pumps are significantly under-delivering on their promised efficiency, making it harder to meet the region's efficiency goals.

NEEA has identified a set of low- and no-cost improvements that have the potential to meaningfully increase installed heat pump system efficiency.

To address the market's lack of awareness of what delivers efficiency and ability to competitively differentiate advanced heat pumps, NEEA aims to do the following for each improvement:

(1) Validate energy savings and establish metrics to identify qualifying products for each improvement.
(2) Build support among manufacturers and efficiency program partners for incorporating recommended improvements into specs and standards.
(3) Leverage existing training and marketing delivered by manufacturers, distributors and efficiency ~~and decarbonization (where applicable)~~ programs ~~training and marketing to drive contractor and consumer awareness and education,~~ to disseminate improvements to contractors and consumers with contributed content, data, specifications, and information on product identification ~~when identified as an opportunity., resulting in increased availability and adoption of higher efficiency systems.~~

As demand for improved products expands due to awareness, specifications, and standards, we anticipate manufacturers will see competitive advantage in including improvements, resulting in expanded availability, and marketing of the improvements. As adoption of improved products grows,

[4] Pacific Northwest Power Supply Adequacy Assessment for 2027 (nwcouncil.org)

installed systems will deliver greater efficiency regardless of design and installation errors, reducing the likelihood that significant contractor engagement will be needed.

The program's ultimate goal is to promote systems with these improvements in the Northwest so that by 2030, average installed efficiency of residential-size heat pumps is 30% more efficient than 2017 average.

2.2 – Product Definition

NEEA's product definition for this program is heat pumps with both compressors and fans that can vary their speed to meet space heating and cooling demand (two-, or more, speed compressor; multi-speed fans). These heat pumps are available in several system configurations: central forced air, ductless heat pump, whole home multi split, micro heat pumps[5], manufactured home packaged heat pump, packaged terminal heat pumps and dual fuel heat pumps.

This NEEA program will focus on systems that:

- Meet EPA ENERGY STAR v6.1 certification requirements for heat pumps[6]
- Include at least one heat pump improvement (see Improvements table below)

The heat pump improvements are features or capabilities of the products that can save energy, and often also deliver secondary benefits of peak power and/or carbon savings. By choosing a product with these improvements the overall system performance will be improved (not limited to just equipment performance). Most of these improvements are independent of contractor decisions other than simply choosing a product with those features or capabilities. The improvements apply to most but not all of the system configurations described above. The improvements are generally the result of improved controls or data, with minimal hardware requirements and consequently represent low-cost upgrades.

NEEA's efforts at program launch will prioritize products with the low load efficient (LLE) improvement. Additional improvements will follow as validation and differentiation work is completed. The table below lists improvements identified to-date. More improvements may be identified in the future. The program proposes to launch with the validated low load efficient improvement and continue to advance improvements as their metrics are defined and baselines and savings validated.

Improvements	Description
Low Load Efficient	Heat pump operates very efficiently when under mild outdoor conditions
Cold Climate Capable	Heat pump maintains good efficiency above 5°F and is designed with sufficient capacity to avoid use of auxiliary heat when outdoor temperature is above 17°F
Minimize Auxiliary Heat	Heat pump does not use auxiliary heat if the heating load can be met by the heat pump within 60 minutes (this requires soft setback recovery to avoid customer comfort complaints). The heat pump compressor is not locked out above 5°F. Explore minimizing use of unnecessary supplemental heat through Connected Commissioning and CTA-2045B connection in Demand Response improvements.

[5] The term "micro heat pumps" is used here to refer to heat pumps that meet the following criteria:

1. Can operate on a shared 120V 15A circuit – presumably not drawing more than approximately 10A at peak output.
2. Designed for customer installation and does not require professional installation.

Optional features include:

3. Wifi customer interface that manufacturers can use to aggregate operational data. No individual site data would be needed.
4. CTA-2045B interface.

[6] ENERGY STAR Program Requirements for Central Air Source Heat Pumps and Central Air Conditioners

Improvements	Description
Connected Commissioning	Connected commissioning refers to the capability of the heat pump system to use onboard and/or 3rd party probes to guide proper commissioning of a system. Requires product specific information, internet connection and generation of a commissioning report.
No Duct Losses	When to ~~S~~switch~~ing~~ from a central ducted system to a ductless heat pump to eliminate duct losses (only applies to homes where existing ducts are inadequate, leaky and or uninsulated)
Auto Demand Response	CTA 2045-B equipped heat pump automatically enrolls a heat pump into a utility demand response program if present
Adaptive Defrost	Uses onboard sensors and logic to minimize use of defrost energy when not needed
Drain Pan Heater	Uses physical design, onboard sensors, and logic to minimize use of drain pan heater energy when not needed
Standby Losses	Reduced total standby losses
Crankcase Heater	Heat pump crankcase heater use is minimized

2.3 – Market Description

Target Market		
Who Purchases?	Homeowners, residential and small commercial property owners	
Who are the End Users?	Homeowners, residential and small commercial tenants, small-business owners	
Who Influences the Purchase Decision?	Manufacturers, HVAC contractors, Property Managers, federal standards, and federal, state and utility incentive programs	
Market Size		**Data Sources**
Current Market Size	For centrally ducted systems: Approximately 20,000 ducted VSHPs are sold per year with annual growth expected to be 5–13%. Expanded market size for full program target market and product definition will be updated as subsequent improvements are validated and advanced. Preliminary analysis shows that the DHP market could grow from about 60,000 in 2021 to 115,000 in 2042.	2021 BPA Residential HVAC Momentum Savings model, RBSA, HVAC supplier sales data.
Potential of Market	Annual sales of central ducted VSHPs could exceed 100,000 by 2039. This number could double if ACs are replaced by heat pumps. Expanded market potential for full program target market and product definition will be updated as subsequent improvements are validated and advanced when more market information is gathered. Preliminary analysis using the cited data sources suggest the market for VSHPs and DHPs could grow 3-8% annually, from roughly	NEEA staff analysis of 2021 BPA Residential HVAC Momentum Savings model, RBSA, and HVAC supplier sales data.

Target Market		
	80,000 in 2021 to 240,000 in 2042 or from about 40% to 54% of the annual HVAC system sales market.	

2.4 – Next Phase: Primary Intervention Strategies

Primary Intervention Strategies	Barrier(s) or Opportunity(s) being addressed	Desired Outcomes
• Develop and verify metrics to differentiate product performance • Work jointly with manufacturers, trade organizations and efficiency programs to influence specifications, federal test procedure and standards (to adopt metrics, improve test procedure, raise minimum requirements)	• Lack of product differentiation for improvements that impact efficiency and capacity	• Federal test procedure better differentiates efficient products; more stringent federal efficiency standards • Voluntary specification(s) and qualified product lists include validated improvements
• Engage manufacturers, labs, efficiency community to identify and validate potential improvements that deliver efficiency or capacity benefits • Encourage manufacturers to adopt identified improvements • Work collaboratively with manufacturers and leading programs to develop and adopt specification(s) in support of identified improvements	• Lack of product differentiation for improvements that impact efficiency and capacity • Competitive environment leads manufacturers to seek product differentiation opportunities; QPLs & specs enable efficiency differentiation • Many other programs/orgs investing and incenting heat pumps for efficiency, decarb, and capacity	• Voluntary specification(s) and qualified product lists include validated improvements • Manufacturers increasingly produce qualifying products • Increasing market share of qualifying products
• Encourage regional and extra-regional programs to promote qualifying systems with supply chain, customers (training, marketing, incentives) • Encourage manufacturers to, as needed, provide training and marketing	• Lack of awareness of energy efficient features and capabilities and their value propositions • Many other programs/orgs investing and incenting heat pumps for efficiency, decarb, and capacity	• Programs, manufacturers, and influencer orgs (e.g. ACCA) increasingly incorporate improvements into training, education, marketing, and programs

2.5 – Transition Plan (How will we know when we're done?)

The program team will monitor Market Progress Indicators (MPIs) for barrier reduction/removal and market growth that can be sustained without NEEA interventions, leading toward the ultimate impact

indicated in the table below. The program will only track MPIs for improvements once they have been fully vetted through the program's ongoing improvement validation process. MPI tracking will be for each validated improvement separately and thus will be staggered based on the timing of the vetting process. The program will "exit" its work for each improvement once each improvement meets the Exit Criteria below. When there are no longer improvements to support with market interventions, the program will have fully exited the market.

In addition to tracking MPIs, the program's external evaluation will include formative/process evaluation to promote continuous improvement and adaptive management of market interventions to ensure continued diffusion and minimize/eliminate any new barriers that may arise. This, along with the Exit Criteria listed below, will indicate the program is ready for transition to Long Term Monitoring and Tracking (LTMT).

Target Year for Transition to Long-Term Monitoring & Tracking: 2030 for LLE, CCC and test procedure. Other improvements to follow.	
Ultimate Impact	*By 2030, average installed efficiency of residential-size heat pumps is 30% more efficient than 2017 average.*
NEEA's Exit Criteria	NEEA will exit based on indications of sustained market change that will continue without NEEA interventions, as operationalized through the following key MPIs: 1. Rulemaking for a federal test procedure sufficiently differentiates performance of heat pumps with variable speed compressors. (Expected by 2030) 2. The federal minimum efficiency standard for residential heat pumps is 6%[7] more efficient than the 2017 average. (Expected by 2030) 3. Market share grows to at least 30% over baseline with at least three years of a sustained, positive trend. (Expected by 2030 for LLE & CCC. Other improvements to follow beyond 2030.) Importantly, we will measure Exit Criterion #3 separately for *each* improvement, as each has a different baseline market share.

3 – Milestone Decision

3.1 – Program Advancement Criteria

The Program Advancement milestone represents a decision that NEEA has validated that this is a good MT program for the region and the portfolio, we understand the market barriers and there is a viable plan for how to remove those barriers and achieve the identified savings potential. In the Market Development phase, we will implement intervention strategies, evaluate NEEA's influence, and measure market progress. The internal stage gate go/no go criteria for Program Advancement that NEEA uses include:

- Market: There is a clear target market and a compelling value proposition for that market.
- Product: There is a clear product definition and we have met critical product assessment/validation objectives.
- Interventions: We have a viable leverage point for intervening in the market. Interventions are tailored to that market, and we have a solid theory of diffusion.

[7] The program team selected 6% because the last three increases to the standard were 6-10%.

- Energy Savings and Benefit/Cost Analysis: The forecasted energy savings is worth the anticipated cost/effort to intervene in the market, and the benefit cost ratio is above 1.
- Risk: We have addressed the knowledge gaps that were identified as critical to mitigate risk. We have identified any product, market or policy or measurability risks that could prevent success, and the risk mitigation plan is acceptable.
- Portfolio: This program supports short-term and long-term portfolio needs and there are available resources
- Product Group: It aligns with the Product Group strategy and have identified potential opportunities to leverage existing programs/infrastructure.
- Funder coordination: We are aligned with stakeholders on roles, responsibilities, and communications/engagement expectations.

3.2 – What does the transition to Market Development entail?

Transitioning into Market Development will provide stakeholders and market partners with the confidence that NEEA and the region are committed to the long-term success of this market strategy and to investing in its success. This is expected to boost NEEA's success in building collaborative bi-national support and in securing co-funding and market investment in continuing to validate and build broader market support for the improvements.

Moving into Market Development, NEEA can lay out a longer-term roadmap with partners to gain adoption of the improvements in federal standards, ENERGY STAR and CEE criteria, utility and energy efficiency specifications, and the NEEP or other qualified products list.

In the near term, the new program phase will not usher in sudden or dramatic changes to program delivery because of : 1) the years of groundwork already laid by the team to begin building bi-national interest and coalitions; 2) the standards play, which is a central activity for the program, that offers both short and long-term opportunities; and 3) the work already launched to maximize program budget impact by leveraging the opportunity offered by recent federal legislation to invest in heat pumps and residential efficiency.

3.3 - Utility Role

As NEEA focuses its work primarily with manufacturers, federal partners, and bi-national specifications and standards partners, local programs have a very important role in the continued growth of efficient heat pumps in the region with installer and consumer-facing program delivery. Specifically, in existing and ongoing heat pump programs, local programs are encouraged to:

- continue evolving residential heat pump programs to incorporate these advanced heat pump improvements in:
    - qualified product lists
    - system criteria
    - consumer and trade ally education
    - awareness campaigns
- engage local distributors to offer the advanced products with these improvements
- partner on delivering the necessary training and support for these advanced products to succeed in the market

In partnership with NEEA, local programs and alliance members can:

- partner on field studies, pilots, and case studies as new improvements are identified
- work together to support Regional Technical Forum new measure development
- participate in the Advanced Heat Pump Coalition and CEE working groups, and the ACEEE Hot Air Forum and other spaces where these improvements will need voices of support

3.4 – Investment

Proposed Investment for Market Development (Q4 2023 – Q4 2030)	
Activities	Amount (Direct Costs)
Implement program strategies focused on barrier removal and market transformation	$4,510,000 (over 7 years) *Includes $1,450,000 (if Low Load Efficient~~LE~~ only over 3 years)*
Market research and evaluation	$500,000 (over 7 years) *Includes $360,000 (LLE only over 7 years)*
Market Development Total	**$5,010,000**

Total Proposed Program Investment – Direct Costs Only (Full program lifecycle)			
Phase	Investment to Date	Future Estimated Investment	Total
Scanning (2016-2019)	$300,000	$0	$300,000
Concept Assessment (2020)	$128,000	$0	$128,000
Program Development (2021-2023)	$1,023,000	$0	$1,023,000
Market Development (Q4 2023~~4~~- Q4 2030)	**$0**	**$5,010,000**	**$5,010,000**
Long-Term Monitoring and Tracking* (2031-)	$0	$50,000	$50,000
Total Investment	$1,451,000	$5,060,000	$6,511,000
* Includes one year of LTMT costs			

3.5 – Return on Investment

Return on Investment (ROI)/Outcomes			
Program Benefits			
The AHP Program provides several benefits to the alliance: First, NEEA has identified a strategy to deliver significantly increased and cost-effective residential HVAC savings to Northwest consumers and utilities. Second, the program builds binational support for quicker diffusion of improvements and quicker adoption into federal standards and specifications. Third, these additional savings will support regional utilities in meeting both energy and peak power savings goals. Fourth, should the 3 million non-electric heated homes in the Northwest shift to dual-fuel space heating systems, the market impact of this program could more than double.			
Energy Efficiency/Savings: *Below currently reflects estimates for only central ducted low load efficient VSHPs. Future improvements and expanded technologies, which will be evaluated individually, will be additive to these numbers. (see note below)*			
Savings Forecast	**2025 – 2029 LLE only below**	**2030 – 2034 LLE only below**	**20 - Year Total LLE only below**
Total Regional Savings	3 (1–6)	8 (2–18)	35 (9–83)
Co-Created Savings	1 (.1–3)	5 (1–13)	21 (4–54)
Net Market Effects	1 (0.1–2)	2 (.4–7)	11 (2–28)
Current Power Plan Baseline Regional Savings	Low load efficient VSHP measure not included in 2021P baseline; all savings above 2021P baseline.		
Cost Effectiveness: Total Resource Cost Perspective for central ducted low load efficient VSHPs			
	Value	Additional Information (please include source of information)	
Levelized Cost	-27 mills/kWh	ProCost v5.07 analysis of incremental cost and UES data. UES is based on a field-calibrated energy modeling study conducted by MN CEE (2022). Incremental cost is based on a hedonic pricing model using data from online storefronts. Mills/kWh is the metric used by the Regional Technical Forum in their ProCost tool to calculate Benefit Cost Ratio.	

		Negative value indicates the program will generate more benefits/savings than it is expected to cost to start up and maintain the program.
Benefit Cost Ratio	79	~~See above.~~ This value has a lower limit of 0 and an upper limit of 9,999 (imputed for infinity when the cost of the efficient product is lower than the cost of the inefficient alternative.) A typical NEEA program has a BCR of 1-3

Note: This program is comprised of a set of heat pump improvements that apply to a variety of heat pump types. Unit energy savings, market size, and cost effectiveness will be evaluated for each improvement and technology individually as sufficient evidence becomes available and key assumptions are evaluated. Nevertheless, a rough estimate for total program savings can be calculated based on data and methods used to define the market size for ducted low load efficient variable speed heat pumps and early research on unit energy savings for other improvements in ducted and ductless heat pumps. These estimates show program efforts could yield savings between 50 and 150 aMW in total regional savings over the course of 20 years. This assumes 40 to 60 percent of regional product flow (i.e., extrapolated sales) during that period will include one or more improvement—including low load efficiency—above naturally occurring baselines.

3.6 - Portfolio Fit

How does this program fit into the portfolio?	The Advanced Heat Pump Program is an essential contributor to achieving the HVAC Product Group Vision of newly installed systems using an average of 30% less energy by 2030 and halting further increase of regional HVAC load. The program has identified an approach based on NEEA's criteria to capture significant residential HVAC savings with cost effective measures. In addition, the timing of this program launch will enable the alliance to leverage the emerging opportunity of accelerated heat pump adoption brought on by new federal tax credits and rebates.	
How does this program impact portfolio risks? (e.g. measurability, timing of savings)	The program has relatively low portfolio risks. It is based on technologies that are available in the market and interventions that NEEA has deep expertise implementing. Measurability, cost effectiveness, and ramp speed could vary by improvement. For centrally ducted low load efficient VSHPs, measurability and cost effectiveness risks are low. If program interventions achieve intended results, we may observe meaningful increases in market share within five years. While some improvements will have more universal applicability, most will deliver more benefits to climate zones with larger heating loads.	
% of Savings (Cycle 7 Investments)	**5-Year Co-Created Savings** **For central ducted low load efficient only*:** 1% (1 aMW)	**10-Year Co-Created Savings** **For central ducted low load efficient only*:** 1% (6 aMW)
% of Budget (Cycle 7 Electric Portfolio Direct)	TBD – Cycle 7 budget will be approved by Board with 2025-29 Strategic and Business Plan	

* Savings for other improvements and types of AHPs (e.g., ductless) will be estimated when evidence is available and key assumptions are reviewed.

3.7 - Regional Distribution of Potential Metrics

Regional Equity
This is assigned by determining the efficiency opportunity in the target market, by state, and comparing that to NEEA's funding mix. The result should then be adjusted by the initiative team based on the expectation of the long-term impacts of NEEA's intervention in that market.

State-level equity metrics are derived from the regional percentage of residential square feet conditioned by electric heating equipment according to Residential Building Stock Assessment II relative to funder share. There is no evidence to suggest that urban and rural areas would have inequitable access to Market Transformation opportunities and achievements.				
	Index where 1 Indicates Share of Opportunity is Equal to NEEA Funding Share			
By State	ID	MT	OR	WA
	1.01	0.93	1.04	~~1~~0.99
Urban/Rural	Urban		Rural	
	1		1	

4 – Program Risk Summary

Because of anticipated near-term standards and specifications opportunities, as well as the speed of current market changes and opportunities, the proposed program approach targets nearer-term opportunities and applies an iterative process to validate other product improvements as the program matures. For example, while we have strong research, evidence, verification, and market interest for the low load efficiency and cold climate capable improvements, there are still unknowns for those less-developed improvements. Success of the program will also likely rely on building alignment and adoption of these improvements more broadly by utilities outside of the Northwest and by heat pump manufacturers.

The program strategy also does not directly address barriers associated with design and installation practices. NEEA will remain focused upstream and on standards and specifications, leveraging other education and training and allowing utilities to continue leading with their mature consumer and trade ally programs. This decision is based on the feedback NEEA heard from funding stakeholders, as well as market learnings during the Ductless Heat Pump (DHP) Program. NEEA designed a program that aims to lock in savings by pursuing better built-in efficiencies to avoid the savings erosion the region experienced with DHPs. However, NEEA and the alliance will need to monitor remaining field installation savings risks and determine if program strategy requires a pivot.

4.1 – Risk and Response

Risk Event		Probability (H/M/L)	Impact (H/M/L)	Risk Response (Accept, Avoid, Mitigate, Transfer)	Response Plan
"IF" this happens	"THEN" this will occur (impact)				
If data is insufficient to verify baselines, savings estimates, and forecasts of future improvements…	…then those improvements will not advance through the program and overall program savings potential is reduced.	L	H	Accept, Mitigate	Slow down advancement of improvements with insufficient data and continue to advance proven improvements. Allocate additional budget for validation data and field research to supplement data gathered with third parties.
If lack of well-trained labor force leads to poorly installed systems…	…then improvement savings may be drowned out by increased energy	M	M	Mitigate	Reassess NEEA's role in mid- and downstream diffusion strategies. Potentially re-engage with utilities to provide installer training or

	use caused by poor installation quality.				added support for utilities and national partners to disseminate.
If policy drivers and decarbonization requirements support strong market adoption with minimal regard for savings or efficiency …	… then key partners may not be persuaded to adopt improvements into their specifications, metrics, and product listings.	~~L~~ M	H	Mitigate	Develop a Northwest specification or QPL. Increase funding to accelerate clear product differentiation regionally.
If utilities, manufacturers, and other EE market partners do not play desired role in training, education, and promotion of improvements …	…then increasing market share of improvements may not yield expected diffusion or in desired timeline.	M	H	Mitigate	Reassess NEEA's role in mid- and downstream diffusion strategies. Identify opportunities for additional influence in these market streams. Identify additional compelling value propositions for these market partners.
If installers begin adding premium to price of products identified in the market to include efficiency improvements…	…then adoption of more efficient products may slow as products become less affordable to a larger portion of consumers.	H	M	Accept	Monitor market adoption rates and if sales continue but are slow, adjust savings forecasts.
If consumers who install advanced heat pumps continue to use supplemental heating and cooling…	…then estimated savings will be reduced.	H	H	Avoid	Continue to seek new technical solutions to lock out back up heat and manual overrides. Work with utilities, manufacturers, and other national partners to include consumer and contractor education about supplemental heat into their heat pump promotion, education, and training programs.

4.2 – Competitive Landscape

Competitive Landscape				
Competitive Product, Practice or Service	**Commercially available?**	**Comparable Cost**	**Energy Savings**	**Comments/Notes**
Multi-speed air source heat pumps without improvements	Yes	Same	Lower than program products	There are countless 2-, 3- and variable-speed heat pumps on the market today that do not meet the proposed program criteria (EPA ENERGY STAR v6.1 certification requirements for heat

				pumps and do not include the identified improvements) and are not well-differentiated.
Single speed air source heat pumps	Yes	Lower	Lower than program products	Single Speed ASHPs (ssASHPs) are less expensive than multi-speed but are relatively similar to install and maintain. Like any heat pump system, they require additional experience and technical skills compared to a furnace along with an EPA 608 certification to install and service. The main limitations of ssASHPs are that they have substantially reduced heating capacity at low outdoor temperatures and consequently rely on electric resistance heating to meet loads when outdoor temperatures drop below 30-40F. Other limitations include considerably noisier outdoor condenser units and higher levels of refrigerant.
Air conditioner add-on or replacement for furnace	Yes	Lower	Lower than program products	Air conditioner-only add-ons and replacements are lower cost to purchase and install but cost more to operate than multi-speed or variable-speed heat pumps and cannot take advantage of energy and demand savings during heating season.

Memorandum *– Tier 1 - Agenda item*

August 22, 2023

TO: Regional Portfolio Advisory Committee (RPAC)

FROM: Jonathan Belais, Policy Manager
Peter Christeleit, Manager, Natural Gas Portfolio & Strategy
Ryan Brown, Manager, Planning and Analysis

SUBJECT: Update on Active Work Groups

Our Ask of You:

This is an informational update. Please come with any questions you may have about these work groups. Each work group owner will provide a quick overview during our Q3 meeting.

Brief Overview:

(1) RPAC Federal Funding Work Group

This work group was formed in Q2 of 2023 to share information regarding upcoming federal opportunities flowing from the Infrastructure Investment and Jobs Act (IIJA) and the Inflation Reduction Act (IRA) and coordinate activities where possible.

Following its first meeting in May, the work group identified some priority topics for future discussion, including workforce issues related to the new federal opportunities and coordination of messaging to customers. The work group has two meetings scheduled for Q3. In August, the group will convene to discuss workforce, and the group will reconvene in September to discuss the recently released DOE guidelines for state-run home rebate programs.

Please contact me at JBelais@neea.org if you have questions about the RPAC Federal Funding Work Group.

(2) NGAC Dual Fuel Product Work Group

This group was formed in Q2 and met for the first time in July. It was formed to share insights and coordinate efforts, with the ultimate goal of accelerating dual fuel adoption within the region. We envision the work group discussions will inform dual fuel programs and market transformation within the region, reduce duplication of efforts, and better steward ratepayer funds.

Key objectives of the group include:

1. High-level awareness in product and market explorations within region.
2. Well-coordinated activities and investments among regional stakeholders (well-planned use of regional ratepayer funds, avoidance of duplication, etc.).
3. Aware of relevant extra-regional work and insights.
4. Identify methods of staying coordinated beyond meetings in work group.
5. Develop initial vision for alliance engagement in dual fuel in the Northwest.

Please contact me at PChristeleit@neea.org if you have questions about the NGAC Dual Fuel Product Work Group.

(3) CEAC Dual Fuel Measurement Work Group

NEEA has proposed forming a Cost Effectiveness Advisory Committee (CEAC)-based workgroup to collaboratively develop guidelines for NEEA to use when calculating and reporting on savings, efficiency, peak reduction, and carbon emissions resulting from a dual fuel program. These guidelines would be used for NEEA's regional work only.

This group is still in the early stages of establishing membership and scheduling a kickoff meeting for Q3 2023. To balance the high level of interest in this group and NEEA's need to keep the meetings efficient and manageable, we will be restricting direct membership in the workgroup to approximately 15 people, but circulating all draft guidelines that are developed to a much broader group of interested stakeholders for feedback, questions and input.

Please contact me at RBrown@neea.org if you have questions about the CEAC Dual Fuel Measurement Work Group.

Memorandum – *Informational item*

August 22, 2023

TO: Regional Portfolio Advisory Committee (RPAC)

FROM: Britt Cutsforth Dawkins, Manager, Program Marketing Strategy

SUBJECT: Updated Timing for Proposed HPWH Consumer Consideration Campaign

Our Ask of You:

The timing for the proposed heat pump water heater (HPWH) marketing campaign changed from what was presented in the Q2 May RPAC meeting. Please review the overview below and plan to attend the October 26 RPAC/RPAC+ meeting for detail on the proposed campaign.

Overview:

Per the 2023 HPWH Operations Plan, the Program's primary focus is on the supply side. We're working with distributors and installers to increase their preference for HPWHs and drive midstream adoption. To ensure the Program is simultaneously continuing to move consumers along their journey and ultimately drive long-term downstream demand for HPWHs, we recommend running a small-scale consumer consideration campaign.

Consumer awareness of HPWHs has grown significantly in the Northwest, increasing from 28% in 2016 to 57% in 2021, and findings from the 2022 Boring But Efficient post-campaign survey indicate the campaign increased rural awareness by approximately 20%. Consumer interest is growing, as indicated by the positive response to the Boring But Efficient campaign, and this interest is expected to continue to grow given the federal tax credits and incentives offered for HPWHs.

The purpose of this campaign is to take advantage of this current momentum and move these consumers from their current understanding of HPWHs (the *awareness phase*) to the next step (the *consideration phase*). This is necessary to ensure these consumers are aware of the value proposition and proactively ask for a HPWH when they need to replace their existing water heater (the *conversion phase*).

Given the Hot Water Solutions website is undergoing updates and will relaunch in Q1 2024, the proposed campaign would run in Q2 2024. This allows us to drive traffic to the new campaign landing page.

Next Steps:

Plan to attend the October 26 RPAC/RPAC+ meeting to review the proposed campaign, with time allowed for comments and revisions. The final RPAC+ vote will be held in the Q1 2024 RPAC meeting.

Note that the 2024 Marketing Calendar will also be shared in Q4 2023. Please contact Britt Cutsforth Dawkins (bdawkins@neea.org) if you have questions about the proposed HPWH Consumer Consideration Campaign or other alliance program marketing efforts.

Memorandum – *Informational item*

August 22, 2023

TO: Regional Portfolio Advisory Committee (RPAC)

FROM: Mark Rehley, Director Codes, Standard, New Construction, and Emerging Technology

SUBJECT: Manufactured Homes Update

Overview:

At the May 18, 2023 RPAC meeting, we reviewed NEEA's manufactured home program and the status of Federal standards. Since that meeting, the Department of Energy (DOE) delayed the effective date for the Federal standard and Housing and Urban Development (HUD) code until July 2025. Despite this two-year delay, it appears that ENERGY STAR and DOE's Zero Energy Ready Home Program are continuing with their plans to increase the stringency of their specifications. NEEA staff are continuing to work with DOE, ENERGY STAR, and the Northwest Energy Efficient Manufactured Homes Program to navigate the impacts to the Northwest from these changes to the voluntary specifications and standards / code.

We plan to bring an update to RPAC in Q4 or Q1 2024 once we have more clarity on these changes. In the meantime, please don't hesitate to contact me with any questions or concerns.

Please contact Mark Rehley if you have questions about the **NEEA's manufactured home program or the status of the Federal standard.**

Memorandum – *Informational Update*

August 22, 2023

TO: Regional Portfolio Advisory Committee (RPAC)

FROM: Alisyn Maggiora, Sr. Stakeholder Relations Manager
Anouksha Gardner, Stakeholder Relations Manager
Jonathan Belais, Policy Manager & CEAC Meeting Facilitator

SUBJECT: Update on recent Committee Meetings (Q2 and/or Q3 2023)

Our Ask of You:
Please review the memo and bring any questions, recommendations, feedback, or concerns to the Q3 RPAC meeting, or contact NEEA staff listed below.

Integrated Systems Coordinating Committee (ISCC):

The Integrated Systems Coordinating Committee uses an annual planning process to co-create high priority regional topics for each program in NEEA's Integrated Systems portfolio [Variable Speed Heat Pumps (VSHP), Luminaire Level Lighting Controls (LLLC), High-Performance HVAC, High-Performance Windows, and Better Bricks]. This year's co-created regional priority topics are listed in the ISCC 2023 Workplan.

In the Q3 meeting (August 14), Committee stakeholders and NEEA staff shared out on program, regional, and/or organizational updates. The High-Performance HVAC regional priority topic was postponed due to stakeholder availability and capacity. The meeting also had a discussion around the 2024 annual planning process and the format of the Q4 meeting. See Q3 2023 ISCC Agenda Packet and slides for detail.

Please contact Stephanie Quinn or Anouksha Gardner with questions about the ISCC.

Products Coordinating Committee (PCC):

As with ISCC, the Products Coordinating Committee uses an annual planning process to co-create high priority, regional topics for each program in NEEA's Products portfolio [Heat Pump Water Heaters (HPWH), Consumer Products/Retail Product Portfolio (RPP), Extended Motor Products (XMP) Pumps & Circulators, and Efficient Fans]. This year's co-created regional priority topics are listed in the PCC 2023 Workplan.

In Q3 (August 17), the PCC focused on the following, which was identified by committee members as a regional priority topic for 2023: *Consumer Products: Sales Data & Equity.* Committee members whose organizations are actively targeting, or planning to target, specific customer groups/segments (e.g. low income) shared highlights from their efforts. NEEA staff then provided an overview of ENERGY STAR activities around affordability, a few retailer data insights between rural and urban areas, and a short overview of the latest window A/C & micro heat pump technologies available that could help address affordability challenges. Committee members and NEEA Program Managers also shared out on current program highlights and other organizational updates. The committee also discussed the 2024 annual topic planning process and expect to use part of the Q4 meeting for that purpose. See Q3 2023 PCC Agenda Packet and slides for detail.

Please contact Stephanie Quinn or Alisyn Maggiora with questions about the PCC.

Regional Emerging Technology Advisory Committee (RETAC)

At RETAC's Q2 meeting, Tim Minezaki with Energy Solutions presented on California's CalNEXT electric emerging technology program. Tim provided an overview of the California emerging technology landscape, their scanning and screening process, their technology priorities, current projects, and opportunities for partnerships and coordination. The committee had a good discussion on these technologies and other potential opportunities for collaboration. Following this, Suzanne Frew from Snohomish County PUD presented on their efforts around smart energy and load flex, microgrid, and EV integration. Lastly, NEEA staff shared updates on 2023 scanning priorities, emphasizing dual-fuel pilot efforts by Energy Trust and Puget Sound Energy. Q2 2023 RETAC Meeting notes.

To view the Product Council schedule and recordings of previous meetings, or to submit requests for product councils, visit neea.org.

The agenda for RETAC's Q3 meeting (September 21) will include a presentation by EPRI on several aspects of their work including industrial heat pumps, end use load flexibility, and an overview of the CalFLEX Hub. NEEA staff will also provide a brief overview of residential heat pump efforts including micro heat pumps.

Please contact Eric Olson or Alisyn Maggiora with any questions about RETAC.

Cost-Effectiveness Advisory Committee (CEAC)

During the Q2 meeting on April 27, 2023, NEEA staff reviewed and answered questions regarding activities highlighted in the quarterly MRE newsletter. Staff then provided an overview of key portfolio metrics from 2022 and updates to key assumptions. To provide additional context for annual reporting, the meeting concluded with a review of key market stories from 2022.

The Q3 CEAC Meeting, scheduled for August 24, 2023, will include a review of available cost-effectiveness and savings data for Advanced Heat Pumps. The committee will also receive a brief recap of the recently published Assessment of NEEA's Approach to the Evaluation of Market Transformation Programs. Staff will provide updates and answer questions on market research and evaluation work in progress, the development of a Dual Fuel Measurement and Reporting Work Group, and updated key assumptions used in NEEA's planning and reporting.

Please contact Stephanie Rider or Jonathan Belais if you have questions about CEAC.