



Regional Technical Forum

**November 7, 2023
Meeting Minutes**

Welcome, Agenda Review, and Meeting Minutes

Jennifer Light, RTF Chair, began the meeting at 9:00am by calling for introductions. She counted 23 voting members. Eric Miller, independent, moved to adopt the day's agenda. Sam Rosenberg, PNNL, seconded. The agenda was adopted unanimously.

Rebecca Blanton, independent, moved to approve the minutes from the October 17, 2023 meeting. Jackie Goss, Energy Trust of Oregon, seconded. The minutes were approved unanimously.

Light took a moment to remember Dr. Tina Jayaweera, NWPC. Many people spoke about her sharp, critical mind, her brilliant and inciteful support, her silly socks, and nerdy sense of humor. All agreed on the size and scope of this loss.

Management Updates

Laura Thomas, RTF Manager [Presentation](#)

Staff provided an update on the upcoming RTF meeting topics and subcommittee meetings, as well as noting the recently released RFPs.

There was no discussion.

New Measure Proposals

Ryan Firestone, RTF Contract Analyst (CAT) [Presentation](#)

Staff presented on new measure proposals for cool roofs, all-in-one clothes washer and heat pump dryer, linear fluorescent buybacks, and hydronic additives. The RTF provided feedback that for all-in-one clothes washers/dryers that there are programs that could benefit from either guidance, or the measure update being moved earlier than 2025. The RTF Manager will consider this in the timeline of measure updates. The RTF approved staff's recommendation to allocate resources to further explore all-in-one clothes washer/dryers and linear fluorescent buyback and not allocate resources to cool roofs or hydronic additives.

Andrew Grant, Cadmus, asked if the model accounts for snow on the roof [Slide 8].

- Ryan Firestone, RTF CAT: I don't think so.
- Christian Douglass, RTF CAT: I don't think the model takes snow cover and reflectance on the roof into account.

- Grant: So, we may be overestimating the winter impact.

Dave Baylon, independent, confirmed that [Slide 17] says we don't need to do anything because we're already covering the savings for this product?

- Firestone: Yes.
- Baylon: Cost-effectiveness could be a big deal. It's hard to analyze in multifamily settings where the product brings some construction benefits. It would need a lot of work to better understand the cost implications. Does that matter in the near term?
- Firestone: We're not considering construction benefits. We're just looking at the appliance itself and asking what it competes with. In the current analysis, the competition group is standard washers and dryers.

Light reminded the room that today's main decision is about allocating time to explore this further. She said in this case, the CAT is proposing 'yes, in the course of the next washer/dryer measure update.' Light stated that precisely what form that analysis takes should come later.

- Mark Rehley, NEEA: I support the staff recommendation to look further into this. We should be strategic though. I think this combo product, and some related technologies like ultrasonic drying, will lead to big market transformations in the next several years.
- Kevin Watier, Snohomish County PUD: I support the recommendation too. But utilities would benefit from guidance on how the existing analysis might be used before the 2025 scheduled update.
- Firestone: I think we'd need more RTF discussion on the savings logic.
- Light: Thomas has discretion to shift the timing of measure updates. It could also make sense for her to find time to work out some program guidance before the full update.
- Watier: I think the humidity issue is resolved, so a lot of the work may already be done.
- Baylon: Perhaps the CAT could put together an interim savings calculation.
- Light: Thomas can look into finding a good time for that.

Baylon said [Slide 22] reminds him of the old refrigerator recycling programs. He said that time the RTF looked at these considerations and came up with a watered down any-any-any measure. Baylon thought that this was similar and would require a lot of utility intervention to identify actual savings opportunities.

- Nick O'Neil, Energy 350: I agree. This seems more like program design than measure development. The RTF should spend time on this in subcommittee to create clearer guardrails for program design and measure definition.

Rehley voiced confusion over the experimental design as most of the treatments in the studies NEEA looked at included a complete system flush at the time of applying the additive [Slide 27]. He said this made it impossible to separate out the effect of the additive from the effect of system maintenance. Rehley thought that future researchers should address this for more compelling results.

MOTION

Light addressed O'Neil's earlier point, referencing the Linear Fluorescent buyback. She asked programs to speak up about what program design they'd be interested in upfront to avoid chasing our tails in research.

I, David Baylon, move the RTF Allocate resource to further explore: Heat Pump Combination Washer Dryers and Linear Fluorescent Buyback. The RTF should not allocate resources to Cool Roofs or Hydronic Additives.

Watier seconded.

Vote on the Motion. The Motion carries. (21 yes, 0 no, 0 abstain)

BREAK

New Measure: Packaged Terminal Heat Pumps for Lodging and Residential Care

David Bopp, RTF CAT [Presentation](#)

Staff presented details on a new UES measure for packaged terminal heat pumps for lodging and residential care. The RTF discussed the impact of door leakage in both lodging and residential care, adding a pre-conditions baseline, areas of uncertainty such as lock out temperatures, and compared how the measure compared to the RTF's PTHP Multi-family measure. The RTF adopted the measure as presented and develop a retrofit baseline version for future presentation and set the sunset date to March 2027.

Pace Goodman, Illume Advising, asked if a PTAC requires a condensate drain [Slide 8].

- Bopp: No, the PTAC uses a slinger ring which can throw the condensation outward. This wouldn't work in the winter because the moisture wouldn't evaporate. So, the condensate drain is only needed for the PTHP.

Baylon asked about the assumption of not replacing on burnout, adding that this doesn't make sense in this market [Slide 10].

- Light: We are proposing this as a replace on burnout.
- Baylon: Oh, OK. So, this is just what will happen as you put new ones in. The only data we have on the market is from 20 years ago?
- Bopp: Correct.
- Baylon: Don't we think there have been changes in the market in the last 20 years? You should check that. It's a big factor.
- Bopp: I agree. It's in our proposed research strategy. But I haven't been able to find any more data.
- Baylon: What about the CBSA?
- Bopp: We could see how many buildings had a PTAC versus a PTHP, but that doesn't tell us anything about sales.
- Baylon: The nice thing about this technology is that it breaks within 10 years. So, everything in the 2020 CBSA would be newer than the data you're using.

Light suggested putting a pin in this conversation for now. She suggested that the RTF accept this or give the CAT guidance to do more.

- O'Neil: We looked at the CBSA when we did work for BPA. CBSA 2014 tracked this, but I don't think all the PTHP were categorized correctly. From that analysis, we estimated 26% PTHP, but with a lot of uncertainty.
- Baylon: No other CBSA has picked this up? At least a picture of the tag on the machine?
- O'Neil: You could maybe do that. It'd be a lot of work.
- Light: I'm putting this in the parking lot.

Baylon confirmed that the monitored units on [Slide 15] were in unoccupied rooms and not touched by staff.

- Bopp: That's right. Staff weren't changing settings. The units were turned on and left on.

Jamie Anthony, BPA, addressed ventilation on [Slide 20], noting that the equipment is similar to DOAS. He asked if this includes heat recovery ventilation.

- Bopp: No, just conditioning.
- Anthony: Then the effect should be similar to other conditioning sources. The ventilation air needs to be conditioned somewhere.
- Bopp: Yes, the distinction is that the ventilation air is conditioned at point of intake, not by the PTAC.
- Anthony: I don't like that. It doesn't sound quite right.
- Bopp: The models pressurized corridors. That ventilated air is conditioned and pushed into the rooms.
- Anthony: We found that savings don't look that good until you consider the high ventilation load that the PTAC might be conditioning.
- Bopp: I have more slides on this topic later.

Baylon insisted that the code is explicit on not allowing a lot of leakage as the door serves as a one-hour firewall. He stated that this assumption ignores that and removes the weather stripping, which wouldn't meet code that has been in place for at least 25 years. Baylon conceded that code doesn't always stay followed and you do see a lot of leakage between corridors and rooms. He concluded by saying it may be the current practice, even if it's not to code.

- Light: The concern I'm hearing from you and Anthony is around how we handled leakage from main corridor. I'm putting it in the parking lot.

Goss asked if the model was for motels or hotels. She said motels rooms open to the outdoors and not to corridors, so leakage wouldn't be an issue.

- Bopp: No, we don't have a separate model for motels. Just the small hotel.
- Light: Keep in mind that we're proposing this as Planning. Are there things we can adjust today to get comfortable with this as a Planning measure?

O'Neil asked about the negative fan savings over the PTAC [Slide 25].

- Bopp: I'm assuming PTHP has longer run times because lower heat temperature means longer fan run time. We would need to dig into the models to answer this.

Baylon asked about the cooling savings and if we are expecting a better EER in the PTHP.

- Bopp: We're expecting the EER value to be higher. But we don't know this from market data. We suspect there's a lot of uncertainty in the cooling savings estimates.
- Baylon: I agree. Also, why are there half the savings in HZ1, but there is no difference between HZ2 or HZ3?
- Bopp: We have nine representative cities. All three cities in each cooling zone fall within the range of CDD, but they're not the same.
- Baylon: And this can lead to a factor-of-two difference in load?
- Bopp: We haven't done enough digging to fully answer that, but these are the results we got using our nine climate zones.

O'Neil addressed the false ventilation load [Slide 29] saying it seems like something is off with the large increase in ventilation and no corresponding increase in heating load. He suggested digging into the models to see what's happening. O'Neil then wondered if auto sizing was throwing things off.

- Bopp: I looked at the higher ventilation runs, and most rooms still only needed one unit.
- O'Neil: The units only put out 350 CFM max. Is that within the realm of the airflow results you got in the model?
- Bopp: I don't have more detail on how the model handles unconditioned ventilation air.
- O'Neil: That's the one thing we found that drove savings in our analysis.
- Paul Sklar, RTF CAT: We picked a pretty extreme case. The savings didn't go up as high as you'd expect with so much outside air and it's hard to tell why. We had both the electric resistance backup and compressor running at the same time. That could be why the high infiltration case didn't see as much savings as you'd expect, as the resistance could be running a lot.

Sarah Widder, Cadeo, respected that this was the best staff could do with the time and resources on hand, but pointed to a lot of gaps in our knowledge. When contemplating if this is good enough, she wanted to know if the CAT compared these model results to existing data and if so, what were the conclusions. Widder wondered if they are in the ballpark, or if the numbers were expected pointing to [Slide 28] as example.

- Bopp: These are engineering estimates from other entities. Some used unrealistically high COPs, like 3.5. Given the products available, those estimates seemed high.
- Widder: So, you're saying we might not be getting the modeling right, but the results feel like they're in the ballpark?
- Bopp: Yes.

Anthony asked how it works when the compressor switches to electric resistance.

- Bopp: It's electric resistance when the temperature is below 40°F. Anything above engages the heat pump.

- Anthony: We let our compressor work at lower temperatures. That helps explain BPA's higher estimates. There are a lot of hours between 32°F and 40°F to get savings.
- Bopp: The majority of products default to compressor cutoff at 40°F unless you have built-in active defrost. We don't think active defrost products are that common in the market, but you might see higher savings if they are.

Christopher Dymond, NEEA, thought there should be room in the future to look for PTHPs that have defrost and operate at colder temperatures.

- Bopp: Our research strategy acknowledges that programs could propose a more efficient spec and collect data to support it.

Watier asked if the residential care group is senior care facilities [Slide 42]. If so, he thought the heating setpoints were off. He also questioned the spec of doors normally remaining open, as his experience showed that doors are not open unless there's a medical situation.

- Bopp: This also applies to dorms, barracks, and a wide range of facilities. But the Research Strategy calls for categorizing buildings more granularly. Regarding temperature setpoints, we all thought it should be warmer, but the one datapoint we have didn't show that.
- Sklar: We used the CBSA definition of residential care, which includes barracks and dormitories.

Baylon pointed to differences in building a PTHP, including adding a reversing valve [Slide 45]. He said a reversing valve is more than \$40, and NYSERDA thinks it would be about \$80.

- Bopp: That's right. We estimate about \$70+, but there's a current practice adjustment of about 50%.
- Baylon: I don't have data on hand, but my recollection is that these numbers should be about three times higher.
- Bopp: The data we have is from regional programs in the past three years.

Watier asked if lodging is replaced on burnout or during an interior update [Slide 46]. He thought burnout suggests a longer lifetime.

- Bopp: Current practice would cover both. We used the feedback that DOE received that said, in general, these units go in during renovation cycles.

Baylon said that earlier, it looked like the PTHP had a better EER than the PTAC [Slide 48]. He then said the savings shape seems to indicate that you don't see cooling savings.

- Bopp: The graph on the left shows AC savings.
- Baylon: Residential care doesn't show this [Slide 49].
- Bopp: Yes, AC savings are much smaller in residential care than in lodging.
- Baylon: That assumes not much cooling load there. Is that because of extra ventilation?
- Bopp: Yes, that's the hypothesis. The corridor is providing the cooling.

Parking Lot

O'Neil stated that the 2019 CBSA did look at PTHP/PTAC [Slide 56]. He said CBSA lodging found 41 sites with a PTHP or PTAC. He said lodging had a lower share of PTHP, while residential care had about 65% PTAC. O'Neil said he supervised these audits and knows they are not always perfect. However, he thought they might be better estimates of current practice.

Eric Mullendore, BPA, discussed the decision to assume market baseline, saying BPA has promoted this measure over last few years and seems to have engaged customers to replace equipment when they weren't planning to in order to achieve efficiency.

- Bopp: Our decision was based on DOE assumptions about renovation lifecycles, relatively low savings numbers, and short lifetime. We didn't think people would choose to upgrade ahead of time. If this is occurring, we could develop a separate baseline.
- Light: We haven't heard interest from programs in a retrofit program until now. We could come back with that if programs wanted it. The pieces are there, we'd just need to add delivery verification and add it to the spec.
- Mullendore: I think that this would be useful. Programs would need to verify that existing equipment had remaining useful life.

Widder recalled Multi-family PTHP using a preconditions baseline.

- Bopp: That's right.
- Widder: I haven't looked back at how we approached that measure. Did you look at that project when doing this one? Can you speak to consistencies between the analyses?
- Bopp: We did take lessons learned into consideration.
- Widder: Multi-family savings looked higher. Is that current practice or a pre-conditions baseline? You've spent a lot of time and effort on this, but if there's a desire for another measure, I like the idea of aligning with the Multi-family measure. 2027 is pretty far off for that. Maybe we could align everything in two to three years, instead of four.
- Light: Multi-family uses residential models, not ModelKit. There are different assumptions on hours. I don't think the models are misaligned, so I'm not sure we'd change anything when we update them.
- Widder: OK.

Light addressed current practice, saying we could use CBSA 2019 for current practice instead of what we've done.

- Anthony: I'm interested in the CBSA data.
- Mitt Jones, Cadmus Group: The CBSA makes it difficult to discern PTAC from PTHP. I'd recommend going back and looking up model numbers to confirm.
- Goss: CBSA would include older buildings that aren't subjected to newer codes.

Light thought the RTF had the elements for pre-conditions and recommended that the motion include CAT developing a retrofit application.

- Language was added to the motion.

Jerome wondered if measure wording should be more specific than "Commercial PTHP."

- Bopp: Our measure identifiers cover this.

- Jerome: OK, that makes sense. We could have new applications come along and we wouldn't want to have to change the name.

MOTION

I, Eric Miller, move the RTF adopt the Commercial PTHP UES as presented and: Develop a retrofit baseline version for future presentation, Set the Category to Planning, Set the Status to Active, Set the sunset day to March 31, 2027.

Mullendore seconded.

Vote for the motion. The motion carries. (16 yes, 3 no, 2 abstain)

Light ended the meeting at 12:30.

Voting Record: November 7, 2023

Motion Language	Yea	Nea	Abs	Motion Passes?	Percent of Yea Votes		Number of Voting Members Present
					RTF Voting Members (40% min)	Members Voting (60% min)	
Motion: Approve the minutes from the October 17 meeting (Blanton/Goss)	25	0	0	Yes	83%	100%	25
Motion: Approve the agenda for November 7 meeting as posted (Miller/Rosenburg)	25	0	0	Yes	83%	100%	25
Motion: Allocate resources to further explore: -Heat Pump Combination Washer Dryers -Linear Fluorescent Buyback Do not allocate resources to: -Cool Roofs -Hydronic Additives (Baylon/Watier)	21	0	0	Yes	70%	100%	21
Motion: Adopt the Commercial PTHP UES as presented and -Develop a retrofit baseline version for future presentation -Set the Status to Active -Set the Category to Planning -Set the sunset date to March 31, 2027 (Miller/Mullendore)	16	3	2	Yes	53%	84%	21

November 7, 2023, Meeting Attendance

* Designates Voting Member

Name	Affiliation
Jamie Anthony*	BPA
Rich Arneson	Tacoma Power
Clifford Babson	Energy Solutions
David Baylon*	Independent
Meghan Been	NEES
Rebecca Blanton*	Independent
David Bopp	RTF Contract Analyst
Greg Brown	RTF Contract Analyst
Anne Brink	NEEA
Nate Collins	TRC Companies
Bill Crabtree	BPA
Jeff Cropp	Cadmus Group
Christian Douglass	RTF Contract Analyst
Logan Douglass	Ptarmigan Consulting
Rick Dunn	NEEA
Christopher Dymond	NEEA
Faith Evren	PNNL
Joseph Fernandi*	Seattle City Light
Ryan Firestone	RTF Contract Analyst
Trevor Frick	Clark PUD
Kevin Geraghty*	independent
Pace Goodman*	Illume Advising
Jackie Goss*	Energy Trust of Oregon
Andrew Grant	Cadmus Group
Adam Hadley	Hadley Energy
Brandon Hines	TRC Companies
Mark Jerome*	CLEAResult
Mitt Jones*	Cadmus Group
Phillip Kelsven*	BPA
Rick Knori*	Lower Valley Electric
Mark Lenssen*	PSE
Jennifer Light*	RTF Chair
Ben Mabee	BPA
Eric Miller*	Benton REA
Eric Mullendore*	BPA

Andi Nix	Energy Trust of Oregon
Alex Novie*	Energy Trust
Nick O'Neil*	Energy 350
Brian Owens*	CLEAResult
Wendy Preiser	NEEA
Joe Prijyanonda	Applied Energy Group
Laney Ralph*	NW Natural
Mark Rehley*	NEEA
Samuel Rosenberg*	PNNL
Josh Rushton	RTF Contract Analyst
Aven Satre-Meloy	LBNL
Halle Senger	Applied Energy Group
Paul Sklar	RTF Contract Analyst
Kevin Smit	NWPCC
John Stalnaker	BPA
Allegra Steenson	PNNL
Laura Thomas	RTF Manager
Michelle Wildie	PSE
Kevin Watier*	Snohomish PUD
Jim White*	Chelan County PUD
Sarah Widder*	Cadeo Group
Kathy Yi*	Idaho Power