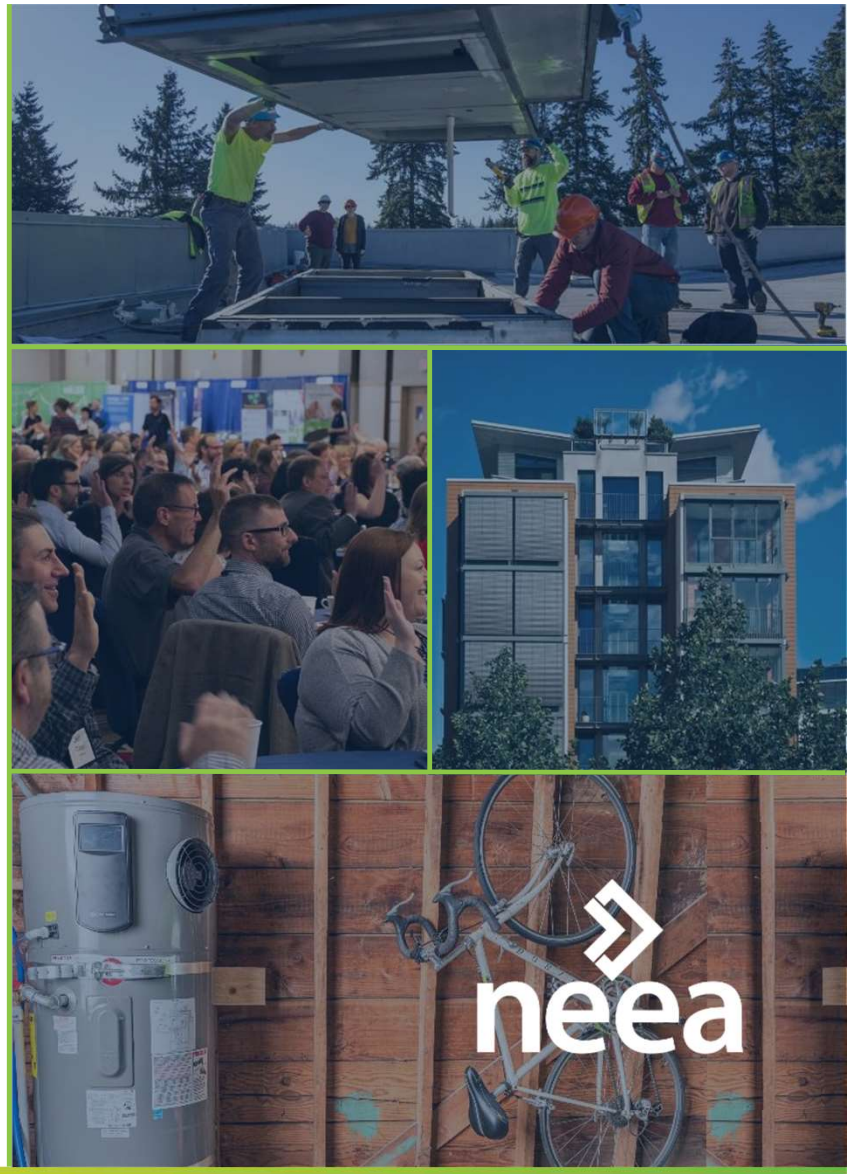
Products Coordinating Committee

Q2 2024 Meeting

Day 2
Tuesday June 25, 2024
9:30am, Pacific Time



This meeting will be recorded and transcribed

WELCOME Back!

AGENDA

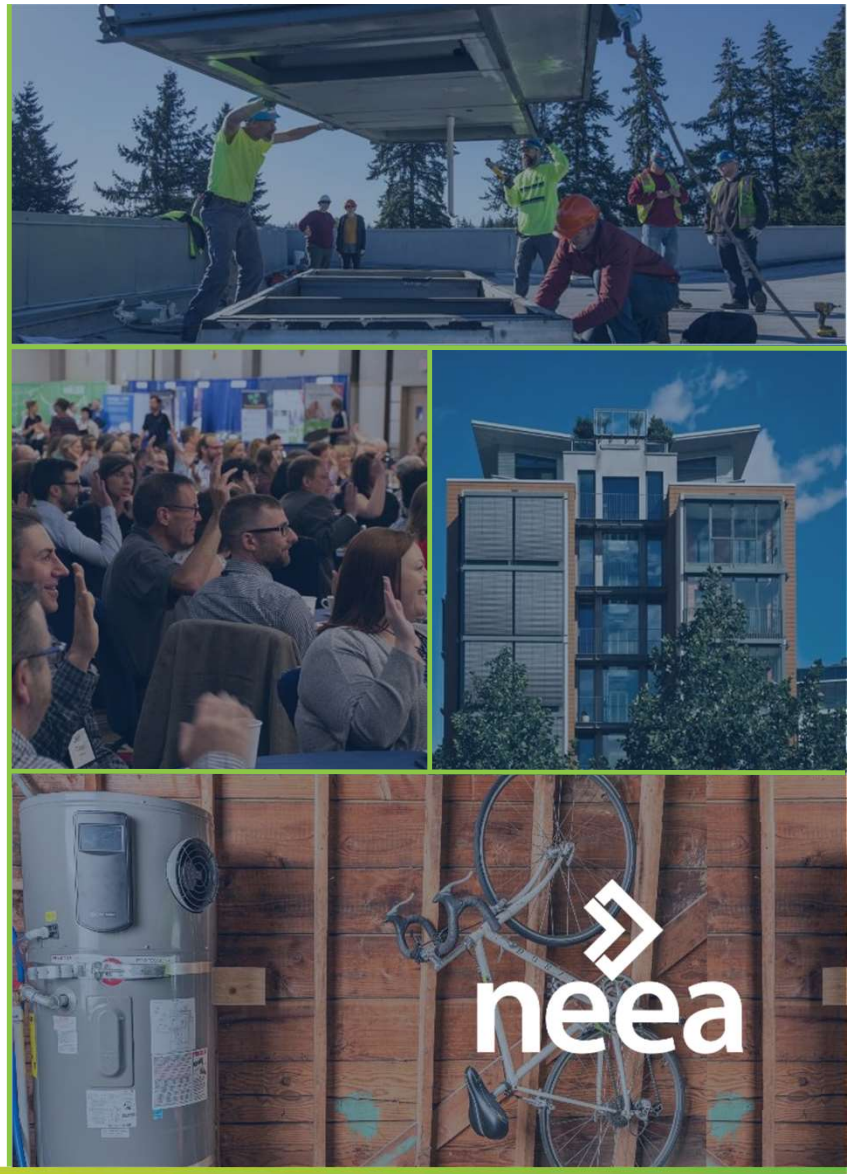
All times Pacific

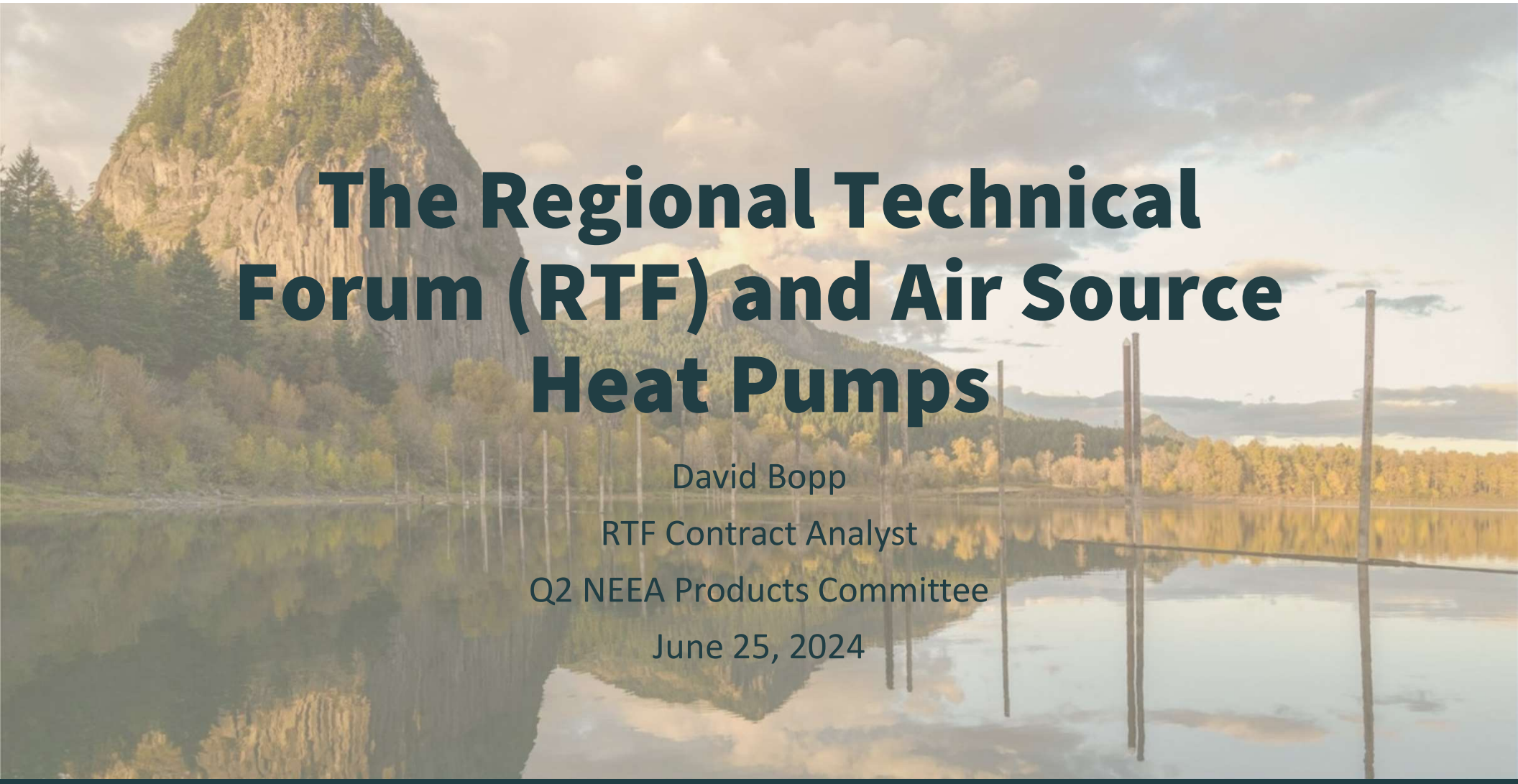
9:30 - 9:45 am (15 mins)	**Welcome**
9:45 – 11:15 am (90 mins)	**Regional Priority Topic** **Advanced Heat Pumps -** *Heat Pump Measure Development Updates by Regional Technical Forum (RTF)*
11:15 – 11:25 am	***BREAK***
11:25 – 11:30 am (5 mins)	**Q3 Topic Check In** • **Heat Pump Water Heater** • **Any additional relevant topics**
11:30 – 11:50 am (20 mins)	**Coordinating Committee Assessment**
11:50 – 12:00 pm (10 mins)	**Housekeeping** • Announcements & Upcoming Meetings/Events
12:00 – 12:05 pm (5 mins)	**Recap, Next Steps, Adjourn**

Regional Technical Forum Measure Updates

David Bopp; boppda@gmail.com

Laura Thomas; lthomas@nwcouncil.org





The Regional Technical Forum (RTF) and Air Source Heat Pumps

David Bopp

RTF Contract Analyst

Q2 NEEA Products Committee

June 25, 2024

Regional Technical Forum

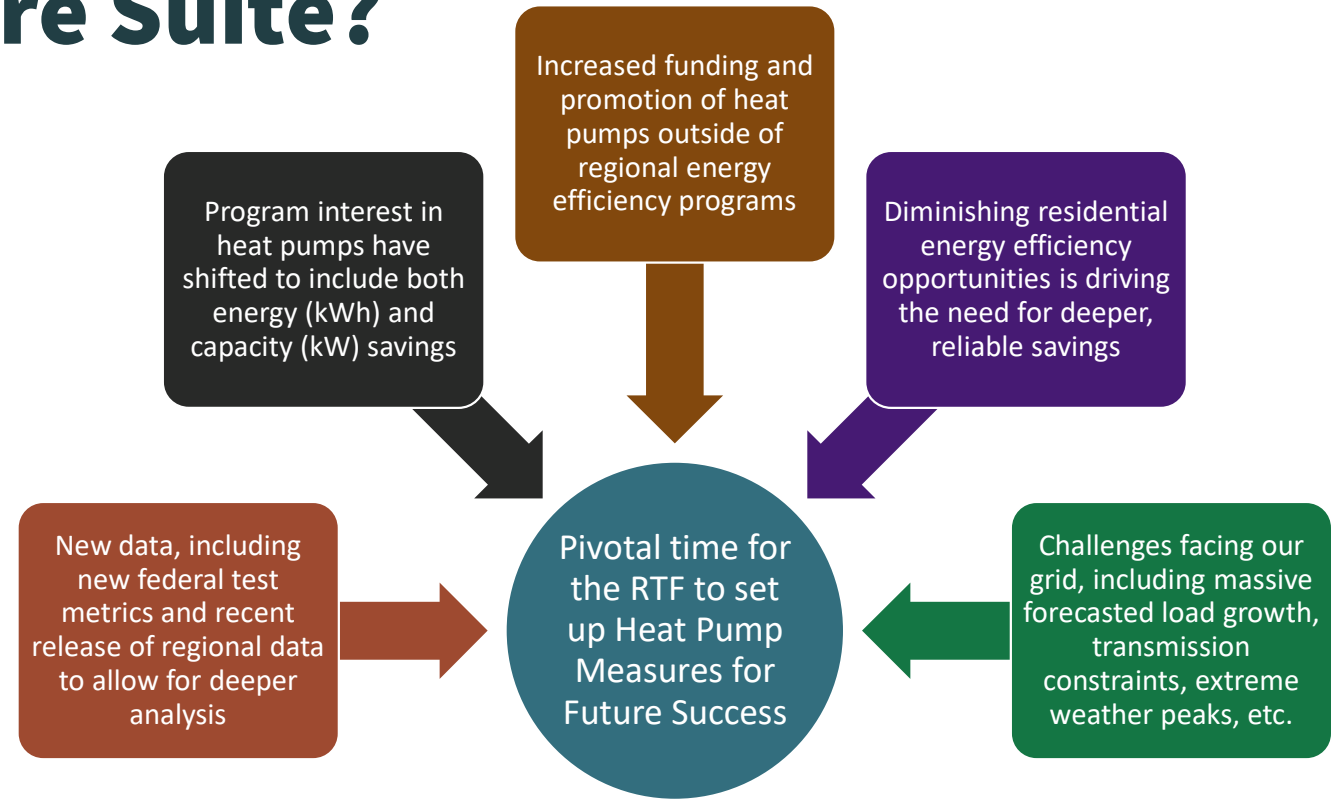
Presentation Overview

Today, we will present the current plans for the RTF concerning air source heat pumps:

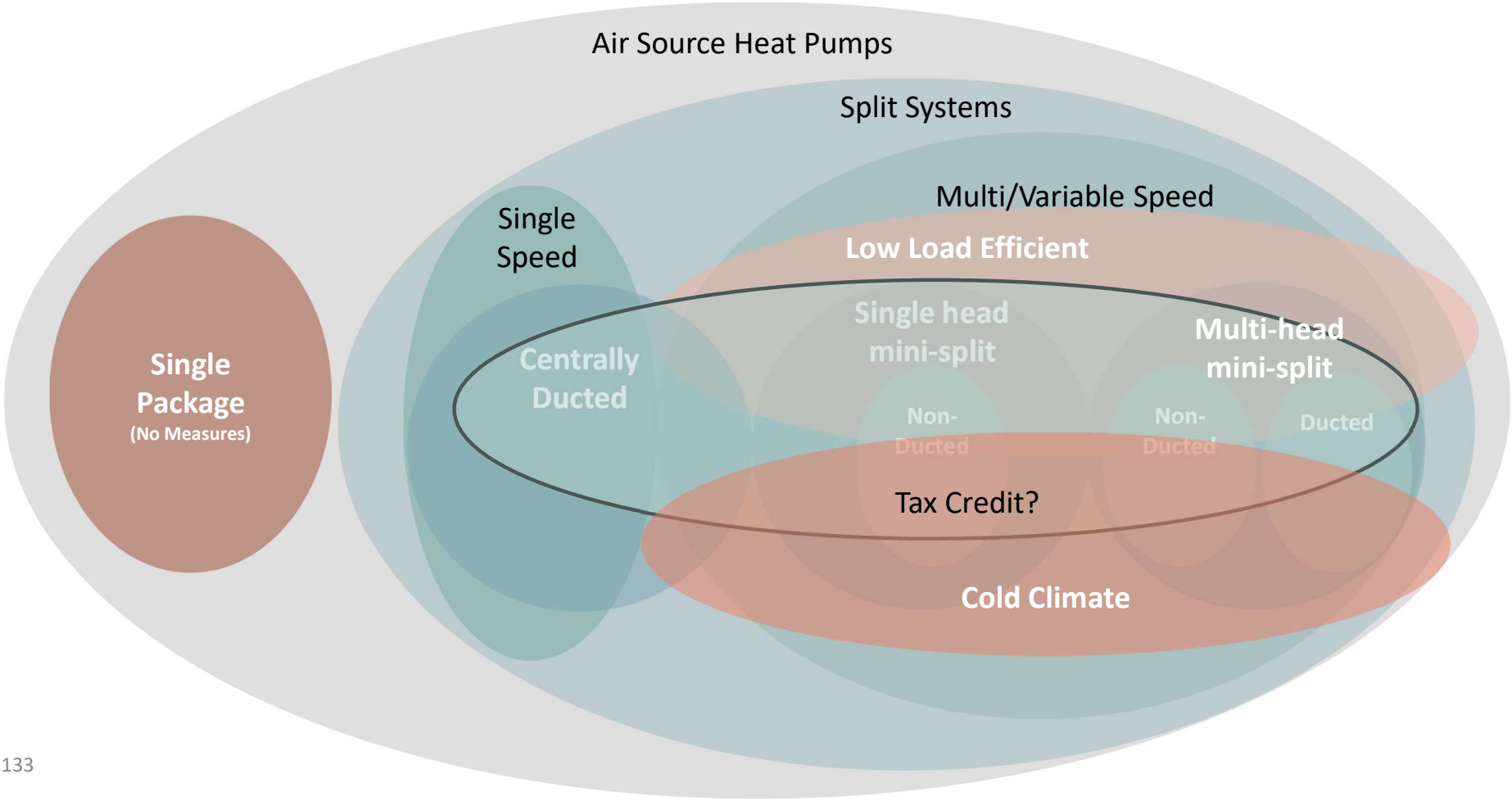
- Centrally Ducted Heat Pumps
  - Equipment
  - Controls
- Ductless Heat Pumps

There are built in spots for questions or comments but if at any time you have questions, thoughts, or feedback please speak up. We would very much like to hear your responses to our ideas.

Why is the RTF Focused on Refining the HP Measure Suite?

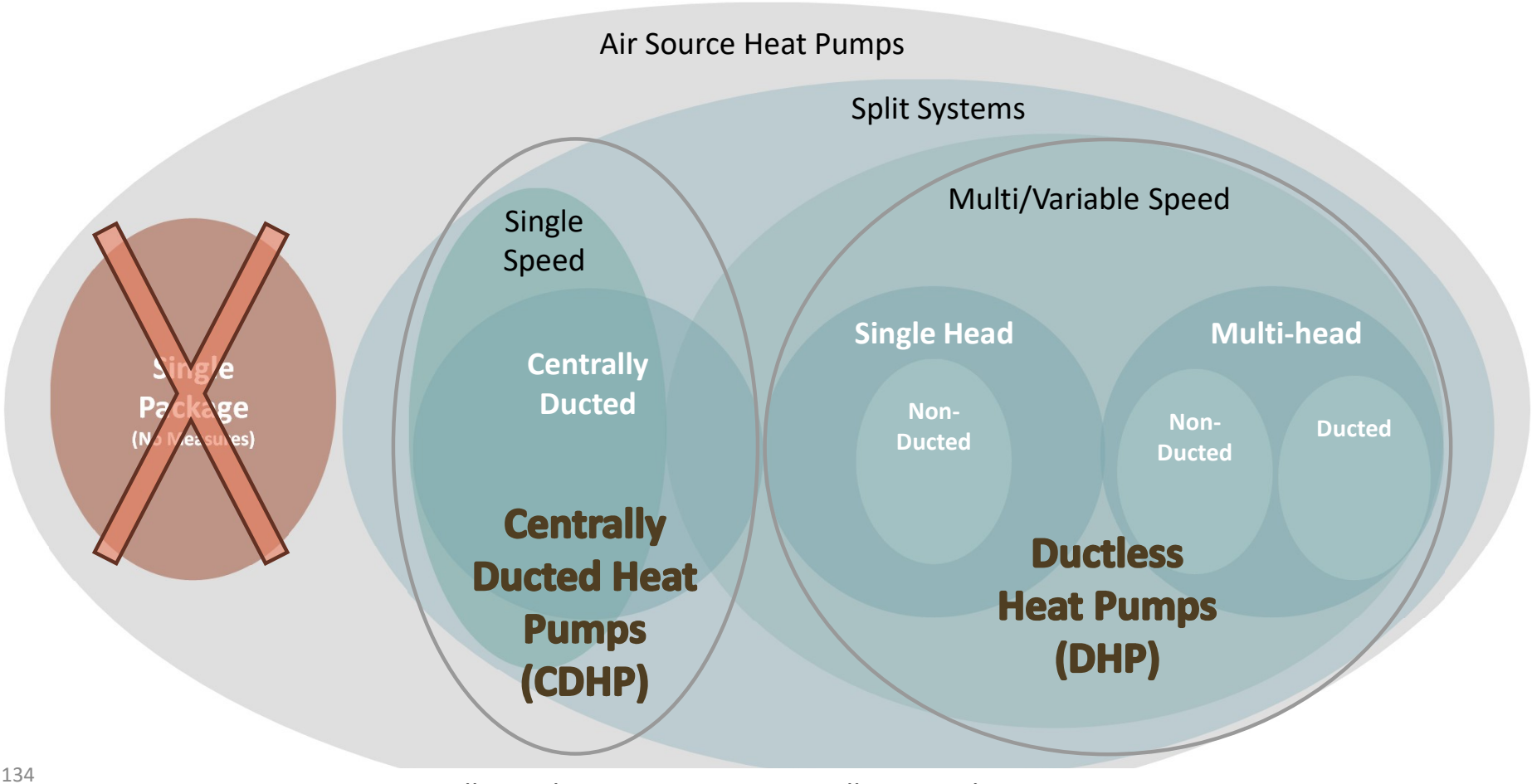


Air Source Heat Pumps: Lots of Options



RTF

Air Source Heat Pumps: Simplify

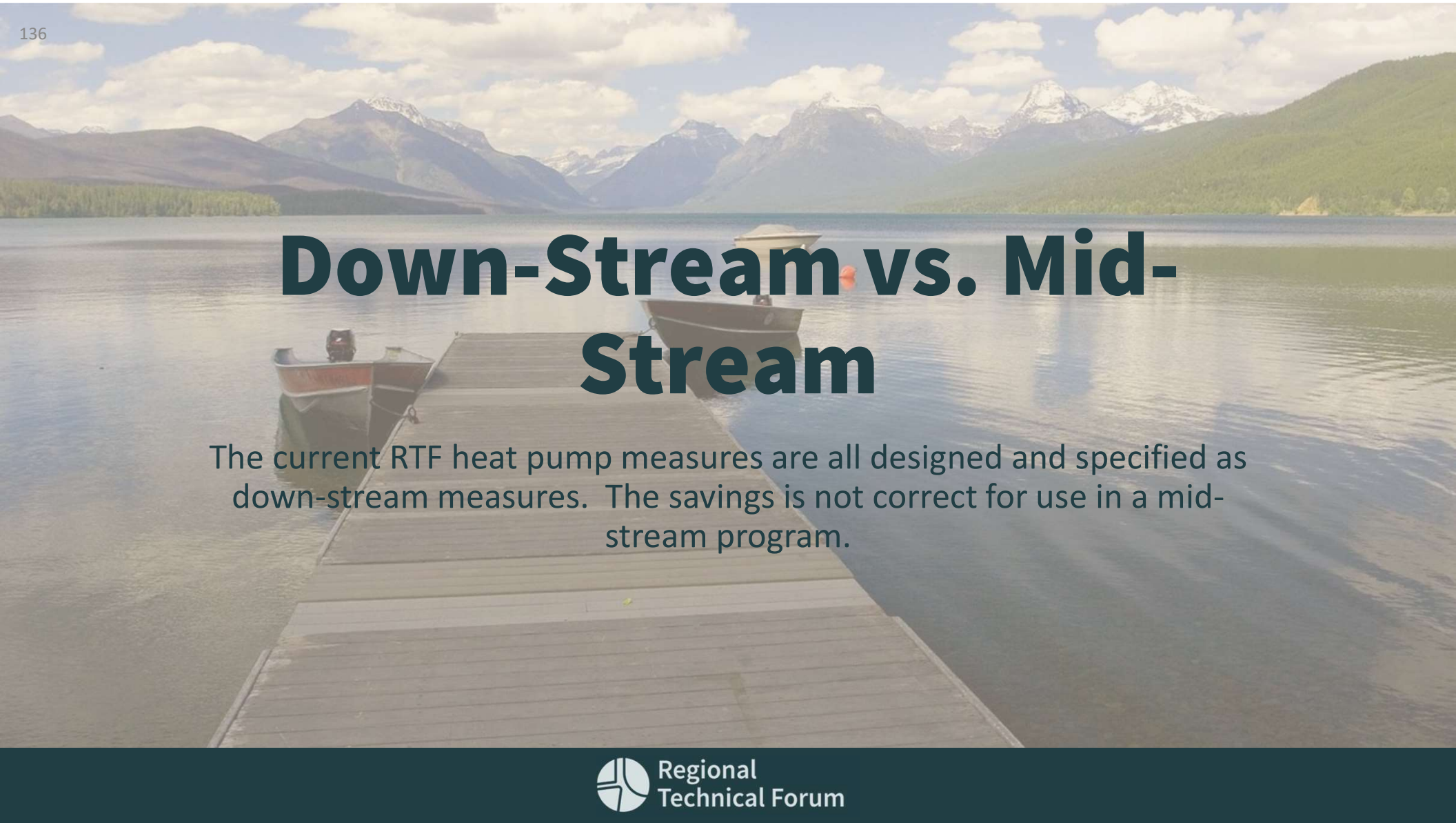


Historically, at the RTF, ASHP = Centrally Ducted Air Source Heat Pump

RTF

Other Heat Pump or Heat Pump Related Measures that we will Not be Discussing Today

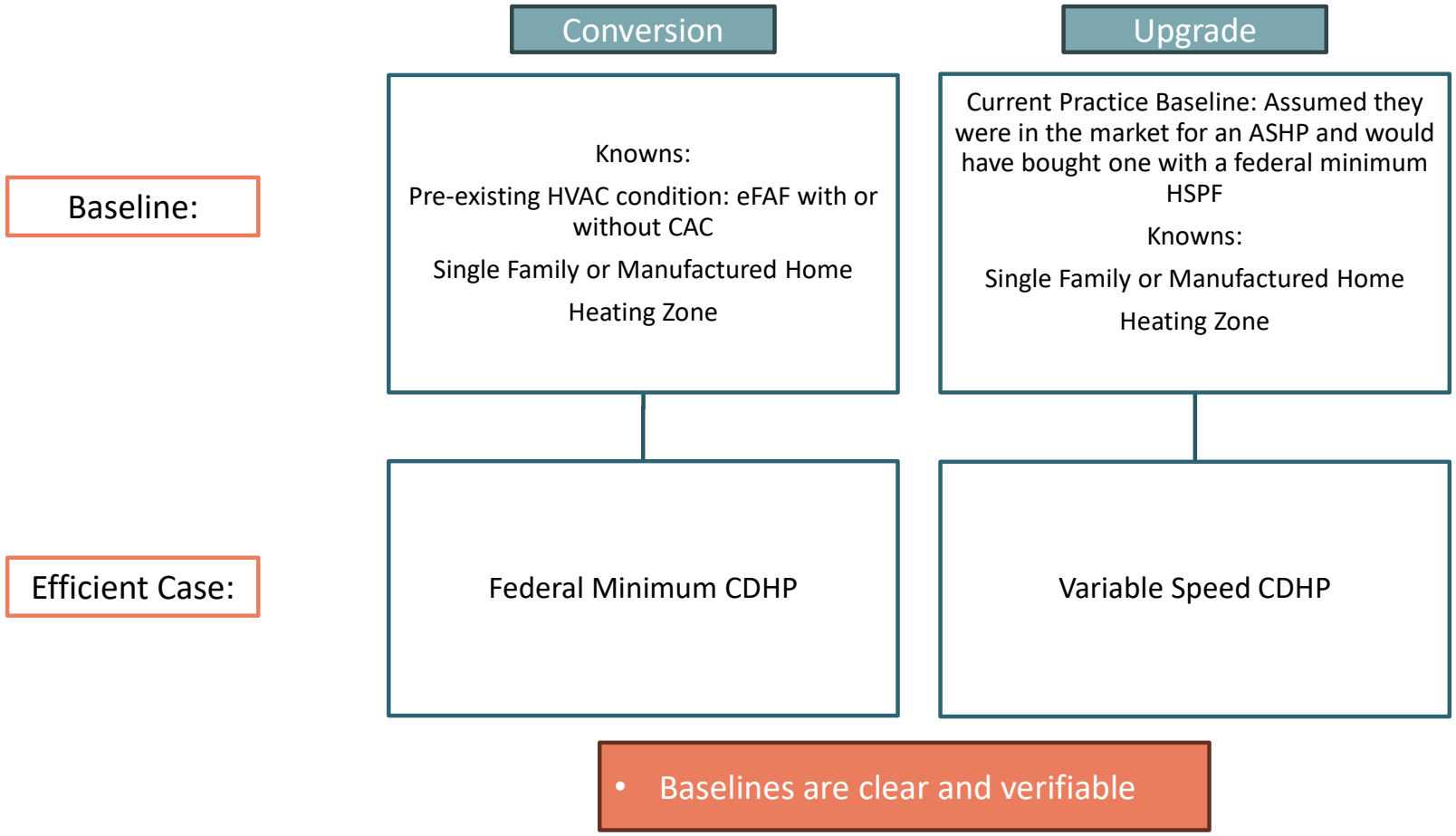
- Connected Thermostats
  - Residential
  - Commercial
  - To be updated in the next year
- Commercial DHP (residential style)
  - To be updated in the next year
- Commercial CDHP (residential style)
  - To be created in the next year
- Ground Source Heat Pumps
  - No current RTF measure



Down-Stream vs. Mid-Stream

The current RTF heat pump measures are all designed and specified as down-stream measures. The savings is not correct for use in a mid-stream program.

The Current Measures Do Not Work for Mid-stream

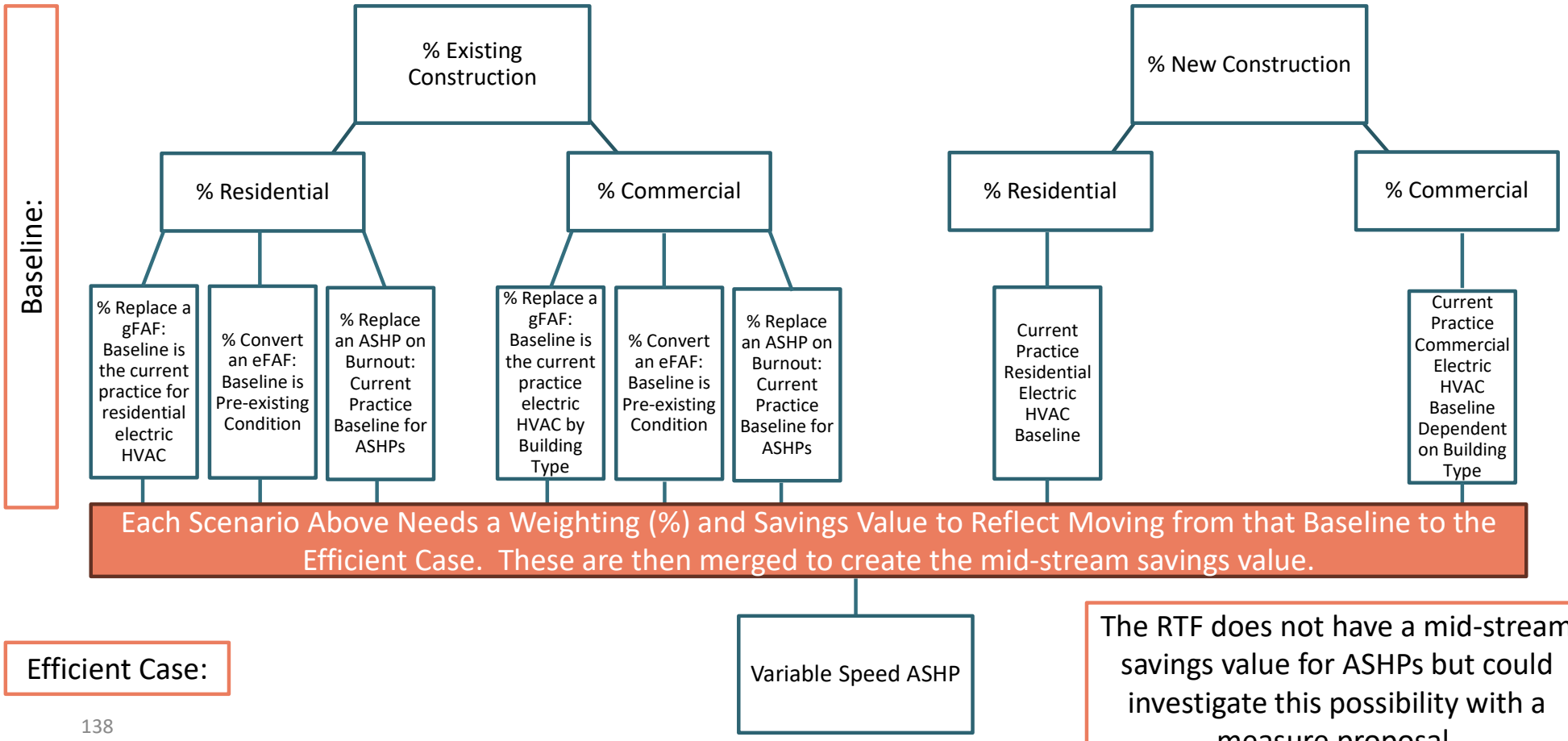


- Baselines are clear and verifiable

RTF

Mid-Stream Baselines are Very Different From Down Stream Baselines

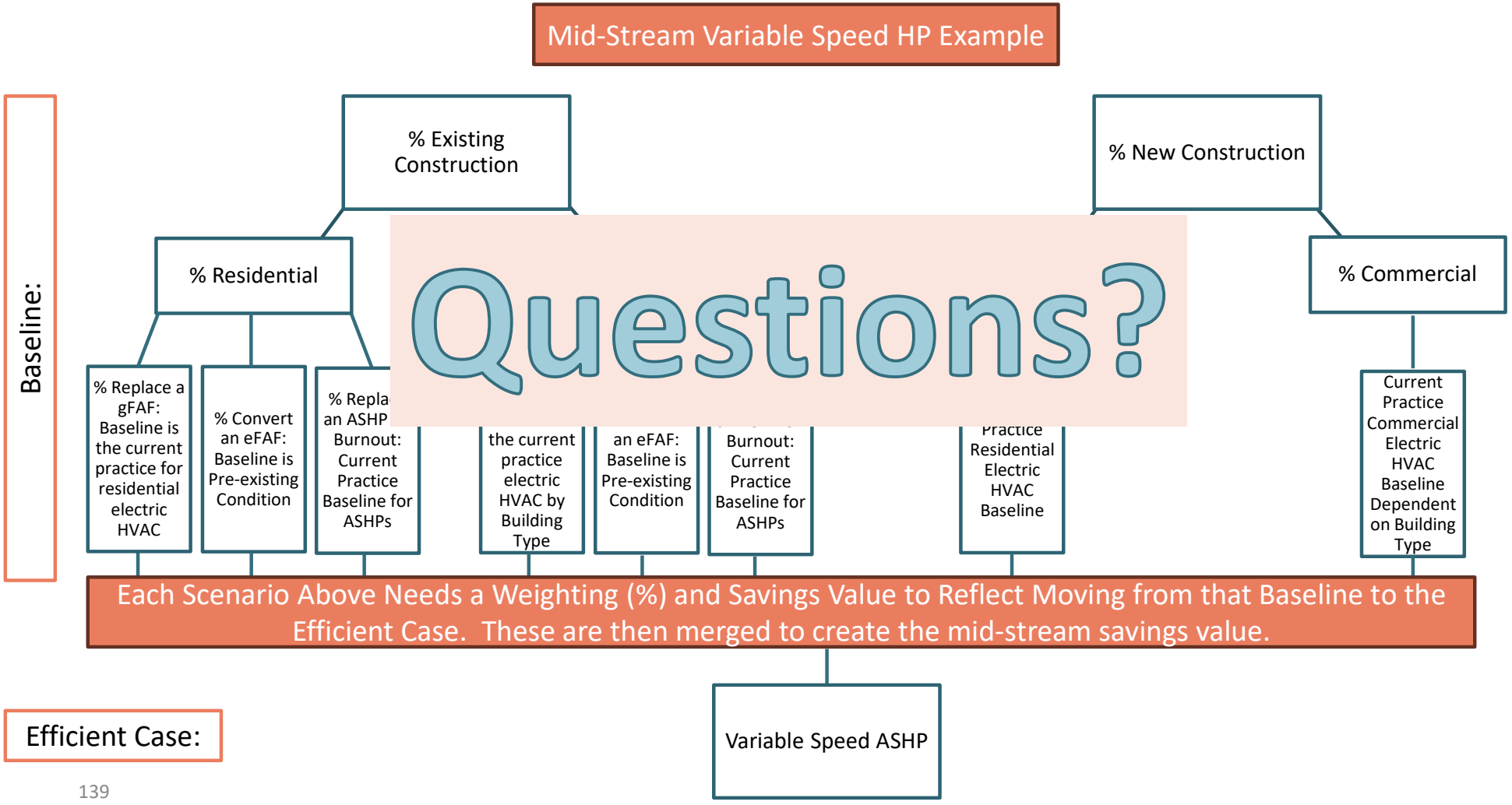
Mid-Stream Variable Speed HP Example



The RTF does not have a mid-stream savings value for ASHPs but could investigate this possibility with a measure proposal.

RTF

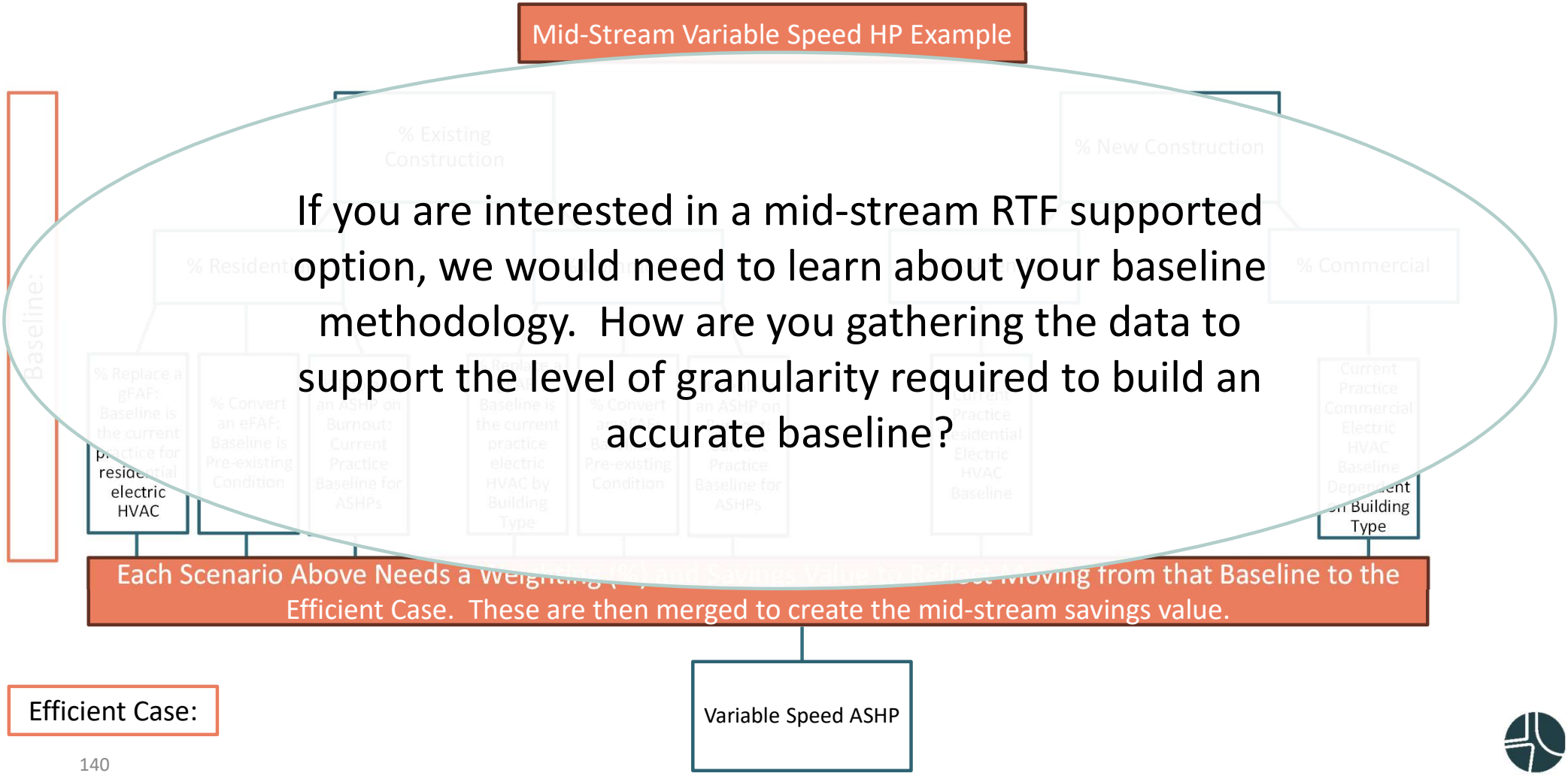
Mid-Stream Baselines are Very Different From Down Stream Baselines



Questions?

RTF

Mid-Stream Baselines are Very Different From Down Stream Baselines



If you are interested in a mid-stream RTF supported option, we would need to learn about your baseline methodology. How are you gathering the data to support the level of granularity required to build an accurate baseline?

RTF

RTF Heat Pump Measures and Savings Values

=

Down-Stream Programs

The rest of this presentation focuses on these program options

≠

Mid-Stream Programs

RTF

CDHP Context

The Challenges Facing Our Grid

- We've all read the current headlines regarding the challenges facing the grid:
  - Massive forecasted load growth (data centers)
  - Growing transmission constraints
  - Fewer dispatchable resources
  - More intermittent resources
  - Record peaks from extreme weather events (heat domes, cold snaps)

"Amid Explosive Demand, America is Running Out of Power"

– The Washington Post
(May 7, 2024)

"A New Surge in Power Use is Threatening U.S. Climate Goals"

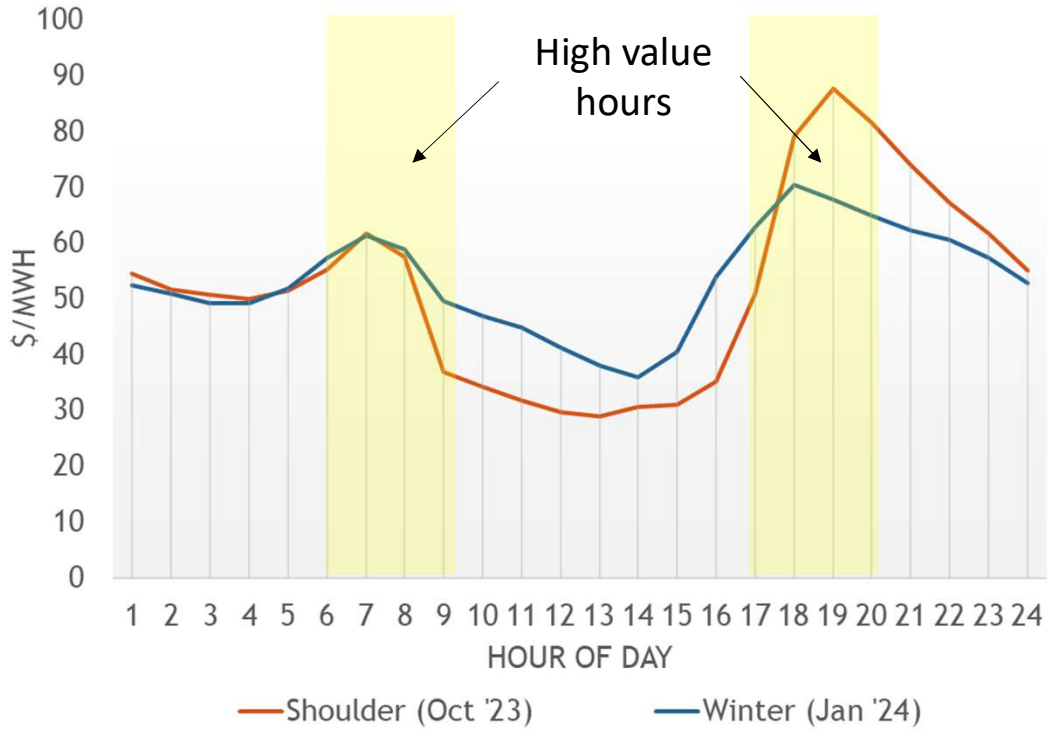
– The New York Times
(March 14, 2024)

"Surge in Electricity Demand Spells Trouble for PNW, Forecasts Show"

– The Seattle Times
(April 11, 2024)

What Value Can Energy Efficiency Play?

- The most valuable EE will provide **energy savings** and **capacity benefits at high value hours**
- Value of EE will be further driven by:
  - **Deferring transmission and distribution** investments
  - **Deferring generation** purchases

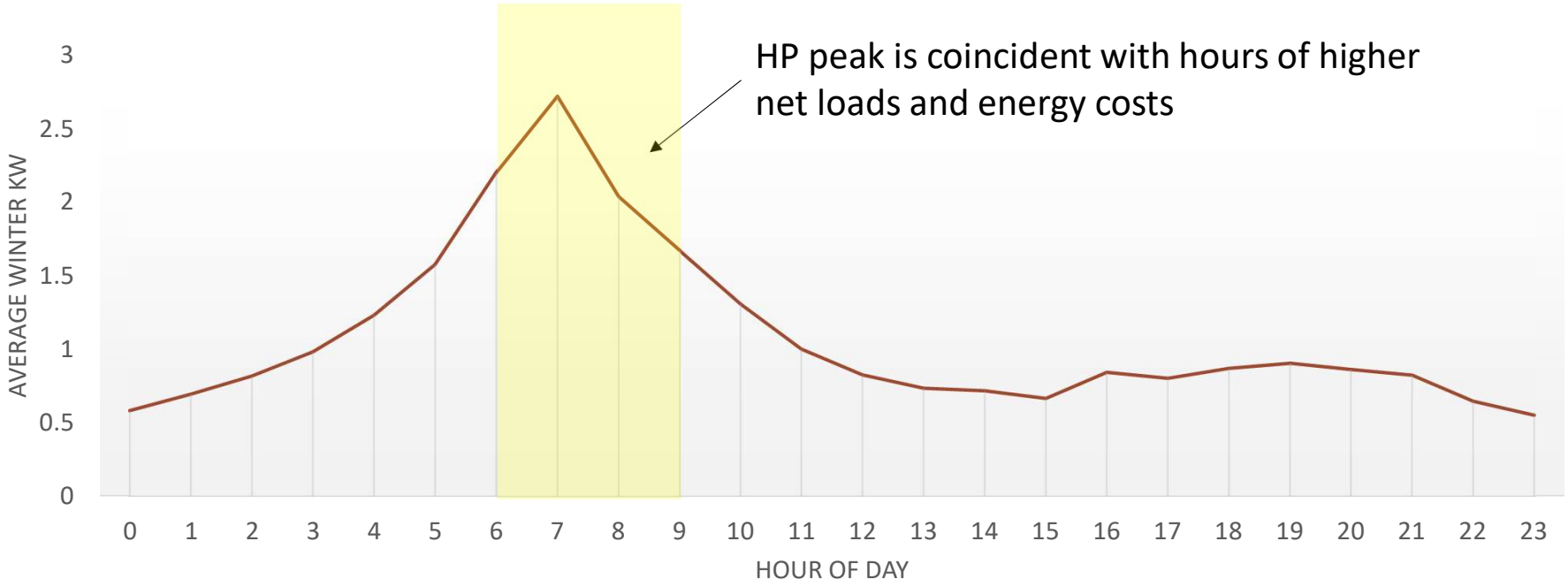


Centrally Ducted Air Source Heat Pumps

- **16%** of Northwest homes now have a ducted HP
- In Washington state, the number is nearly **20%**
- In addition, more than **50%** of the region has ducted gas or electric furnaces, which could be converted to ducted HPs

Source: NEEA 2022 Residential Building Stock Assessment (RBSA).
Photo credit: https://www.trane.com/residential/en/products/heat-pumps/xr15/

Hourly Load Shape of Existing Ducted HPs



Source: RTF/Council staff analysis of 36 ducted heat pump homes in NEEA Home Energy Metering Study (HEMS).

CDHP Measures

Regional
Technical Forum

Current Centrally Ducted Heat Pump Measures

Currently the RTF measures are solely focused on HSPF (HSPF2).

The RTF has included requirements on commissioning, controls, and sizing as part of the measure and as a separate add-on but in the end, this was not found to add to savings when compared to current market installation practices.

ASHP Conversion

Requirements: Centrally Ducted and Minimum HSPF2

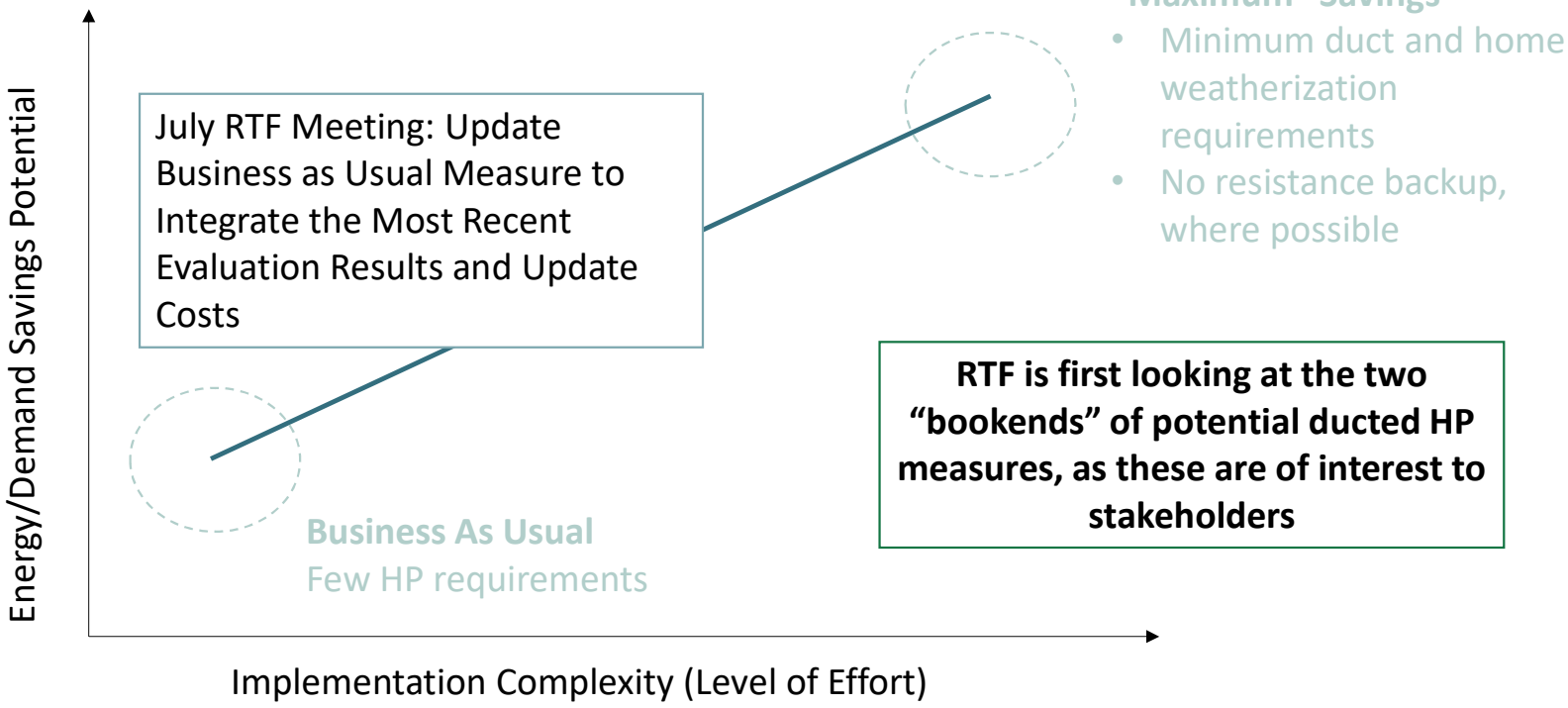
Typically, Single or Dual Speed

ASHP Upgrade

Requirements: Centrally Ducted, Variable Speed, and Minimum HSPF2

eFAF -> Single or Dual Speed = Conversion Savings
eFAF -> Variable Speed = Conversion + Upgrade Savings
CDHP at the end of its life -> Variable Speed = Upgrade Savings

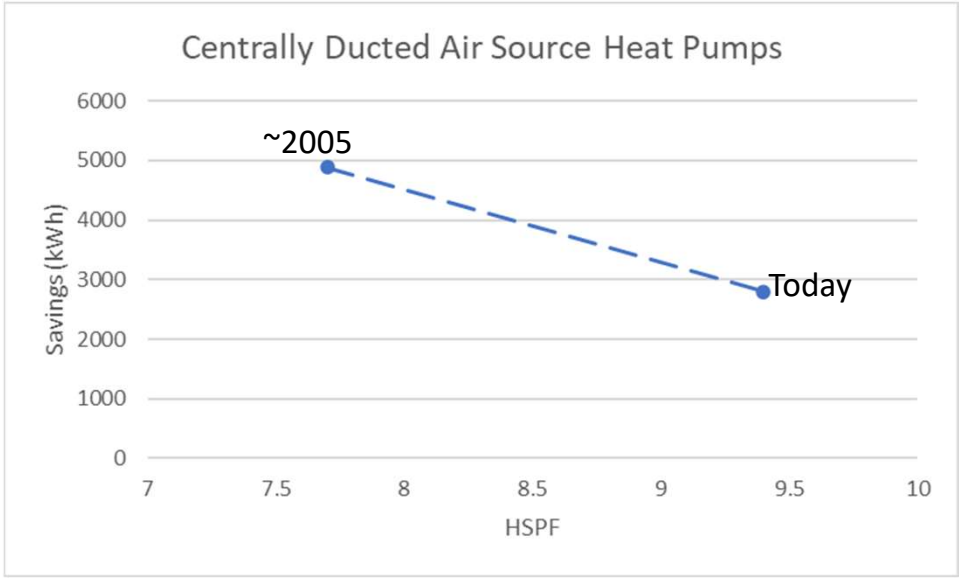
RTF's Current Process of Updating CDHP Conversion Measures



Lessons for CDHP Conversions

Centrally Ducted Heat Pumps

- Despite increasing HSPF values and years of contractor education, regional savings per home has decreased
- Data shows that efforts to control or limit electric resistance heat have been unsuccessful



Why are Savings Eroding?

Programmatic Reasons

-Lack of control/screening of supplemental heat
-Lack of substantive QAQC
-Utility program model of not limiting customer eligibility
-Focus on heat pumps over other efficiency measures first (i.e., weatherization)
-Consumer education on the impacts of setbacks

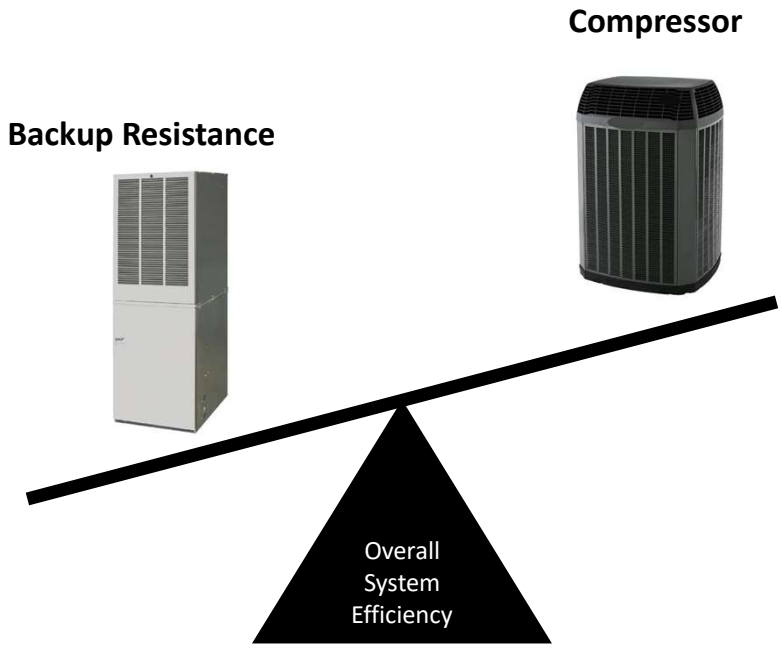
Technological Reasons

-Too much back up (electric resistance) heating

Other Trends Impacting Savings Erosion
-Falling EUIs from weatherization

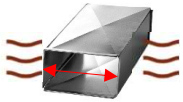
Evaluating the Control of Heat Pump Backup Heating

- Most ducted air source heat pumps have two heaters:
  - An efficient one: the compressor
  - A much less efficient one: “backup” electric resistance
- Historically, much attention has been paid to getting more efficient and better compressors (which is important)
- However, less attention has been paid to how much the inefficient heater runs! (also, important)



Causes of Excessing Backup Heating


Undersized heat pumps


Undersized, uninsulated, and/or leaky ducts


Uninsulated building envelope (i.e., high heating load)


Poor heat pump cold climate capacity


Improper lockout of backup heat or compressor


Oversized backup heat


Inefficient control logic

Note: These are not listed in any particular order of importance

How to Significantly Reduce Backup Heat Demand

≤ 30°F Sizing heat pump to meet all heating needs at 30°F or below

Ensuring ducts are sufficiently sized and insulated

Ensuring home envelopes are insulated first

Locking out backup heat until it is needed

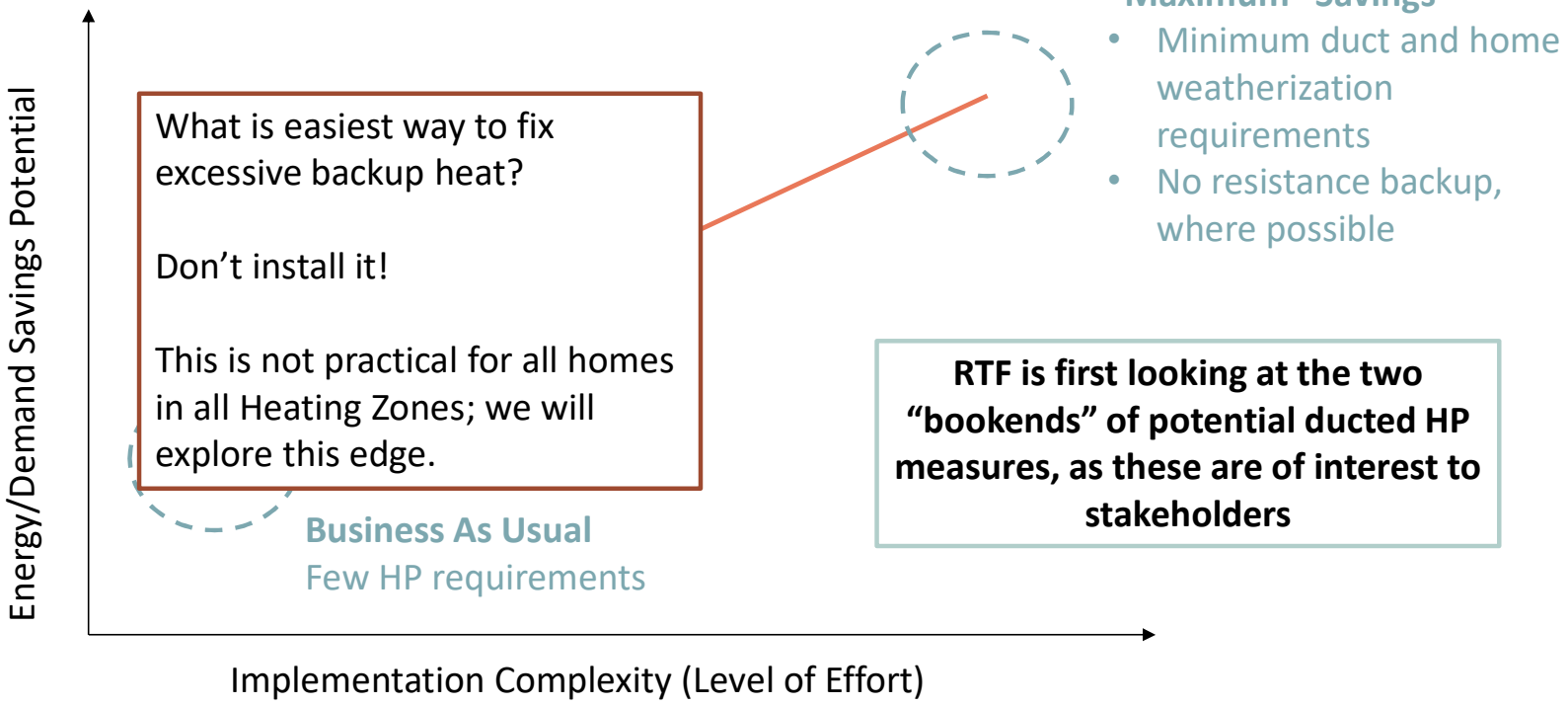
Selecting a cold-climate heat pump that can provide low temperature capacity and efficiency

Reducing unnecessary backup heat capacity

Smarter setback control logic and system defaults

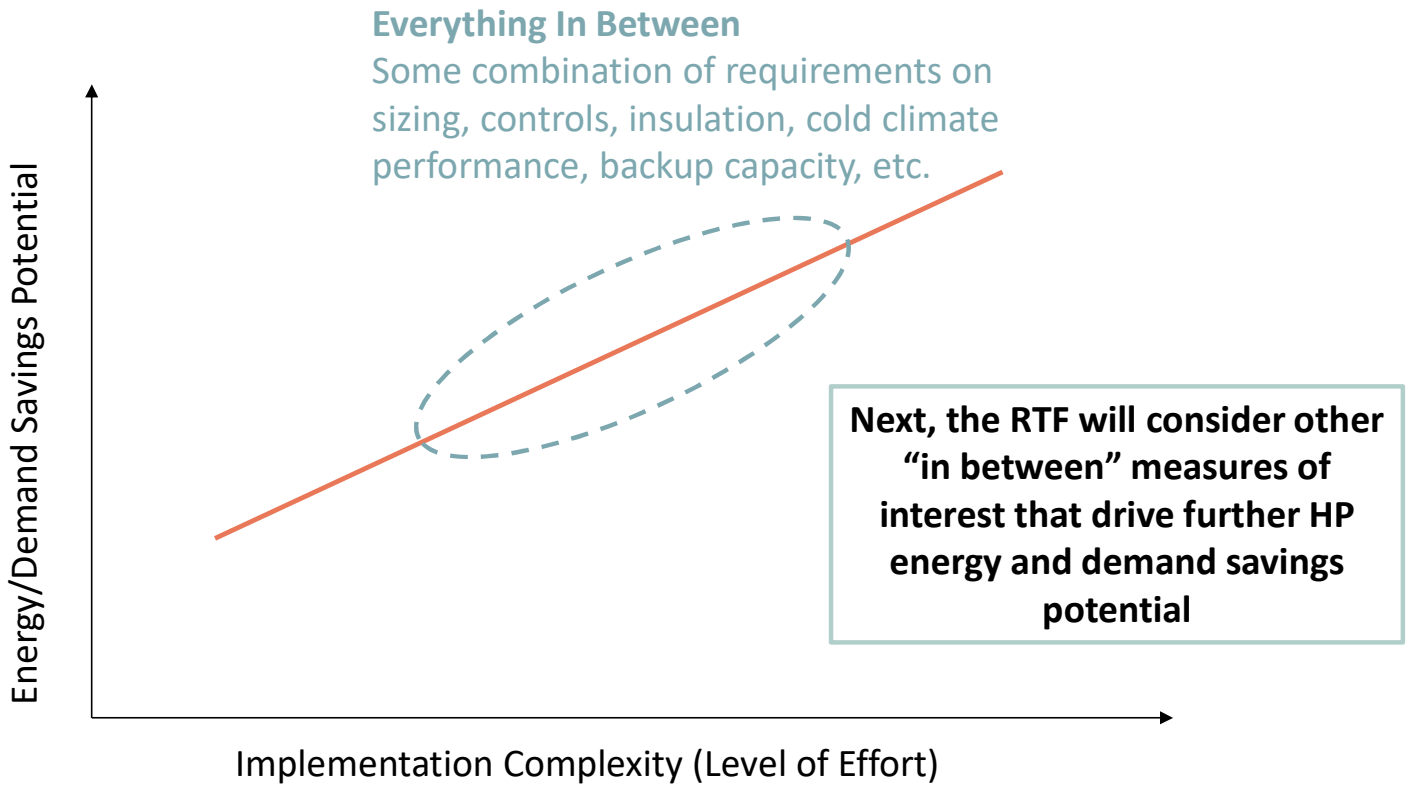
Note: These are not listed in any particular order of importance

RTF's Current Process of Updating CDHP Conversion Measures



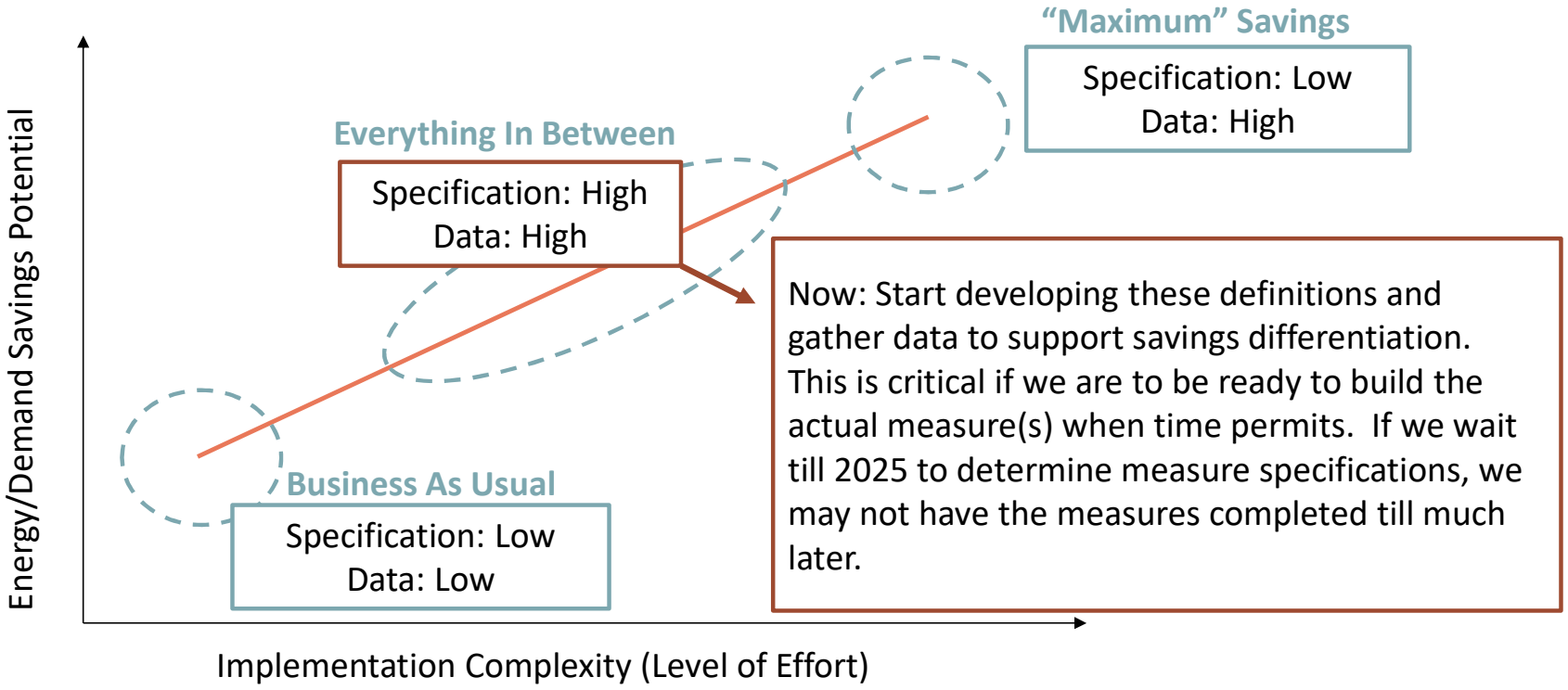
RTF

RTF's Current Process of Updating CDHP Conversion Measures



RTF

Regional Support Required

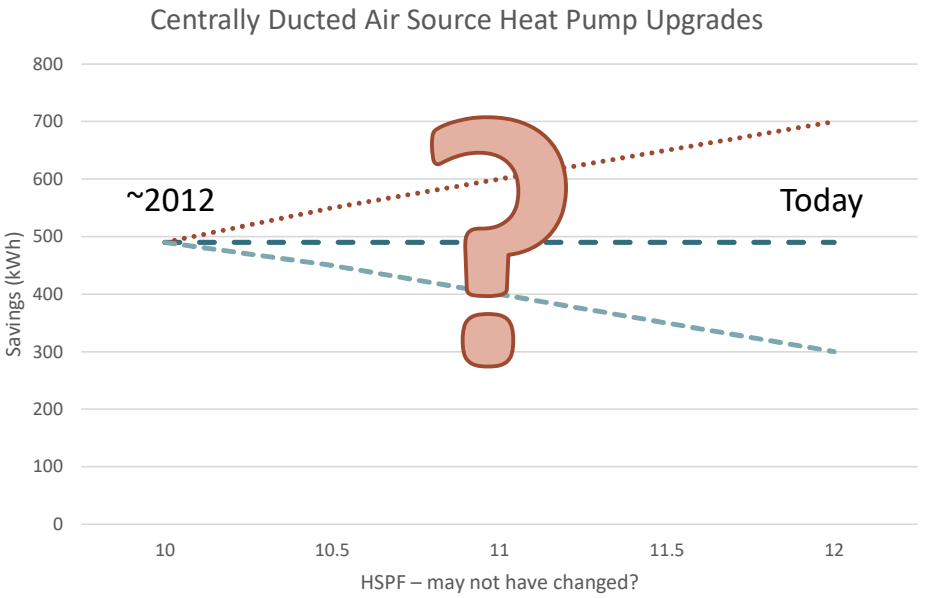


Now: Start developing these definitions and gather data to support savings differentiation. This is critical if we are to be ready to build the actual measure(s) when time permits. If we wait till 2025 to determine measure specifications, we may not have the measures completed till much later.

RTF

Questions or Comments?

Lessons for CDHP Upgrades



Centrally Ducted Heat Pump Upgrades

- ?????

Photo by Garin Chadwick on Unsplash

We are receiving data and will be able to paint pretty picture!

- Data is slowing coming in for higher efficiency centrally ducted heat pumps
  - Variable speed
  - Cold Climate
  - Extended Capacity
  - Etc.

July RTF Meeting

- Change status to “Under Review”
  - Emphasizes that the savings estimation methods need to be updated
  - Upon receipt of sufficient data for an update the Contract Analyst Team will rework the savings for this measure
    - Projected update to savings within a year
- Update Costs
- Review overlap of current HSPF2 requirement and other market options for higher efficiency variable speed heat pumps
  - Contract Analyst Team may propose updating eligibility of units
    - Possible option: NEEP Cold Climate QPL

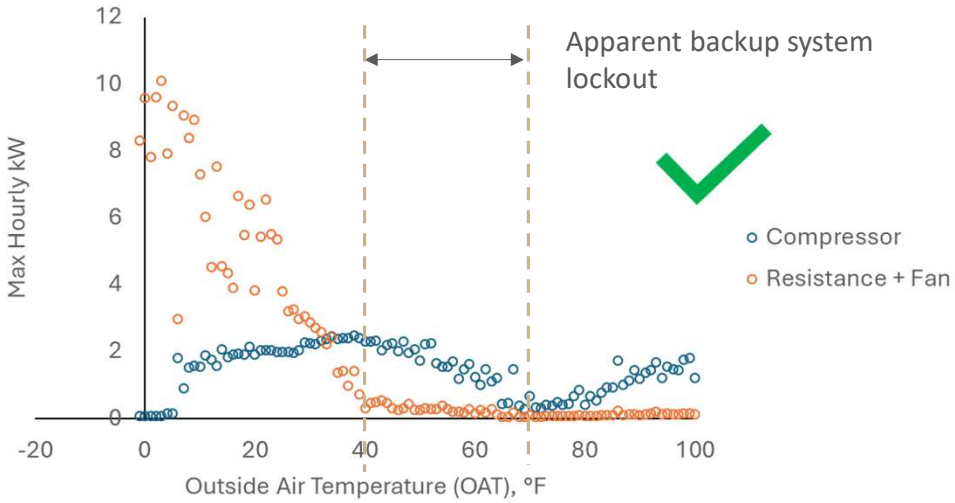
Questions or Comments?

Potential Controls in Existing CDHPs (Two Options for "Everything in Between")

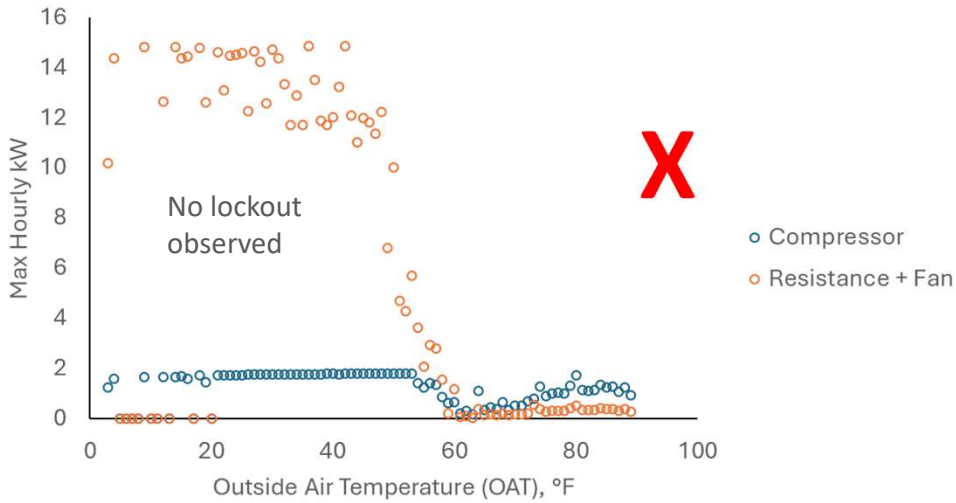
- Lockouts: ER and HP
  - Were never set up or have been disabled
  - Typically, easy to correct
    - Hardest part is determining the correct outdoor air temperature for the lockout
- Setbacks
  - Homeowners operate their heat pumps as they have been taught to operate gas and electric forced air furnaces
    - Simple education but it takes time to create new norms

Lockout of inefficient backup resistant heating is not occurring

HEMS Site *With* An Apparent Backup Lockout

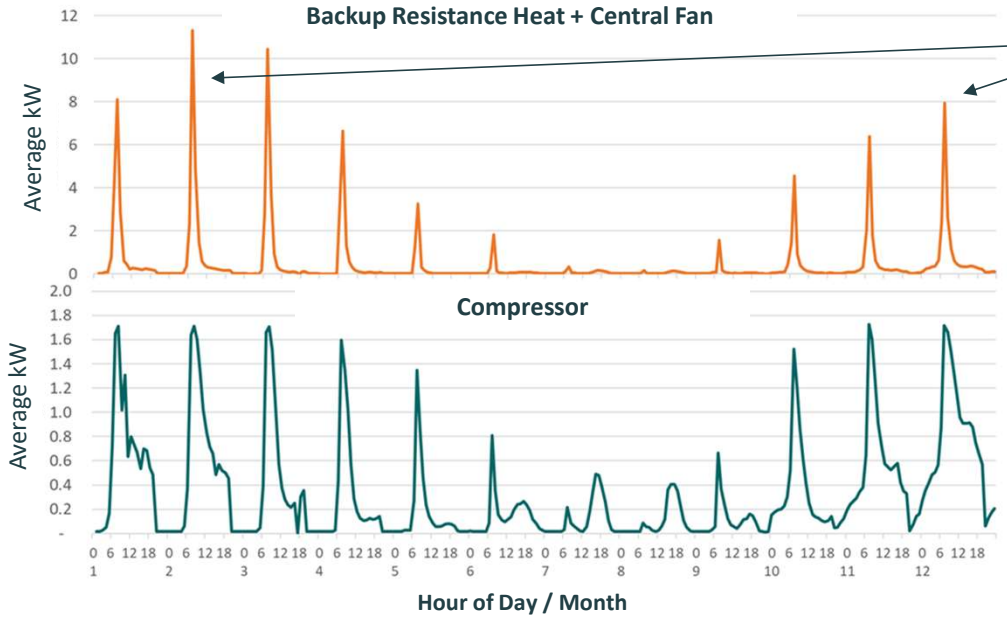


HEMS Site *Without* An Apparent Backup Lockout



Deep night seatbacks are relatively common and result in significant backup heating

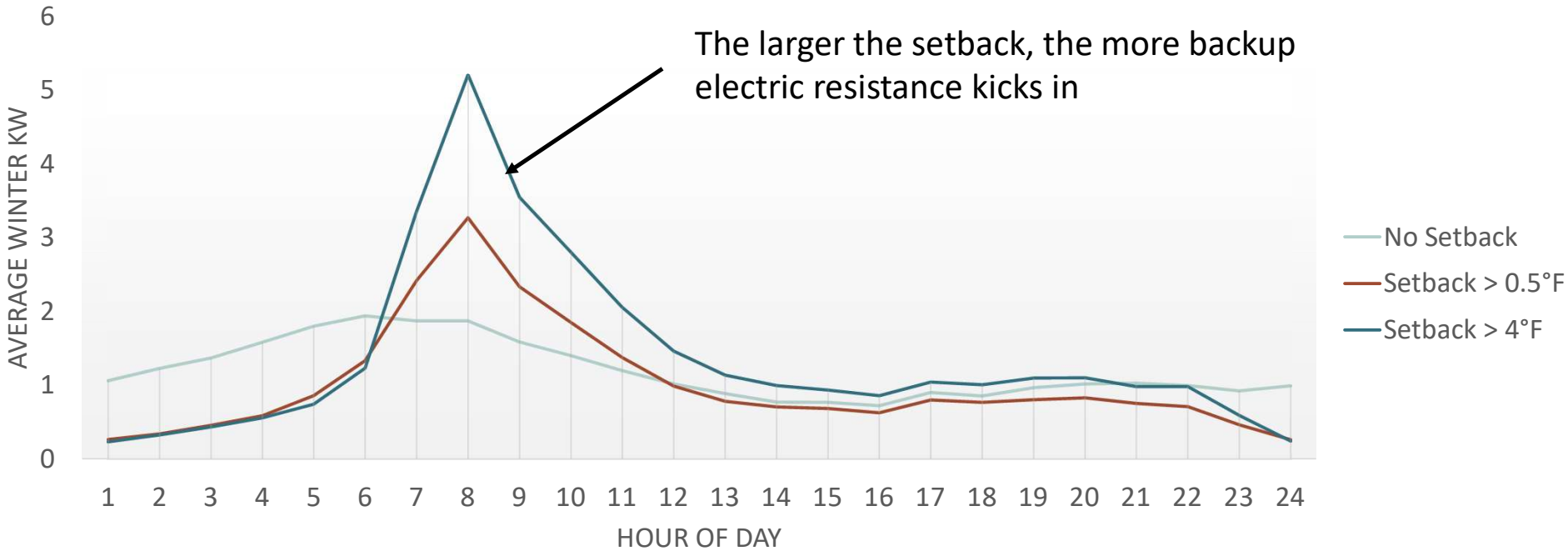
Deep setback: turning your thermostat down (colder) at night by 5 degrees F or more



- Deep setbacks can cause sharp morning spikes of backup electric resistance heat
- This real home from HEMS sets its thermostat back by 10°F at night

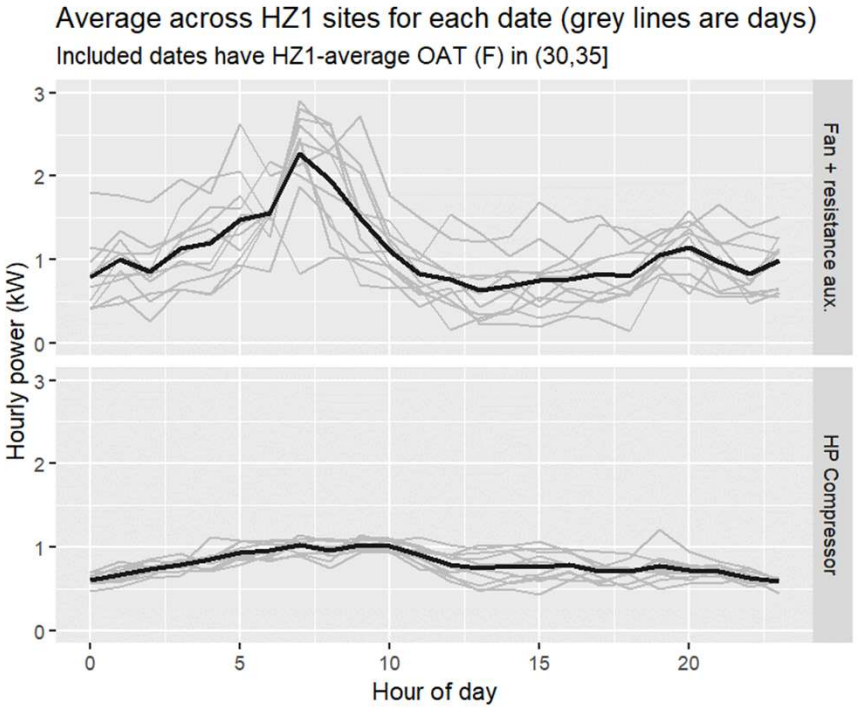
RTF

CDHP Hourly Demand by Size of Setback

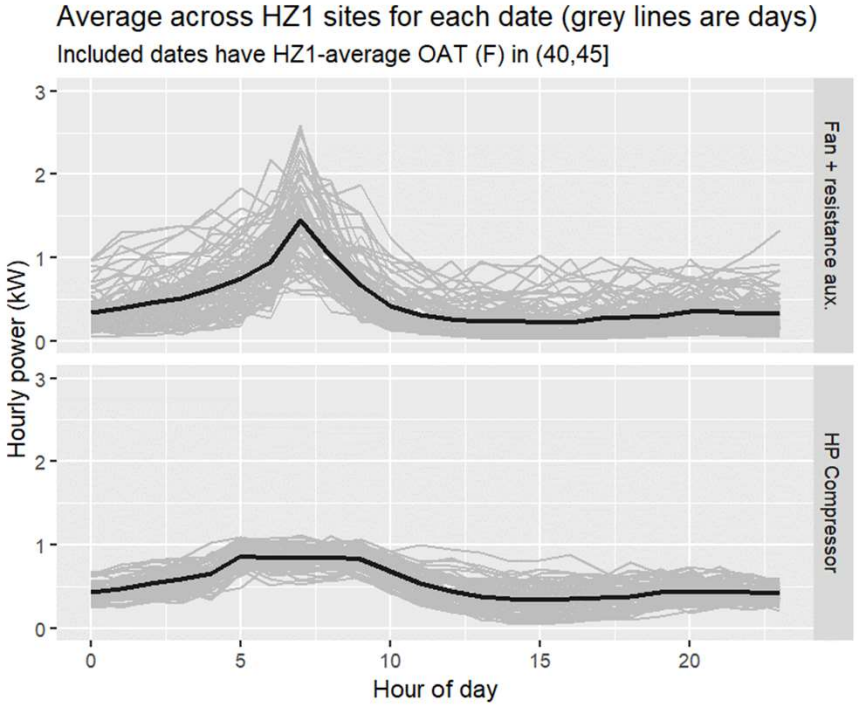


What are HEMS and RBSA showing us about how are CDHPs performing in the region?

Cold Days

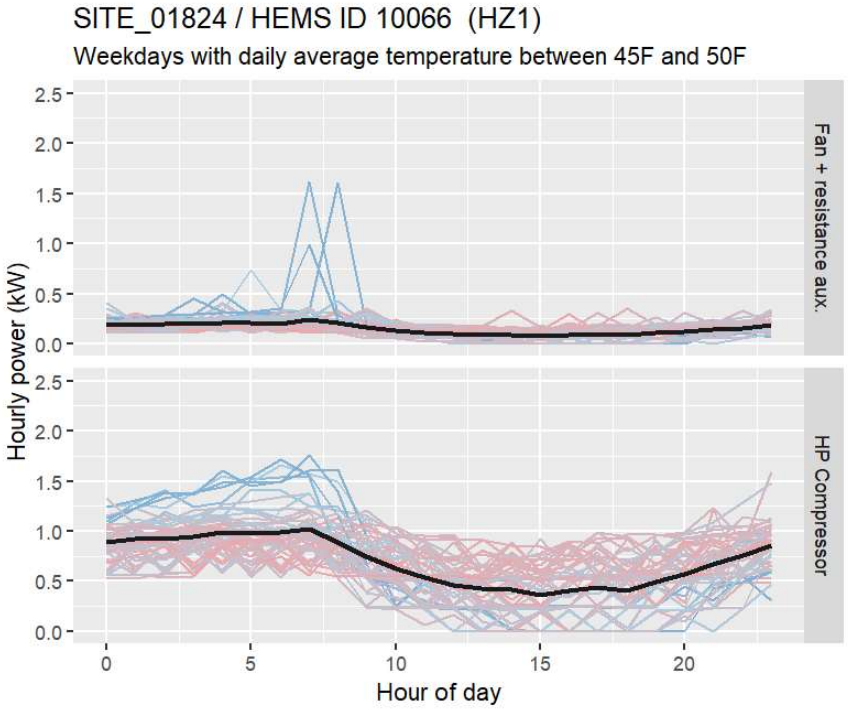


Mild Days

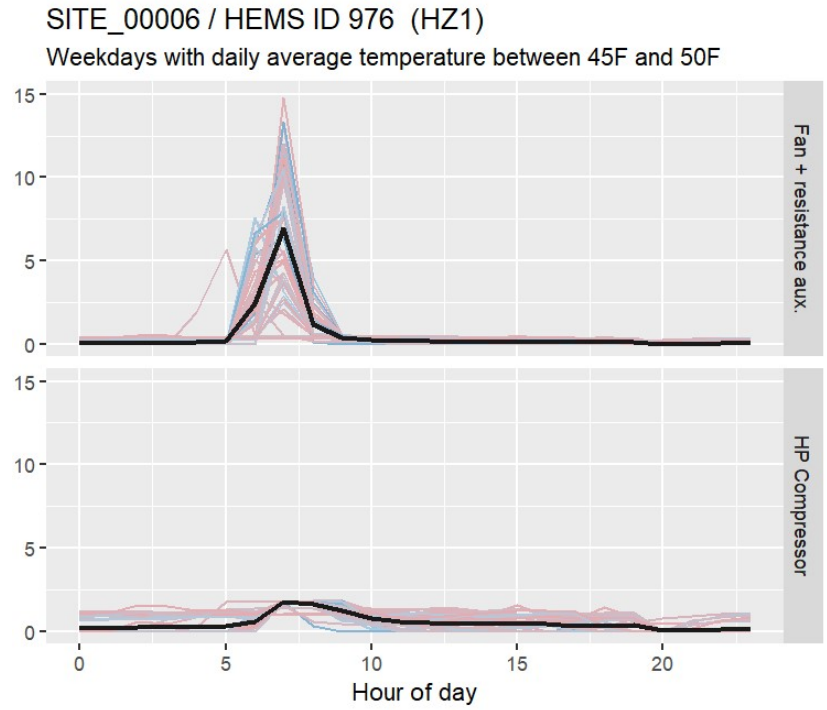


What would we want to see on mild days?

Nice Site



Bad Site



Centrally Ducted Heat Pump Control Options

- Retro-commissioning
  - kWh focus
  - Initial focus on lockouts
    - Potential “Full Meal Deal”
      - Lockouts and ducts
- Setback DR Exploration
  - Focus on kW reduction
    - Continuous or dispatchable
  - kWh impact to be determined

Applicable to regional existing programmatic heat pumps and non-programmatic heat pumps

- These could have very large potentials as the amount of non-programmatic heat pumps rises due to other incentive money (IRA)

Timeline:

- Retro-commissioning is likely sooner
- Setback DR Exploration: later; Tacoma power is planning a pilot for winter 2024-2025

Questions or Comments?

DHP Measures

Regional
Technical Forum

Current Ductless Heat Pump Measures

- Currently the RTF measures are focused on HSPF (HSPF2) and nominal tonnage (3/4 ton). The Single-Family identifier does not include any requirements for where the DHP is installed.

DHP

Requirements: Inverter Driven and Minimum HSPF2

If low-static duct run(s): verify static meets manufacturer specs, system is sealed, and if it is outside of conditioned space that everything is insulated

Single-Family Home:

- Electric Zonal -> any DHP possibility or location = DHP Savings
- eFAF -> DHP in main living area = DHP Savings

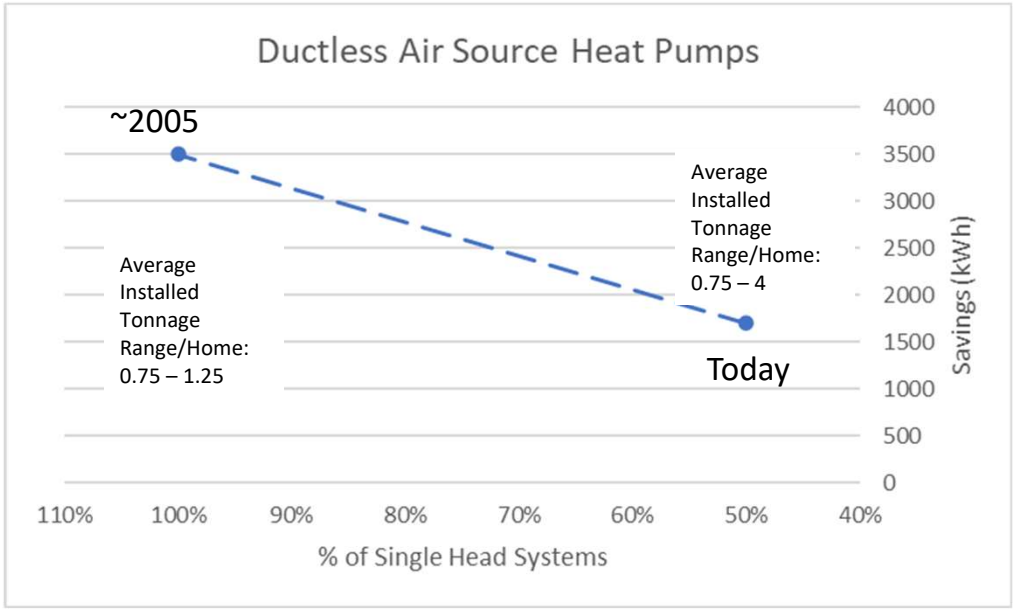
Manufactured Home:

- Electric Zonal -> any DHP possibility or location= DHP Savings
- eFAF -> DHP in main living area = DHP Savings

Lessons for DHPs

Ductless Heat Pumps

- Savings is reliably quantifiable when installed in a main living area of a home with zonal electric resistance heat in that living space and where supplemental fuels are not used as a primary heat source



Why are Savings Eroding?

Programmatic Reasons

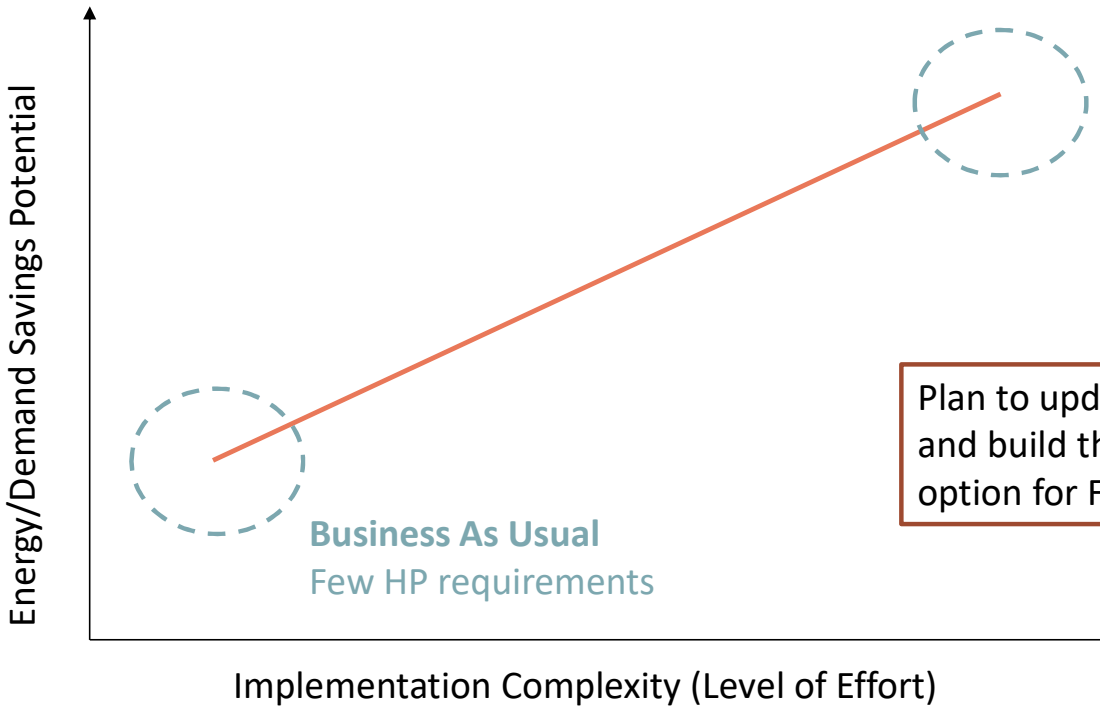
-Acceptance of installations of any style or combination in any location
-Lack of control/screening of supplemental heat
-Lack of substantive QAQC
-Utility program model of not limiting customer eligibility
-Focus on heat pumps over other efficiency measures first (i.e., weatherization)

Technological Reasons

-Multi-head installations have lower operating efficiency than 1:1 installations
-Introduction of duct leakage
-Thermostat Wars: no communication between the two primary thermostats

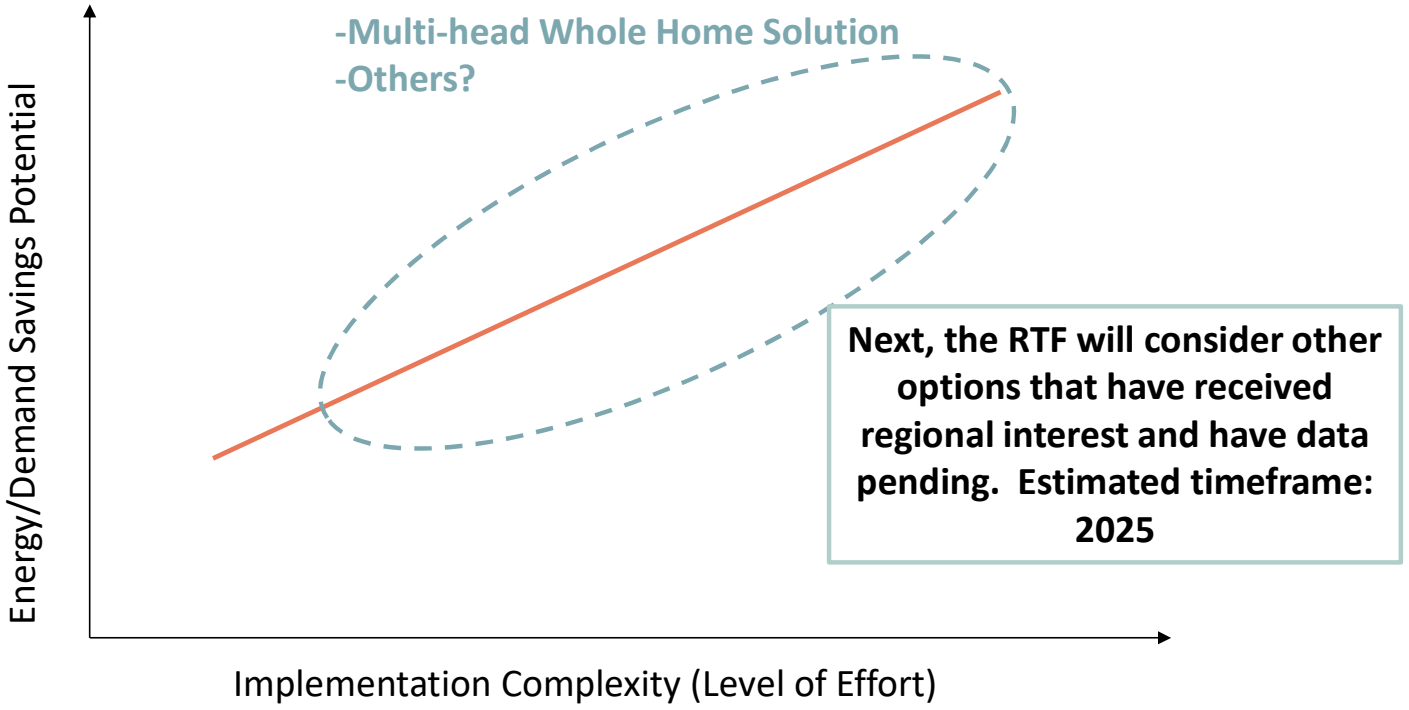
Other Trends Impacting Savings Erosion
-Falling EUIs from weatherization

RTF's Current Process of Updating DHP Measures



RTF

RTF's Current Process of Updating DHP Measures

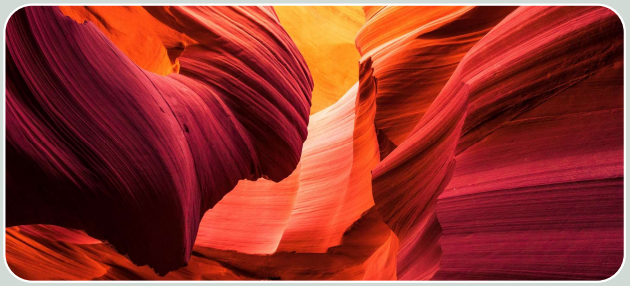


Next, the RTF will consider other options that have received regional interest and have data pending. Estimated timeframe: 2025

RTF

Questions or Comments?

Summary: Regional Lessons Learned on Heat Pumps

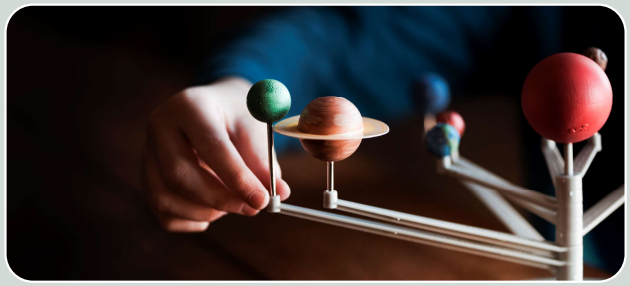


Savings Easily Erode

- Electric resistance heating is being diminished but not displaced due to several factors:
  - Installation of ER backup to ensure comfort
  - Controls with setbacks do not play well with HPs
  - Sizing, duct sealing, etc. are impactful to savings

Stakeholder Goal Misalignment

- Contractor's and customer's goals for heat pumps appear to be misaligned with efficiency program goals of achieving energy savings. Contractors and customers are focused on:
  - Perception of Comfort and Worries of HP Limitations
  - Upfront Cost
  - Ease of installation



Being Holistic is Hard Yet Important

- Providing contractors with comprehensive HP training, certification, & QA is difficult.
- PTCS (commissioning, controls, and sizing) programs had mixed success in changing contractor behavior but are extremely important to savings.
- Heat pumps are not a plug and play technology as they interact with the home and occupants. This can be difficult to integrate into programs.

Other Work in the Region

- A lot of focus is on focusing on equipment and controls logic, including influencing manufacturers, developing more reliable test metrics, etc., all of which will support heat pumps in the region in the long term.
- In the short term the region may want to consider development of a regional strategy, as more effort will be needed in the long term to:
  - Improve the housing stock to prepare for heat pumps to replace or supplement existing heating systems
    - This is true in electrically heated homes which have seen over 40 years of weatherization programs and even more true in gas forced air homes that could become heat pumps which have historically had very little weatherization activity
  - Prepare for increased need of the heat pump (and/or controls) to support demand response programs
  - Educate contractors, distributors, and manufacturers about heat pump challenges and program needs
  - Educate customers about setbacks, how HPs differ from existing heating systems, etc.
    - There is a need to reset expectations; different HVAC system = different operating conditions and therefore different expectations are needed

Opportunity for programs to be a trusted advisor to customers and provide value beyond just heat pump incentives

Path for RTF HP Measure Updates

Assessment

Assessing Portfolio

What is the right measure suite?

Past year working with the RTF and region to identify what the right scope for the RTF measures looks like.

Expanded Measures

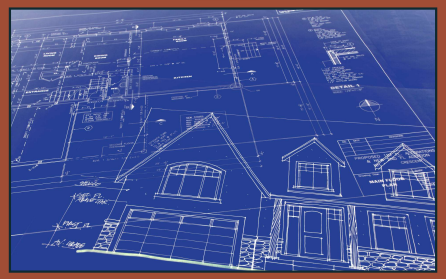
Develop new applications

In support of regional interest to reduce ER, develop new measure applications to reduce or eliminate ER in heat pumps. Fall '24-early '25.

Develop New Measures

Develop new HP measures

Explore the opportunity to develop new equipment or retro-commissioning measures. Early to mid 2025.



Data Analysis

Foundation

Expansion

New

Data Analysis

Regional data to support measure development

Currently, CAT and staff plan to use utility evaluations, RBSA III and HEMS, and REEDR to support deeper understanding of the scoped measures.

Measure Foundation

Develop key measures

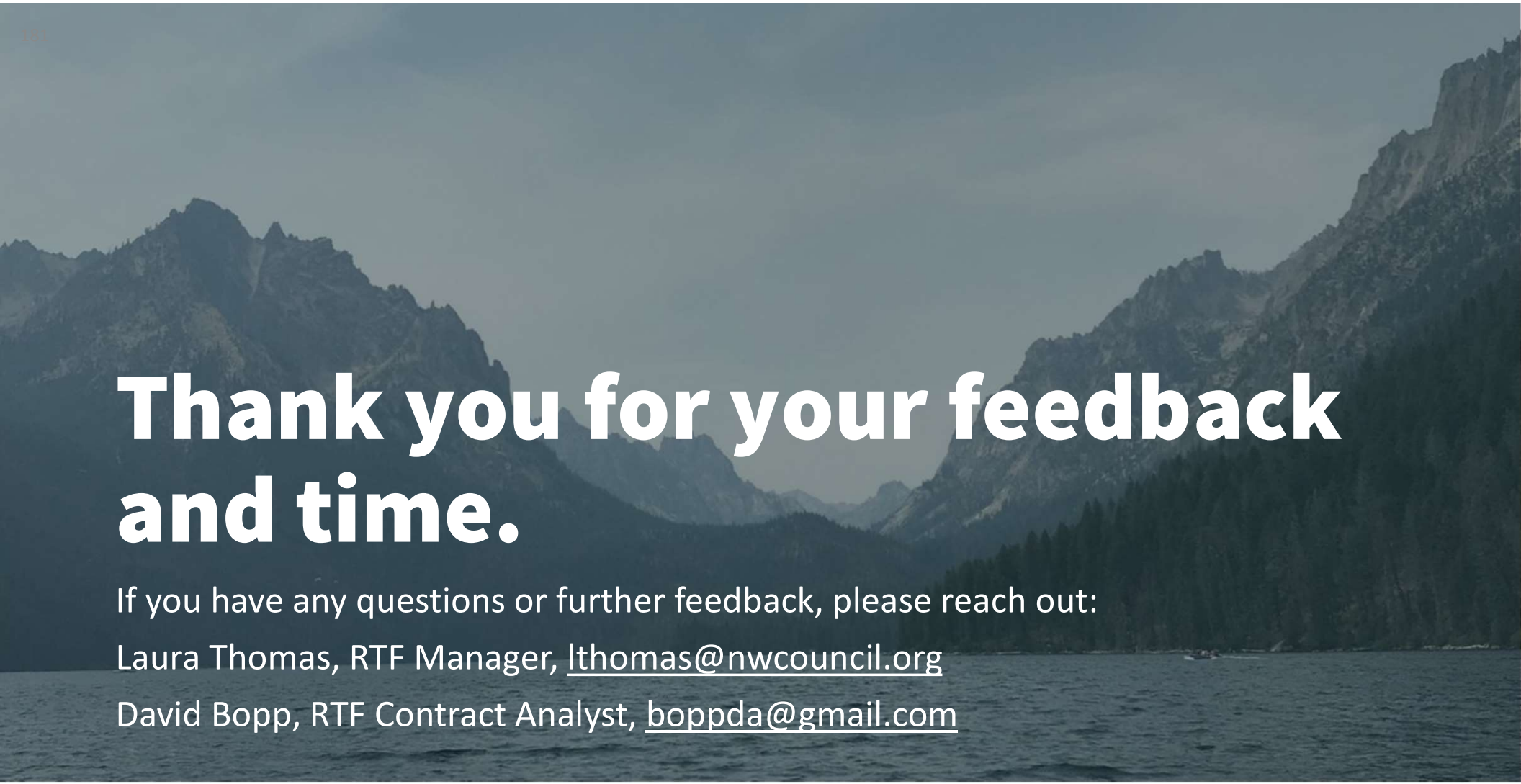
Starting with existing residential measures, (i.e., centrally ducted and ductless HPs) and updating analysis for RTF decision between Jun-Oct. This will ensure programs have updated RTF measures for 2025.

Commercial Measures

Update commercial heat pump measures

Once residential measures are complete, updates to the commercial heat pump measures will begin. Mid to late 2025.

Commercial



Thank you for your feedback and time.

If you have any questions or further feedback, please reach out:

Laura Thomas, RTF Manager, lthomas@nwcouncil.org

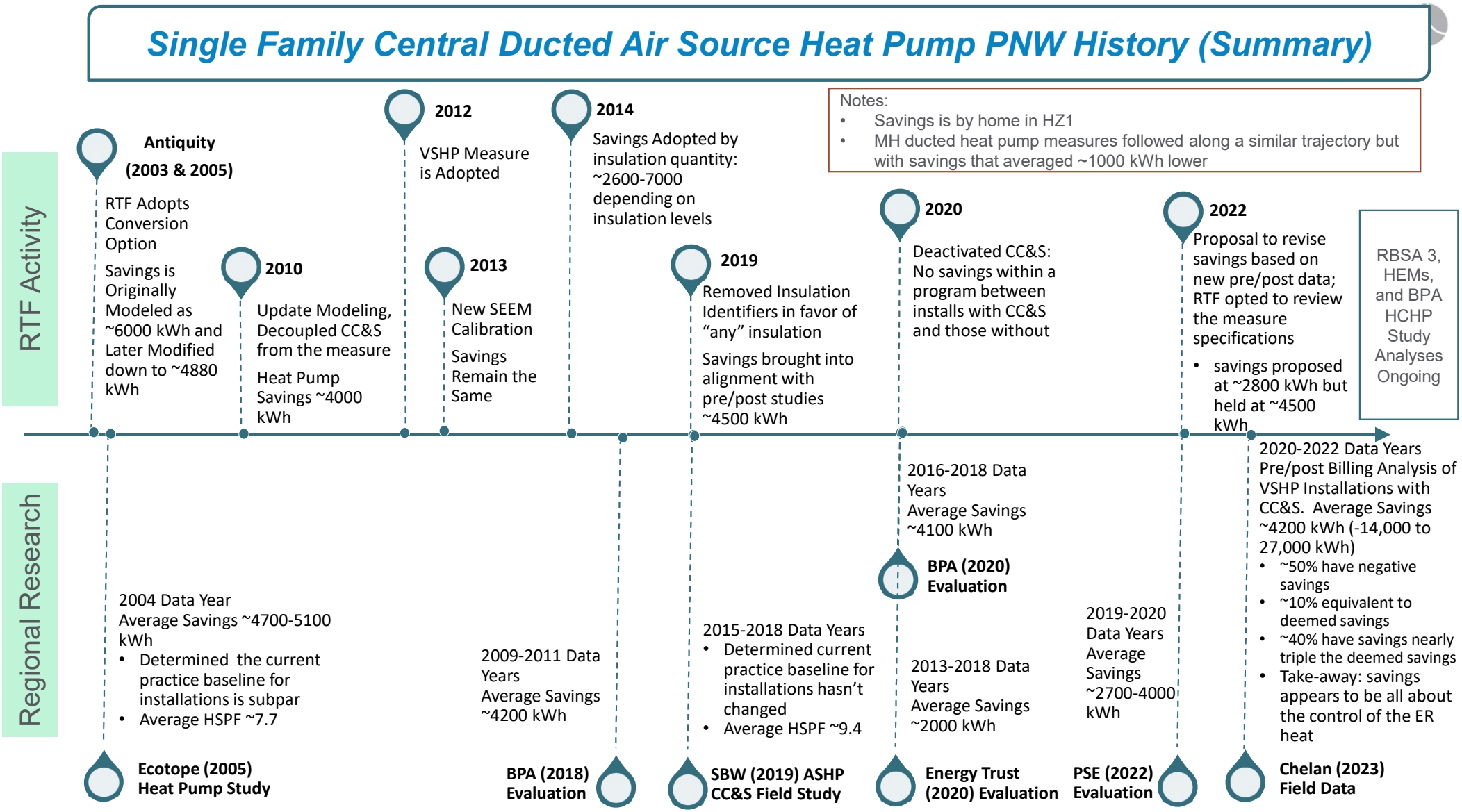
David Bopp, RTF Contract Analyst, boppda@gmail.com

Regional Technical Forum

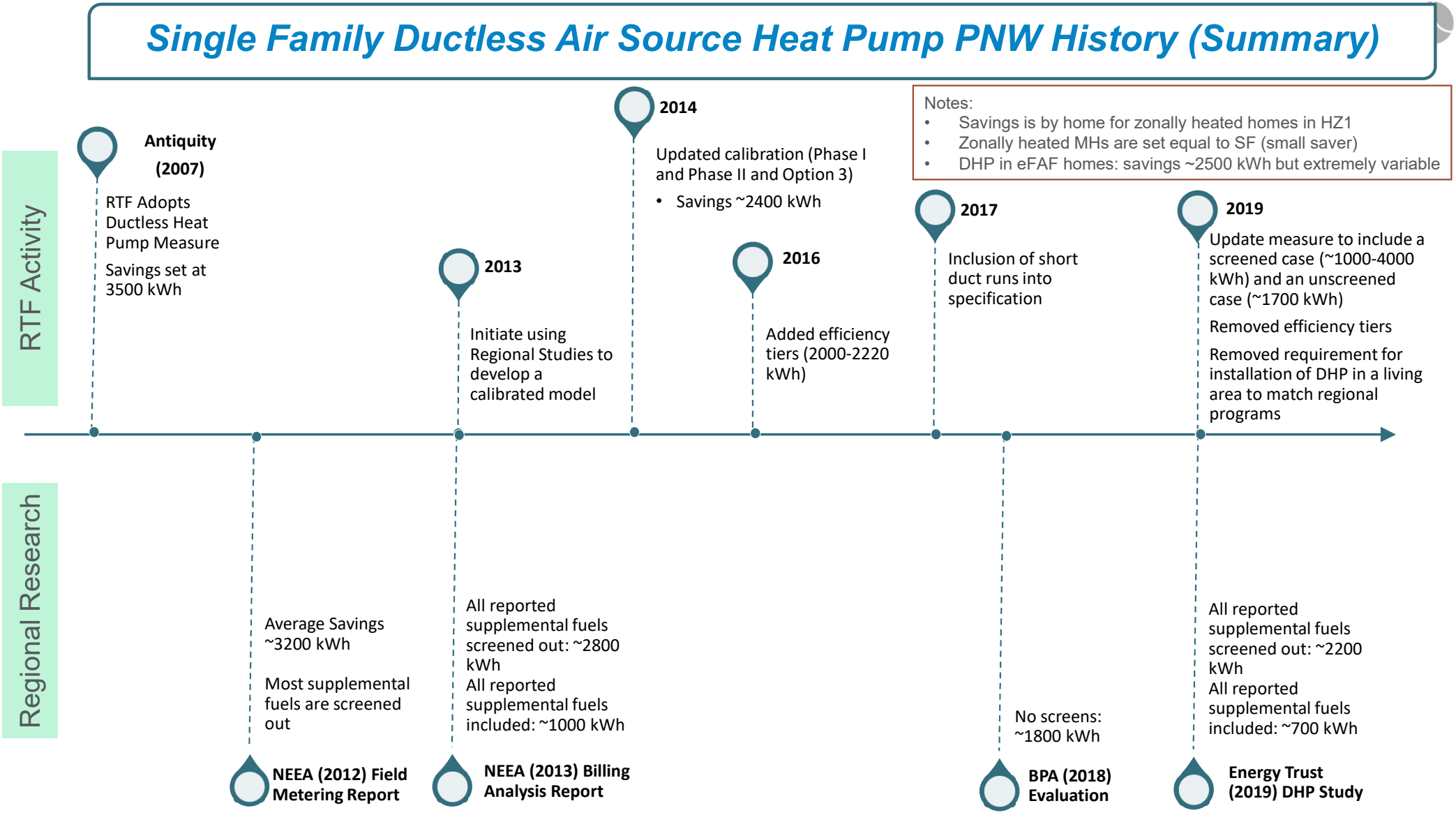
Additional Slides

Regional Technical Forum

Single Family Central Ducted Air Source Heat Pump PNW History (Summary)



Single Family Ductless Air Source Heat Pump PNW History (Summary)



Thank you!

Break

 |

AGENDA

All times Pacific

9:30 - 9:45 am (15 mins)	**Welcome**
9:45 – 11:15 am (90 mins)	**Regional Priority Topic** • **Advanced Heat Pumps -** *Heat Pump Measure Development Updates by Regional Technical Forum (RTF)*
11:15 – 11:25 am	***BREAK***
11:25 – 11:30 am (5 mins)	**Q3 Topic Check In** • **Heat Pump Water Heater** • **Any additional relevant topics**
11:30 – 11:50 am (20 mins)	**Coordinating Committee Assessment**
11:50 – 12:00 pm (10 mins)	**Housekeeping** • Announcements & Upcoming Meetings/Events
12:00 – 12:05 pm (5 mins)	**Recap, Next Steps, Adjourn**

Q3 Regional Topic Check In

Heat Pump Water Heaters

- NEEA share out on current market activities targeting this barrier while also inviting others to share out on relevant activities, research and pilots

Any Other Relevant Topics

- Ad hoc Topics?

AGENDA

All times Pacific

9:30 - 9:45 am (15 mins)	**Welcome**
9:45 – 11:15 am (90 mins)	**Regional Priority Topic** • **Advanced Heat Pumps -** *Heat Pump Measure Development Updates by Regional Technical Forum (RTF)*
11:15 – 11:25 am	***BREAK***
11:25 – 11:30 am (5 mins)	**Q3 Topic Check In** • **Heat Pump Water Heater** • **Any additional relevant topics**
11:30 – 11:50 am (20 mins)	**Coordinating Committee Assessment**
11:50 – 12:00 pm (10 mins)	**Housekeeping** • Announcements & Upcoming Meetings/Events
12:00 – 12:05 pm (5 mins)	**Recap, Next Steps, Adjourn**

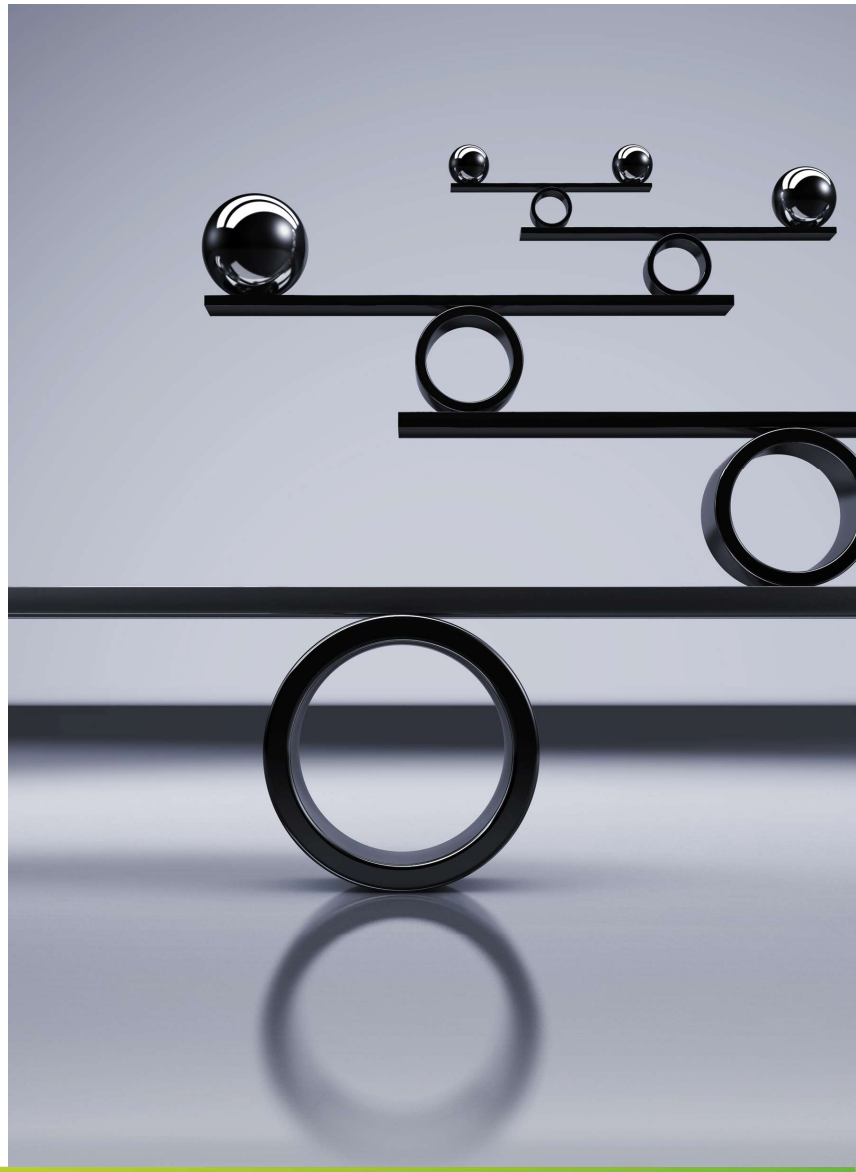
Coordinating Committee (CC) Assessment

Alisyn Maggiora

amaggiora@neea.org

Sr. Stakeholder Relations Manager

NEEA



Memo: pg. 7-8

Coordinating Committee Assessment

Topic Agenda

1. *Ask of you Today*
2. *Context*
3. *Proposal Review*
4. *Next Steps*
5. *Poll & Discussion (initial feedback)*

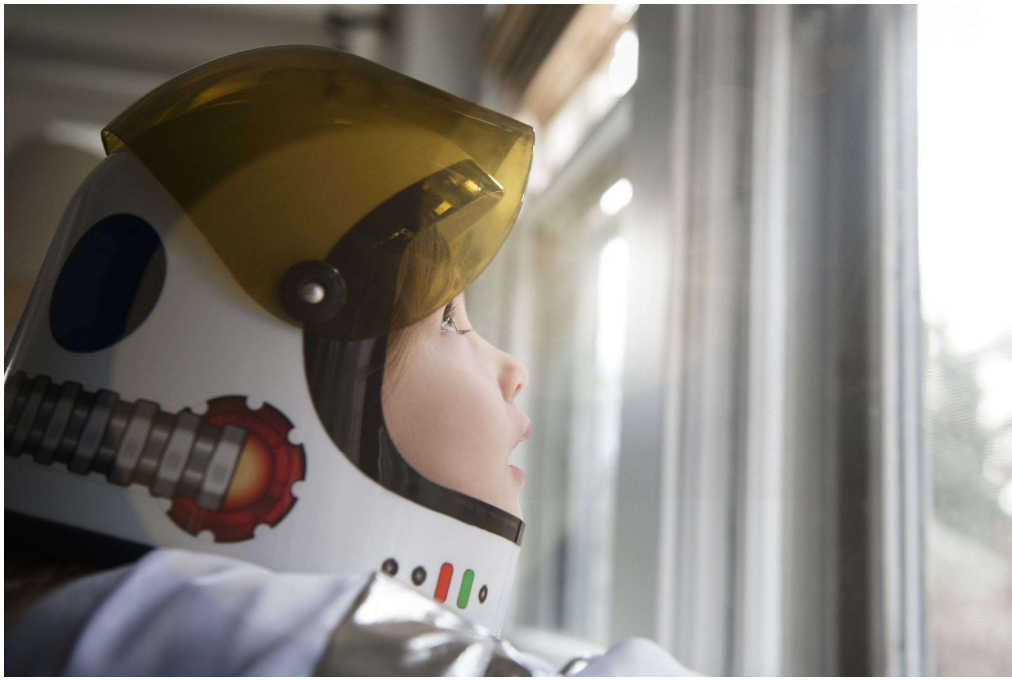
 |

Ask of You Today

- Consider the proposed changes
- Offer initial feedback via poll and live discussion

Next Step

- Confirm your feedback w/ Anouksha (1:1s, email) by Aug 1



Memo: pg. 7-8

CONTEXT:

Coordinating Committee (CC) Assessment

- **Focus areas:**
  - Structure, content flexibility, # of meetings
- **Goals:**
  - Identify areas for improvement and support transition to Cycle 7 (2025-29)
  - Ensure regional value delivery and effective resource allocation.
- **Next Steps:**
  - Q2: Scenario review, input gathering w/ CCs
  - Q3: Review w/ RPAC, confirm w/ CCs

Stakeholder Survey + 1:1s:

What we heard Re: Coordinating Committee improvements

- Reduce meeting frequency
- Increase agenda flexibility
- At least 1 hybrid meeting/year
- Packet materials & notes
- Utility / sector alignment

Proposal

Continuous Improvement Efforts

Recent Improvements (2024):

Program Swap

- Pumps & Fans → ISCC
- Adv HPs & Windows → PCC

Increase Agenda Flexibility

- Regional Priority Topic check-in every quarter
- Dedicated ad-hoc topic time

Proposed Improvements (2025+):

Rename Committees w/ Sector

- Residential Coordinating Committee
- Commercial & Industrial " "

3 Meetings a year

- Q1 & Q4: 2 half-day meetings (1 hybrid)
- Q2: 1 half-day webinar with program focused breakouts

Proposed changes in red font + highlight

Proposed Schedule & Agendas

Q1 (Feb / Mar) *Hybrid*	Q2 (May / June) Virtual	Q4 (Nov / Dec) Virtual
2-Half-Days: Agenda Day 1	**1-Half-Day Agenda**	**2-Half-Days: Agenda Day 1**
Welcome & Introductions	Welcome, Housekeeping, & Introductions	Welcome, Housekeeping, & Introductions
Regional Priority Topic	Break	Regional Priority Topic
Break	Regional Roundtable Updates	Break
Regional Priority Topic	Break	Round Table Updates
	Q4 Regional Topic check in	
	1 hour breakout sessions for program-specific coordination needs, ad-hoc topics, or regional/utility related topics	
2-Half-Days: Agenda Day 2		**2-Half-Days: Agenda Day 2**
Welcome & Housekeeping		Welcome
Regional Priority Topic		Ad hoc topic time
Break		Break
Round Table Updates		Annual planning
Ad hoc topic time		

Residential Coordinating Committee (RCC)
Commercial & Industrial Coordinating Committee (CICC)

The Takeaways:

- Lighten the load and increase flexibility
  - 3 meetings/year (summer break)
  - Incorporate “breakouts”
  - Balance convening w/ regional coordination

CC Assessment Next Steps

Time	Task
May/June	Discuss assessment insights and share proposed improvements with coordinating committees
June/July	Internal recommendation review/feedback; CC members discuss w/ Anouksha in 1:1s
August 22	Present proposal to RPAC for consultation and feedback
August/September	Share RPAC feedback; confirm final adjustments w/ coordinating committees
November/December	Share final proposed changes to implement in 2025 with RPAC

POLL

Select option 1 –OR– option 2

Select 3 as well if you'd like to discuss

1. Keep as is – 4 mtgs/year
2. Incorporate proposed improvements
   - 3 meetings / year
   - more flexibility in agenda
   - program-specific, simultaneous breakouts
3. Please contact me to discuss

Have other ideas for the group to consider?
- Pipe up
- Share in the chat
- Discuss 1:1

Discussion

Thoughts?

Questions?

Ideas?

 |

Thank you PCC!

Alisyn Maggiora
amaggiora@neea.org

AGENDA

All times Pacific

9:30 - 9:45 am (15 mins)	**Welcome**
9:45 – 11:15 am (90 mins)	**Regional Priority Topic** • **Advanced Heat Pumps -** *Heat Pump Measure Development Updates by Regional Technical Forum (RTF)*
11:15 – 11:25 am	***BREAK***
11:25 – 11:30 am (5 mins)	**Q3 Topic Check In** • **Heat Pump Water Heater** • **Any additional relevant topics**
11:30 – 11:50 am (20 mins)	**Coordinating Committee Assessment**
11:50 – 12:00 pm (10 mins)	**Housekeeping** • Announcements & Upcoming Meetings/Events
12:00 – 12:05 pm (5 mins)	**Recap, Next Steps, Adjourn**

Housekeeping & Looking Ahead

- RPAC Updates
- Announcements
- Upcoming NEEA Meetings

RPAC Updates

- Federal Funding Workgroup Update
- Reminder of 2024 Stakeholder Engagement Activities
- HPWH Marketing Campaign elections May 13 – all utilities plan to participate.
- NEEA Manufactured Homes program winding down – shifting to “monitoring and tracking” status in Q3.

2022 RBSA Data Reveals Northwest Energy Trends

neea.org/rbsa

Upcoming NEEA Meetings

June

- June 25th & 26th – NEEA Board Meeting
- June 27th – Regional Emerging Technology Advisory Committee

August

- August 15th – Q3 Integrated Systems Coordinating Committee Meeting
- August 22nd – Regional Portfolio Advisory Committee Meeting
- August 28th – Q3 Cost-Effectiveness & Evaluation Advisory Committee Meeting

September

- September 9th & 10th – Q3 Board Meeting
- September 12th – Q3 Products Coordinating Committee Meeting
- September 19th – Natural Gas Advisory Committee Webinar
- September 25th – Regional Emerging Technology Advisory Committee Meeting

2024 PCC Meeting Dates

Q1

- Thursday, March 21

Q2

- Monday, June 24
- Tuesday, June 25

HYBRID @ NEEA Office

Q3

- Thursday, September 12

Q4

- Tuesday, December 3
- Wednesday, December 4

Other Upcoming Events or Announcements?


Let’s wrap it up!

Action Items | Any Final Qs?

- Action Items

Thank you PCC!
Till we meet again…

Q3 PCC Meeting

Thursday, September 12, 2024 (virtual)