



Regional Technical Forum

**April 23, 2024
Meeting Minutes**

Welcome, Agenda Review and Meeting Minutes

Jennifer Light, RTF Chair, began the meeting at 9:00am by calling for introductions. She counted 18 voting members. Rebecca Blanton, independent, moved to adopt minutes from the March 19, 2024 meeting. Rick Knori, Lower Valley Electric, seconded. The minutes were adopted unanimously.

Eric Miller, independent, moved to adopt the day's agenda. Phillip Kelsven, BPA, seconded. The agenda was adopted unanimously.

Management Update

Laura Thomas, RTF Manager [Presentation](#)

Staff provided an update on upcoming meeting topics, data requests, current RFPs, and discussed recent analysis and workbook to understand RTF planning measures. RTF asked clarifying questions and recommendations to gain deeper understanding of the priority measures regarding the RTF planning measure analysis.

David Baylon, independent, asked what was meant by precision on [Slide 13] signaling out residential heat pump water heaters specifically. He noted the large amount of work done on this measure, insisting that the uncertainty should be much less.

- Laura Thomas, RTF Manager: This is just the uncertainty on the split systems, which are a small portion of the total potential.
- Light: Also, the HVAC interaction is very uncertain. We've accepted that we can't do better.
- Josh Keeling, Utility API: Twenty percent is probably an overestimate of our precision. It does incorporate specification error, measurement error, and some made up precision on parameter estimates. We codify some of this in the planning/proven categorization so we should be clear and call it out.

Baylon noted that, in this case, 100 units across the region have been sub metered. He did concede that they are not split systems.

- Keeling: If the measure was just the submetering data, I'd agree with you. But more goes into our measure and there's uncertainty in all of this.
- Light: This slide is just illustrative of the risk by measure.

Eric Mullendore, BPA, addressed commercial secondary glazing systems, saying they've only done one project in the last few years. He said research requires market uptake, adding that an indication of what's moving in the market would help focus on which planning measures to move to proven.

- Thomas: Yes, hopefully this work inspires more of the analysis you're suggesting.
- Light: Plus, we have some insight from the RCP. It's always good to consider which measures are viable for programs.

Sarah Widder, Cadeo Group, addressed Mullendore's point saying she thought the characterization of uncertainty is pretty accurate as it represents the Contract Analyst Team's best guess as quantified in research strategies. She said it considers some, but not all, aspects of uncertainty. Widder suggested also thinking about how much uncertainty can be reduced by doing research. She used heat pump water heaters as an example, saying there is a lot of uncertainty that can't be improved on.

- Light: The RTF updated guidelines a few years ago to define Proven. It means we can't improve uncertainty a reasonable cost. It's not that we necessarily know the savings at 10% precision/90% confidence.

Update Planning [Proven] UES: Display Case Lighting

Paul Sklar, RTF Contract Analyst (CAT) [Presentation](#)

[Note this is a proven measure, not planning as indicated on the agenda]

Staff presented proposed updates to the Display Case Lighting UES. The RTF discussion focused on the upcoming state and federal legislation, as well as the second period costs. As this measure does not sunset until 2026 and is being updated due to upcoming state requirements, the RTF decided to bring this measure back for consideration at the May 2024 RTF meeting.

Baylon asked if the "sales of linear florescent" noted on [Slide 4] are the luminaires themselves or replacement tubes.

- Paul Sklar, RTF CAT: I haven't looked at the details.
- Jackie Goss, Energy Trust of Oregon: It's the sale of the tubes that will be banned in January [in Oregon].
- Baylon: So, these will be gone within a year or two?
- Goss: Yes.

Baylon asked how this can be a measure if fluorescents become illegal in six months [Slide 8].

- Sklar: This is a preconditions measures. That means there are savings at least up until the point the fluorescents would have been replaced. Also, there is the cost savings of not having to replace the fluorescents later on.

Widder summarized the issue, saying we need to think incrementally about periodic replacement costs [Slide 14]. She asked why staff are not computing the incremental cost for the whole lifetime and then just using that. She then asked if this is an issue for all measures.

- Sklar: This is how ProCost handles these values. We'd need to check how it's handled in other measures.
- Widder: This sounds like a systemic ProCost issue.
- Ryan Firestone, RTF CAT: We're being consistent with the guidelines and ProCost documentation. It's just not very straightforward what that base case cost in period two represents. We could improve the wording about what this represents.

Goss asked if the crux of this problem is that the fluorescents have a shorter measure life than the LEDs.

- Sklar: No, it's that it has a shorter lifetime than the 20-year planning period.
- Goss: Then I'm not following what's going on.
- Sklar: We want to track costs the same way in the efficient case and the base case. This requires a little extra work for the base case.

Blanton related that the measure life of a fluorescent tube is two years. She wondered about assuming a cost of replacing the tube repeatedly, even though they're illegal.

- Sklar: This would only be relevant to states with a fluorescent ban.

Kevin Geraghty, independent, confirmed that these costs are discounted before asking if they even matter. He noted that the base case becomes illegal soon but thought the bigger issue is that costs will change over 20 years. He said the base case may be irrelevant or wrong. Geraghty asked what the allegiance to the planning period is, noting that the price and technology environment will change. Because of this Geraghty didn't understand why the group was wedded to the planning period adding that discounting future costs to the present makes them smaller/irrelevant.

- Sklar: This is a question for the Planners. And yes, this is a short-term measure. The present value of the fluorescents is more than the cost of one lamp. It doesn't look like it disappears in value.
- Light: Let's keep going. We're getting the accounting right. We can discuss what this accounting actually is at a later point.

Goss thought that the fluorescent ban starts in Washington in 2029, adding that we might need a WA specific measure identifier [Slide 15].

- Light: We can discuss this at the end.
- Baylon: The only difference would be that Washington would have a chance of having legal fluorescent tubes in the 2nd period. But not for 20 years.
- Sklar: We'll take a look at that. We'd have to add WA now or on the next update.
- Light: Let's put this in parking lot.

Light addressed the Washington question, asking if the RTF needs to do anything with current analysis [Slide 18].

- Thomas: This sunsets in 2026.
- Light: We can bring this back in May. That gives us time to deal appropriately with WA and the baseline replacement piece.

MOTION

Miller moved to bring this work back at the May meeting.
Baylon seconded.

Kevin Smit, NWPCC, asked if anyone accounted for the new GSL Federal standard that takes effect in 2028, adding that it just hit the floor a few weeks ago.

- Sklar: I wasn't aware. I'll take a look.
- Andrew Grant, Cadmus Group: Yes, the same thing. The GSL federal standard starts in 2028.
- Light: We'll look at that between now and May.

Vote on the Motion. The motion Carries. (18 yes, 1 no, 0 abstain).

Update Planning UES: Commercial Timers on Water Coolers

Sorochi Okam and David Bopp, RTF Contract Analyst, [Presentation](#)

Staff presented proposed updates to the Commercial Timers on Water Coolers UES measure. The RTF discussed on-demand products and the labor rates, as well as asking clarifying questions on the saving shape, stand by hours, and delivery mechanism. The RTF approved the updates to this measure as presented, kept the category as Planning and status as active, and set the sunset date to April 2028.

Baylon asked if on-demand equipment is rare [Slide 9].

- Sorochi Okam, RTF CAT: Correct. On demand is not as common.

Baylon was surprised that delivery verification doesn't ask if the machine offers on-demand hot water or if it is storage [Slide 13].

- Okam: From the customer's perspective it's hard to determine if the technology is on-demand or storage. Plus, the timers are installed after the water cooler, so the customer might not know much about the product/model at that point.
- Baylon: I think on-demand is rare, but you'd want to know because the savings would be different. There would be no standby loss.
- Okam: Only a small percentage of products are on-demand, so it wouldn't have a big impact on savings.
- Thomas: There are only four on-demand products in the market. We're not sure if the timer and water cooler are installed at the same time. And it's not clear if a customer would be able to tell a program what type of equipment it is.
- Josh Rushton, RTF CAT: They could determine that if that wanted to.
- Denis Livchak, RTF CAT: The on-demand products we looked at had 1000-watt heating elements, the reservoir ones are 400 watts.
- Baylon: That's my point. There's a big difference in these technologies. The savings for a timer would be non-existent for on-demand products. Is it ever true that we care? The hot water savings could be as large as the cooling savings. I want to make sure we're not counting savings for on-demand hot water dispensers. I think the only thing we could

do is check the wattage. 1000 watts would be on demand. Anything smaller would count as storage.

- Light: I'll put that in the parking lot.

Blanton asked if labor rates have been reduced bringing the installation costs done [Slide 16].

- Okam: Yes, the unskilled labor rate is reduced.
- Blanton: Everything in the world is going up. I don't think labor rates would be going down.
- Light: I think this is more a matter of what's in the SIW (Standard Information Workbook) and when it's been updated, rather than an actual reduction in labor costs.
- Blanton: Home services labor has gone up 30%-plus in the NW. This is a big driver of inflation.
- Light: I think this reflects the vintage of the data in our SIW. The RTF could decide to increase the labor cost.

Geraghty asked how standby savings for storage water heaters were calculated.

- Okam: I used the CBSA to get hours of use.
- Geraghty: A water heater is a setback. I agree that there's savings. But there's also a catch-up period when the water heater is on. It's not as simple as "multiply the hours of use by standby." That's wrong. I don't know how wrong, but it's wrong.
- Okam: We have assumptions about repeat and preheat, addressed in the research strategy as well.
- Geraghty: Alright.

Widder addressed savings shape on [Slide 17] saying she understands the rationale that some buildings have year-round operation. She asked about buildings with a different weekend schedule, wondering if the timer is seven day or just a 24-hour programmable device.

- Okam: Both. It can do seven-day schedules.

Baylon addressed on-demand hot water on [Slide 19] noting that it's not included in the hot/cold because there's no hot water savings. He asked if this is the correct set up, that demand hot water never has savings associated with it.

- Okam: No, we'd count that as hot/cold.
- Light: We've got that in the parking lot.
- Goss: I think it's important to note that these are the names customers would need to know. They won't know on-demand/storage. They will know cold versus hot/cold. Also, there's a blending that goes on in the measure analysis that we're not seeing. That accounts for this, right?
- Okam: Yes.

Nick O'Neil, Energy 350, saw no problem with using removal rate on [Slide 24], but recalled when this was brought forward before, the RTF policy was to reflect savings and account for the removal rate in delivery verification. He asked why this is changing now and for this measure.

- Light: We've gone both ways on this. We bake in the removal for some, for others it's part of delivery verification. We can make it clear what we're doing, and programs can decide to bake this in or not.
- O'Neil: Costs may have previously been incorrect when there was an error in GDP deflators.
- Light: Thanks, that makes sense. And costs might be higher when we update the SIW.

Parking Lot

David Bopp, RTF CAT, addressed the discrepancy in labor costs saying the current version uses fully burdened and the proposed using just the labor rate. He said after cleaning that up there will be no difference in cost.

Light asked if the measure should be limited to conditioned storage and exclude on-demand.

- Bopp: On-demand equipment uses about half the energy per day as full storage. We account for this in the analysis, assuming they are in the field in proportion to their presence in the QPL. We could have a separate identifier. But could we identify this equipment in the field?
- Baylon: If you use an on-demand water heater, it adds 9 amps to the equipment load. It should be easy to tell by documenting the device.
- Light: So, you'd like to see them split out?
- Baylon: Yes. You could make measure eligibility have a wattage maximum.

Goss understand Baylon's intent but asked the body to look at the delivery mechanism: mail by request. She thought asking end users to look equipment labels and tell the truth would make this so much more complicated to deliver. She added that it's already too complicated.

Baylon asked what the potential is.

- Light: 10 aMW. If we saw a lot of on-demand water heaters, we'd reform the measure to reflect that.
- Goss: It would be better if the savings and weighting for on-demand and storage were in the workbook. Currently the workbook refers to another workbook that we don't have access to.
- Light: We'll clean that up.
- Bopp: If I remove on-demand from the analysis, the savings change by 1 kWh/yr.

MOTION

I, Mark Jerome, move that the RTF approve the updates to the Commercial Water Cooler Timer UES as presented, and: Keep the Category to Planning, Keep the Status to Active, Set the sunset date to April 30, 2028

Blanton seconded.

Vote on the motion. The motion carries. (20 yes, 0 no, 1 abstain)

BREAK

Update Prove UES: Residential Gas Water Heaters

Ryan Firestone, RTF CAT [Presentation](#)

Staff presented updates to the Residential Gas Water Heaters UES measure. RTF discussion focused on the competition groups and maintaining ENERGY STAR® Version 4.0 criteria. The RTF approved the updates as presented and kept storage and tankless units in the same competition group, keep the category as Proven and status as Active and set the sunset date to April 2026.

Baylon asked for clarification around intermediate products analysis [Slide 9].

- Firestone: The main one is recovery efficiency.
- Baylon: When you combine the baseline, recovery efficiency is a totally different object in storage and tankless units.
- Firestone: We build up the analyses separately. You are right that a storage unit and a tankless unit with the same recovery efficiency would have different energy usage.

Baylon confirmed that the proposal is to provide savings for ENERGY STAR® 4.0 [Slide 13].

- Firestone: We have separate measure applications for units that qualify for 5.0 and for units that only qualify for 4.0.
- Baylon: But in effect, 4.0 is basically the current federal standard?
- Firestone: It's close.

Keeling noted that the only cost-effective product is basically the federal standard, calling it like residential lighting all over again.

- Firestone: We'll see more differences as we get into the details.

Keeling asked if [Slide 14] represented a simple average across products or a sales-weighted average.

- Firestone: It's a sales-weighted average.

Keeling asked if the baseline assumes any fuel switching in the technical potential [Slide 16].

- Light: We'll be accounting for external electrification trends in the next Power Plan. That will affect the potential for measures like this. But the new Washington laws weren't in place last time around, so the 2021 Plan doesn't account for that, so neither does this measure at this time.

Goss asked if this measure could be used in a new construction application [Slide 17].

- Firestone: That would be a separate measure.

Baylon stated that there was some work in Minnesota from about 10 years ago showing that standby losses were a lot greater than expected in tankless water heaters. He said the tests missed this.

- Firestone: There's an adjustment that attempts to get at this. Also, there has been other research, including by NEEA, showing that tankless units really do save significant energy over storage units.

Baylon said that the 6% penalty on [Slide 20] differs from what was shown in the Minnesota literature.

Mark Rehley, NEEA, asked if daily volume has a different value between tankless and storage [Slide 21].

- Firestone: We use the same value for both. This is consistent with the research we're seeing, though that kind of resolution was not the specific research objective.
- Baylon: Some of the Minnesota research does show a difference.

Blanton pointed to the common practice baseline, saying incremental costs are relative to it [Slide 26]. She confirmed that decreasing incremental costs means the efficient equipment plus installation costs have risen much more slowly than common practice costs.

- Firestone: These are just equipment plus installation costs, not incremental costs. So be careful what you read into this slide. Also note that ENERGY STAR changed their methodology a bit.

Baylon asked how ENERGY STAR 4.0 tankless products save energy if it's the same as the Federal standard [Slide 30].

- Firestone: It's above the standard. The measure cases are mostly condensing.
- Light: There's no tankless non-condensing in our measure [Slide 13].
- Firestone: There is one.
- Light: But that's the delta when we're talking about ENERGY STAR 4.0.
- Geraghty: Also, the combined baseline includes a lot of storage. It isn't just tankless.

Rehley asked if Department of Energy Technical Standards Program (TSP) equipment costs were used.

- Firestone: No, we used the NEEA data for that. We did use the TSD for installation costs.

Baylon did not understand combining the two product types into a single group because they are very different [Slide 39]. He said we wouldn't have a measure without a single competition group. Baylon did not think this reflects how consumers make this decision.

- Light: The red bars on [Slide 39] are the savings and this is not focused on new construction.
- Baylon: I don't get how we have negative savings.
- Firestone: (further explained the graphs.)
- Baylon: So if we don't keep the same competition group it's not a measure except for ENERGY STAR 5.0.

Keeling supported this proposal, saying it feels like LEDs versus CFLs. He said tank measures aren't really efficiency, adding that they've hit the wall. Keeling thought the combined baseline correctly reflects that.

- Knori: For electric tankless we're seeing some unhappy customers because of the demand charge.
- Light: This is a gas measure.

Kathy Yi, Idaho Power, asked if the subcommittee recommend this.

- Firestone: They brought it up, but we didn't get a clear recommendation.
- Yi: I think the proposed approach is the right way to go.

Goss disagreed, leaning toward separating them. She thought it only made sense to combine the two if the RTF believed our incentives would be high enough to motivate a switch.

- Geraghty: Why wouldn't you want to incentivize this switch?

Rehley clearly saw these as separate competition groups, not combined. He said they function differently and have different non-energy benefits. Rehley then pointed to interesting storage technologies coming along which could present a big opportunity. He said the DOE is moving towards condensing tankless as the Federal Standard, calling it weird to incentivize a non-condensing tankless.

Widder addressed the incremental cost of switching from storage to tankless. She said, excluding cases that need a gas line upgrade, the incremental cost is not huge. This made her doubt that incentives wouldn't be able to motivate the decision to go tankless.

- Goss: [Slide 26] shows that tankless is \$500 more than storage. That's a lot to overcome, and I'm not sure how it squares with later graphs.
- Firestone: That's total installed cost. Keep in mind that tankless equipment has a longer lifetime. That means when we normalize for ProCost inputs, the costs look much more similar. But you are correct that the customer's first cost is higher.

O'Neil reported that even though he was in the "keep them separate" camp last time he did some digging and found contractors saying that upsells to tankless are actually pretty common in emergency replacements.

Noe Contreras, NEEA, thought the categories should be separate. He said market research shows a lot of messaging about endless hot water with tankless heaters. He also thought the pipe upgrade is a big deal in a lot of cases.

Jerome said that, like O'Neil, he wanted to see these technologies separated last time, but has been persuaded to agree with the combined baseline. He noted that they're seeing more and more units that can run with half-inch pipe.

- Christian Douglass, NWPCC: I agree with using the combined baseline. I think that's more consistent with other measures, like clothes washers. It seems weird to carve this out with combined baseline.
- Kelsven: I think it's going to be feasible to go tankless in most applications, so I'm good with the combined baseline.

Baylon agreed to the combined baseline but only if the body gets rid of ENERGY STAR 4.0 applications, so we lose non-condensing tanks.

Rehley thought concerns around pipe sizing were fair, but said lower pressure means lower capacity which might generate customer complaints. He said we need to know more about this.

Parking Lot

Light pointed to the issue of keeping the ENERGY STAR 4.0 identifier, adding that she agreed with using a single competition group. She called for more conversation about the 4.0 issue.

- Goss: [Slide 39] makes a difference. All the proposed measures are at a .2 so there will not be a measure.
- Light: There is one for going tankless with no gas line upgrade.

Keeling asked about how staff deals with mismatched measure lives.

- Firestone: We used the same current practice baseline with frozen efficiency.
- Light: Let's not read too much into the regional gas cost-effectiveness. We weight them via NEEA shares to get you in the ballpark.

MOTION

I, Mark Jerome, move the RTF approve the updates to the Residential Gas Water Heaters UES measure as presented and Keep storage and tankless units in the same competition group, Set the sunset date to April 30, 2026, Keep the status at Active, Keep the category at Proven. Knori seconded.

Keeling proposed a Friendly Amendment to move the sunset date to 2026.

- There were no objections. It was accepted.

AMENDMENT

Baylon moved to amend the motion to only allow ENERGY STAR 5.0 applications.

- There was no second. The Amendment fails.

Vote on the motion. The motion carries. (16 yes, 2 no, 1 abstain)

LUNCH

Update Small Saver UES: Rack Ovens

Denis Livchak, RTF CAT, [Presentation](#)

Staff presented proposed updates to the Rack Ovens UES. RTF asked clarifying questions on the hours of operation and ENERGY STAR criteria. The RTF approved the Rack Oven UES as presented, and kept the category as Small Saver and status as Active and set the sunset date to May 2028.

Contreras referred to the four bakeries staff spoke to for this update and asked what percentage of market they represent [Slide 21].

- Livchak: It's a very small percentage. This was just a spot check for the hours of operation. Grand Central Baking probably has ten locations. There are probably a couple of hundred bakeries in the state.
- Light: So, this was just to check that our numbers are reasonable?
- Livchak: Yes.

Keeling addressed operating hours, adding that he was a bread baker in college and used the equipment quite a bit. He thought the presented hours seemed very daytime oriented while bakeries typically have different shifts for different products.

- Livchak: For central bakeries we assume 3:00am to 10:00pm.
- Keeling: I worked from 10:00pm to 6:00am. I would expect to see near 24-hour, production-type hours.
- Livchak: We assume about 20 hours for production bakeries. The SCG study saw they shut down for a few hours a day for cleaning.
- Keeling: Do they cool them down or let them idle?
- Livchak: Supermarket and restaurant bakeries turn them off after 1:00 or 2:00pm. But they don't turn them off in between loads. That's where the idle time factors in.

Goss stated that Energy Trust of Oregon's gas load shapes are monthly, not hourly. She said these means the exact hours of operation are not important.

- Light: We follow the electric methodology, including hourly analysis.
- Livchak: Let us know if you have data to inform our shapes. The common theme in food service measures is a lack of data.

Keeling asked why staff broke out rack ovens from the other commercial ovens [Slide 29].

- Livchak: They have different savings and hours of operation.
- Thomas: ENERGY STAR has different criteria for rack oven as well.
- Keeling: Got it. And this is just for existing construction?
- Light: It's current practice. It can go in either existing or new construction. Washington is excluded because ENERGY STAR is code minimum.
- Keeling: Washington is going to put the RTF out of business.
- Light: And what a business it is!

Brandon Hines, TRC Companies, asked when this new version of the measure is expected to be released [Slide 34].

- Light: If the RTF approves it today, it will be effective today. The workbook will go through QA/QC but it's effective as of today.

MOTION

I, Eric Miller, move that the RTF approve the Rack Oven UES as presented, and: Keep the Category at Small Saver, Keep the Status at Active, Set the sunset date to May 31, 2028. Blanton seconded.

Vote on the motion. The motion carries. (18 yes, 0 no, 0 abstain)

Standard Information Workbook Update Plan

Logan Douglass, RTF CAT, [Presentation](#)

Staff presented details on the plan for updating the Standard Information Workbook (SIW) to gather preliminary feedback from the RTF on tabs proposed to archive and add.

Baylon asked why the RTF would drop retail electric rates [Slide 4].

- Logan Douglass, RTF CAT: I have a slide on that. We'll get to it.

Baylon did not agree with the rationale presented on [Slide 6]. He said that it's useful to have consistent sets of factors when trying to build up cost data. Baylon called the presented values consistent, if not accurate, arguing that getting less consistent and maybe, possibly more accurate measure by measure seems like a waste of everybody's time.

- Light: How often does the business plan have you updating the SIW?
- Thomas: There's both one big update and one minor update within the next five years.
- Light: So, we could keep this and keep update it. It doesn't seem like the analysts are using it.

Jerome asked if this will still be accessible if it is archived. He said that would make it available if needed.

- Baylon: But it wouldn't be updated.
- Jerome: These values seem good. They are not worth updating as these rates are fairly static. I don't think they change that regularly.
- L. Douglass: "Archiving" means that we remove the tab in the new workbook as we update it. But the archived versions of the SIW would have this (and are available on the website).

Baylon asked if this was updated last time.

- Light: I don't recall when this specific tab was updated.
- C. Douglass: I don't think this has been updated in a while. I don't think we've used it in any measure. We always want the cost at the end. That's typically what we want for measures.
- Light: I'm seeing head nods. Thomas can use her management judgement to decide how to move forward on this one.

Light stopped at [Slide 7] to explain that cost data is pulled out from our measure when we need it. She called this a reason to archive the data in the SIW.

- Baylon: This would normally be something okay to archive. Except that the next presentation is about updated heat pump measures. This data would be very useful for that.
- Light: This table shouldn't be updated. If there are pieces of commissioning, controls, and sizing when we update our heat pump measure, we'll include the costs in the workbook. If we keep it in the SIW, it will get out of date.
- Jerome: These are really old costs.

- Light: That's a problem with having measure-specific costs in the SIW. The SIW is really good for values we use across measures, but not for measure-specific assumptions.

Jerome recalled that the information on [Slide 9] was originally put this together to help value wood and things like that. He said that ship has sailed, adding that it's no longer needed.

- Baylon: I agree if we no longer use non-energy benefits.
- Light: We use non-energy impacts that relate to the framework in the Plan. The Plan cares about some, but not all, non-energy impacts. This includes fuel offsets. For ductless heat pumps we do this by valuing the other fuels. Let's take a look at our measures to make sure we're not using this.

Baylon asked if this is just Bonneville utilities.

- Light: I'm not sure. We trying to capture a regional average.
- Baylon: It's probably out of date for the region but not bad for the public utilities.

Keeling confirmed that these rates are used in RTF analysis.

- Firestone: No, we don't use these. We use the Council's marginal avoided costs.
- Keeling: What about the electric savings in a gas measure?
- Firestone: We use the electric methodology.
- Keeling: But that's not what the customer sees. Their bill goes up.
- Light: We can discuss this at another time offline.
- Bopp: These values are from the nationwide EIA. We weight the values based on population. This data is from 2017.

Light said that in the past we updated this after each measure [Slide 11]. She noted that the lifetimes are in the UES master workbook, and this sheet captures uncertainty and other important details. She thought it would be fine if this is in the summary sheet of each measure workbook.

- Thomas: We can keep updating this if we want.

Baylon argued to maintain and keep this table. He said people across the country are looking for this information and it should be updated least every decade or so.

- Thomas: I wasn't aware that this previously got updated every month. We can start doing that again.
- Jerome: People do reference this. I would like to consider not archiving.
- Goss: I agree that it's useful. And I also agree that the UES master workbook already includes the information.
- Light: The UES master workbook doesn't capture uncertainty. I like this because it helps look out for circular references and gets more details on uncertainty.

C. Douglass only half agreed with Light, asking why it has lifetimes only and not costs. He called the UES master workbook a great resource, suggesting moving this information there.

- Light: Maybe there's a way to indicate something about this in a column in the master measure workbook.

- Widder: I support taking this out of SIW because that's for data we use across measures and not a source. It seems like the wrong place for this complication. Maybe it could go in the workbook with all of the planning measures and their uncertainty?

Goss thought the tab on [Slide 13] sounded nice but thought it might belong in the measure workbooks, not the SIW.

- Thomas: I thought it would be good to create consistency across measures and save some work.
- Baylon: I agree. We do the same thing repeatedly. It seems like a good idea to write it all down to save time and avoid errors.
- Grant: I agree. But sometimes we need to convert metrics like SEER and SEER2. Getting those in there as well would be good.

Light asked why staff should not archive the heat pump costs if they are already in our measure workbook [Slide 14].

- Thomas: We need to do more work to see which measures use these values. If it's used across other measures, we'd want to keep it.
- Light: It'd be helpful to map measures to SIW. That way the SIW gets updated when measures get updated.

Baylon asked if the CAT will update this, or if it will be farmed out.

- Thomas: The CAT will do this. I've posted an RFP twice and gotten no responses.
- O'Neil: What's the update schedule? Annual? As needed?
- Thomas: It will probably be every couple of years with a major update every five years. We can tie minor updates to individual measure updates.

BREAK

Progress Update on Plan for ASHPs and Next Steps David Bopp, RTF CAT, Laura Thomas, RTF Manager [Presentation](#)

Staff presented on the plan for updating the air source heat pumps, specifically the proposed direction for centrally ducted heat pumps.

Sam Rosenberg, PNNL said [Slide 10] represents a conversation some people have been having with manufacturers. He pointed to a new generation of heat pumps coming soon, perhaps as soon as this summer, due to the [DOE Cold Climate Challenge](#). Rosenberg explained that these devices optimize the heat pump over resistance, and guarantee 100% capacity down to -5°F. He said most manufacturers are developing these products and thought that some concerns will hopefully be addressed by the new products. He conceded that there may be a higher price point.

- Bopp: Yes, it would be great to hear more about those. And hopefully some testing in the region as well.
- Rosenberg: We would be excited to support that work for TRMs nation-wide.
- Kelsven: This can be problematic when the heat pump isn't sized correctly. It can backfire. I do think it belongs in a spec for cold climate.

Baylon asked what is being considered for In Between Retro-commissioning [Slide 11].

- Bopp: I need guidance from the region/utilities on what they're thinking.
- Baylon: What if they're not a utility? I'm not a utility.
- Light: So, let us know what you're thinking.
- Baylon: This is an important list. Sizing and ducts are crucial to the performance of the heat pump.

Widder asked if it would accelerate the timeline if entities in the region came forward with interest in in-between measures.

- Thomas: Maybe. I can't make any promises. Right now, we have a big balancing act. I'll get into the timeline later on. I know it's important. I know there's a lot of interest in the region. But we also have a lot of other measures to work on. The "in-between" measure could happen in 2025 instead of 2026 if there's significant feedback/interest.
- Light: It would be helpful to have a prioritized list of interests for "in-between programs." For the 9th Power Plan, we'd need work done by Q1 2025. Let's see if we can get something by then.

C. Douglass asked if someone with no electric resistance backup could add resistance later on.

- Bopp: Yes. We're trying to build the measure in such a way that the homeowner won't call the contractor to ask for electric resistance.
- C. Douglass: That makes sense. We'll need to be careful about delivery verification. Maybe it's "no resistance," maybe it's "a judicious use of resistance, which could be verified."
- Bopp: I agree with C. Douglass. AMI data could pretty easily tell you if electric resistance has been added. You'll see large usage spikes.

Knori recalled a pilot his utility did with [Steffes](#) that used bricks for thermal storage. He said it works well for short amounts of time.

Baylon suggested adding "installer education" to the list as it's shown to be critical to the performance of heat pumps.

- Light: Thanks. I'm not sure how we'd add that to measure spec in a way that gets verified.
- Widder: It's hard to include installer education in a measure but there are a lot of new tools for sizing, selecting, and commissioning heat pumps. Those steps are critical to getting this right. I hope they make things more effective and remove the burden from utilities to provide training. I agree with Baylon that this should be part of retro commissioning and other "in-between" options.
- Light: We should also have another discussion about interaction with the building shell. And something about commissioning done too late in the process.

Light asked if Bopp's children were playing "The Heat Pump Blues" in honor of [Slide 25], acknowledging the piano music in the background.

- Bopp: Maybe....

Baylon pointed out that a heat pump conversion isn't just electric forced air furnace conversion, there can also be fuel switching [Slide 26]. He said regardless, these are important rules/specs for converting any system to a central heat pump.

- Light: We'll assume that the home chose electric.
- Jerome: We've thought through this a few times. This is like a standard protocol. Standard protocols are hard to implement and not that attractive unless we have something like the "The Heat Pump Blues," which we have. Maybe we should consider this as a viable option.
- Keeling: The reality is that a lot of projects will be done through State Energy Office funds or some similar programs. Maybe we should look for alignment with what's happening in Inflation Reduction Act programs, utility programs, and here.
- Baylon: This level of discussion isn't happening anywhere else. This whole idea of Quality Control to make sure you get everything done right. It would be nice to resolve this if you're going to do heat pumps with any other entity.
- Keeling: I agree. The Measurement & Verification discussion is very robust at this point. Just not the installation part.

Keeling asked if staff are thinking about measures that package insulation plus heat pumps [Slide 30]. He approved of that but called it kind of a weird program-design-y thing.

- Bopp: The first option is screening. The house has to qualify. The utility could go out and make the house qualify. Maybe the future could see the package measure. The region would need to ask for that. I haven't heard much interest yet.
- Keeling: It would be super valuable if you got that analysis done in time for states as they put their implementation plans together. Those should flow into programs.

Baylon noted that this kind of analysis was done 15 years ago. He said it's not a difficult analysis, but you need to decide where to draw the lines. Baylon said this is fine, adding that we have a massive simulation with lots of dials that we can segment however we want. Baylon said Bopp was right about limits to what can be done with older houses with 2x4 walls and aluminum windows.

- Keeling: I think there's never going to be as much interest in bundling heat pump measures as there will be in the new few years. Policy makers in the region need this spelled out for them. It's not traditionally the RTF's role, but you have the best analysis of anybody.
- Light: We have a lot of these pieces individually. We could think about the lift required to add other pieces. For example, we have ceiling insulation measures.

C. Douglass pointed to another interesting thing to look at for no electric resistance analysis, pointing to the fact that new heat pumps have a lot of capacity at low temps. He asked about a small, like 5 kW, electric resistance backup, saying that might make a difference.

Pace Goodman, Illume Advising, noted that in other parts of the country, programs are trying to lump measures together to create "make ready for electrification" programs. He said this adds

an expense and programs are trying to figure out how to fund it. Goodman wondered if “make ready” portions of the effort could skip having to pass cost-effectiveness.

- Light: We don’t limit our work to only things that are cost-effective.

Knori referenced a pilot project where [Right-J®](#) software looked at building heat loss and encourage customers to use a backup heat source like a propane furnace when it’s 30° or 40°F below. He said those projects turned out to be very successful.

- Bob Davis, Ecotope: There’s a lot of labor/training needed to keep these measures on track.

[Path for Reconsidering HP Measures]

Baylon noted that the region has a lot of heat pumps, many of which are actually not bad. He lamented that many, since the 2006 standard change, are acceptable for savings, but they’re not. Baylon said those houses are fine, insisting that there’s a measure here and utilities could provide significant savings.

Thomas agreed. She pointed to longer term goals and the need to have measures ready for programs now while keeping this ball rolling.

- Light: Trying to time things for programs makes sense, but not all programs are on the same schedule. Some things seem further out but are important for the region. Maybe there are some measures in the queue that are small, or we wouldn’t have big updates. Maybe we could prioritize getting some heat pump measures or other new measures ready for the Plan, rather than the smaller things closer in the queue.
- Thomas: Absolutely. I’ll need some help identifying which heat pump measures would be preferred.
- Keeling: Take a look at the IRA funding, you could cross reference with what’s going on there.

C. Douglass stressed that there’s a lot of modeling to be done here adding that we have a good model for the work. He said we should also look at what others are doing and what other data is available. C. Douglass called the Chelan data good, adding that Tony Koch at BPA is doing interesting work on high performance heat pumps that asks how low you can go if you do everything right. C. Douglass reported that they now have two homes with no resistance backup, and the RTF can look at metered data from those homes. He said he’s seen some of the results and there will be a presentation at the Efficiency Exchange. C. Douglass insisted that this stuff can be done but conceded that these are high touch homes. He said the question of how to scale that to a program remains.

- Davis: As long as there’s overemphasis on box specs and box spec incentives, we will continue to leave a lot on the table. This will only get worse with cold climate models. Houses with lower heating loads and good ducts will work well down to cold temps. CEE in Minnesota has done a lot of good work on this.
- Light: This is great work. Please send Laura Thomas and Dave Bopp your thoughts soon as Thomas is trying to manage and prioritize work.

Light ended the meeting at 3:45.

Voting Record: April 23, 2024

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 agenda for the April 23 meeting (Miller/Kelsven)	18	0	0	Yes	60%	100%	18
Motion: Approve the minutes from the March 19 meeting as posted (Blanton/Knori)	18	0	0	Yes	60%	100%	18
Motion: Bring the UES: Display Case Lighting measure back to the RTF in May (Miller/Baylon)	18	1	0	Yes	60%	95%	19
Motion: Approve the updates to the Commercial Water Cooler Timer UES as presented, and: <ul style="list-style-type: none"> • Keep the Category to Planning • Keep the Status to Active • Set the sunset date to April 30, 2028 (Jerome/Blanton) 	20	0	1	Yes	67%	100%	21
Motion: Approve the updates to the Residential Gas Water Heaters UES measure as presented <ul style="list-style-type: none"> – Keep storage and tankless units in the same competition group – Set the sunset date to April 30, 2026 – Keep the status at Active – Keep the category at Proven (Jerome/Knori) 	16	2	3	Yes	53%	89%	21
Motion: Approve the Rack Oven UES as presented, and: <ul style="list-style-type: none"> • Keep the Category at Small Saver • Keep the Status at Active • Set the sunset date to May 31, 2028 (Miller/Blanton) 	18	0	0	Yes	60%	100%	18

April 23, 2024, Meeting Attendance

* Designates Voting Member

Name	Affiliation
Jamie Anthony*	BPA
Suzi Asmus	NEEA
Sofya Atitsogbe	WA UTC
Jonathon Belmont	BPA
David Baylon*	Independent
Rebecca Blanton*	Independent
David Bopp	RTF Contract Analyst
Robert Burns	Pivotal Energy Solutions
Noe Contreras	NEEA
Bob Davis*	Ecotope
Christian Douglass	NWPCC
Logan Douglass	RTF Contract Analyst
Christopher Dymond	NEEA
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
Todd Greenwell	Idaho Power
Ken Hays	Clallam PUD
Anna Hilbruner	Elise Solutions
Jonathan Heller	Ecotope
Brandon Hines	TRC Companies
Michael Hoch	Energy Trust of Oregon
Aaron Ingle	NEEA
Mattias Jarvegren	Clallam PUD
Mark Jerome*	CLEAResult
Josh Keeling*	Utility API
Phillip Kelsven*	BPA
Rick Knori*	Lower Valley Electric
Ben Larson	Larson Energy Research
Jennifer Light*	RTF Chair
Denis Livchak	RTF Contract Analyst
Ben Mabee	BPA
Eric Miller*	Independent
Eric Mullendore*	BPA
Andi Nix	Energy Trust of Oregon

Alex Novie*	Energy Trust of Oregon
Nick O'Neil*	Energy 350
Natalia Ojeda	Energy Trust of Oregon
Sorochi Okam	RTF Contract Analyst
Brian Owens*	CLEAResult
Craig Patterson	Independent
Andrew Paul	Avista Corp
Joe Prijyanonda	Applied Energy Group
Laney Ralph*	NW Natural
Mark Rehley*	NEEA
Samuel Rosenberg*	PNNL
Josh Rushton	RTF Contract Analyst
Aven Satre-Meloy	LBNL
Peter Schaffer*	PacifiCorp
Aditya Saxena	TRC Companies
Halle Senger	Applied Energy Group
Blake Shelide*	ODOE
Paul Sklar	RTF Contract Analyst
Kevin Smit	NWPCC
Kenji Spielman	Energy Trust of Oregon
Jennifer Snyder	WA UTC
John Stainaker	BPA
Mariah Sullivan	BPA
Laura Thomas	RTF Manager
Patrick Urain	Energy Trust of Oregon
Michelle Wildie	Puget Sound Energy
Sarah Widder*	Cadeo Group
Kathy Yi*	Idaho Power