

Memorandum

February 14, 2017



TO: Regional Emerging Technology Advisory Committee
FROM: Mark Rehley, Senior Manager, Technology & Product Management
SUBJECT: Key Takeaways & Action Items – January 25, 2017

To Committee Members,

Thank you for your attendance and participation at our January 25, 2017 Regional Emerging Technology Advisory Committee meeting. We appreciate the attention and support you lend to our Committee agenda items so we can move forward with your feedback and alignment.

Below are the key takeaways from the January 25 meeting:

TOPIC	WHAT WE HEARD	ACTIONS
RETAC 2.0 on Conduit	Let's keep it simple and use Conduit, making it as easy as possible to find	NEEA will pass along all feedback to Conduit manager to make necessary adjustments
Acceptance Testing	Volunteers: <ul style="list-style-type: none">• Suzanne Frew• Keshmira McVey• Rem Husted• Todd Currier• Geoff Wickes	Let NEEA know if you would like to be a volunteer
RETAC 2.0 Taxonomy & Readiness Criteria	Add "transportation" category Ensure that non-energy benefits are included	Dave Kresta will make necessary adjustments
RETAC Charter	Make adjustments in wording, especially to 3 rd point	Small group of RETAC members will come together separately to discuss final changes to RETAC charter
Field Test Opportunity		NEEA to align with group, VHAC and Charlie on field test opportunities

ANNOUNCEMENT: Dave Kresta will act as RETAC 2.0 administrator for the first year of implementation

Optional Topics for Discussion at next RETAC Meeting:

1. NEEA, BPA & Ken presentation on CO2 Heat Pumps
2. Alternate refrigeration options

APPENDIX ONE: Full Meeting Notes – January 25, 2017

REGIONAL EMERGING TECHNOLOGIES ADVISORY COMMITTEE

Date: January 25, 2017

Time: 10:00am – 4:00pm

Location: NEEA Offices (421 SW 6th Ave, 6th Floor, Portland) – Cedar Conference Room

Webinar Link: <http://neea.adobeconnect.com/retacjan2017/>

Meeting Outcomes:

- Status updates and feedback on current RETAC 2.0 work
- Test RETAC 2.0 framework on current emerging technology portfolio
- Provide an updated understanding of thermostat and pay for performance technologies and their applications in the region

Presentations:

Agenda:

Attendees:

NEEA Staff (Johnathan Belais, BJ Moghadam, Mark Rehley, Christopher Dymond, Robert Curry, Dave Kresta, Geoff Wickes, John Jennings, Nick Leritz)
Rem Husted, PSE
Suzanne Frew, Snohomish County PUD
Ammi Amarnath, EPRI
Edward Smalley, Seattle City Light

John Owen, Seattle City Light
Kathy Yi, Idaho Power
Marc Ledbetter, Pacific Northwest National Laboratory
Todd Currier, WSU Extension Energy Program
Jennifer McMaster, BPA
Keshmira McVey, BPA
Mike Bailey, ETO

On the Phone:

David Shepherd-Gaw, Cowlitz County PUD
Kevin Smit, NWPPCC
Robert Weber, BPA

10:00 am Welcome and Agenda Review

Review meeting tasks and desired outcomes

- BJ Moghadam, NEEA

10:15 am RETAC 2.0

Mark Rehley and the RETAC 2.0 workgroup will provide an updated status report on the development of the RETAC 2.0 tool and lead a discussion about potential changes to the RETAC charter. The RETAC 2.0 framework will be demonstrated and discussed using the regions' current emerging technology portfolio.

- Outcomes:
 1. Bring RETAC members up to speed on current RETAC 2.0 project status.
 2. Generate consensus on scope and direction of potential changes for the RETAC charter.
 3. Provide feedback and necessary adjustments to the RETAC 2.0 workgroup

12:15 pm Lunch – Provided

BPA Video

12:45 pm Technology Coordination

Discuss technology projects that would benefit from the help of other organizations.

- Outcome: Prioritized list of technologies and partnering organizations.
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1:45 pm Technology Discussions

If you have other topics that you would like to discuss at a deeper level with the committee, please let us know.

- Thermostats: ETO will lead a discussion around thermostat technology and existing regional efforts
 - Pay for Performance: Seattle City Light will provide an update on their pay for performance program and kick off a discussion about other efforts and lessons learned.
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3:50 pm Meeting Review and Adjournment

– 4:00 Feedback about the meeting and adjourn

Welcome & Agenda Review

- Slight change to the agenda – Lori Moen to call in and discuss Pay for Performance after part one of technology coordination

RETAC 2.0 – Update by Dave Kresta

- Reminder – why we’re pursuing RETAC 2.0
 - Response to council’s request to better coordinate ET work (Model conservation standard-4)
 - **Goals:**
 - Aligning investments (of RETAC members) in ET
 - Generating insights & opportunities for collaboration
 - Proactively managing pipeline
 - Avoiding duplication
 - K.I.S.S. – keep it simple, stupid → the pervasive theme of the steering team
- Review of the Pipeline (see slide)
 - Focusing RETAC 2.0 on the middle piece of pipeline
 - Most of work is past tech. development and moving towards commercialization
 - Focusing on the actual product itself, not necessarily all of the applications
 - The tool will also allow us to track projects, but is not intended to be a project management tool
- STATUS
 - Requirement met in December
 - Some folks have entered preliminary data into SurveyMonkey as an experiment in using the taxonomy and readiness levels (may experiment with this today)
 - Continue to learn where we want changes by entering data
 - Chose Axian as vendor (current Conduit vendor)
 - Intend to leverage the work of Conduit
 - TODD (WSU): Are you planning on having Survey Monkey as data entry long term?
 - No. There will be another entry point to do this

- **Question for the group:** do we want to leave our RETAC community on Conduit as just general knowledge sharing and create a separate RETAC 2.0 community? Or should they be one?
 - Keshmira (BPA) – How have people been using Conduit up until now?
 - Jennifer (BPA) – mostly as a data repository
 - REM (PSE) – I want simple, least amount of click- throughs
 - Keshmira (BPA) – I've never used for collaboration, challenging to get there, but supportive of not recreating the wheel
 - REM (PSE) – could encourage people to use it more
- **CONCLUSION – let's keep it simple**
 - Kathy Yi (Idaho Power) – I like using Conduit because Outlook is limited in sight. If the organization on RETAC is there, then that's great. Let's make it easy to get to and find.
 - Mark R. (NEEA) – we could change the group to private if necessary
- RETAC 2.0 is supposed to be viewable by all and editable only by few
 - Mike Bailey (ETO) – it's very difficult to reset your password because you reset it and then don't get an email to reset their password – is there a tech issue here?

ACTION ITEM: Pass Conduit feedback to Veronica (NEEA)

- Timeline – starting implementation this week
 - We'd like volunteers to user acceptance testing (March 7-21)

VOLUNTEERS FOR ACCEPTANCE TESTING:

- **Suzanne Frew**
- **Keshmira McVey**
- **Rem Husted**
- **Todd Currier**
- **Geoff Wickes**
 - KESHMIRA (BPA) – what does the deliverable look like? What are the expectations?
 - These are captured in the requirements document to implement and produce
 - We will be looking for the comprehensive report – we want it to drive portfolio discussions
 - GEOFF (NEEA) – can you review what the use cases are for everybody?
 - These are in the requirements document
 - What's not there are the kinds of reports we want out of it – initially we'll have a couple of simple reports and then refine as we use it what kinds of reports we want
 - Geoff – very helpful to have flexibility here
 - Keshmira (BPA) – what about the position we want filled
 - Mark R. (NEEA) – didn't get a ton of feedback here and there is uncertainty at NEEA with regards to resources

ANNOUNCEMENT: Dave will fill in for the year as the admin for this tool as well as bringing it to fruition

- We will reassess at end of the year

• Taxonomy

- Mark R. (NEEA) – we really don't want duplicates in the tool – this is the purpose of the taxonomy need
- Marc L. (PNNL) – what's the difference between commercial multi-family and residential multi-family
 - Mike Bailey (ETO) – there may be measures that are applied more to high rises vs. units/mixed use, etc.
- We're trying for consistency, but also allowing for flexibility
- John Jennings (NEEA) – won't there be a definitions field early on?
 - We're unsure of if there's a standard here
 - Mike Bailey (ETO) – we're applying the 80/20 rule here – even if we use the DOE or what the power council uses, it doesn't fit with all of our programs
 - Edward Smalley (Seattle City Light) – it would be nice if there was a definition that allowed us to get close every time
 - John Owen (Seattle City Light) – let's make a determination for THIS application, so that everyone is in agreement
 - Mike Bailey (ETO) – we can't force people to enforce the taxonomy all the time, so we are working to bolster the search function
 - Ammi (EPRI) – where do the data centers fit in? thinking of large server farms
 - Commercial or industrial?
 - Mike (ETO) – for us, it's both – again, you can't just say data centers
 - Suzanne (Snohomish) – there's some tech that may start off in one category and develops into some other place (industrial → small business as an example); is it market first or tech first?
 - Edward (SCL) – I start with the application and then select the sector
 - You do have boundaries on where this thing will likely go (multiple if you envision programs in multiple sectors)
 - Notice there are projects as well – some that may specifically be investigating the industrial applications, but maybe next year you'd develop one for residential – you should see both projects related to that particular technology
 - You may have a project that's looking at many technologies
 - Suzanne (Snohomish) – is there somebody that's managing the connections?
 - You'd have to fill in and specify the taxonomy
 - In terms of the projects, you would have to link those as you enter it in
 - The goal is that the system shows you where other items are showing up and where things are already going on – do you want to link to them, etc.
 - Keshmira (BPA) – with the whole 80/20, let's take a baby step because we know we're going to have to have a version 2; from my perspective in looking at technologies, it takes a lot of information to distinguish technologies – so let's not get to that level of detail for now; we will likely need improvements, but that's okay
 - Todd (WSU) – we've been focused on what can go in; it does seem time for input on what everyone would like to see back out; that could be very helpful for us

- Keshmira (BPA) – this afternoon’s discussion, the tech-a-palooza, may be what we want; so what do we like about that and how do we want that from RETAC 2.0
- Mike (ETO) – we need validation from the greater team; ours was a preference toward quick & simple; because a complex/comprehensive system rarely gets used and gets quickly outdated; we agree that there’s a need; let’s try to do the 20% of the work that gives us 80% of the goal; this should spark the conversations between people
- Todd (WSU) – fundamental to the model was that everyone would have better conversations rather than solve the conversation problems
- Dave (NEEA) – this is why we have the half-time administrator to smooth the edges to the product as it goes; it’s not going to be automated at the moment
- Sectors – at the highest level
 - Distributed energy resource (adjusted from the council’s “PV”)
 - Edward (SCL) – what about EVs? On the service equipment that some are promoting; is that on anyone else’s radar
 - Rem (PSE) – not on our radar as EE yet
 - Edward (SCL) – it’s on our green radar – can be looked at from many angles
 - Jennifer (BPA) – it would be a DR, not an EE technology
 - Kathy (Idaho) – could we add an “other” category?

ACTION ITEM: Add a “transportation” category here

- Ammi (EPRI) – what is in the utility category? (like this category)
 - Jennifer(BPA) – distribution system efficiency, etc.
- Ammi (EPRI) Combined heat and power – would this land under utility?
- Energy System/Subsystem
 - Jennifer (BPA) – have you already talked about things that apply to multiple sectors?
 - These fields are optional – you don’t have to add sector/building types; you can select multiple
 - Marc (PNNL) – we’re seeing an increasing amount of integrations that provide multiple functions; are you assuming that people entering these products will select multiple categories or will you select an “integrated product categories”
 - You would enter it in as a single product and then add multiples
 - Todd (WSU) – the nice thing about the system, we can add sectors/systems/subsystems later down the road; we have the ability to change with the changing times
 - Suzanne (Snohomish) – one system puts process, loads, and appliances in one bucket – how did these come together in the same category?
 - Keshmira (BPA) – we started with the RTF list – is this consistent with that?
 - This wasn’t changed from the RTF; it is a pretty big bucket
 - We may decide we want to pull this apart, but for now, we’re keeping it simple
 - Mark (NEEA) – the other categories hit on the big stuff; this category is a bit about the rest
 - Keshmira (BPA) – the project layer would be different as well
 - Ammi (EPRI) – the California energy commission has a separate category (industrial/ag./water) all lumped together
 - Mark (NEEA) – we do have industrial separated from ag here; you could pull out compressed air – I could see that as an industrial piece
 - We’re just looking at this now
 - There’s opportunity to evolve this

- Todd (WSU) – the taxonomy is not intended a report structure, it’s just an input mechanism, each of these don’t become a summary report necessarily
- READINESS LEVELS – the other question – what stage is this thing at?
 - See reference spreadsheet in packet
 - 3 types of readiness (market & commercial/product performance/program readiness)
 - 1 product could be at multiple levels at once (commercial/program/etc.); we could consider lumping things together if they are always tracking at the same rate
 - Market & Commercial – supply chain maturity/product availability
 - Product Performance – Energy Savings viability/potential
 - Program readiness (struggled with this one) – how well do we understand cost effectiveness, and how well are we ready to deliver on program interventions; how well do we understand the risks in delivering it in a program (more for the program manager)?
 - QUESTIONS? COMMENTS? CONCERNS? SUPPORT
 - Christopher D. (NEEA) – what about when you’re using a tech in a slightly different way?
 - Keshmira (BPA) – if it’s a new app, it doesn’t mean it’s automatically ready in that new application
 - Dave (NEEA) – if you need to test it again, then it’s a separate product; yes, you do have to go back to the beginning
 - Chris D. (NEEA) – it implies that the product is far from ready; example – inverter driven heat pump
 - Todd (WSU) – it’s not an automatic fallback/look at the delivery piece – this is the harder piece; if you don’t know if it’s cost effective in a retro-fit application, it would be way back on the readiness scale
 - Mark (NEEA) – a particular technology will have performance iterations on it and might open up other end uses
 - Chris D. (NEEA) – what about something that I want to use something for a different application but I know it has an energy savings factor of 2?
 - Mark (NEEA) – this is where Dave fixes everything ☺
 - Dave (NEEA) – you as the engineer need to make this decision – the tool will not answer the question
 - Suzanne (Snohomish) – with emerging tech it’s often applying existing tech in a new way; I would want to know if someone has proven it out or is still experimenting; that’s what I want to know
 - Edward (SCL) – you have some knowns
 - Suzanne (Snohomish) – want to know that someone or nobody is looking at something in a new area
 - Mike Bailey (ETO) – that’s what we’re trying to get to with the readiness criteria on a high level; this is for present and forward-looking work, not past work – “who’s doing what in the next year or two?”
 - Rem (PSE) – if up front you don’t find it, it becomes your responsibility to put it in; requires due diligence; it’s on us if we don’t put it in there
 - Mike (ETO) – either myself or someone on our team is the point of contact to regularly update and change process so that we constantly are using this near-term; who’s going to ask “did you check the database before you put in the ask to do this research?”

- Ammi (EPRI) – I didn't see a readiness criteria for "clean" technology – carbon reduction – this is one of the things we look at
- Mark (NEEA) – the "what benefit will this tech bring" field exists (there's a description field for non-energy benefits)

ACTION ITEM: Dave to double-check that there is a field for non-energy benefits

- Mark (NEEA) – it would be good to match up for carbon footprint (California energy commission)
- Geoff (NEEA) – California is revisiting the 3-pronged approach because of carbon goals
- Todd (WSU) – we need "fortunate"/ "unfortunate" features ☺
- Keshmira (BPA) – thought we discussed this and realized that carbon footprint wasn't marked as an issue in the power plan
- Mark (NEEA) – we can put it in and label it as an optional field
- John (NEEA) – under program readiness it seems we're locked into cost effectiveness; what if it's cost effective but not program ready?
- Mark (NEEA) – we decided that whatever one is the lowest is the number, it's a little conservative in some ways; they can get out of sync, but in general
- Todd (WSU) – we had the same problem with limiting factors
- Mark (NEEA) – it's a good way to identify low-hanging fruit that's proven in California, but low on program needs, etc.
- John (NEEA) – on program readiness, "program" was problematic for me – MTU vs. utility program vs. infrastructure – the word program;
- Dave (NEEA) we're willing to use whatever word we need to
- Mark (NEEA) – there are hooks for MT in here; in program readiness, we still need to be cost effective, etc., and we do need to pay attention to risk; one of the things we will likely find, each org will have a sweet spot; this at least provides a framework
 - It will evolve; let us know if it's too granular, not specific enough, etc.
- Todd (WSU) – everyone will get an opportunity to get into it before our next meeting; are we by and large capturing the right stuff? Or is there a systematic gap?

PROPOSED CHANGES TO THE CHARTER

- Making it a dual-purpose (NEEA & regional direction)
- Incorporating council MCS-4 direction
- Providing consistency with other NEEA charters
- **QUESTION: Does this match with your expectations for this group?**
 - Kevin (NWPCC): how often is the charter updated? How often to you anticipate an update?
 - BJ (NEEA): the governance committee and board and strategic planning committees review annually
 - Kevin (NWPCC): could make 2nd plan more generic (it would have to be revised)
 - Rem (PSE): want more action words "aggressively increase adoption" etc. – to show other stakeholders that we're really serious about this stuff; now specifically with RETAC – but yes, the region as a whole
 - Mark R (NEEA): 1,2,4 are mostly what we do today; the 3rd one is a little tougher as it involves program support
 - Rem (PSE): the onus is on us (on the 3rd point)

- Keshmira (BPA): the hand off between RETAC & RPAC is a pain point with the ET work we're pushing forward; more of a collaborative thing
- Mark R (NEEA): it does go outside of our sphere of influence (HPWH as an example); there are a lot of other factors that must be considered outside of the pipeline metric
- Rem(PSE): should there be a message of facilitating from NEEA?
- Susan H (NEEA): on 3rd point, what if we added language that says "in coordination with RPAC" at the end of it
- Suzanne (Snohomish): #3, I'm not sure that that's right; not all existing technologies we might want to move forward with market share; our utility is looking at the value of demand; is there a tech that doesn't have a significant demand component, we might not want to increase the market share here; as a whole, RETAC isn't going to advance all of the tech with a low market share – there's got to be something else
- Kevin(NWPCC): using HPWH as an example – is there a role for RETAC to highlight this thing? Is there some technical reason why it's not moving forward; we want to keep track of this; I suspect there are other technologies that could use this
- Mark R (NEEA): is there a different way to word #3 differently so that we are tapping into the right connection?
- Debbie (NEEA): RETAC is also identifying actions to find new tech with low market shares; there's a line between ET and programs; is there instead something that's saying that the transition between 2 & 3 or between programs that needs to happen here
- Todd (WSU): is it "deliver" instead of "increase"
- Kevin(NWPCC): the ultimate goal is "increase" adoption of existing tech; this group could start a strategy here
- Jennifer (BPA): nobody else is the pipeline; that's the core;
- Mark R (NEEA): beyond just delivering, also picking up anything that needs to be picked up
- Kevin (NWPCC): initiating strategies to increase adoption?
- Dave (NEEA): what's missing is the coordination piece
- Mike (ETO): want to avoid the pipeline spewing out or throwing it over the fence; it may not be a technology issue; we want to get more savings through creating a pipeline, but there's more than just the tech piece
- Jennifer (BPA): has there been conversation around transparency to CEOs, etc. – is this the group that needs to communicate the pipeline
- Geoff (NEEA): suggest outcomes and deliverables
- Mark R (NEEA): charter says that this committee will set a goal – we will need to establish this
- Rem (PSE): a goal also allows you to measure the why you did or did not hit it
- Keshmira (BPA): I do think what's missing is how our operating procedures change; which we will need to come back to

ACTION ITEM: Small group to come together separately to discuss final changes to the RETAC charter

TECHNOLOGY COORDINATION – tech that would be valuable for more coordination

- Mark R (NEEA)
 - Thermostats
 - Window attachments
 - Commercial HVAC - separating ventilation from heating and cooling
- Suzanne (Snohomish)
 - Residential HVAC – the whole ventilation either separate (Net zero)

- Rem (PSE)
 - Moving beyond value LEDs (controls)
 - DR & EE – especially for HPWH
- Debbie (NEEA)
 - IoT (internet of things) – future of connected systems
 - Commercial lighting
- David Shephard – Gaw (Cowlitz)
 - Aero Sealing - there's currently a project at Evergreen in Olympia
- Ammi (EPRI)
 - IoT – demand aggregation platform that integrates items that speak in different languages
 - Ultra low GWP chillers (applications in refrigerants)
 - Work with NILM (disaggregation)
- Jennifer (BPA)
 - We could set up a structure that between RETAC committees to have calls with the right people about various topics
- Keshmira & Mike (BPA & ETO)
 - In search of partners for list of near-term programs

LORI MOEN (SCL) – Pay for Performance

- Agenda:
 - Will discuss Pay for Performance background/pilots/status of each pilot/lessons learned
- Background:
 - 40 years of commitment
 - “What got us here, won't get us there”
 - Still a lot to do
- Solutions to customers
 - Financial incentives (for existing buildings/new construction)
 - Tech assistance
 - Info services
- Incentives
 - Simple rebates
 - Standard incentives
 - Custom incentives
 - Typically measure-based
 - Need to have lots of cost documentation
 - NOT THE BEST SOLUTION FOR ALL PROJECTS
 - We're looking for ways to make it easier for customers to participate/for us to administer
- Better Solution: Whole Building Performance
 - Savings at building meter will capture all savings
 - Measure blind means energy savings for the whole building, allowing the customer greater flexibility; gives options and hopefully some predictability
- PILOTS
 - Anhalt Apartments
 - Renovation on historic building
 - Wanted to take EUI pathway
 - Still getting feedback on in unit sub-meters
 - Building wouldn't have to comply until 75% occupancy
 - Deep Retrofit RFP (3 buildings associated with it)
 - “Pay for Performance” pilot
 - Picked 3 buildings – they told us what incentive rate they wanted
 - All very different buildings

- One Union Square – all-electric (35% occupancy rate at the time) – implemented a night cooling “purge” mode
 - Results – see model on PPT for daily savings – 20% savings over 3 years
 - Jennifer (BPA): I assume things like the prediction took into account occupancy levels
 - There were dependent/independent variables that were considered (weather/occupancy)
 - Rem (PSE): it looks like the savings are increasing every year?
 - Yes – in this building; in 2016, the energy savings decreased quite a bit – maybe a change in occupancy
 - Dave K. (NEEA): how often will you re-calculate the baseline?
 - Under discussion for a scale-up; if there are major changes that can't be accounted for – haven't established that criteria yet
- 1111 3rd avenue – all-electric (brought Quest in)
 - Larger list of efficiency measures
 - Results – see model on PPT – this is the building that increased in occupancy and decided not to make an adjustment for that – 12% savings over 3 years
 - Actually installed solar window film (pulled back out of reduction)
 - Mike (ETO): how did the cumulative savings decline if daily savings stayed positive?
 - It's a 12-month rolling
- Lake Union Building – shorter, right on the water – historically difficult to control
 - Savings from new measure (electro-chromatic glazing)
 - Didn't have any savings until 2nd year → 20% reduction
 - Glazing had significant impact on heating/cooling mode
- Bullitt Center (new construction)
 - Net Zero (living building)
 - The transaction structure is the unique portion
 - MEETS – 20 year agreement with 3 year pilot
 - SCL is filling the tenant for baseline energy consumption so that the investor can recover the investments for EE improvements
 - Because solar is a part, they sell solar to SCL during summer and purchase from SCL in winter
 - Transactions don't fit into utility box, but the concept is that it bridges tenant/owner divide with split incentive
- Pacific Tower
 - Historic building/former amazon building
 - Wanted to take targeted performance pathway
 - It's relatively complete and already reached 75% occupancy
 - The incentive per kW hour is higher the deeper they go – the last measures are more expensive to implement
- Virtual Audits – on small to medium sized buildings (60 buildings)
 - Interval data on these (between 50-100k)
 - Pay for energy saved over time

ACTION ITEM: LORI TO SEND DOCUMENT to GROUP

- Findings
 - Savings can be seen at the meter
 - Data mgmt. can be difficult
 - Industry not quite as mature as expected
 - David S-G (Cowlitz): examples with issues managing data?
 - Some are internal; we have interval meters and sometimes data wasn't available

- Sometimes data isn't available when you want to use it; sometimes it has holes in it; need everyone quality checking; making sure it can input into the tools you are using; there were different tools and experience levels being used
- We're not there yet with our fleet of meters
- Open Questions:
 - Customer engagement yesterday (50)
 - How do you best incentivize this? (most difficult)
 - Hired SBW consulting to run profiles/mixtures of measures/etc. to find the sweet spot
 - How do you fit this into utility reporting box? How do you ensure the data tells the story?
 - Haven't reported savings to BPA for a few
 - How do you attribute savings to the whole building?
 - How do you document cost?
 - What do site inspections look like?
 - How do you make sure you're accounting for the adjustments?
 - Marc (PNNL): are you only doing weather adjustments to establish baseline? (or to account for changes in building activities/occupancy?) how are you tracking changes?
 - The models state correlations (weather/occupancy normalization)
 - Changes are tracked between owner/service provider and facility
 - Rem (PSE): you would have individual tenant meters, right?
 - It depends; the bullet center has meters on each floor
 - 3 buildings didn't have meters per floor
 - Marc (PNNL): asking because we're moving to an era where this is getting increasingly complicated – a lot more people are working from home and then there are employers that are adapting to that by building structures that allow "office hoteling"
 - In theory, there is very little energy saved when an employee works from home
 - Have to be cognizant of what's in the baseline and what's in the current year
 - We will need to think through how habits will affect our energy consumption
 - Edward (SCL): the Bullitt center is metered down to the plug load; we aren't billing individual tenants
 - Each tenant has own energy budget at Bullitt center
 - Jennifer (BPA): when you say "delta Meter" – what do you mean by that?
 - That's actually a product name
 - The MEETS coalition promotes metered EE transaction
 - The Delta Meter has the modeling software that analyzes the actual consumption and manages the model baseline – owned by energy RM

COORDINATION Continued...

- Keshmira (see hand outs)
 - Commercial
 - VRF Billing Analysis Studies (only change is VRF) – need data
 - Efficiency Forward grant – will provide info to fund calculator – need data
 - Field Test Opportunities – passing out fliers (looking for sites – partner utilities; could work something out with IOUs)
 - RTU – replacing rooftop units

ACTION: align on field test opportunities with VHAC & Charlie @ NEEA

- CHEPS – link to brown bag on printout
- Large scale HPWH – priority for DOE
 - Kevin: is this new tech or off the shelf?
 - Putting together different components – not off the shelf
 - Ammi: available in US – tested in Marriott; uses CO2; the first UL approved machine in America/Mitsubishi has great product as well – connect offline

ACTION: Keshmira and Ammi to connect offline about large scale HPWH

1/25/2017

APPENDIX ONE

- Smart Power Strips – beginning stages – interested in hearing from ETO
 - Secondary Glazing – interested in what NEEA & ETO Have
- Mike Bailey (ETO)
 - Ending pilot with new buildings – weren't getting participation
 - Had to create whole alternative design and cost it
 - Moving forward with NEEA – DLC LLLC pilot – targeting 10 buildings on major renovation offices and warehouses – hopefully launch this quarter
 - Biggest challenge – fast moving target – first spec released last spring
 - Manufacturers constantly changing products
 - No pilots on HVAC/rooftop, but interested in that info
 - Edward: on controls, what are your ultimate goals in testing
 - List of features; with integrated controls on a fixture level, is there incremental savings above standard controls? Do those result in any additional incremental savings? Questions on commissioning of these systems
 - We need to find out what's coming next after TLEDs
 - Rem (PSE): did study at our office – seeing 84% savings
 - Trying to do small pilot in our office (ETO)
- ACTION: Rem to send presentation to Mike Bailey re: control studies**
 - Power strips – completed tier 1 power strip study that verified savings cost effective
 - Rolled measure out – twice estimated savings of RTF for tier 1
 - Only looking at multi-family
 - Avista is looking at other applications (commercial)
 - BPA looking at tier 2
 - If you have data, that'd be great
 - PSE is leading group about this
 - Trying to get info on TLEDs – why are you choosing these over fixtures/LEDs – incentivizing them
 - NEST Thermostats
 - Study with NEST only for their seasonal savings program – they've already purchased NEST
 - It's additional, incremental savings over the baseline
 - They call it seasonal savings – we're calling it "automated thermostat"
 - Provide incentives now for new NEST sales
 - This was a pilot on already installed in service territory – they send out email to existing customers to opt in to this – and they will share data with us (the back and forth has been about which data ETO can get from NEST)
 - Todd: what about NEST in manufactured housing
 - Have had a challenge about getting heatpumps into manufactured homes – space, etc.; trying to incentivize contractors to get them installed better and paired with NEST
 - Don't have pilots but interested in
 - Connected thermostats in commercial
 - Next gen shower heads/water conservation – the market seems saturated
 - Beyond the valve
 - Some change colors over time
 - One with a drowning polar bear
 - Occupancy sensor
 - Currently RTF assumes no behavioral change
 - Quick look at Hex blinds for residential – not cost effective at this point – waiting on standard
- Keshmira (BPA) – residential
 - Ducted mini-split for multifamily – looking for data to model
 - NEEAs doing in this space

- Performance test on inverter driven packaged terminal heat pumps for multifamily
 - NEEA & Ecotope test here
 - Future field tests?
- CO2 heatpumps
 - Finishing marketing and tech assessment
 - Next step = field test
 - BPAS ready to move forward – do we want to develop a collaborative game plan?

ACTION: next session do we want to incorporate this? Let's focus on this next time – CO2 heatpumps – NEEA & BPA & KEN presentation for next time

- Sites for installations of low installation spray app in OR & WA
 - Field testing going on right now
 - Kathy (Idaho): can talk to the low elevation piece
- Residential HPWH DR test – 2045 communication protocol port
 - Field testing – applications close next month
 - Pilot as an extension with EPRI – 300 electric resistant and 300 HPWH – showing that device that measures is cost effective to measure things
 - Ammi (EPRI): developments for it to become 2-way
 - Rem (PSE): looking at our DR project & folks with proprietary equipment for customers
 - Mike (ETO): FM signal but then using Wi-Fi to get data for pilot
 - Might be interesting to loop in HECO – long term plan calls for electric resistant water heaters – they said it wasn't cost effective to do HPWH

Connected Thermostats – presentation by Mike Bailey (ETO)

- Pilot Study Results – will provide slides to group
 - Looked at both heating and cooling seasons
 - Is this going to hold for gas heated homes as well?
- At the time, thermostat features – see slide
 - The secret sauce is in the software
 - Both “smart, connected”
 - Require a web-enabled home
- Pilot implementation
 - Participants were randomly selected Nest vs. Lyric
 - Randomized study (200 to lyric, 200 to Nest)
 - Billing analysis – pre and post for those sites
- Findings
 - 96% Nest installed, only 88% Lyric
 - Participant characteristics – 90% replaced programmable thermostat
 - Most useful features – see slide
 - Occupancy detection – default with Nest/opt in with Lyric
 - How frequently did folks manually adjust it? – see slide
 - Post-installation problems – lot fewer with Nest than Lyric
 - Ease of use – Nest clearly easier
 - Satisfaction – satisfaction results similar
 - Energy savings – Nest resulted in savings and Lyrics resulted in increased use across the board – low users for Nest actually saved more
 - Dave: what's the percentage of low, medium, and high users?
 - Savings by furnace type – see slide
 - Whether programmed or not, Lyric increased energy use
 - Occupancy sensor was driving NEST savings

- Conclusions
 - Nest essentially beat Lyric in all categories
 - Links to Nest with heat pump study
 - 2017 study (in progress) – automated thermostat optimization in existing single family
 - Offering \$50 incentive for Nest or Ecobee3 (Ecobee3 lite doesn't qualify) for forced air furnace or ducted heat pumps
 - Concern is around software upgrades that change the way folks interact and are untested
- Partnering with PGE on DR program with NEST – provide \$50 from PGE as well
 - List of qualified products for contractor installed web-enabled thermostats
 - Todd (WSU): how do you do that if it's self-installed?
 - Unsure on details – more specifics into the program, but the idea is that specific products have that enabled already
 - How has Lyric responded?
 - Not happy – came out with new one, but here are similar reviews
 - It uses geo-fencing that's not prioritizing the logic very efficiently
- INTERESTED in anyone else doing this with commercial
- Kathy (Idaho): very interested on the cooling savings side of things; the automated thermostat pilot right now looks at cooling and heating savings?
 - Yes – only Nest customers and they opt in
 - It's incremental savings that ETO pays Nest for
 - Got cooling savings for Heat pump savings
- BJ (NEEA): any other studies?
 - NEST has other studies that are fairly consistent (with gas)
 - Don't see any studies yet for new version of Lyric
 - NEST isn't compatible with high efficiency staged gas furnaces
 - Ammi (EPRI): green sweep – trying to minimize electrical strip heating; but every company has own logic on variability
 - It's clear NEST built their device with the homeowner in mind (not the engineer); other items even the installers have trouble installing on occasion
 - Google owns Nest at this point, but they are trying hard for a second success – trying smoke detectors and security systems
 - Rem (PSE): they dropped their whole home thing
 - Jennifer (BPA): are you using data to measure UA of home, etc.?
 - No – it's difficult to get the data from black-box that is Nest
- Keshmira (BPA): anyone interested in Manufactured homes with Nest?
 - ETO
 - Rem (PSE)
 - Ken
 - Ammi (EPRI) – have tested smart thermostats in 4-5k homes – I'm unsure if any of these are manufactured hoes

Ammi Presentation – EPRI EE/DR Programs

- Sampling of EE & DR program and End Use technologies – test around the nation/world
 - Trying to do more and more field pilots
- Emphasis in 2017
 - Focus on HPWH
 - Looking at both EE and DR at the same time – tech that can do both
 - Lots is focused on the whole building approach
 - Load research and customer data analytics
 - What can the customer side do to help me in the mgmt. of my grid? (utilities thinking differently)
 - The needle seems to be moving more towards DR

- Load Research & Non-intrusive Load Monitoring (NILM)
 - We have a library of load profiles for different parts of the country – the public data base that lots of our members are using
 - Currently testing many NILMs
 - Goal → comparing tech
- Smart Thermostat Collaborative
 - 5000+ homes around the country
 - Very clear DR opportunities here
 - We've learned that EE % all depends on behavior of the consumer
 - Partnering with Snohomish & BPA here
- EPRI Refrigerant Collaborative
 - BPA funds this as well
 - Doing technical review and evaluation of different types of refrigerants for refrigerators
 - John (NEEA): does CO2 fit into this?
 - We've tested combo ammonia/CO2 system
 - Feb ASHRAE there's a paper on this
 - In the primary loop, low-charge ammonia is being used and the secondary loop is CO2
 - Moved from 30lbs ammonia to 3 lbs ammonia per ton refrigeration and better
 - Mark R (NEEA): is there an energy penalty when you go to the load chart?
 - The company's we've tested are more efficient
 - It's the flooding of ammonia in the super-heater
 - Mike Bailey (ETO): we've heard claims that grocery refrigerant are claiming improved efficiency but can't find independent studies; are there independent studies? ; they often have to do equipment upgrades...was that the cause of the efficiency?

ACTION ITEM: Alternate refrigerant options might be an interesting deep dive for next time

- Mark R (NEEA): it'd be interesting to give you a list of the things we're looking at – especially ammonia applications

ACTION ITEM: Mark R. to send to BPA & EPRI (Jamie Anthony) the list of things NEEA's looking at regarding ammonia applications

- HFCs will be phased out regardless of administration
- CEC EPIC Program
 - Funding for EE & DR projects – all RFPs going out to them
- Next-Generation Residential Heat Pump
 - Ducted split heat pump
 - DR ready out of the box
 - Will use R32 as refrigerant → 10% more efficient than R410
 - Christopher D (NEEA): GDP of R32? 675
 - Testing in laboratories in California and will do field testing soon
- Climate-Appropriate Innovations for VRF Systems
 - Hybrid system – looking at efficiency in California
- Intelligent HVAC controls for Low Income Customers
 - Smartphones as a gateway for smart thermostats (building smart thermostats that are \$75 or less
 - Blue tooth connection vs. Wi-Fi
- Near Zero Net Energy Retrofit of Low Income Multifamily Housing
 - Cost-effective – very challenging
- Scaling Energy Efficiency Retrofits
 - Fresno
- Grid Integration of ZNE Communities: CPUC Project
 - What's the effect on the grid with zero net energy homes
 - Peaks seem to be the same as before
 - Chris D (NEEA): community – what does that mean? Development

- Zero Net Energy Communities – the entire community – not just development
- Customer-Centric Demand Management using Load Aggregation and Data Analytics
 - Automotive standards for connectivity
- (MOST PROJECTS FUNDED PUBLICALLY SO CAN SHARE MUCH MORE)
 - There's only a small veil of secrecy, but there is a lot that is public and can be shared

ACTION ITEM: BJ TO SHARE THESE SLIDES – send to people here – but don't post on Conduit

Wrapping up

Todd (WSU): there's so much to talk about that we never quite get through it, which is fine, but it's always an ambitious agenda

Jennifer (BPA): I struggle a little bit with the informational briefing; **add 15 minutes to talk about what this means to RETAC and what does it mean to the region**

Mike (ETO): helpful to hear what BPA is working on project-wise; would like to hear more from other folks about near-term research projects

Action Item: Mike to send BJ the share-out

Jennifer (BPA): liked NEEA's bi-weekly share out

Mark R (NEEA): let's talk about it later

Rem (PSE): would be good to see what policies are out there that ET will be affected by (political, etc.)

Mark R (NEEA): Charlie Stephen's presentation

Mike (ETO): other things like WA and OR legislatures

Rem (PSE): Washington State legislatures for IOUs on I937 proposing to change how we look at residential and commercial retrofit to bring them up to code

1-25-2017 RETAC ETC Classifieds Research Projects

TECHNOLOGY	PROJECT	STATUS	RETAC ASK
Commercial			
VRF	VRF Billing Analysis Study	Looking for additional sites to complete a billing analyses study.	<ul style="list-style-type: none"> Identify VRF installations to conduct billing analyses. Looking for sites which meet these requirements: <ul style="list-style-type: none"> Need 1 year post data. VRF was only significant building change.
Advanced Lighting Controls	Working with Efficiency Forward (formerly DLC) to develop a calculator for ALC and to verify energy savings using data from actual projects.	BPA provided a grant to Efficiency Forward (formerly DLC) to build a calculator, collect data from actual projects to test the calculator.	<ul style="list-style-type: none"> Looking for additional data to assist Efficiency Forward with their data collection to test the new calculator.
BPA ET Field Tests – BPA is offering grant money to BPA utilities for the field tests https://www.bpa.gov/EE/Technology/EE-emerging-technologies/Projects-Reports-Archives/Field-Tests/Pages/default.aspx			
RTU Replacement HRV +VCHP	Grants to share cost for the design, installation, and commissioning to replace Roof Top Units (RTU) with Heat Recovery Ventilation (HRV) and Variable Capacity Heat Pump (VCHP) systems as part of their Emerging Technology Field Test program.	BPA Brown Bag lunch session scheduled for February 8 th to educate BPA utilities about this opportunity : https://www.bpa.gov/EE/NewsEvents/ee-announcements/Documents/Commercial_FieldTest_Brownbag_announcement.pdf	<p>Project Eligibility The building needs to have electricity use data available for a minimum of 12 months prior. Operates 3000 + hours and is between 2 and 10 tons.</p> <p>Please see Announcement Summaries for additional details.</p>
High Efficiency Pumping Systems (CHEPS)	Commercial HVAC Efficient Pumping Systems (CHEPS) retrofits include integrated, variable-speed HVAC system pumps, ranging in size between 1/3 and 10 hp, and controls. Multiple manufacturers offer integrated, variable speed pumps, such as Armstrong, Bell & Gossett, Grundfos and Taco.	ET Field Tests were announced in December. There is a brown bag lunch session scheduled for February 8 th to educate BPA utilities about this opportunity: https://www.bpa.gov/EE/NewsEvents/ee-announcements/Documents/Commercial_FieldTest_Brownbag_announcement.pdf	<p>Project Eligibility</p> <ul style="list-style-type: none"> Facilities with longer hours of operation (i.e. hospitals, grocery, etc.) Minimum 2000 hrs per year Variability of loads, and Regional applicability. <p>Please see Announcement Summaries for additional details.</p>
Commercial Large Scale HPWH	Replacing electric water heaters with heat pump water heaters (HPWH) at commercial sites with large hot water needs has been identified as a measure with high savings potential.	Developing the details for the project. Priority technology for the US DOE Better Building Alliance.	<p>Project Eligibility</p> <ul style="list-style-type: none"> Commercial buildings, MF building which use 400+ gallons a day.
Smart Power Strips	Advanced Power Strips are in the 7 th Power Plan and slated to deliver significant aMWs of energy savings to the region.	Beginning stages for this project.	<ul style="list-style-type: none"> Under development Are others studying smart power strips? Other pilots?

TECHNOLOGY	PROJECT	STATUS	RETAC ASK
Residential			
Ducted Minisplits for Multifamily (DMS)	Priority for BPA Residential Programs. Looking for new measure in 2017 IM.	Current E3T research project with PNNL to complete modeling work for DMS. Coordinating with NEEA and using their data in this modeling research.	<ul style="list-style-type: none"> Do RETAC members have data to add to the modeling project? If the results from the PNNL modeling study are positive, is there interest in participating in additional field tests?
Inverter Driven Packaged Terminal Heat Pumps for Multifamily	BPA is exploring joining NEEA and Ecotope to bench test performance and noise levels in new market entrants.	New technology identified during the E3T Multifamily TAG. Interested in testing new market entrants.	<ul style="list-style-type: none"> If the bench test is successful, BPA would like to conduct field tests with research partners to share research costs and to help with identification of field sites.
CO2HPWPH in Multifamily Applications	Current TI project assessing this technology in multifamily homes.	Project is underway. Team is looking for 4 sites to test CO2HPWH in multifamily buildings.	<ul style="list-style-type: none"> Do you know of sites in your territory who might be good candidates for this field test?
CO2HPWH	Completing a Technical and Market Assessment after UL listing	Finishing up the Market and Technical Assessment. Completed the lab tests and installed 4 units. Performance looks good. RETAC identified this technology as a priority for collaborative research and created an Action Plan for next steps.	<ul style="list-style-type: none"> Is this still a priority for the RETAC? If this continues to be a priority, are their RETAC members who would participate in future research by providing funding and suggesting field sites? <p>Recommendation: Schedule time on the next RETAC agenda to present research results and decide on next steps.</p>
HRV – Heat Recovery Ventilation and ERV Energy Recovery for Multifamily	No research projects at this time. Recommended by Multifamily Technical Advisory Group.	Wanting to gauge the level of interest for these technologies.	<ul style="list-style-type: none"> Are RETAC members conducting research for these technologies? Asking for level of interest in pursuing research for these technologies?

TECHNOLOGY	PROJECT	STATUS	RETAC ASK
Agricultural			
Low Evaluation Spray Application (LESA)	This project is focused on data collection to support an RTF UES or protocol measure for Low Evaluation Spray Application. The project is collecting data from 100 LESA implementations to determine energy savings.	Focus on identifying LESA installations for data collection. Working with Rocky Mountain Power and Idaho Power to solicit more data.	Looking for sites in WA, OR and Idaho for LESA installations for data collection.
Grid Facing			
Smart Water Heaters Field Tests	Up to 600 residential electricity customers may participate in a smart water heater emerging technology demonstration project that enables better management of energy. A smart water heater is a water heater with a modular communication interface that will be able to receive and respond to demand response (DR) signals from utilities.	Applications will be accepted from up to 12 utilities through January 31, 2017.	Participation of residences with qualifying electric resistance water heaters (ERWH) and heat pump water heaters (HPWH). Eligibility requirements include: <ul style="list-style-type: none"> • Strong radio reception of specific FM stations to be used in the project (Seattle/Tacoma: TBD, Portland: KINK 101.9, Eugene: TBD, Wenatchee: TBD) • Residential customers only

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