APPENDIX 1

Memorandum

April 24, 2017

TO: Regional Emerging Technology Advisory Committee

FROM: Mark Rehley, Senior Manager, Technology & Product Management

SUBJECT: Key Takeaways & Action Items – April 13, 2017

To Committee Members,

Thank you for your attendance and participation at our April 13, 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 April 13 meeting:

TOPIC	WHAT WE HEARD	ACTIONS
RETAC 2.0 (the tool)	There are a few adjustments that should be made for ease of use It would be beneficial to have a roll-out plan in place along with tutorials and a readiness criteria one-pager It would be helpful to have a lot of information filled in prior to budgets for 2018 being finalized Getting the tool populated is the next challenge, now that it is available.	• NEEA will send out a method to capture further feedback on the tool: https://conduitnw.org/Pages/Article.aspx?rid=1786 • NEEA will add "lead organization" to the report view • NEEA will add a link to the full readiness application from the RETAC product creation form: done • NEEA will create a one-pager/tutorial for all fields and make it available on Conduit: done, online tutorials now available • NEEA/Steering Committee will come up with a draft plan and bring it back to the larger committee on "how we plan to change the way we work with the new tool" – the group will meet before the next advisory committee meeting • NEEA will reach out to RETAC organizations to discuss optimal process for each organization to utilize RETAC 2.0
Consumer Products & Qualified Thermostats	The group would benefit from a more in-depth discussion on the Consumer Products side	• NEEA will coordinate a future discussion which includes consumer products, experts & utility teams
Heat Pump Water Heaters	Speaking with manufacturers and distributors would add value to the discussion for increasing the market share of HPWH	• NEEA will coordinate a follow-up conversation to include Sanden and other, local distributors

ANNOUNCEMENT:
Please contact Mark Rehley if you would like to be included in further discussions regarding the use of RETAC 2.0 (the tool) and how this applies to the greater RETAC 2.0 vision.

APPENDIX 1: Full Meeting Notes – April 13, 2017

APPENDIX 1

Welcome and Agenda Review

Review meeting tasks and desired outcomes

In Attendance

Mike Bailey, ETO	Ammi Amaranth, EPRI
Kathy Yi, Idaho Power	Suzanne Frew, Snohomish PUD
Keshmira McVey, BPA	Jennifer McMaster, BPA
Kevin Smit, NWPCC	Marc Ledbetter, PNNL
Ryan Fedie, BPA	Tina Jayaweera, NWPCC
Todd Currier, WSU Extension Energy Program	Rem Husted, PSE
Jennifer Light, RTF	

On Phone:
Ed Smalley, Seattle City Light
Robert Weber, BPA
Jim White, Chelan PUD

NEEA STAFF: BJ, Jonathan Belais, Dave Kresta, Susan Hermenet, Mark Rehley, John Jennings

RETAC 2.0 - Dave Kresta

- Went live this week
- Won't be the full on training session
- ASK TO GROUP - what kind of training might we need?
- Thanks to the steering committee for RETAC 2.0
- Best way to get to it – RETAC community page on Conduit
    1. Make sure you're a member of Conduit & the RETAC Community
    2. Anyone on Conduit can view but only community members can edit
- MAIN FUNCTIONALITY
    1. Import/Export – projects or products (they will come in as a "needs review" status – imports)
    2. Reports – most user friendly views
        - Choose projects or products to report on
        - Set up filters
        - Produce a PDF, excel, or just run for simplified view
        - Open individual items in new tab
            - Can then edit
        - Products vs. Projects
            - Projects refer to product(s)
            - Projects are pilots but not specific technologies
        - Can run on any phases (of project)
- Suzanne – if I'm doing something similar project, do I add on to existing, or do I create my own
- Mike – you add your own project
- Dave – it could be the same title, but start and end dates would be different
- Mike – the idea is to be able to search for a technology and find out what folks are working on; if someone is already doing something with that technology, try to use that same language
- Suzanne – is product components the only category that is a drop down?
- Dave demos how to create a new project
- Mike – heard that the symbols for creating a project/product is not intuitive – could we do something about this?

- Kathy Yi – if we don't see a product on there, would we add it first?
    1. Yes, you would add that in
- Example report on HVAC items
    1. Shows technology and the associated projects
    2. Cross linking between products and projects
- Questions about the report?
    1. Kathy – can you add in the product listing the lead organization on the report?
- **ACTION ITEM – Dave to send out way to capture feedback on tool**
- **ACTION ITEM – Dave to add "lead organization" to the report view**
- Resources – standard way to get to content on Conduit if you're used to it
- What you can do with reports
    1. Export and show graph of programs on readiness levels
    2. We want to explore using this system to up-level the conversation in RETAC
- Jennifer – who enters the readiness level?
    1. Click on blue button
    2. Create a RETAC product
    3. Readiness level is subjective, but they do have explanations for what they are
    4. At RETAC meetings, we can review what's new and modify as needed
- **ACTION ITEM: Add link to full readiness application from RETAC product creation form**
- Keshmira – it would be nice to have a one-pager that haves all of the fields for people's reference
    1. Like a click here for a mini-tutorial
- **ACTION ITEM: create one-pager/tutorial for all fields and make available on Conduit so that people are prepared when adding in items**
- Ryan – where are we at with synthesizing readiness levels?
    1. The steering team has had several discussions on this – this is the initial synthesis on it
    2. Could evolve – it does represent the best effort at synthesizing market, readiness, and program
- Ryan – think about how we can get synced with other regions as well
- Products – performance, market & program
- Mark – we should compare where we landed with CEE - we can close the loop here
    1. Mike – used CEE matrix initially
    2. Keshmira – CEE has way too much information
    3. They have a description instead of a number
    4. Mike – our big concern from CEE is that they tend to go to mass customer which tend to be laggards behind what we do in the Northwest
        - We've got more limitations on Cost-Effectiveness than CEE as well
    5. Keshmira – putting in place additional filters for scanning and screening
        - Readiness criteria is a lot more objective – less open ended questions
        - Try to crosswalk our measure readiness levels at Bonneville
    6. Ryan – I'm hearing you guys have gone through it, and it's good
    7. Rem – when you look at market readiness, for someone who isn't versed on this, how do they find out where you're at?
- Finding Conduit
    1. Search "emerging" under "communities"
    2. First ones that pop up
    3. Can also use search box to look for product/project
        - Type nest and search "retac products"
    4. Under Nest Thermostat
        - New thing called "related products"
        - Allows us to bundle products that are somewhat related
        - Points to other thermostat products
        - Todd – cool thing is that you don't have to be a "search wizard"
        - Mark – it also searches the aliases – what anyone might call the product

- Kathy – do we add in related products?
- Dave – it would be nice if you did; maybe it will be part of the tutorial; searching before you enter; may try to get this to be automate
- Mike – you would add project and only add a product if its significantly different than what's already in there
- Mike – we don't have gas in here yet
- Mark – we will go through the thermostat as an example
    - Sometimes the products will morph (you're trying to get to the root of what's saving energy)
- Mike – for thermostats, there was a significant difference in performance between Lyric and Nest, which is why we pulled them apart; we wouldn't have defined by manufacturer if that wasn't the case; if they work similarly enough, we would call it a single product
- Example – 4 items come up under thermostat (RETAC products)
- Todd – we have a Dave and we have a RETAC – if we say "this label doesn't work anymore" – we can change it

Action Item: Dave will follow-up with what's a good process for each organization to populate

- Mark – want to talk about how to role this out
    1. How do we ensure project managers are plugged into this?
    2. Whose responsibility is it to get this in here when there is collaboration involved?
    3. Is there an easy excel template to import?
        - Dave – if you go to import/export – you can just export all products to see format; it depends on how many you have – it may be easier to enter them individually
            - For importing, we want to ensure nothing gets messed up – we do have version control and the status will say "needs review"
        - Keshmira – I'd like to look at how we use this information – what's important to us – how do we change the way we do our work – if we could come up with a draft plan and bring it back to the larger committee

ACTION ITEM: NEEA/Steering committee to come up with a draft plan and bring back to larger committee on "how do we plan to change the way we work with this new product" – to meet before next meeting & discuss if we need further participation in sub-committee

- **If you're interested in participating in this above action item, let Dave know, there's room on the committee if you haven't been involved in the process**
- Jennifer – it hasn't been clear to me what 2.0 meant/means
- Mark – it is more than the tool, so we should include that in the reading materials
- Mike – the primary purpose is to focus on communication in region to help facilitate research
    1. It would be really helpful to know what folks are planning before they launch products/projects
    2. Intended to be a communication forum for products/research being funded in region
    3. Ammi – the region could also benefit from research outside of the region
    4. Mike – this could be on the wish list – this is intended to assist and not duplicate work of region
    5. Dave – there is a field for "hyperlinks/attachments" to add reports/outside existing information
    6. Kevin – isn't this tool also to help get products into the pipeline?
    7. Mark – yes, though we are trying to get there with baby steps – RETAC first, Region second, and then beyond
    8. Todd – right now, products can come anywhere, and that's good; projects should be primarily NW centric, and the hyperlinks/attachments can reference outside of the NW

Research Coordination – Classified Ads

- See handouts from Keshmira – looking for partners, not only to share in the financial, but as a confirmation that this is the right research to do
- Commercial – tier 2 powerstrips
    1. Mike – Tom Lienhard at Avista is doing an APS pilot – small commercial/retail offices
        - ETO has offered tier 1s in commercial for a long time (great to eliminate peripherals)
        - It was hard for us to determine effects/behavioral for tier 2
        - You're identifying a new, good next step gap
    2. Jennifer – programs folks were motivated to do this because they hoped this could be a direct install measure
    3. Mike – would be interested in what you guys find as a baseline
- Lighting controls – haven't seen a lot of projects come up with lighting as a group
    1. ETO – doing pilot with NEEA on new buildings and major renovation
        - Trying to target 10 of them
        - ETO incentives/NEEA evaluation – currently in the recruitment phase – tied to LLLC
        - Spec is updated every year, so a moving target
        - Some may have fixture level reporting available
        - NEEA is providing for pre-post circuit level monitoring
    2. Mark – we're interested in this
        - Chris Wolgamott – alighted now has added an HVAC control piece to theirs – first in the market to do that – using occupancy centers and temperature centers
        - Don't have a budget for this, but are very interested in this – if we wanted to morph this a bit, we would just want to do a proof of concept on this – REI headquarters might be up for another study
        - Rem – will talk to Michael Lane
        - Marc L. – doing a project with enlighted project in collaboration with GSA based in Chicago
        - Mike – this helps eliminate the issue of the HVAC sensors – lighting provides multiple sensors
- RTU replacement – difficult to find sites
    1. Mark – Charlie is trying to get a case study around 9 sites he has – learning around modeling (energy predictions) – the actual data savings are huge
    2. John – be interested in variation in sites – have a lot of common sites, restaurants and offices – looking for high air volume use – 12 months before data needs to be monthly by fuel type
        - Budget constrained to add any more
    3. Mike – are you coordinating on gas side?
- CHEPS – 12 sites at this point
- Commercial Large Scale HPWH – struggling to find sites that are appropriate
- Automated window blinds – working with PNNL
    1. Do you even want the informs?
- CO2 HPWH – punting on this – ready to field test a lot of activities – could be better coordinated on deployment
- CO2 HPWH pool applications – costlier than we thought – in flight now
- CO2 HPWH in multi-family applications
- Ducted Mini-splits for Multifamily – with PNNL & assessments
    1. ETO is doing single family and are curious about
    2. Rem – not seeing in multi
    3. Mike – seeing ductless ducted mini-split for heating and cooling (standard DHP in other than zonal electric homes)

4. Mark – there's an interest because people are getting requests for incentives around this
5. Mike – you're only doing it in multifamily
6. Mark – Suzi has worked with BPA to put together wish list for this
7. Mike – to connect NEEA & reach out to SCL

- Inverter Driven Packaged Terminal Heat Pumps for Multifamily
  1. Mark – these are complimentary to DHPs
     - Come in many flavors – multiple mounting options
     - Suzanne - BPA doing a project with Snohomish – trying to do net 0 but there is a commercial kitchen as a part of it – to take homeless youth
  2. Mark – looked at company called Evo that do cook surfaces – Benny Hanna is now standardized on them – don't need cook surfaces vented
  3. Suzanne – Ecotope is doing some interesting things here
- CO2 HPWH Seawater Source Heat Pump Multi-family
  1. In Snohomish service territory – there is waterfront redevelopment there – Ecotope project
  2. Ammi – several projects like this in Europe
- HRV ERV – also has HP clothes dryer, etc.
  1. A bunch of tech going into this project
- Ag – LESA – could uptake – will coordinate w/Idaho afterwards
- Smart Water Heaters Field Tests – grayed out – not actually soliciting sites right now
- EMPLI – working with NEEA hear (extended motor products)
  1. Ryan – it's really multi-sector
  2. Mark – yes it's basically a pump control system and a motor all together
     - There's a lot of commercial applications for this
     - Even Vermont has had a hard time
  3. Ammi – this would be a good place to get info from California
     - ___Force is the biggest player here
  4. Mike – interested in this; what is the risk, real or perceived, in legionnaires
  5. Ammi – one of the Canadian Provinces don't have any because of the fear of the disease
  6. Mike – Legionnaires dies at 130 instantaneously, if you drop temp, harder to kill and 80-100 easier to survive
  7. Ammi – it was from hydro Quebec – in HPWH DR program
  8. Mike – if you try and do load shifting for multiple hours, then it does become an issue
  9. Mark – may be something that we want to dig into more – but it's not a HPWH issue
- Keshmira – is it valuable to go through research projects that are happening?
  1. How valuable is it?
  2. Mark – I like this form; I'd like to look at entered in projects in the tool and go through that – but this kind of conversation is good
  3. Todd – if we can pull it out of the system, that would be good
  4. Keshmira – there's an ask on these generally
  5. Kathy – is there a way in the database that there are asks associated with that
  6. Suzanne – can the other advisory committees use this database to influence or advise what they're doing?
     - Have you educated your staff on what this is and what's there?
  7. Mark – yes, just started
  8. Rem – brings up the whole "tech potential"
  9. Mark – it's on there, but it's not required
  10. Ammi – What of the work we do with ET is being look at by Codes & Standards?
      - John – launching something in commercial that will bear this in mind
  11. Ammi – do we have any specific code s here?
      - Todd – yes – we look for ET to drive good ideas
  12. Mark – if you have suggestions for how the project managers can best utilize this – we don't currently have a real clear path on bridging this gap

13. Kevin – the other part of RETAC 2.0 is working the other committees and the overlap, but that is part of it
14. Todd – heard lots of good examples around the table as far as recruitment
15. Mark – the intent was to cover peer technologies – the tool is necessary but insufficient to the whole goal – I think we've scoped but haven't solved it all
16. Todd – we've got to think at some point how we're going to continually drive folks to the Conduit site – maybe adding tech updates or market progress reports
17. Mark – you can set alerts for our groups – in the future, you could get alerts for specific readiness levels
18. Rem – only super relevant information during a funding cycle – we're in the new funding cycle – have to deliver on the plan in August
19. Mark – if we could get this populated in the next month

Action Items – if we can get enough info to help with the ETO pilot work as well as Rem's work, before the funding cycle, we should do it – populating the tool as much as possible

20. Jennifer – food for thought: we've tried various versions of various things to see where things are; BPA has technical advisory groups, etc. on a regular basis and search for topics
    - You can subscribe just like you can to Conduit
21. Mike – we like this, but it doesn't seem very actionable
22. Keshmira – have a really successful webinar in multifamily – but we can change the format to make it more meaningful; the longer term strategy (our documented strategy is the EE action plan)

RETAC 2.0 Demonstration using Advanced Thermostat Products

- What do we as an ET group feel are the knowledge gaps? Research questions that exist that we need to pursue before going full steam ahead on advanced thermostat products?
- RTF to address measure approved and plan

Jennifer Light presentation – Connected Thermostats at the RTF and Council

- 7th Plan Savings Estimates – 12aMW – focusing on residential
    1. Based on resistance heat lock out
    2. Put in uncertainty – primarily for ETO gas studies
    3. Rem – can you explain lower & upward bound?
    4. We didn't feel confident coming up with 1 number – so we took a 90% confidence interval ot address with upper and lower bounds
- Graph – shows difference between run time reduction & run time reduction plus resistance heat lock out
    1. Run time reduction is about half the reduction – so it would really be 24aMW in total
    2. We tend not to prove out small savings
- RTF Research strategy
    1. To lay out potential path forward
    2. Lowest cost way of trying to prove it out
    3. Goal to help qualify new products more easily
    4. Need better baseline of thermostat behavior
    5. Mike – Nest did a particularly good job by increasing run time to avoid resistance back up heat
        - We hope EcoBee does this as well
    6. Came up with metrics by looking at Energy Star
    7. If there's not a good tech spec, how do we come up with something that we're comfortable putting stamp in
    8. Rem – savings value with new installation vs. existing system
    9. Mike – more complicated; user friendly vs. not but provides results

        - Savings we're getting from Nest is from software/algorithm – learning the habits of the home, great customer feedback, great interaction – better optimization than any of the other devices
    10. Ammi – every single manufacturer is going after own thermostat – to control indoor and outdoor units; have a very careful look at what's happening in California environment – how are we going to handle this duck curve?
    11. RTF moving towards less prescriptive is because of information like this – is this research worth doing if it's not where the industry going
    12. Mark – there will be a lot of evolution w/nrg savings potential & can our framework handle that?
    13. Rem – NEST pro came out to address installer market
    14. Marc L – now is a time we could dissuade manufacturers to not do proprietary – w/ CA – then "no equipment can be given incentives unless it can talk to other people's devices"
        - Buyers really like this idea – you do force them to behave a little more rationally
    15. Mark – this convo will come into effect with rooftop units as well
        - At what point do we step in with a specification that doesn't pick a tech, because the permutations could go crazy
    16. Dave – what's more proprietary – a Mitsubishi or a Nest?
    17. Marc – it's a bad thing if the pairing results in a much higher cost for the user after they've locked you in
    18. Mark – a smart thermostat with a smart device = a dumb solution….
    19. Mike – engineered solutions won't happen – Nest has proven that the key is the user interface
    20. Todd – part is figuring out how to test stuff
    21. Mike – what's even more scary is that the Lyric probably tested really well, but behavior limited the results
- Potential Research Approach
    1. Trying to do 3 things
        - Baseline
            - Didn't specify type of thermostat
        - Determine NRG savings & performance metrics (pre/post billing)
            - Need a lot of homes
            - Rem – so we have to rely on the manufacturer's manipulation of the data?
            - Part of this was based on where Energy Star was going
            - We ultimately are at a place where programs want a number to make planning & evaluation easier
            - Dave – ran into a little with HPWH
            - Ammi – it might be a bit more difficult with this
        - Ammi – can try to get thermostat data if its available in the public domain
- How this fits into the RETAC 2.0 Tool
    1. Ran a report on thermostats
    2. What ultimately are our research interests here beyond what Jennifer laid out?
    3. ETO has two completed and one that is active "seasonal savings" – opted in more aggressive in optimization of energy use
        - Have savings from last summer and currently collecting data for this winter
        - Savings coming this summer
    4. BC Hydro Line Voltage Thermostat Project – Rem would like to talk to them
    5. What do we need to know in order feel confident of savings?
        - RTF has planning numbers for these things – what does that mean?
        - If measure gets picked up in evaluation, there's a bigger burden if it's not proven
        - Mike – we're approving through retail Nest & Ecobee & not other products – requiring a third party evaluation performance study that demonstrates savings and

customer satisfaction – you can't just say that a product that has certain specifications will perform well
    - Requiring 3rd party to test it (lab test does not correlate with field results)
6. Jennifer - If Energy Star doesn't label it, we're looking to another proof (lab/field test)
7. Mike – even ES is recognizing that a product spec won't do it
8. Kathy – added smart thermostats to list last year (don't know how list is made0
    - Right now, the connected thermostats require electric heat (only 30% have electric) – we're looking for cooling savings –

- Dave – what if our statement back to the Consumer Products Regional Strategy Steering Team is – there's a lot of unknowns – is there consensus that we should support the RTF and push it out ASAP?
    1. Keshmira – it's one of the right questions to ask – in future, need to prep with internal teams
    2. Should we plan another meeting with experts and our teams? Yes
    3. Jennifer Light – would be interested in pushing forward without NRG star spec – would be valuable too to programs side – are there broader things that could inform the regional strategy on connected thermostats and how you approach

ACTION ITEM – schedule follow-up on this topic (Consumer Products – with experts & teams)

Technology Discussion

- CO2 Refrigerants – BPA
    1. Invested $1.4M in HPWH and this is really a success story
    2. So here - what are people doing, how do they perceive readiness, and what are the next steps?
    3. Robert – talked a lot about when's the best time for programs to roll this out
        - Are we catching everything with our feedback loops?
    4. Janice – technical expert
        - Would like to see increased retail activity
        - Are considering this a new measure, not just something to add to a products list (would add until the implementation manual cycle to get it its own measure designation)
    5. Keshmira – WSU research partnership over many years
        - NEEA added to qualified products list
        - Customers asked for it in programs
        - Would like to align and get common strategy, common objective, gauge interest
        - It is technically sound – where is everybody else on this tech
    6. Mark – cost effectiveness is an issue to examine (expensive)
        - Has Sanden mentioned how many units they want to sell?
    7. Janice – only thing I heard was that they stalked 30 units in the Northwest
        - If there weren't any incentives, sales would slow and have to move inventory maybe
    8. Mark – is this similar to what they're making in Japan/Australia?
        - If it's to unique, moving slowly – investment's not worth it
    9. Ammi – there is some volume in Japan – Sanden has spent money getting it ready for this country
        - HPWH period have been slow – it's not seeing the uptick
        - Come back to Codes & Standards
        - If you're going to push HPWH in CA (for electric) may as well push this product
    10. John – Charlie is pretty sure that the phasing out of greenhouse gases is coming faster than we think – CO2 for heating & propane for cooling
    11. Keshmira – might be a good approach to do supplemental

12. Suzanne – you're talking more technically proving it out, but I see this more as a marketing question than a technical question
    - In our position, we're having trouble with HPWHs altogether
    - The question is, do you have competing tech or does this really belong in small commercial?
13. Jennifer McMaster – it's a little strategy too – we could augment this in field tests, we could continue to study in field (for early adopters
14. Suzanne – counter – why would I want to keep throwing money after something that's not really working
15. Jennifer McMaster – some niche utilities are asking for incentives
16. Mike – we can't get the volume/interest on regular HPWH – hasn't been a lot of interest in the CO2 product for that reason
17. Janice – one key is also going to be finding new applications for it, i.e. the multi-family market
18. Robert – also looking at in multi-family realm as a central heat plan for a hundred uses – there will be multiple/diff applications; it's a new class of heat pump; not rolling out for mass adoption, but we need to learn more so we can roll it out
19. Mark – NEEA is actually going to bring a recommendation this split system to the existing HPWH program – do additional work around what the market barriers that are unique to this product – targeting for hard to reach locations
20. Fred – it's expensive, there's lots of acculturation issues – we think that near 0 builders are where we'll see continued pull for something like this – this might be the place to get the next tier of experience
21. Jennifer McMaster – it might sound like adding it to the program is premature?
    - Mark – we want it to be included in talk on codes and standards, etc.; we also want to help Sandlin in a way – tool for the national work
22. John – there's another reason (can go to really low temps for climate) and have a great lift to combat Legionnaire's
23. Rem – we don't have a boiler market here and the coil for forced air struggles to get to 90 degrees
24. Janice – told coil problem was solved according to Ken
25. Jennifer McMaster – the ask – do people want to partner for more research now? Or not now? If not now, then what does the region want do?
    - Keshmira – maybe we push for commercial?
        - We should answer some of the strategic questions and coalesce on common route
26. Todd – is this a RETAC question or is this an RPAC question?
27. Keshmira – it's a tweener question
28. Jennifer McMaster – it is our role to do a little more work on this
29. Rem – I think if we can't handle HPWH, we'll have trouble with this upscale approach
30. Kevin – there may be some niche markets that this is a better fit for
31. Todd – so today, niche, with an eye for all markets 5-7 years' out
32. Ammi – national push not regional push, areas where it will enter first has opportunity to expand to other national areas
33. Jennifer McMaster – maybe it's okay to let CA do it first
34. Todd – here there should be a high performance home market
35. Robert – we're seeing this in high performance multi-family
36. Ammi – I would highly recommend it be done in a very collaborative way with other utilities – but it does have to be done beyond PNW for it to catch fire
37. Robert – still in incubation phase but time to start crawling
38. Keshmira – maybe it isn't just the HPWH, maybe it's the combo unit is where we want to make our push
39. Rem – what's the possibility of getting Sanden to talk about it

APPENDIX 1

ACTION ITEM: Get Sanden folks to talk about where they see opportunities with heat pump water heaters and maybe the local distributor as well.

Economizers

- Mark – given the tech that has emerged, is there another avenue to move economizing forward? History is littered with failed attempts
- Fred – historic timeline; getting one that wasn't designed not to work; getting those in the field with rooftop techs
    1. 80s-90s – half people thought issue was refrigerant leakage; we focused on our climate, and it's cool outside air
    2. Studies showed that 50% weren't operating very well
    3. NEEA in late 90s came up with program to transform market so that rooftop techs could want to make a living doing this right
        - Conclusions
            - Rooftop techs don't see as business
            - Hard to get them to change anything (all rote/oral tradition)
            - Zero accountable industry
            - Controller is designed not to work here (our climate)
        - Honeywell actually changed the design of their controller
    4. People started doing tune up pilots – did a lot of quality control & training that couldn't have been done on large scale
    5. Scaled up – a few problems (maybe it requires a lot of QC all the time) – used existing conditions baseline (used more energy but got non-energy ben's that couldn't be counted
    6. What's the way to make this work?
    7. Having current small-scale success where folks are using code baseline (working with catalyst)
        - Rem – advocating incenting the sensors?
        - Fred – need to create market model that holds people accountable
            - It's an MT theory in a deep, long-term way
            - The other part is how to deal with baseline
    8. Mark – can you talk about ratio of benefit between gas and electric?
    9. Fred – try to do both because we're gas and electric…ventilation issues on cooling side too but less of problem – DCV controls are now cheap but do they save anything?
        - Don't know that going single fuel is the way out
        - Seems like a real thing that could be fixed
        - Ideal outcome is working together…
    10. Todd – something was going on in PSE…
        - PNNL was doing some stuff on automating sensors and all that stuff
    11. Mark – can't just monitor, you have to translate to someone to care
    12. Fred – a large % of medium to small were running on res thermostats that didn't have the controls; part of the problem is also user monkey wrenching – giving people bounded autonomy was interesting
    13. Ammi – DOE RTU challenge – new tech that passed are so expensive
    14. Fred – Charlie's idea that you move ventilation away from heating/cooling changes the problem
    15. Todd – until there's a comfort problem, they'll run to fail (largely won't do maintenance)
    16. Fred – some of the equipment actually works
    17. Mark – Charlie studied 9 sites – none had outside air (sealed shut)
    18. Fred – ventilation in buildings is random with respect to code

19. Mark – the solutions that are coming (like Enlightened…) addresses sensor solution with thermostats – at least it's not running it 24/7; notion of comfort – people will find a way to make themselves comfortable
20. Fred – comfort & economizing (somewhat separable)
21. Ammi – if you can find a means of controlling RTUs use (for cooling purposes) you can provide that NRG to the grid
22. Fred – it seems like they're an off peak saver
23. Suzanne – done a lot of work on Catalyst
    - Controls are actually an ideal one (for establishing baseline) where you don't have to have year – can turn on one day and off the next
    - One negative – the economizer was temp based – demand spikes on everyone's bill at the same time instead of randomly like they used to
        - Some work that can be done here
24. Fred – Catalyst – train their own contractors
25. Jennifer McMaster – I got the impression that the work the Charlie and everyone is doing was meant to be plan B?
26. Mark – Charlie is optimistic, but this is a hard thing; can you do something with the units as they are today? Has anyone seen a system that gives grade report of how your system is functioning?
27. Fred – there's a long history of those things not quite becoming commercial
28. Suzanne – what about those sensors that give maintenance alerts?
29. Mark – should we add this to smart thermostat wish list – monitoring of system effectiveness?
30. Mark – notion of side car – if you could do a direct/indirect evaporative system cheaply (uses 100% outside air) and runs into supply line from RTU – concept worked
31. Fred – when things don't work you want to get smarter or dumber – an economizer with fixed operating schedule that doesn't quite do the job but you can't ruin
32. Mark – conclusion – no silver bullet…
33. Jennifer McMaster – just pay one company to do it?

ACTION ITEM: Continue monitoring ventilation solutions

Wrap Up

Feedback

- Consensus was good

Happy Hour