Memorandum

October 26, 2017

TO: Regional Emerging Technology Advisory Committee

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

SUBJECT: Key Takeaways & Action Items – October 26, 2017

To Committee Members,

Thank you for your attendance and participation at our October 26, 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 October 26 meeting:

TOPIC	WHAT WE HEARD	ACTIONS
RETAC database	It would be beneficial to have secondary research in the database as well	• The RETAC steering committee will discuss getting secondary research into the tool • NEEA staff will send an email to RETAC members closer to the next meeting to ensure that 1-2 extra items are added to the database before the next meeting
Advanced Lighting Controls	More transparency around pilots would be helpful as well as understanding of lighting in the commercial sector	• Committee members will put any advanced lighting control pilots into the database • NEEA staff will check on flipping speeds of buildings, add this to state action plans, find out what's going on in the internal lighting group, and possibly introduce a follow-up conversation regarding features that would be most beneficial
Emerging Tech to Program Transition	There needs to be some more clarity around the hand-off from the emerging tech side to the programs side, specifically RPAC	• NEEA staff will coordinate internally to begin the conversation around some guideposts for this handoff
Smart Thermostats	For those not going to the smart thermostat's workshop, a summary would be helpful	• The January meeting will include a brief recap of the learnings/outcomes of the smart thermostats workshop

ANNOUNCEMENT:
- Please RSVP for smarts thermostats workshop (Jan 11th – rescheduled)
- Next RETAC meeting is scheduled for January 22nd, 2108

APPENDIX 1: Full Meeting Notes – October 26, 2017

Welcome and Agenda Review
Review meeting tasks and desired outcomes

In Attendance

Mike Bailey, ETO	Kathy Yi, Idaho Power
Keshmira McVey, BPA	Kevin Smit, NWPCC
Rem Husted, PSE	Todd, WSU Extension Energy Program

On Phone:

Jim White, Chelan PUD	Ken Nichols, BPA
Cheryn Metzger, PNNL	Rob Penney, WSU Extension Energy Program
Tom Lienhard, Avista	Karen Janowitz, WSU Extension Energy Program
Debra Bristow, BPA	

Announcements:
- Please RSVP for the smart thermostats workshop rescheduled to January 11th:
  https://conduitnw.org/smarttherm

NEEA STAFF: Jonathan Belais, Amanda Showers, Dave Kresta, Susan Hermenet, Nick Leritz, Mark Rehley, Debbie Driscoll, John Jennings, Geoff Wickes

Welcome and Agenda Review
- Portfolio Update (RETAC 2.0)
- Product Prioritization
- ET Definition Activity
- Advanced lighting controls discussion
- Pipeline metrics review
- Announcements:
  - Please RSVP for smarts thermostats workshop (Jan 11th – rescheduled)
    - Encourage all RETAC members to attend
    - We want ET, program, evaluation, engineering people – cross-disciplinary
    - Publicize this within your organizations – signing up during the month of November would be ideal
    - Speakers and agenda is now available at the link
  - Submit EFX session recommendations (due October 31st)

RETAC 2.0 Database Update
- As of last meeting, cleaned up products from 77 to 74
- Added 2 new projects
  - Pivot Commissioning Update Added
    - Doing survey work and updating work from Feb. 2014 to see what's changed since last in that space
    - Want to see how much has developed since we left the market
    - Scope what could be done to improve programs
    - Get feedback from this group and interest in demonstrations

- o UHD TV Test Procedures/Clip and ENERGY STAR Specification Added

Questions?

- o Keshmira – would like to connect w/Geoff on Pivot Commissioning
- o Geoff – probably an extension that's whole farm commissioning as well

ACTION: Keshmira and Geoff to connect offline re: commissioning

- o Kevin – what's the difference between Micro, Organic LEDs and Quantam Dots?
  - ▪ It's about a quarter of the size of existing LEDS (Quantam), Organic is more of a film technology; runs as a bunch of individual LEDS and replaces film layers in manufacturing; not a huge difference between MLED and OLED – not as efficient yet; emerging and lots of promise; neither one has shuttering; reduces layering of filtering stuff
  - ▪ Lots of work happening in TVs right now; fixed loopholes in test procedure to prevent gaming; the test clip is still inadequate and has content that allows gaming to happen under certain scenarios
  - ▪ HDR is upscaling, most TVs that are HDR capable are now transitioning to HDR (brighter brights and darker darks); they will be driving sets harder to drive this HDR content; 30-60% energy loss
  - ▪ Mark – this is an example of a market that's very ready, but as far as product performance, it's still very young
  - ▪ Dave – we should talk about this in the prioritization
- **Are we getting the new stuff added to the database, or are you thinking that we're missing big stuff? How can we ensure we're getting new stuff into the database?**
  - o An example: custom projects could be a potential area to add to the database
  - o Jim White: not able to find the database
  - o Geoff: it would be good to have ground rules for whether we're keeping it up in a good cadence
  - o Mike Bailey: we haven't looked at it since we put stuff in; in the middle of budget planning for next year; developing status reports for pilots; once we finalize in Dec/Jan, we'll go back in to update it; we're also waiting on the discussion in the committee that helps us understand when to kick things out as "done"; we also want to identify conclusions for how certain studies ended up
  - o Geoff: would love insight in addition to what I put in regarding commissioning
  - o Mike: the intention wasn't to make this a repository for everything; but how do we show that something has been completed
  - o Geoff: should we be saying "we're thinking about this, we're doing this, the results are this"
  - o Dave: we all should be adding stuff as wishlist; err on the side of adding more rather than filtering it out
  - o Rem: three different groups; there's R&D, NEEA stuff, and planning from utilities when new programs are planned about every 2 years
    - ▪ For us, it's right now
    - ▪ We've done our preliminary work finding out
    - ▪ The business case may or may not include primary research
    - ▪ The pilot would be something we'd want in the database

ACTION: Steering committee to discuss getting secondary research into the database – this is a project AND would make sense to include in here

- o Jim White: we need to include the readiness levels for each projects/products – maybe there's a field that says "what are the next steps or unknowns"
- o Kathy: haven't entered anything in the database; we don't do a lot of primary research; we're very shy about using customer funds on things we don't know; don't know if we

can put things in because not sure if they're "emerging technology" – it's not emerging, but it's a new idea

- Kind of hung up on custom projects; this is where we get the most energy savings; don't know if anything would fit in here as emerging; which ones would qualify
  - o Todd: there's information about ET and their performance buried inside the results and analysis on the custom projects; we should try to figure out which custom projects would have something "like that" in it
  - o Kathy: so an example might be if pivot commissioning in a custom project somewhere
  - o Geoff: there's a lot of innovation that happens in those custom projects because they don't fit into a normal box
  - o Mark: it may be less about the actual project, and more about the product
  - o Keshmira:
    - it does have a lot to do with the ET definition; rather than being rigorously precise about boundaries; keeping big picture objective of what's going to help move stuff forward; what should you be sharing might be a good guidepost
    - I was also curious about the timing for how folks do their development; our timing of how this stuff stacks up; generally, once a year we have our planning
    - with custom projects; there's potential here – it's not as siloed as we've set it up to be
  - o Debbie: what's the trigger for custom projects?
  - o Nick: the development of the business plan is really valuable information; if there's a way to leverage natural cycles that are already happening, that would be really useful to trigger and build out the database with what's most valuable
  - o Mike: I like the idea of trying to coordinate on the timing; Q1 is when we come up with the details on the stuff we want to launch; what questions should we ask that might be of value to other utilities; the sweet spot of making it in the budget but not locked in stone yet – the opportunity for outside input
    - Ideally, I'd like to know the wish list of projects for Q2, because then I can work to get it in the 2019 budget; and we're overwhelmed with custom projects, and we're relying on individual programs to bubble that up
  - o Rem: there's another piece missing that's the evaluation work
  - o Kevin: interested in the little ideas even if there aren't projects around them
  - o Geoff: being a voice for manufacturers – I hear the "how many pilots do you need to run and can't you guys get together"

ACTION: Dave will send email to RETAC members in enough time so that people can add maybe 1 or 2 things to the database before next meeting

- Dave: we've added something to the database that will allow us to mark projects that have disproven something as opposed to proven; if we feel like there's enough info to disprove a project, we can mark in the database as a "disproven product"

Product Prioritization – Mark Rehley

- Recap from last time
- Four items: HPWH, Smart T-stats, Advanced Lighting Controls, Whole Building
- Sent a note out to the team and weigh in on which ones were most interesting
  - o Didn't receive a lot of responses
- Results – top scores
  - o Whole building approaches to EE
  - o Advanced Networking lighting controls
- E2T webinar poll
  - o Advanced network lighting controls

- o Advanced Rooftop HVAC
- o Smart T-stats
- Because lighting controls showed up in both – presentation this afternoon for how to better collaborate on this as a region
- Would like to have conversation with Michael about how we should work together differently than how we've done before
- Debbie: this is a perfect example of where the collaboration would be so helpful; we're ALL doing pilots of advanced lighting controls –

ACTION: Put any pilots for advanced lighting controls into the RETAC database

Priority Questions – this is just slivering out a bit of our time – will ask these again this afternoon
1. Focused or diverse investment?
2. Top focus area?
3. Who is interested in developing a work plan/leader?

- Rem: like this idea of focused collaboration
- Kevin: it would be helpful for this group to have a bigger picture view of the priorities as well; backdrop is that we just finished first year report for 7th Power Plan – 65% of savings is from lighting; there's a real huge gap in HVAC if you're just looking at end uses
- Mike: we're exceeding our goals largely because of lighting; but we're cutting residential by half and projecting much deeper drops in 2019; numbers are because we're accelerating savings earlier and they're inexpensive to get
- Rem: small business lighting is good opportunity for the hard to reach markets
- Mike: we're trying to push ET, but there are cost effect rules that can be a challenge and we don't see a technology solution
- Susan: got a little sense that it's an either/or; from a portfolio standpoint, it might make sense to focus on HVAC and lighting (focus on a couple)
- Debbie: advanced controls will eventually effect all building systems
- Susan: maybe the conversation is around what's the vision around the prioritization standpoint – being deliberate around the vision

Defining Emerging Technology:

Draft Emerging Technology Definition

A technology, widget, service or best practice that exists on the spectrum of technology, product, market and program readiness and has the potential to: improve in performance; expanding to new applications; bring new value to utilities and the market; but hasn't realized its full value/potential.

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- Real-time tweaking
- We did world café back in July – recap of questions asked
- In our last product council meetings: worked through the results of the brainstorm and refined through a consolidation technique

- o Six different general categories that we assembled
- o Additional thoughts?
    - Dave: potential to bring new value is too broad
    - Rem: don't know if we captured "tech that will disrupt business from other tech being used elsewhere"; seeing this with web enabled stuff as well; behavior as well
    - Susan: where in the conversation does the consumer/end user fit in?
    - Dave: I think it's the last one
    - Susan: it's really easy not to have the voice of the customer; and it's important to have this early on
    - Dave: maybe the whole column focus is disruption
    - Mike: it's so hard to define this upfront because you might have incremental progress up front and then eventually you have a game changer; it seems like we're trying to slice and dice this too finely
    - Nick: it needs to be broad enough to include all of that
    - Mark: this last column is really our current definition that doesn't necessarily cover some of the other comments
    - Nick: recap of NEEA's definitions
    - Rem: in the customer piece; how would we characterize smart cities?
        - Is it the strategy of smart city? Rather than the tech
        - Mike: has both potential for efficiency and for increased energy use
    - Susan: it's just about bringing clarity to emerging technology
    - Dave: it'd be interesting to bring this definition to some of the confusion around current entries into the database
    - Keshmira: when we get this definition, how is it going to impact my objective?
    - Mike: there's no more silver bullets as far as widgets; it may be an approach or software or tech or etc…; it's going to mean different things for different people and that's okay; if it has meaning for somebody, put it in the database
    - Mark: the pipeline is not homogeneous; there's a need to get at least a little clarity that it's more than just emergent of low adoption; we need to expand people's thinking
    - Mike: I think you can eliminate the last "but hasn't realized its full value/potential" as that's given; everything we do hasn't reach its full value/potential
    - General agreement to strike last bit.
    - Susan: could we add "end users & the market"; or "bring new value to supply and demand"
    - Dave: need to capture commercialized vs. non-commercialized

LUNCH

Defining Emerging Technology continued:

- o Would like to come up with a definition that's broad enough to encompass what everyone needs so that personal organizations can pick along continuum where their sweet spots are
    - ETO – does it have a measure? If yes, not emerging tech
    - Mark: we'd like to try and encompass the issue that makes it easier to distinguish on a broad scale regardless of organization
        - Maybe we should keep visibility though we're not working on it

- Mike: another way to look at this → can we review things we don't define as ET periodically for potential
- Dave: is one definition too much to ask; two buckets (one for pre-commercial, etc.)
- Mike: we need a definition, but don't make it the limiting factor
- Nick: let's pick one, imperfect, and agree that it's broadly applicable
- Todd: maybe to that string on the first line, maybe also "product innovation" should be one of those items
- Dave: what's the purpose of a definition if it doesn't have a limiting factor?
- Keshmira: need to think about what NEEA needs to do as a regional entity and how can I help NEEA articulate that
  - I might simplify it: do we even need widget in there?
- Kathy: are you planning on putting this on Conduit?
- Amanda: can you define it as what it's not instead of what it is?
- Debbie: yes, at what point does it cross over
- Mark: there's quite a few things that would fall out of this

Updated Emerging Technology Definition

An energy efficiency opportunity that exists in a range of technology, product, market and program readiness and has the potential to: improve in performance; expand to new applications; bring new value to the market.

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Unanimous agreement on it as a working draft
- Dave: can Kathy answer this definition about your custom program?
- Kathy: probably couldn't include shade trees
- Dave: are there opportunities to improve EE elsewhere?
- Mike: for us, the program cost to implement it to find out how many will cast shade on a building would be difficult; my point is that everything could be ET
- Dave: do we need to expand adoption?
- Kathy: we're about to start a commercial kit pilot; down the road maybe to more industry specific
- Todd: not everything that I have a question about needs to fit here

ACTION: Each organization to take working definition back to organizations and continue to refine & identify use cases that show what's in or out

Advanced Lighting Controls – Michael (PNNL)
- Connected lighting: update, opportunities and choices
- Tech & Market Status
  - LED is definitely happening, but still large potential for energy savings & product efficacy
  - Prices are down sharply
  - Competitive in almost every application
  - Market penetration rapidly increasing

- - Research underway to improve tech
  - Will add new functionality beyond just replacement
- Savings Forecast
  - 5.1 Quads of savings
  - Display of controls impact
  - Mark: residential number is pretty small; why is this
  - Michael: houses don't have lights on all the time; the more surprising number for me is that industrial is so low in both total and controls
  - Is it implied that it's interior for both commercial and residential and outdoor is all lumped together?
  - Yes – generally; outdoor for home is considered res but not for commercial
  - DOE SSl plan goals 20 greater than SSL current path
  - Mark: we should apply this to our region specifically to understand how much we should do
- Historical and Projected Source Efficacy (DOE)
  - Color mixed LEDs are taking off
- Global Shipments Growing Rapidly
  - You see average asking price going down and volume of a variety of products going up
  - Keshmira: doesn't say anything about quality, however
  - Mike: is it weighted average by volume or by data or?
- LED Package Price/Efficacy improving; still only 13% converted in U.S.
  - The northwest will be different
  - Debbie: Though linear fixtures have small penetration, they're also the highest potential
    - This is where the effort is needed
  - Michael: the acceptable payback time for property owners is very small; about 2 years (commercial); it's arguably why the space will be the last space connected goes in
    - A lot of people are wasting energy going into commercial spaces
    - Debbie: another space is residential where the benefits to them are with energy savings but elsewhere
- Wide Range of DOE Research to Improve SSL
  - Potential barriers to adoption listed
  - Spectral engineering and tunability
  - Connected lighting
- What is a Connected Lighting Device?
  - Controllable, solid state, one or more interfaces, etc.
- DOE lighting systems strategy
  - Energy reporting as the most important
  - Collaboration
  - Key new features
  - Configuration complexity
  - Interoperability
  - DOE has joined several industry consortia
  - Lighting companies are not involved in these
  - Other collaborators include tech developers and system integrators; to accelerate this is to enable users to demand it (interoperability)
  - Talking about model specifications to help diff. industries to define and demand interoperability
- Will connected lighting save or use more energy? YES
  - Only way to sort this out will be with data
- Why focus on energy reporting – you can't manage what you can't measure
  - Enable new market opportunities
  - Reduce energy consumption
- Does this lead to energy savings?

- o Can you take data and throw it at intelligence and improve energy use?
  - o Google used this
- Connected outlet energy reporting accuracy study
  - o Anything that's exchanged for commerce in any country, a federal body affects the test method
  - o Historically, this doesn't exist for electricity because it has its own body that regulates it
  - o Test methods don't provide a 1:1 sizing down; we need new ones
  - o Todd: how do you measure accuracy if you don't know how to measure the baseline?
  - o Michael: how well do you characterize the reference device? How good is that? Might be a loophole in the test method
- Will "open standards" make this all happen?
  - o This does not guarantee adoption or interoperability
  - o Having something published is only step one
  - o You need some standardization and component testing programs → transition from by design, to paper implementation, to physical implementation
- What is the Utility Role in SSL?
  - o We think it will be widely adopted with or without much help
  - o It's not a matter of if they'll be adopted, it's a matter of how well those devices will be applied in the environment
  - o This isn't a static tech
  - o Trying to get customers to buy MOST EFFICIENT versions of them
  - o Need help realizing the high potential savings
    - ▪ Manufacturers need incentives/motivation
  - o Help connected lighting tech maximize energy savings
- What is the utility role in connected lighting?
  - o Still in its infancy
  - o Adoption will be highly disruptive
  - o Predicting energy performance is becoming increasingly difficult
  - o Pay for performance? Not easy
  - o Could increasingly look like plug loads
- KEY QUESTIONS:
  - o Do you want to learn how to develop and manage programs that are based on data (collect and analyze) or do you want to forego lighting programs?
  - o What makes lighting unique and worth staying engaged in?
  - o What makes the PNW unique?

- Rem: in new construction, do you see more of a distribution integration in the buildings?
- Michael: to me, that is mostly a POE questions (power over Ethernet); we are doing a study (publishing in a month) to look at cable consumption
- Mike: Ethernet cabling, yes, but traditional DC distribution no
- Michael: can you transition from single end use devices to more real world environments with a full infrastructure?
- Mike: a lot of our programmatic paradigm goes counter to this
- Michael: how do you get people installing TLEDs to install something a little bit better?
- If you use the reference point as TLEDs, the reference point should be "does the lighting manufacturer have to be involved or not?"
- Mark: NEEA's worked on LLLC for 7 years now, and thinking that it's right around the corner
- Mark: if you recognize that LED alone is going to come into the market, utilities with their considerable influence will help move it along at a higher level of efficacy than what the market would do on its own
- Michael: yes, and you focus on easy to control and configure; and you focus on data; energy data

- Mark: on the data piece, I struggle with how/where the energy is being recorded
- Rem: if you start looking at lighting as real estate, is there the potential that we wouldn't have access to the data?
- Michael: beyond efficacy, how much do you believe there is unrealized energy savings from lighting controls?
- Mark – was there something that rose to the top that we should do?
    - Do we need a whole other meeting to figure out what to avoid?
    - We need to address the standard that says we're not going to incent certain
    - There's no downside to efficacy (together with the things that ensure a quality product)
    - But you can't keep pulling savings numbers off of the efficacy; there's a more complicated story
    - Michael: need new codes & standards; efficacy needs to be refocused; and if we're going to collect energy data, how are we going to do that (logistically)
    - Emerging tech needs to focus on features rather than the particular technology

ACTION: Check into flipping speed of buildings, add this to state action plans and maybe a follow-on conversation on features (and maybe prioritize a feature here); and find out what's going on with the lighting group
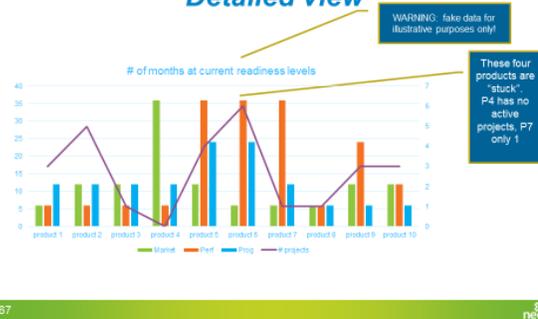
Pipeline Metrics

- Covering ways to look at pipeline & get feedback as well as tech transfer
- Context:
    - Refresher of MCS-4
    - There's new stuff & then there's stuff that isn't getting market adoption
    - Need to figure out a way to adopt and track new measures & assure success and progress
- Metrics Discussion: **Our ask of you**
    - Do the metrics make sense/are they tracking at a regional level/will they help RETAAC make better decisions?
    - Two types of metrics: speed of flow & savings potential in pipeline
        - Looking at things moving both fast and slow?
        - Measuring time spent in pipeline?
        - Tech potential in pipeline (regional?)
    - Speed of Flow
        - An example of avg. #months at various levels of market readiness
        - Could do same for other readiness levels
        - Rem: so we're talking about things as a part of the pipeline as far as Conduit? Yes
        - An example of individual product speed through pipeline
        - Conversation around what the graphs mean
        - Not sure flow rate matters but how many products in matters
        - EXPAND slide 66 & 67 with energy subsystems & systems

APPENDIX 1

Speed of Flow through Pipeline
Aggregate view

Speed of Flow through Pipeline
Detailed view

- What would be a good number in this case? 42
- Cheryl – couldn't you do number of installs per year and see if that grows as one metric that shows flow through pipeline?
- Keshmira – that's a good point; not necessarily currently captured in what we have
  o Would highlight any product that changed readiness levels during meetings
    - We need to think about whose responsibility certain metrics are
    - The scale is going to vary greatly by the type of product
    - Maybe installs is embedded in next def of tech potential (because ramp rate is embedded in this assumption)
    - Kevin: when we have real data, we'll be able to answer these questions better
    - The starting point for this was April

ACTION: Next year: look where there are a lot of projects and where there aren't and then do another cleanup of readiness levels, then you go and start looking at the movement

    - John: it's important to have active, inactive and terminated
    - Todd: I think of metrics, dashboards, ways to look at whether we're having success; and I don't know what good looks like yet
    - We're not at an external reporting point; we're at an internal making better decisions point
  • Amount of savings in pipeline
    o Draft look at 3 diff types of readiness and tech potential in each
    o This is real data
    o It's worth looking at if we can compare to power plan
    o ETO will have 0 because they don't look at that
    o Kevin: will look at the ones in the plan and estimate the ones that aren't

- o Dave: more straightforward
- o Todd: how can you have tech potential at level 1?
- o Mark: haven't established an agreed upon methodology for putting in tech potential
- Who has overall responsibility for overall "new measures"? – gets at our relationship with RPAC
  - o What would be better handled by RPAC?
  - o Does it make sense for RPAC to get involved with product/tech when it advances to RTF?
  - o Mike: afraid of tossing it over the fence because each org will be different
  - o Need a common tool to communicate between the tool
- Idea: set trigger points for each readiness types – orange = RPAC responsibility & grey = RETAC responsibility; may not be a strict line
  - o Maybe it's about the way and how we're communicating
  - o Is there a cadence to this communication?
  - o This is where we're making the investments; or I have nothing new to add; it's not always just potential; those discussions bring about other drivers for them
  - o Mark: what about programs coming back and saying "I'm running out of something here."
  - o There's a two-way component to this
  - o Mark: I've asked Julia to get us some willing RPAC folks (but they're pretty tapped) to put a call out to see if there could be a side conversation to discuss this with RETAC

ACTION: Mark to follow-up on the long-handoff to RPAC discussion both internally and externally

ACTION: NEEA to send a proposed schedule for next year

ACTION: Report back on the smart thermostat workshop at next meeting

- Kevin: we're working through a lot of the issues that we need to; but I'm anxious to get back to technology conversations
- Todd: opportunity to go through a chunk of high readiness that might be ready to go through to the group
- Mike: would love to have ideas as to where the potential gaps are as well
- Keshmira: we have a lighting tag for res & CEE is having a workshop and we talked about what we should/shouldn't be incenting; deeper dive on all activities we should be and what we shouldn't be working on

ADJOURN