

# Memorandum



August 24, 2017

TO: Cost Effectiveness and Evaluation Advisory Committee

FROM: Stephanie Rider, Senior Manager, Market Planning

CC: Susan Hermenet, Director, Emerging Technology, Planning, and Evaluation

SUBJECT: Key Takeaways & Action Items – August 23, 2017

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To Committee Members,

Thank you for your attendance and participation at our August 23<sup>rd</sup> Cost Effectiveness and Evaluation Advisory Committee meeting. We appreciate your feedback on our new Market Research and Evaluation Newsletter, all of your thoughtful questions that can inform our Market Intelligence team's work, and your input on the most relevant Emerging Technology updates.

Below is a summary of the feedback we heard and are taking into consideration as we continue to improve upon the information we share at these meetings:

TOPIC	WHAT WE HEARD	ACTIONS
Estimating Capacity Savings	<ul style="list-style-type: none"><li>Some utilities are already doing some of this</li><li>Coming up with a more accurate methodology would be beneficial to the region</li></ul>	<ul style="list-style-type: none"><li>NEEA will reach out to the utilities that have worked on this to present their methodologies at a subsequent meeting</li><li>NEEA will continue to work on creating the most accurate methodology for estimating capacity savings</li></ul>
MRE Newsletter feedback	<ul style="list-style-type: none"><li>The newsletter provides good insight into NEEA's research activities</li><li>Showing a more holistic view of NEEA's market research activities alongside emerging technologies and other research activities would be helpful</li></ul>	<ul style="list-style-type: none"><li>NEEA's market research team will present snapshots of their work with greater context as deep dives at future meetings</li></ul>
Questions for Market Intelligence	<ul style="list-style-type: none"><li>A variety of questions/possible topics for NEEA's market intelligence team were put forward for consideration</li></ul>	<ul style="list-style-type: none"><li>NEEA's market intelligence team will reach out to utilities with possible opportunities for improved information around these topics/questions</li></ul>

- Next Cost Effectiveness and Evaluation Advisory Committee meeting is November 6, 2017.

# Cost Effectiveness and Evaluation Advisory Committee



## Summary Meeting Notes and Action Items

August 23, 2017

IN ATTENDANCE	ON THE PHONE
Nolan Moser, OPUC Jennifer Snyder, WUTC Jennifer Light, NWPCC Janine Benner, ODOE Phil Degens, ETO	Andy Paul, Avista Cory Reed, Idaho Power Deb Young, NorthWestern Energy Greg Kelleher, EWEB Rebecca Blanton, PSE Jim Perich-Anderson, PSE Larry Blaufus, Clark PUD Warren Cook, ODOE Adam Shick, ETO JP Batmale, Public Utility Commission Jennifer Finnigan, Snohomish PUD

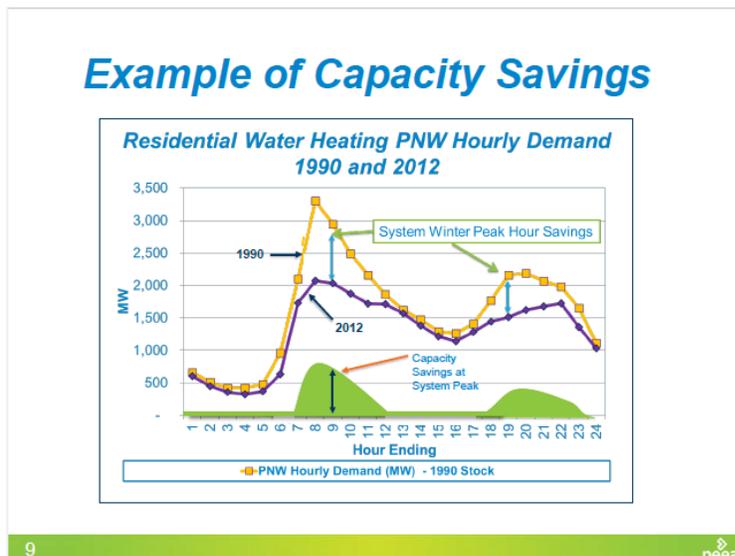
**NEEA Staff:** Jonathan Belais, David Clement, Dulane Moran, Stephanie Rider, Ryan Brown, Greg Kaleka, Melinda Eden, Christina Steinhoff

**Agenda Review** – Jonathan Belais

**Calculating Capacity Savings** – David Clement

- Something happened this year – we were told we were going to be short on capacity
  - Interesting for a region that’s so hydro rich
  - Right now, roughly 1500MW of coal energy retired and about the same gained via EE
  - Capacity is becoming increasingly dear to the Northwest
- The Disadvantages of Capacity from EE
  - Hard to count, a bit imprecise, can’t be metered & many other factors
  - Many small transactions
  - Not dispatchable – can’t ramp up OR down
  - There is a lot of complexity to market rules outside the PNW
- The Advantages of Capacity from EE
  - Low cost (about half)
  - Speed of deployment much higher
  - High locational value

- Reduces peak load – minimizes load of most expensive generators
- Improved air quality/public health/less GHGs
- Lower wholesale prices (demand reduction induced price effect DRIPE)
- ProCost
  - An excel-based model w/data base of load savings shapes (called GLSShapes) that help identify capacity savings among other things
    - Subtract baseline from savings
  - Example of Capacity Savings



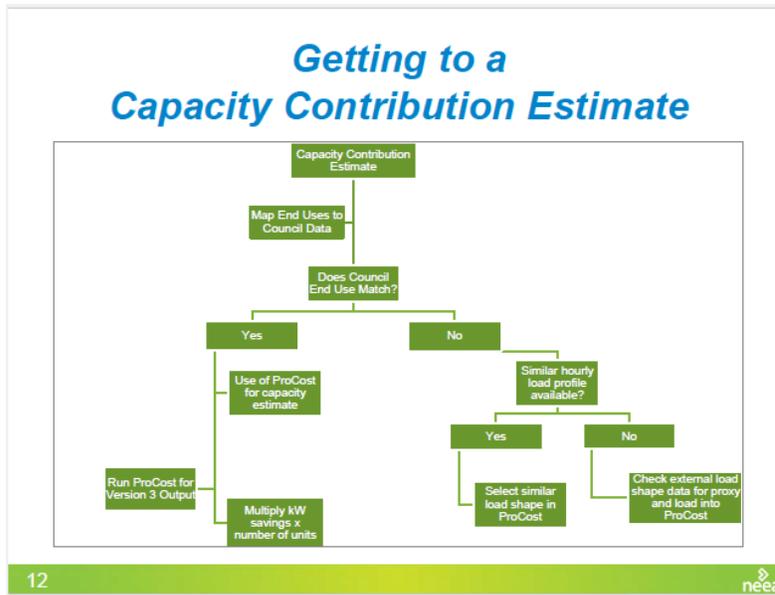
- Calculating Capacity Savings = kW Capacity Savings per Unit x Units Sold

## Calculating Capacity Savings

### kW Capacity Savings per Unit x Units Sold

- ProCost contains annual wholesale (retail + losses) capacity savings in kilowatts (kW) at time of system peak (weekday at 6 PM)
- Capacity savings per unit (electric end use) from ProCost are multiplied by the matching NEEA annual number of units sold
  - In cases of no direct match within ProCost GLShapes, a proxy for the efficient load shape is identified
- To value capacity savings, total capacity savings (kW) at system peak is multiplied by a value for capacity in \$/kW-year

- Valuing Capacity
  - The council does it similar to resource planners
  - Using a simple-cycle combustion turbine
- A decision-tree from NEEEA in getting to a Capacity Contribution Estimate



- We can usually find something within in the council’s database that’s similar
- Sat down with council staff for Load Shape Choices

## NEEA Load Shape Choices

- NEEA works with measures that do not always perfectly match the Council taxonomy
  - Clothes Washers
    - » Use R-All-WH-Cwash-All-All-R
  - Secondary Glazing System
    - » Use C-Off-HVAC-Vent-All-All-E
  - Non-Residential T8 Fluorescent 28W:
    - » Use COMlight
  - Residential Room Air Conditioners
    - » Use ASHP HVAC – Res
  - Commissioning
    - » COM-Total-COM-Total
  - Industrial
    - » Total Industrial-Total Industrial

- 13 neea
- Came up with ProCost Estimate of Annual Generation Capacity Savings



Customer Class	Co-created Capacity Savings
Residential	40.8 MW
Commercial	41.1 MW
Total	81.9 MW

Customer Class	Co-created Capacity Value
Residential	\$4.69 million
Commercial	\$4.73 million
Total	\$9.42 million

- What's not included in the Generation Capacity Value
  - Discussion of what the total resource cost often includes
  - In this context, capacity value might be in the 20% range of the Energy Efficiency value
- How could we improve these estimates?
  - The Council has a very good first cut
  - Here are some possible improvements:
    - More accurate load shape data (NEEA's currently embarking on the End Use Load Research Project)
    - Include capacity savings from transmission and distribution
    - Adjust capacity estimates for individual utility use
      - You would need the load factor, diverse factor, etc.
    - Use hourly capacity values instead of single point
      - You could allocate this by looking at the historical difference between peak and load

**Nolan** – in terms of setting prices or attempting to identify the value of capacity, will you be looking at regional utility acquisition events? PGE is looking to acquire capacity. Is this kind of data going to be helpful in the real world?

- It would be helpful, and it's indicative of a particular area and a point in time
- One reason folks use the turbine is because it's easy
- It ranges in price based on a normal day vs. a weather event

**Jennifer Finnigan** - Can you help me understand which utilities do the individual capacity estimates?

- Don't know about anyone who does this well in the Northwest
- PGE is worrying about it right now
- **Jennifer Light** – ETO is looking at this as well and might be a good group to talk to



- **Adam** – this is true, but we’re also having difficulty on matching up loadshapes, etc. but happy to talk to anyone

**Rebecca** – certainly accurate load shapes would help, but for bullet points 2 –

4, we’re already doing this to the best of my knowledge; one of my concerns is that this work will lead to comparisons on who’s better, who’s doing it more efficiently, etc.

- At this point, NEEA has no plans to do estimates for utilities, we’re doing it for our own work and co-created savings, so we don’t have a comparison issue from NEEA
- All of 2, 3, and 4 vary substantially by utility
- I think it is possible to get individual estimates, but it will be a lot of work because it hasn’t been done before really

**Adam** – we are also doing 2 – 4, we are also struggling with the issue with finding when the peak actually happens, dealing with summer and winter peaks – struggling to align the methodology with summer and winter peaking

- What we see in the region is that the shortfalls tend to occur in the summer (more frequently) vs. bigger but fewer shortfalls in the winter

**Cory** – starting with 2015 IRP, we’ve built a program here to match shapes to forecasted peaks 20 years out so we can see what the peak potential is of EE

- Do you know where the load shapes came from?
- Cory – applied energy group; it is quite data intensive, but once in place, it’s not that hard of a process
- **Rebecca** – Sounds like exactly what PSE does

**Nolan** – how are you attempting to create a locational value?

- For NEEA, we’re not going to try to capture that; I’m not sure how you would do that on a regional basis; I would welcome the council to do that first

**Nolan** – How do you view the restrictions and requirements and penalties? There’s no real check on whether or not this resource acts as capacity other than our analysis – does that discount it a bit?

- It probably gets discounted in a lot of plans for that very reason and it’s hard to measure
- There’s a lot of work that’s been done on trying to measure capacity because there are so many variables at play
- If we simply know what the baseline is, etc., that’s a pretty good calculation
- It’s a tough issue that will likely evolve as people value capacity more; and how much more will be chewed up by renewable variable resources (solar & wind will both require backup capacity)
- Not urgent, but important for us to stay focused

**Jennifer Light** – the RTF is in the process of developing policy standards tied back to load shapes and how accurate they are; trying to systematically review load shapes with tool

- RTF focused on 6pm regional winter peak but also summer peaks as well

**Jonathan** – to what extent is it already useful to record this metric and/or are there any other steps NEEA could do to make it more helpful?

- **Nolan** – we strongly encourage this type of analysis, expanding and improving it; we want the lowest cost capacity; the stronger and more robust this is, the more we can rely on it
- **Jennifer Finnigan** - is EULR fully funded now?
- **David** – we’re about 80-85% funded by commitment and are working on putting together contracts with utilities and looking for other sources of funding; we are moving forward with the RFP and have released the residential RFP this week; getting fully funded will help us do the commercial study

**Using NEEA’s Market Intelligence** - Harvey Mathews

- Review of the kinds of data we have:

## *Last time we discussed EE Market data*





- Four examples – diagnosing, characterizing, connecting, and forecasting
  - Diagnosing – rural DHP Analysis – found they just had a different type of building stock & the sales they had were on average with the region based on this
  - Characterizing – who are single family renters? Found out average residences and three dominant mosaic groups (demographic profile groups) – gave group good ideas to shape RFP
  - Forecasting – can we use data to predict future impact; is there an EE opportunity with fast food restaurants? – didn't come up with enough energy savings with that one group
  - Connecting – putting together energy programs with understanding the markets a little better; can we build a better DHP marketing campaign by understanding the Portland area better? – found demographic profiles that stood out and narrowed down zip codes

**David** – on DHP example, you said the building stock limited the penetration of DHPs – I'm wondering what about that newer building? Fuel issue

- What are some of your challenging questions?
  - Jennifer – still trying to think of one
  - Phil – pass at the moment
  - **Jennifer Light** – our question: making sure we can get all cost effective energy efficiency, so we need to know which markets aren't getting touched – where are the hard to reach markets?
  - Hard to reach markets meeting on September 7<sup>th</sup>
  - **Nolan** – we're very focused on avoided costs right now and getting more and more granular – we'd be very interested in how these data sets and tools could help us capture every single avoided cost as accurately as possible; we think that there needs to be a general update and we want to reexamine the entire issue and get more specific and capture as many avoided costs
  - **Cory** – one interesting one: trying to build out a complete inventory for electric heat customers vs. not (not really for NEEA) – a lot of things are based on fuel right now – trying to tease out those that we don't have known data on; looking at interesting things with meter data and patterns of meter data and actually building models that look at patterns, to see if we can tease out the mixed-use fuel customers; just did an end-use data in the fall & also in the hard to reach market segmentation process
  - **Larry** – the only thing that we do with fuel is identifying how big the opportunities are; we like when it informs the campaigns because we don't have the capacity in house to do this
  - **Jennifer Finnigan** – finding pockets where there's a lot of potential quickly to avoid a distribution upgrade
  - **Phil** – we're currently working with a utility on a targeted DSM program; for speed of uptake there's a couple of things you can do; energy kits, etc. but most of the other things are long-term decisions that you need to plan out; also analyzing feeder lines and



what the actual folks are on the feeder lines – it'd be good to have a menu of things you can do & peak loads are also different on those peak lines; we're very interested in EULR to find out when specific equipment goes on so you can value and or target various peak loads differently, etc.

- **Harvey** – you could draw a line around the feeder and tie it with demographic data and tie with existing programs and understand with forecasting
- **Phil** – for targeted DSM for T&D deferrals, one challenge is that can one provide additional incentives, or how can you target marketing to a specific feeder line? Also, for Cost Effectiveness, it's an equity challenge – often you try and target those with very large consumption
- **David** – it would be interesting to know what the situation is with the substation within the targeted area – are you needing to do reconductoring or could you defer replacement of a sub station
- **Phil** – or in New York, it's very expensive for substations; and I'm interested for what you can do for utilities on the T&D types of things and it's good to see what the costs are for utilities and customers
- **Nolan** – we're going to be doing something sig & locational, a test bed for DR, doing a tremendous amount of diff DR approaches with a very specific population, it's in the PGE IRP, the order will come out at the end of the month
- **Jennifer Finnigan** – locational value of EE; would be happy to put in contact with boss (David M?) had a great conversation on this – he's in Virginia
- **Harvey** – BC hydro did some research; anticipate a lot more EVs sold there; they got DMV records to see where Prius owners lived and did analysis of distribution lines to identify where there could be
- **Jim** – very interesting conversations and presentation – I think one of the challenges with larger consumer items is to think about multiple customers and multiple decision makers all along the supply chain; there's different value proposition to each group & often times there's a different messenger that would be most effective with a different group; we do have to be careful in assuming that it's the one in the residence that's making the decision; we not only need to be reaching our consumer, but we also need to be reaching the manufacturers and educating trade allys, etc.
  - It's known who they are – it's getting to know the Value Prop
  - **Harvey** – it's also doing more MRE and understanding consumer path to purchase
- **Harvey** – as we get better with our detail of address level data and what kind of marketing messages might appeal to them, it becomes challenging as an industry to move our marketing game up to what's normal in the consumer world

#### **Market Research and Evaluation Update – Dulane Moran**

- Review of goals for this section of the agenda



- September 20<sup>th</sup> is the next Northwest Research Group – presentations on DR work at PacifiCorp & PGE
- Review of MRE Newsletter
  - Most Residential programs have reports coming out soon
  - Have more stuff in planning in commercial
  - Commercial Window Attachments have been integrated to include low-e storm windows
  - Luminaire Level Lighting Controls – working with ETO to do some research with pilots and will be moving to fielding soon – could take a while; uncertain timing based on different pilots
  - Includes programs that are current and also in long-term monitoring and tracking
  - Mid-cycle Natural Gas Assessment will be in reporting soon
  - Cross Sector water heating is more on the water heater market – not done with BPA but they are part of the conversation, separate from the model they’re building
  - Stock assessments will be added in
  - Level of information feedback:
    - **Jennifer Light** – great, it would be helpful for you to map out where things are in the market – having something that puts everything together and how it’s impacting the transformation for a more holistic work: this plus the ET report in some visual & maybe talking about some of the partners that you’re working with on this (w/ETO or BPA)
    - **Dulane** – so the status on the MT curve – do you want one curve?
    - **Jennifer Light** – it’s plugging in the ET piece and how it’s fitting into market research – connecting the two pieces together as a helpful process, pulling in all the value streams, could also pull in MI, it could be an annual thing, not necessarily a quarterly thing, from a market perspective would be nice not necessarily by initiative
    - **Jennifer Light** – a challenge we always have is understanding what all of the research is when trying to understand how they fit and how they complement each other to see the gaps, etc.
    - **Corinne** – yes, we are working towards something more holistic
    - **Phil** – I agree with Jennifer – it is important to look at markets, certain pieces of relevant market research from ET should be brought into the picture that are more market specific rather than tech specific
    - **Jim P-A** – it might be valuable to do more early deliverable sharing across the board; also if there could be a link to the list of the people to the NEEA committees that are sponsoring this project (stakeholder committees); if something comes up, some slip or something, when something is available like a secondary literature review to show the expected sequence of activities, and then people who have interest in these different pieces could communicate – definitely interested in timeline for fielding (in service territory)

- Codes question from Warren – we are doing Oregon codes first, and we are doing another state in this cycle, not yet determined – Steve Phourides would be the best
- Candidate topics for Deeper Dives
  - How would one know that we were scoping and to get involved, but there isn't a neat/tidy way to work people into this currently
  - Commercial codes? Could dive into this later – strategies for sampling/recruitment
  - **Phil** – going at the residential single-family market – here's the info about it, here are the initiatives, these are the things we're looking at as Emerging Tech and a map of everything that you've done to see gaps and the big picture, lets you see what other people's interest areas are and the current state of the market, and also how utility initiatives fit into NEEA's things and thinking about those in ET might fit into something
  - **Jennifer Light** – that's what I was getting at
  - **Phil** – you can bring in other pieces, like lighting in res is a lot smaller than we thought
  - **Corinne** – some thoughtfulness between the work we're doing, how it's integrated with the data and where we're goin
  - **Jennifer Light** – a great way to show all of the value streams
  - So Commercial Story & Story telling on markets
  - **Phil** – and gas informs a lot of this as well
- CBSA Update
  - Currently moving from phase 1 to phase 2 – the dotted line is another RFP



- We have a final plan and pretty solid workgroup participation
- We need to take the plan that we have, and make sure that's the plan we want to run with in the RFP – the final decision meeting is next week



- Phase 2 is the meat of the project – where we will recruit the buildings and do the field work
  - A fundamental change – two stage study design
    - The list is a pretty good representation of where the commercial buildings are, but not great for representativeness
    - Going to take 10k ish census blocks and couple that with online data (google, etc.) and categorize them in stage one- 15 minutes per census block
    - Then we'll get a list of 30-40k buildings cataloged
    - This is the population for which we pull our actual onsite inspections
      - This solves confidence in catalog & subsequent sample
      - We could save time in auditing/field staff time
      - We could even pull in some preliminary billing information
      - Your weights are robust now
    - It is more expensive, so we may have fewer completed onsites
  - Next steps – finalize study design next week
    - Develop and finalize phase 2 RFP next month and have contractor in place in December
    - Cataloging can happen without touching customers at all
    - Site recruitment will follow immediately after (May 2018)
    - The interim deliverable in the first stage – want to analyze what we learned, do the building types still make sense?
    - The next work group will have more customer care folks
- Utility Involvement
  - Info through Conduit, Advisory Committees, ad hoc meetings
- With a 2 stage design, it's pretty important to know at the first stage if any organizations plan to oversample
  - How can we get this message out better?
  - That gives us 6 months to know
  - Contact Dulane with questions – no money on the table yet
- **Corinne – what role should NEEA play when it comes to Res lighting data?**
  - We're working on the right approach internally
  - Trying to work out where the budget for this is coming from
  - Trying to manage priorities, and don't have an answer yet as to where those monies are coming from
  - How can NEEA play a more holistic/helpful role around res lighting
  - Do you think there's a long term play for NEEA in terms of being a hub for lighting data?
  - Could we feasibly get that same info by doing this every other year?
  - **Phil** – 2 years is not sufficient; right now our planning folks have been using it very strategically



- **Jim P-A** – we’re actually looking at the products at big box (NEEA also buys Neilson sales data), we do get reporting data for rebated items; the value may be more in the tracked sales data
- This isn’t the full product category. But does the stocking data pick up on that?
- We typically do qualitative research to give context for this study as well
- We do get price profiles across the region along with the stock data
- Is there something else that we could/should be doing to identify opportunities – we do want workgroup involvement
- **Jim P-A** – I think this is a good question; I’ve done 3 diff population studies on lighting; if other utilities are doing similar studies, maybe we could share or doing more coordinated studies, or maybe NEEA does a population study with oversampling
- **Jennifer Light** – short term, getting data less frequently would not be a good thing at this point because everything is moving so fast
- Is there a way to do a rolling sample or something?

### Emerging Technology Update

- Moving from RETAC → RETAC 2.0
  - From information sharing to more coordinated collaboration to ensure a consistent flow of new tech in the region over time
  - Half of 7<sup>th</sup> Plan savings are coming from emerging tech
  - Model Conservation Standard 4 – names RETAC & NEEA & ETO & BPA to better align and proactively work towards a structure that achieved the savings potential for those new things into the market
- RETAC 2.0 components
  - Added a few things to RETAC approach → trying to get a regional view of things
  - Working to get consistent in the way we talk about all of the tech & projects
    - Want to look like 1 coordinated emerging tech program
  - Readiness Assessment criteria building off of tech readiness level that DOE uses
    - If you overlay commercial readiness, it does overlap with technology readiness
    - Example: HPWH from startup to top 3 manufacturers
    - Each utility can now decide where their risk tolerance is based on the criteria
- Readiness levels
  - Market vs. product performance vs. program levels
  - Doughy vs. delicious bread
- RETAC 2.0 Pipeline
  - Defining emerging technology
  - Technology – gears/nuts/bolts – discrete elements
  - Product – next level – printing press (measures)
  - Application – a product can be used for a different applications (measure applications)



- **There can be 100s of technologies that support 10s of products that promote thousands of applications**
- End use = application
- Projects are along entire continuum
- Our first step – focus on products, but we need to figure out to scoot into tech realm more and manage into the application realm more
- RETAC 2.0 Database Update
  - Added database to Conduit that tracks products and projects
- Histograms
  - Products by Readiness Levels
    - In the first role up, not a big spike in any particular area
  - Projects by Readiness Levels
    - Very much skewed toward the higher levels of readiness
    - This may be right because you're taking one project at a time when you're uncertain
  - Jennifer – what is level 0?
  - In the packet there is a matrix that describes each readiness level
- Also added additions with Natural Gas
  - Everyone is welcome to run reports on RETAC on Conduit
  - Send a note to Mark or Dave Kresta to ensure data is up to date
- Open Questions
  - This is a journey and there are a lot of things we're grappling work
  - Even just – what is the definition of Emerging technology
  - We think we need a little richer set of terms
- **Jennifer Light** – recap on previous discussion about holistic look from MRE newsletter
- Commercial Comparison – list of end uses
  - Compared this to 7<sup>th</sup> Plan savings vs. whether there was a project within the group or within CEE
  - Generally, it looks like we have good alignment with the 7<sup>th</sup> plan – a gap around data centers and rooftop unit controllers
  - A project could be field test, lab test, not a program, all research work
- Residential Comparison – generally good alignment again
- We will be doing a similar comparison with California
- 2018 Scanning Options
  - Data Centers (small ones)
  - Whole building approaches
  - Task/ambient HVAC
  - Refrigerant changes
  - Advanced network lighting controls
  - Heat Pump Water Heaters
  - Advanced thermostats



- 2018 Nearly Program Ready Technologies – see slide – are any of these that are new/exciting for you?
  - ETO is essentially done with Low-elevation spray application irrigation but sometimes the season is too short to do things as well as OPower
  - ETO is often an early adopter on these things
  - Phil – SEM, hard to do multifamily water sub-metering, heat recovery ventilator, rooftop HVAC
  - Nolan – can you talk about the OPower Personal Energy Reports
    - It’s basically they pull 100k people and send 50k a neighborhood comparison
    - There’s a whole crop of new approaches to this w/Nest as an example
    - Phil – I think people aren’t really interested in energy use on an ongoing basis; and I think lighting controls will continue to be important for utilities and programs
  - Not 1/8 (lighting systems) met all of the requirements at PNNL award show (getting folks to install and commission) – this is an example of the fitness for use not being there though it’s very commercially available
- **You can search for both projects/products in there – it shows who to contact**
- **Phil** – it would be nice also to know the reasons for the things that aren’t on the list or when it would be cost effective to add things back on
  - There is a way to turn a technology into a “not working on it anymore” mode
  - I would love to get to a point where you could see the stock of HPWH in your area, and what percentage are at what performance level and then be able to look at the pipeline to see what’s coming and then look at the technical potential if a particular product came through and see the impact in the area
    - But we’re missing the stock assessment from service territories and the feedback loop from programs
- **Phil** – vending machines is a good example – when should we look at these again? Same with refrigeration in grocery stores
- Haven’t really gotten to this kind of thing yet, but it would be ideal
- **Jim P-A** – I’m curious as to how these products move forward; what’s the process for next steps?
  - We have least control over the market
  - There is some research into supply chain market characterization study (NEEA)
  - If you get into performance – this is distributed among folks
  - With program readiness – it gets more complicated, it’s difficult to predict what the cost effectiveness will be later
  - Are trying to use readiness to inform our next steps
  - **Jim P-A** – it sounds like the idea is to move forward in a more coordinated fashion
  - Yes – we’re having the conversation of how to do enough but not too much and to avoid duplication

**FUTURE MEETING REQUESTS:**

- None

**WRAP UP**

