Memorandum

January 5, 2017

TO: Industrial Advisory Committee (IAC)

FROM: Eugene Rosolie, Stakeholder Relations Manager

SUBJECT: Packet for Q1 2017

PACKET APPROACH

This packet continues the "tiered" approach:

- Tier-1 memo for items on the agenda;
- Tier-2 memos for informational updates on items not requiring agenda time
- Tier-3 materials provided as additional detail for those interested.

INFORMATIONAL UPDATES

Enclosed please find **Tier-2** informational updates on the following:

ADDITIONAL DETAILS (Tier 3)

Tier-3 materials related to the agenda items and informational updates listed above will be accessible through links in those memos. Additional Tier-3 details are available here:

- November 15, 2016 RPAC meeting notes

Date: January 12, 2017
Time: 8:30 am - 1:00 pm PDT
Location: NEEA, 421 SW Sixth Ave Suite 600, Portland OR 97204

Webinar: http://neea.adobeconnect.com/iacjan2017/ (includes phone option)
Dial-In: 1-877-890-9502 participant code 0094737 # (option for dialing in directly)

DESIRED OUTCOMES:

- Robust discussion, feedback and advice on agenda items
- Impart relevant, pertinent information to each other

AGENDA:

			Packet Pg. #
8:30-8:40 am	**WELCOME** Introductions and Agenda review *Desired Outcome*: *Information; agenda approval*	Eugene Rosolie Sepideh Rezania	2-3
8:40-9:15 am	**Emerging Tech Update/New Ideas Forum** • ET Update • Extended Motor Products Labeling *Desired Outcome:* *Information, Input*	Mark Rehley Geoff Wicks	4
9:15:10:00 am	**IAC Member Roundtable** *Desired Outcome:* *Awareness of current activities and issues in the region*	IAC Members	
10:00-10:35 pm	**C&I Strategic Energy Management Infrastructure** • SEM Hub Debut *Desired Outcome:* *Information, Input*	Josh Pelham	6
10:35-10:50 pm	**Break**	All	

10:50-12:30 pm	**RETA-CRES Utility Work Group** • Update on CRES certifications and NEEA/RETA progress and activities • Linkages between Utility Programs and CRES certification • Review 2017 Activities *<u>Desired Outcome</u>:* *Participants understand RETA-CRES initiative activities for 2017 and provide input to for support CRES needs in their program/portfolio once NEEA support ends*	Warren Fish	7-8
12:30-12:40 pm	**Public Comments**		
12:40-12:50 pm	**New Follow-up Actions and Feedback**	Eugene Rosolie	
1:00 pm	**Adjourn**		

Memorandum – *Agenda Item (Tier 1)*

Date: January 5, 2017

TO: Industrial Advisory Committee (IAC)

FROM: Geoff Wickes, Product Manager

SUBJECT: EMPLI Pumps and other products

EMPLI Pumps – RTF Measures

The Extended Motor Product Labeling Initiative (EMPLI) is developing energy performance metrics and labels for fans, pumps, and compressors. In January, 2016, the DOE issued the final rulemaking on pump efficiency standards and test procedure that take effect in 2020. The EMPLI initiative targets savings that can be achieved by pumping systems that go beyond the requirements of the federal standards. NEEA is working with SBW Consulting, Inc., in a multi-phase effort to develop tools for advancing EMPLI in the region.

The first phase, completed in the spring of 2016, produced estimates of the regional savings potential and described a plan for engaging the Regional Technical Forum (RTF) to develop measures based on EMPLI. The second phase, with the goal of developing RTF Planning measures, was jointly funded by NEEA and BPA. The RTF formed a committee that focused on two measures; Unit Energy Saving (UES) and Standard Protocol. Along with NEEA, BPA, and SBW other participants included; Pacific Northwest National Labs (PNNL), Pump OEM's, and the Hydraulic Institute. The result of the committee's work was that on December 16th the RTF approved 3,400 "Planned" UES measures to account for all the variations. At the same time the necessary research plan was submitted and generally approved with the requirement it be firmed up over this first quarter of 2017. The results of research will be used so the RTF can consider upgrading the measures to "Proven". Now that this is approved by the RTF, Planning measures can be used by the region's utilities to offer incentives for pump systems that exceed the Federal standards. These measures are for commercial, industrial and agriculture.

NEEA's Market Transformation plan is that it work with OEM's and distribution to create an upstream or midstream program that utilities can opt in or out of.

Circulators are next under development (commercial focus). After that it looks as if Fans and Compressed Air will be coming out of the DOE rule makings

Memorandum – *Information (Tier 2)*

January 5, 2017

TO: Industrial Advisory Committee (IAC)

FROM: Geoff Wickes, Product Manager

SUBJECT: Compressed Air Blowing Applications

Improving the Efficiency of Compressed Air Blowing Applications

Open blowing of compressed air is often used in industry and is nearly always a wasteful means of achieving some end. A compressed-air-saving device called an air saving unit (ASU) was developed in Japan by Parker Hannifin (Parker) for the automotive industry as a means of saving energy when blowing dust or other contaminants from process applications. The use of ASUs has expanded both geographically to other Asian countries and Europe, and in their breadth of applications. Parker is in the process of bringing this technology to North America. A recent scoping study conducted for NEEA by SBW Consulting, Inc. indicated that ASUs had the potential to provide cost-effective electrical energy savings but that this potential needed to be proven through field testing.

NEEA is working with Parker Hannifin to conduct more detailed in field studies in 2017. In exchange for this Parker Hannifin will provide shipment data of product into the Pacific Northwest. Once these studies are complete and if the results are promising NEEA proposes to work with the Regional Technical Forum (RTF) to create a measure.

In advance of any work NEEA's Product Council has scheduled a presentation for Parker Hannifin and SBW to walk through the technology and next steps. Utilities are invited to attend. The meeting is scheduled for January 24th at 10:30-12:00 NEEA office or via webinar. In addition to this work, SBW has examined the feasibility of developing a functional performance specification that could be used by manufacturers to improve the efficiency of their compressed air blowing applications. Thus far the results look promising. Later in 2017, NEEA staff plan to present the findings of field research and market information to NEEA's Regional Portfolio Advisory Committee (RPAC).

Memorandum – *Agenda Item (Tier 1)*

January 5th, 2017

TO: Industrial Advisory Committee (IAC)

FROM: Warren Fish, Program Manager

SUBJECT: Commercial and Industrial SEM Infrastructure

SEM Hub: The SEM Hub is now online and we are actively optimizing the site for user experience improvements. We will provide the IAC and CAC with a tour of the site in their January meetings. Our site optimization process includes one-on-one user acceptance testing; bug-fixing of issues identified by our internal team and contractors; adjusting how copy and images appear on the site; and adjusting site content, placement and tagging. Stakeholder input and participation in the SEM Hub project has been absolutely critical to our success with the project thus far. The in-depth interviews we conducted in the discovery phase, the guidance we obtained via the SEM Hub Stakeholder Workgroup through four webinars in the second half of 2016 in the site development phase, and the input of interested stakeholders captured through user acceptance testing in the pre-launch phase have already and will continue to shape the site in key ways. As we set about improving functionality of the SEM Hub during January and February of 2017, we welcome additional input from members of our Advisory Committees and SEM Hub Workgroup. Note, in Q1 of 2017, we will have more budget and contractor availability for incorporating further stakeholder input than we will have in the latter quarters of 2017. Thank you for your support of the SEM Hub project and for your ongoing guidance and support as we enhance this regional resource. The SEM Hub and the NW SEM Collaborative (below) are the key elements of the regional Commercial and Industrial SEM Infrastructure which NEEA facilitates for the region.

NW SEM Collaborative: We held two consecutive webinars in follow-up to the 6th annual Fall Workshop of the NW SEM Collaborative. The Fall Workshop was on October 11th and was attended by 80 people. The two follow-up webinars I mentioned were on December 15th, and each webinar was attended by approximately 30 people with some people attending both webinars. In the webinars, we reviewed Technical and Programmatic topics surfaced at the Fall Workshop as well as the topics with active and inactive work teams in place. We also sent a follow-up survey to the webinar participants and to the rest of the Collaborative to inquire about what members view as the top priorities for 2017. 21 people responded to the survey. The Leadership Team of the NW SEM Collaborative is now reviewing those survey responses.

The Leadership Team will meet later this month to determine which work teams should be resourced and endorsed for volunteer work in 2017. The Collaborative will stay informed on the efforts of these work teams through 2017 via email updates, webinars, side-events at either or both Efficiency Exchange in Portland and ACEEE Industrial Summer Study in Denver, and at our annual Fall Workshop (in October 2017, date TBD). Through these channels Collaborative members will be made aware of shared challenges and opportunities on SEM that fellow members are working on. Please contact me with any questions, ideas, input, suggestions, requests, etc. for the NW SEM Collaborative and SEM Hub. Thank you.

Memorandum *– Agenda Item (Tier 1)*

January 5, 2017

TO: Industrial Advisory Committee (IAC)

FROM: Warren Fish

SUBJECT: RETA CRES Utility Working Group – CRES Initiative Update & Utility Program Coordination/Collaboration

At the January IAC / CRES-UWG meeting we will update the committee on recent news on CRES and discuss our 2017 activities. In addition, we want to spend time discussing strategies for CRES support after 2017. NEEA's support for CRES implementation is expected to end at year-end 2017. NW utilities may have additional opportunities to support CRES after that time. We would like stakeholders to come prepared to talk about what they feel is necessary to support CRES in their program/portfolio once NEEA support ends.

Updates:

RETA National Conference: At the RETA national conference (1100 registered attendees; first week of October), we had several outstanding opportunities to promote CRES. I presented to the RETA National Board about NEEA's support of RETA CRES and met several RETA Board Members and guests. Our contractor team from Energy 350 led a one-hour breakout session to an overflow crowd of plant managers and operators on the first day of the conference, "CRES Panel: Waste Not, Want Not: Real-Life Energy Efficiency Projects That Save You Money." Our team also staffed a booth on the exhibition floor where we held over a hundred 1:1 information-sharing conversations about CRES. We addressed the Chapter Leaders' Reception where we shared material that Chapter Leaders can use about CRES in one of their upcoming RETA Chapter Meetings. Our team also attended the Operators Forum where we answered numerous questions on CRES and the certification process, and the Education Committee meeting where we are actively working with other RETA members to develop a new RETA branded CRES reference guide.. Marketing opportunities for CRES at the conference were numerous and included: signage about CRES at various locations around the exhibition; CRES postcards; and a playing of the CRES video for the full conference audience assembled at the Annual RETA Business Meeting; a free full-page ad placement in the Conference Agenda Magazine; and articles in the daily Conference Chronicle newsletter.

Partnerships with Trade Organizations: We are working closely with RETA to promote CRES through marketing channels and events offered by other refrigeration trade associations, including the Global Cold Chain Alliance (GCCA) and International Institute of Ammonia Refrigeration (IIAR). Demonstrating the value proposition for CRES to management in the refrigeration industry is our top priority. We included a request in our recent US DOE grant submission to gain support for a CRES case study that would lay out marketing value prop messages for refrigeration managers, supervisors and owners. We are actively working with GCCA on an educational webinar for their members and on posting CRES information to their website.

Addressing Exam Related Barriers: Our team is working with the RETA Education Committee to support their work on improved CRES preparatory materials including a new energy efficiency reference guide. This is a national committee that meets weekly and takes on writing assignments. Nick and Philip of Energy 350 are supporting the committee's work on energy efficiency by writing and editing specific chapters of content based on their expertise and available source material. This project is on track for completion by March 31, 2017. The reference material in this reference guide will support expansion of the exam question pool for CRES, furthering the goal of ANSI certification by 2018.

RETA Certification Database: The RETA Certification Database (RCD) has now launched and is live for members. We will share a quick demo of that site at our next IAC update in January. RETA promoted the RCD to its members at the RETA National Conference as the new online home for tracking all RETA professional development hours (PDH) as well as activites for their CRES certification. RETA staff have embraced this productivity enhancing tool. RETA's infrastructure and skills with web-based platforms has grown significantly in recent years—no small achievement for a 100-year old trade association with a staff of ten employees.

CRES Review Courses: We completed a three-day CRES Review Course in Wilsonville on November 29th through December 1st of 2016 with assistance from Energy Trust of Oregon, PGE and RETA. We are finalizing details on a March 2017 two-day CRES Review Course in the Tri-Cities which will target recent ROC graduates and others in the area. We are also planning a September 20th and 21st, 2017 two-day CRES Review Course in Tacoma targeting the current ROC cohort that kicked-off in October, 2016.

CRES By The Numbers: Several more people have passed the CRES exam and are working on CRES activities since our last IAC update. We will share the latest numbers in this IAC meeting. Our goal is to have at least 30 people CRES certified by year-end 2017 so that RETA has sufficient data to include CRES on their ANSI recertification application in the beginning of 2018 with their other ANSI accredited certifications, CARO and CIRO.

CRES in 2017: In addition to the actions listed above, NEEA has a host of activites planned in 2017 encompassing resource material development, RETA Chapter meeting support, and marketing materials. These include the development of activity cards for exam passers to help them get started thinking about activities right out of the gate, a CRES practice exam to help potential certificants gauge their readiness for the CRES exam, several presentations for regional chapters given by the technical team at Energy 350, and finalizing the RETA CRES Reference Guide to position CRES for ANSI accreditation in 2018. In addition, we hope to work closely with regional utility programs to develop targeted marketing materials and other necessary resources to help support CRES after NEEA's support ends.

NEEA Emerging Technology Report – Q1 – 2017-*Information (Tier 2)*

Emerging Technology Project List						
Technologies	**Description**	**Sector**	**Product Manager**	**Portfolio Start Schedule**	**TP aMW**	**Updates**
Advanced HVAC Solution and Roof Top Units (RTU)	NEEA staff is scanning for efficient alternatives to existing roof top units. Past research has explored evaporative cooling and advanced controls. Currently we are testing a systems approach to separating ventilation control from building heating and cooling. The approach includes an efficient Heat Recovery Ventilation (HRV) system for Dedicated Outside Air and a hydronic or variable refrigerant flow (VRF) for building heating and cooling.	Commercial	John Jennings / Charlie Stephens	2017-2018	85	Our field research is continuing of a very high efficiency dedicated outdoor air systems (DOAS) using a very efficient heat recovery ventilation (HRV) system from Ventacity Systems and VRF or DHP heating and cooling systems. Two (2) systems were commissioned in Q4 and two (2) other systems were designed and installed. There are now seven (7) projects completed or nearing completion, one that will begin in January, and one at PSU that is in scoping (whole building, or 2 zones as a pilot). We expect 9 pilot projects in all. Q4 work also included preliminary data collection and some preliminary data analysis and model calibration that will continue over the winter and through 2017.
Dynamic Glass	Dynamic glass is glazing that adapts to changing natural light to lower glare and solar gain. Most are also double pane providing high insulation benefits.	Commercial	Rob Curry	2019 or later	40	Seattle IDL is conducting a one-year evaluation study of a 90,000 SF six story UNICO office building in Seattle with electrochromic primary window replacement manufactured by VIEW. The study will run through Q1 2017
Extended Products for Motor Driven Systems	Integrated motor systems with optimized performance to a system curve. Includes motor, controller, and fan / pump / compressor combinations.	Commercial / Industrial	Geoff Wickes	2017	150	Clear water pump systems were reviewed by the RTF in December and over 3,400 provisional unit energy savings were approved for motor systems less than 200 hp. NEEA staff is continuing to participate actively with ACEEE and industry market actors to expand this approach to compressors and fans. NEEA and ACEEE hosted Informal session at ACEEE Summer Study.
Pump Operator Certification	Certification for pump operators who demonstrate mastery of efficiency.	Industrial	Geoff Wickes		20	Hydraulic Institute (HI) has completed Pump System Assessment training course and certificate was released September 2016. The Pumps System Assessment Profession (PSAP) is on track for a release late 2017. Job task analysis 100% complete, Certification Committee and Education committee's bylaws drafted and approved. Once the certification is complete, NEEA staff will consider evaluating the energy savings potential of a certified specialist. NEEA staff has offered to HI the option to repurpose the RETA CRES certification tracking database.
Compressed Air Saving Unit	This is an add-on product to compressed air systems. It reduces air consumption by	Industrial	Geoff Wickes	2017	8	NEEA and BPA are working together to complete an additional research step that will provide more insight into the market.

Emerging Technology Project List						
Technologies	**Description**	**Sector**	**Product Manager**	**Portfolio Start Schedule**	**TP aMW**	**Updates**
	interrupting air flow through engineered air nozzles.					The work is targeted to be completed by end of October. Parker Hanafin manufacturer's reps are socializing product and finding test sites for future work. NEEA's emerging technology group will be hosting two presentations one by Parker Hannafin and the other by Nexmatic January 24th at 10:30-12:00
Combo Hot Water & Space Heating – Ductless Heat Pump (DHP) Includes Carbon Dioxide (CO2) heat pumps	Leverage inverter-driven heat pump technology for space conditioning and domestic hot water.	Residential	Dave Kresta / Charlie Stephens	2017-2018	194	Mitsubishi combo product has been delayed due to Rheem exiting the partnership. No timeline for commercialization as of 1/4/2017. BPA/ Washington State University (WSU) field- and lab-testing of a new Sanden "EcoRuno" combo system from Japan is underway. Note that the prior version of product has been found to be inadequate for space and water heating, and will be released by Sanden as a split-system HPWH.
Clothes Washers	Field data revealed washers test procedure does not adequately estimate the remaining moisture (and consequently drying energy needed). We can improve the test procedure and pursue greater savings.	Residential	Christopher Dymond	2018 – add to Dryers Initiative	36	We are developing a scope of work for additional testing that will quantify impact and help establish the benefit of pairing an Energy Star Washer with an Energy Star Dryer.
Advanced Water Heater systems	Water heaters that don't fit the integral product covered by the federal standard. Includes split systems.	Residential	Dave Kresta/ Geoff Wickes	2017-2018	354	Product is available in the Northwest and North America in general. RTF issued a "Planning" status on the Tier 4 Sanden product but it is currently challenged by the cost effectiveness. NEEA staff plan to publish the Advanced Water Heater Specification qualified products list after the working group has a chance to review the reports. NEEA's portfolio management team agreed to prepare split system water heaters to be included into NEEA's portfolio as a part of the heat pump water heater program. NEEA staff is preparing a proposal for the Regional Portfolio Advisory Committee (RPAC) that will be reviewed in 2017.
Window Attachments	Blinds and permanently installed high performance storm windows	Residential	Rob Curry	2017	100	NEEA's portfolio management team agreed to prepare residential window attachments for inclusion into NEEA's portfolio as a part of the commercial window attachment program. Both products are focused on national energy ratings developed and maintained by the Attachment Energy Rating Council. NEEA staff is preparing a proposal for the Regional

Emerging Technology Project List						
Technologies	**Description**	**Sector**	**Product Manager**	**Portfolio Start Schedule**	**TP aMW**	**Updates**
						Portfolio Advisory Committee (RPAC) that will be reviewed in 2017.
Next Generation/UHD TVs	4K Ultra High Definition (UHD) TVs with various forms of High Dynamic Range (HDR), wide color gamut, smart features are quickly gaining consumer market share. The current DOE test method contains gaps and loop holes and does not adequately test the next generation technologies. Several new display technologies unique from LED back lit LCDs are emerging.	Residential	Nick Leritz	(in RPP)	57	May 2016 EPA released new certification testing guidelines for TVs with screen luminance features that may skew energy consumption test results. DOE also release an RFI regarding the same screen luminance features with the intent of guiding future test method procedures. NEEA commissioned Ecos Research to research and report how to better understand and improve the TV test procedure, what qualities a new test clip should possess, and how to make progress toward an optimal long-term test procedure in the interim to better inform current labeling and incentive programs. The report is published on NEEA.org. ENERGY STAR Version 8 development process is underway with draft 1 being finalized.
Connected Thermostats	Residential thermostats that control various heating and cooling equipment, utilize weather and occupancy data to better manage the systems, and engage homeowner to more closely manage energy use and comfort.	Residential	Dave Kresta		226	No updates. RETAC will be convening a group to discuss collaboration around tstats, and the Consumer Products Regional Market Strategy has identified it as a priority product.
Ductless Heat Pump Product Innovations and Channel Developments	Quick connect ductless heat pumps are common in other parts of the world. They enable end users or contractors to install a DHP without having a refrigerant license. Exploration of new market channels direct to General Contractors and Electricians.	Residential	Geoff Wickes		100	Four test units have been installed in the Portland Metro. Initial results look very promising. Leak tightness testing will continue for one year with regular check ins to verify performance Initial Report due Q1 of 2017
Pivot Commissioning	Pumping energy is used to compensate for poorly maintained pivot systems. We are exploring ways for growers to monitor pivot performance to achieve maximum efficiency of current equipment	Agricultural	Geoff Wickes	TBD	10	The Project is still on hold pending the release of the BPA Market Characteristic Study and the updated Scientific Irrigation Scheduling (SIS) analysis. NEEA staff will start working with the new BPA Lead David Lee as soon as he gets up to speed after Jennifer Eskil's retirement.

Emerging Technology Project List						
Technologies	**Description**	**Sector**	**Product Manager**	**Portfolio Start Schedule**	**TP aMW**	**Updates**
Inverter Driven Packaged Terminal Heat Pumps	PTACs and PTHPs that used the same inverter driven compression cycles that DHPs use. Potentially quieter and capable of operating at lower OATs than current options.	Residential, small commercial	Christopher Dymond	TBD	TBD	Preliminary investigation of current equipment manfuactures, and distributors. Only a few 9,000-15,000 Btuh options currently available – cost roughly $1.1k @. Potential DIY system with that uses 120V source could be great option for motels, manufactured homes and appartement buildings.

TP – Technical potential – maximum possible savings over 20 years MS – Market Share

Emerging Technology Strategic Activities					
Strategies	**Description**	**Sector**	**Product Manager**	**Next Milestone**	**Notes**
Automated Measurement and Verification (M&V) (Used to be Low Cost Whole Building Energy Metering); also incorporates industrial, commercial and residential energy management information systems (EMIS)	Exploring how low cost sensors and / or improved analytics can be used to reduce the cost of measurement and verification of savings	All	Nick Leritz John Jennings	Completion of three-year study of Bullitt foundation building's use of an advanced energy management system. 2018	The energy efficiency power purchase agreement between Seattle City Lighting and the Bullitt building in Seattle reached its first year milestone. EnergyRM's DeltaMeter demonstrated promising performance against an independent model and actual energy use. An explanation of the project can be found here. http://www.meetscoalition.org/pilot-projects/. An independent evaluation requested by Seattle City Light of NEEA's Validation process used at Bullitt was completed in December. Data collection and validation work continues into 2017.

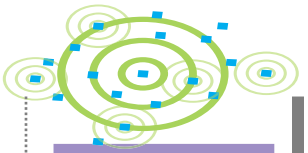
Unsolicited Proposals – Received in the last quarter.				
Date Received	**Title**	**Sector/Description**	**Decision**	**Explanation of Decision**
10/13/2016	Session suggestion for conference – "Addressing the Condo Market Successfully"	This proposal was not for a specific technology but for a session idea centered on the untapped potential of condominiums.	Not an emerging technology	Consider for efficiency exchange
11/29/2016	NW Electric Vehicles Market Development Platform (Pilot)	We propose to develop and launch a Regional Electric Vehicle (EV) Market Development Platform that will engage key market stakeholders, inspire and influence market activities, increase regional market intelligence and educate NW consumers on the value and benefits of electric vehicles.	Consider proposal as part of electric vehicle prospectus for NEEA board.	Electric vehicles and transportation efficiency are currently out of scope for NEEA, but NEEA's board is considering options for future work.

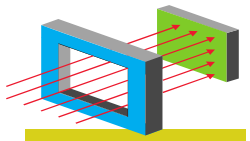
Unsolicited Proposals – Received in the last quarter.				
Date Received	**Title**	**Sector/Description**	**Decision**	**Explanation of Decision**
12/6/2016	Monitoring software to maintain IT network	This software product operates in the client server environment and monitors and manages network activity in order to minimum unplanned network outages	Not a fit for NEEA	This product is not designed to improve energy efficiency but rather IT network reliability.

Technologies / Projects - Moved from Scanning or incorporated into another project					
Title	**Description**	**Sector**	**Product Manager**	**Technical Potential for Savings**	**Status**
Municipal water supply leak detection and correction	Studies of water supply indicate significant losses of water from leaks in the supply system. Losses range from 15-70%. These pre-meter losses affect operating costs. Best practices for leak detection and correction techniques are available, but it is not clear if these practices would help our region.	Industrial	Mark Rehley	20	Removed from active scanning. Savings are small given the market challenges. Report is available on ConduitNW at this location. https://conduitnw.org/Pages/File.aspx?rid=3626
Home Energy Preliminary Score	Generate home energy performance ratings for all existing homes based on publically available data.	Residential	Christopher Dymond	N/A	Market place is proceeding with this concept on its own. The metric might not be accurate or sufficient for utilities, but there isn't a good leverage point for NEEA to intervene at this time.
First Cost Barrier Removal Options	Higher incremental first cost is a problem for most energy efficiency technologies. This is especially true before the new technology reaches scaled production. We are investigating innovative ways to reduce or eliminate the barrier associated with the first cost.	Residential	Dave Kresta	N/A	Report published to NEEA.org. No further work anticipated at this time.

NEEA Portfolio Overview: 20 Year View

Portfolio Status as of December 2016





	CONCEPT OPPORTUNITY ASSESSMENT	MARKET & PRODUCT ASSESSMENT	STRATEGY TESTING & FINALIZATION	MARKET DEVELOPMENT	LONG-TERM MONITORING
Consumer Products	Heat Pump Water Heater Split System Residential Window Attachments		Retail Product Portfolio Super Efficient Dryers	Heat Pump Water Heaters Ductless Heat Pumps Codes & Stds	TVs Residential CFLs White Goods
New Construction (Commercial & Residential)		Manufactured Homes Commercial Codes Enhancement	Next Step Home	Codes & Stds *Integrated Design Lab infrastructure*	Efficient Homes
Commercial Lighting		Luminaire Level Lighting Control		Reduced Wattage Lamp Repl. Codes & Stds *Top Tier Trade Ally infrastructure (opt.)*	
Other Markets	Air Nozzle Industrial Motor Product Labeling	Commercial Window Attachments	RETA CRES Refrigeration Operator Cert.	BldgOp Cert Exp Codes & Stds *Ind. Tech. Training infrastructure (opt.)* *Comm Real Estate infrastructure (opt.)* *Comm & Ind. SEM infrastructure*	Food Processors Drive Power, BldgOp Cert, Commissioning, 80Plus

20 year Total Regional Savings Potential (aMW)

1000-1400

400-600

100-150

100-300