

# Summary Notes Industrial Advisory Committee (IAC) Wednesday, April 11, 2018



## Attendees:

### In Person:

Nancy Goddard – PacifiCorp  
Randy Thorn – Idaho Power  
Chao Chen – Puget Sound Energy (PSE)  
Natasha Houldson – Tacoma Power  
Kevin Smit – NW Power & Conservation Council  
(NWPPCC)

Ryan Fedie – Bonneville Power Administration  
Todd Amundson - Bonneville Power Administration  
Erin Hope – Bonneville Power Administration  
Lindsey Dierksen – Energy Trust of Oregon  
Phone:  
Zeecha Van Hoose – Clark Co. PUD  
Jim Conlan – Snohomish Co. PUD

**NEEA Staff:** Eugene Rosolie, Emily Moore, Mark Rehley, Warren Fish, Geoff Wickes, Alisyn Maggiora

## Product Council / Emerging Technology Presentation Guests:

Chris Jostol, Armstrong Pumps Rep - Presenter  
Trinity Persful, Twin City Fans - Presenter  
Fred Gordon, Jackie Goss, & Mike Bailey (all via phone) – Energy Trust of Oregon

## Resources:

Packet link on Conduit: <https://conduitnw.org/Pages/File.aspx?rid=4367>  
Slides link on Conduit: <https://conduitnw.org/Pages/File.aspx?rid=4390>

## Welcome, Introductions and Housekeeping Items

- A. Agenda review/Introductions
- B. Announcements/Updates:
  - 1. NEEA website updates coming soon – there will be a funder portal link on the home page, allowing funders to select their organization and see information that is directly related to the respective organization. Expect that to be wrapped up and ready by end of April.
  - 2. Extended Motor products initiative had technical workgroup launch last week.
  - 3. SEM collaboratives (NW and North American) continue to see broad interest across the U.S. and Canada; NW SEM collaborative will have fall workshop in September. SEM hub continues to see great website traffic; have customized funder portals available within those for utilities to design what they want on their site. Energy Management Assessment tool getting refined to make it more customizable for funders as well, allowing for custom branding, etc.
  - 4. Industrial Technical Training plan structure is in place for 2019; completed two trainings thus far in 2018, have several on the calendar for Q2. Consult the [calendar](#) or ask Warren Fish (NEEA) if you have questions ([wfish@neea.org](mailto:wfish@neea.org) | 503-688-5402).

## Utility Share-outs

*The desired outcome is for committee members share their what their working on, ideas and highlights from their organization.*

- A. **BPA**: Continuing to show demand side management benefits for the broader utility, not just energy efficiency. Targeted savings look good for 2018. Seeing smaller projects coming in; last year was lowest savings per project, may see that again. Have 1 large project, but otherwise, this is occurring across all industrial markets.
- B. **NWPCC**: Not much focus on industrial lately, working on load forecasting with some consultants. Also have some work going on in food processing; otherwise, developing mid-term assessment of the 7<sup>th</sup> Power Plan. Just completed some work on hard to reach energy efficiency (low-income) work around demographics, partnered with NEEA and involved most utilities in the region; focused mostly on residential and commercial, a little industrial.
- C. **Clark PUD**: Seeing some similar trends as BPA on smaller projects coming in (\$0.25/kwh). Includes lighting, think that's likely because the baseline efficiency has come up on and savings getting smaller on those. Staying engaged on DR, DER and what might be coming our way from a non-wires standpoint.
- D. **PSE**: Corporate strategy is now focused on long-term decarbonization: EVs, smart grid, etc. Focusing on O&M type savings on the industrial side and working with SEM. Doing some performance-based incentives work (have a \$1MM incentive set aside for a gas savings project).
- E. **Idaho Power**: Several plant expansions and new construction projects going on. Have several wastewater projects going on as a results of the engagement from past years; finally seeing savings show up from these longer-term projects. Year 1 report out on drinking water initiative cohort, starting to see results on that, more to come on this since report out will take at least a year to see savings show up.
- F. **Energy Trust**: Custom track RFP is out for bid and posted; bringing in SEM scope with custom PDC scope. Also integrating ATAC study work within the PDC scope. Hoping to keep cost-effectiveness maintained – just contract structure changes for now, no role changes. Last year's full-trends analysis demonstrated smaller custom projects coming in but work load level the same; seeking to dig into the process side with industrial customers to glean more savings. Also focused on irrigation measures, which are changing. SEM is evolving, evaluating to see how we can evolve that as well to continue to glean savings. Did a targeted, joint effort with Pacific Power on target areas to see whether capacity build-out could be delayed. Interested in looking at avoided costs in the future and what will be cost-effective.
- G. **Tacoma Power**: Customer Energy Programs – new department name for Conservation Dept. Have in-house cross functional teams working on electrification, demand response. On Commercial side, working to launch SEM pilot; will probably be mostly institutional (government, office, healthcare) focused, but is still TBD. No strict threshold on commercial SEM participants, but it gets difficult to figure out how to engage with them effectively below 1MM kwh/year. On Industrial side have 6 customers participating in that SEM program. Continuing to see engagement with capital projects as well, a nice positive outcome from this effort. Working on 2019-2020 conservation budget.
- H. **Pacific Power**: Renamed our department a year ago to Customer Solutions; focusing on EVs, community solar, blue sky initiative (renewable energy program). On energy efficiency front, struggling with new lower avoided cost (mainly customer cost) and the need pay closer attention to the measure cost. Also focusing on customer experience, sometimes these things go at odds with each other. Have a limited time bonus incentive going in Idaho for lighting that goes through October to help improve participation. Have commercial updates happening on tune up side of energy management (not SEM), enabling one day tune-ups; also deeming recommissioning costs for these measures, using the tune-up tool to calculate the savings. Will use this on large customers first, then migrate to the smaller customers.
- I. **Snohomish PUD**: Did some demand response pilots, now looking at peak demand reduction on largely commercial and industrial projects; treading lightly – goal is to reduce peak in the winter. Tripled rebates offering for commercial and industrial customers (DHPs, connected thermostats, windows, refrigeration equipment controls, engine block heaters, etc.). This has enabled a massive outreach to

trade allies and top 1000 customers. Also put 25% incentive bonus on building efficiency projects (all non-lighting); interested to see the response on this. Air compressor rebate program simplified (still applies to 75 horsepower and smaller); don't require any pre-metering but do require it post-project. Have a wastewater cohort with 7 members with total usage of 75-80 MM/year; working with Cascade Energy (Cascade) on that. Year 1 to be reported at end of April – expect to come in at 3-5% → 2.5-5 MM kwh plus capital projects coming out of that. Started manufacturing cohort at end of 2017 with 7 large industrial customers, comprising about 100 MM kwh; those will report out in November and expecting 3-5MM kwh as well. Cascade has been great to work with on this. Starting a retro-commissioning for 50,000 sqft commercial buildings and greater; hoping to have 5-10 customers on this. Will use ECAM model for savings, should start up in summer.

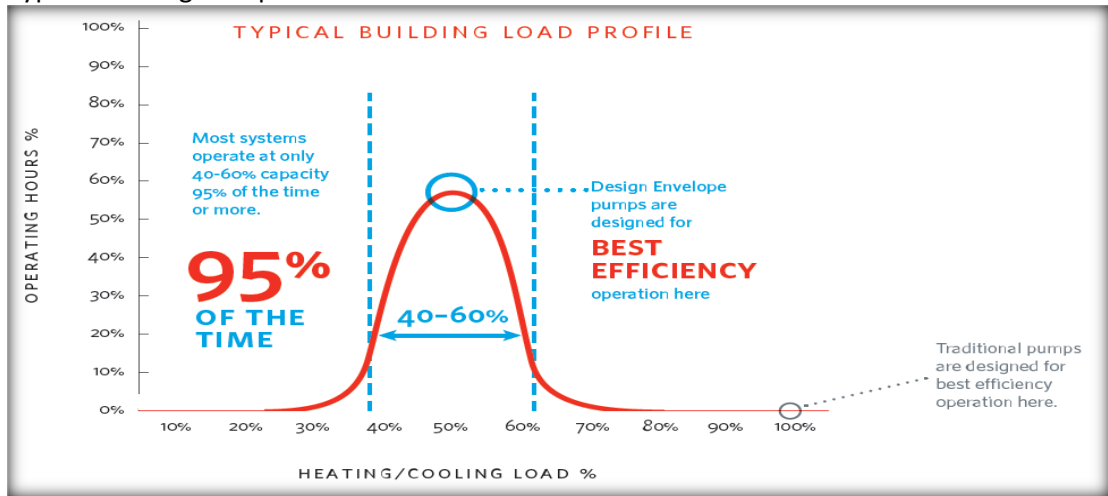
**Emerging Technology Presentations – p. 4-5 in [packet](#)**

*Desired Outcome: Share motor and fan innovations from companies who have a history of supporting energy efficiency.*

**Armstrong Pumps (Chris Jostol) Presentation Highlights (refer to [slides 8-35](#)):**

1. Recap of 1990s to today
  - a) Variable speed pumping – Wall-mounted VFD with remote sensor and 2-way valve systems
  - b) Design Envelope and Sensorless Control - Armstrong Introduced Design Envelope in 2004 and in Canada in 2008 → up to 70% energy savings.
  - c) Latest pump generation (2017) has upwards of 80% energy savings and incorporates ECM motor technology, has more advanced controls tuned to specific motor, and is a more efficient design that maintains over the life of the equipment.

2. Typical building load profile



3. Now and tomorrow

- a) Parallel multiple pump selections for lower operating costs and turndown control
- b) Appropriate redundancy
- c) Best Efficiency Staging through Parallel Sensorless Pump Control
- d) Improved on-board diagnostics and trending
- e) New features to improve performance (Auto-flow balancing, Maximum flow, control, Minimum flow control, Bypass valve control, 2-zone sensor control, Dual-season set-up)
- f) Real-time performance management

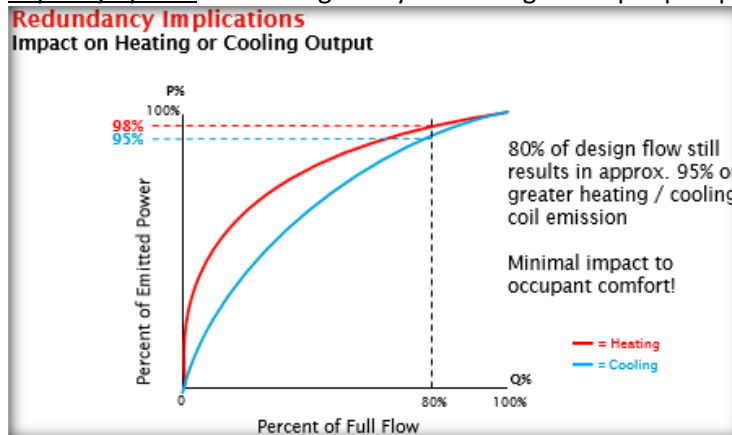
4. Armstrong Intelligent Motor Basics

- a) Permanent magnets generate higher magnetic flux density than induction motors
- b) The higher magnetic flux density results in less material, less heat generated, lower losses, and less noise and vibration
- c) Higher stable operating speeds enables for smaller pumps, and lower installed costs
- d) iECM motors are synchronous which results in no slip loss (i.e. 3600 rpm speed, not 3450 rpm)
- e) 40 lbs. compared to previous model at 150 lbs.
- f) Efficiency Comparison

Power	NEMA Premium Eff 12-12 + IVS 102 at nom. speed	Armstrong Intelligent Motor at nom. speed	% Pts difference at nom. speed	% Pts difference at 50% speed
1hp	73.2%	86.4%	13.3%	19.6%
1.5hp	79.8%	87.2%	7.4%	14.3%
2hp	81.2%	87.9%	6.7%	13.8%
3hp	82.2%	88.1%	5.9%	13.1%
5hp	84.1%	89.2%	5.1%	12.5%
7.5hp	85.0%	89.7%	4.7%	12.1%
10hp	85.7%	90.1%	4.4%	11.9%

5. Parallel Systems, Redundancy and Turndown

- a) **Redundancy**: Percentage of system design flow available when one operating pump fails on a design demand day [N-1]
- b) **Capacity Split %**: Percentage of system design flow per pump in a multi-pump system



**Objective: Convert Duty/Standby to Parallel**

Voice-of-customer estimated market redundancy as:

Duty / Standby : Parallel  
 Huge opportunity to convert **80** : **20**

6. Design Envelop Pumping Summary

- a) Armstrong Design Envelop technology provides the lowest installed and life cost
- b) Further save energy and cost by using appropriate 70% to 100% redundancy levels and all duty parallel operation in lieu of constant speed era duty / standby configurations
- c) Ultimate is Lowest installed and life costs Design Envelop 2\*50...% Tangos or dualArms with Parallel Sensorless control

7. Hydraulic Institute Pump Efficiency Index label will be available on every pump going forward.

8. Presentation takeaways

- a) Pumps With Integrated Controls Are The Best Way To Insure High Efficiency Operation Throughout The Equipment's Life.
- b) Armstrong Recommends A Better Than .55 PEI Rating To Be Considered In The High Efficiency Category.

**Twin City Fans (Trinity Persful) Presentation Highlights** (due to confidentiality, slides not made available after presentation):

1. Learning objectives
  - a) Identify what is new about monitoring
  - b) Tomorrow's IoT fan solution
  - c) Define future expectations - What does it mean for our professions?
  - d) Support of the Fan Efficiency Index and Utility Programs
2. What's New About Monitoring
  - a) Shift to lower costs dramatically, ideally increasing adoption rates
  - b) Improved reliability of hardware
  - c) Better radio technology
  - d) Ubiquitous internet coverage
  - e) Data acquisition, transfer & analysis
    - Data has to be gathered. This requires low cost sensors embedded in equipment, and a micro-computer that pulls data, maintains a data base, and accesses higher level communication.
    - Today, the onsite network hub may be a simple internet bridge. There are many ways to move data from the equipment to an internet node, with wireless having clear advantages in terms of installed cost. But wireless is highly susceptible to communication failures. Wireless is easy to describe but hard to implement reliably.
    - Every application is different – analysis needs to be customized for each application to get the most from these systems. And of course, conclusions that come from analysis must be communicated to operators or maintenance companies.
3. Fan monitoring capabilities
  - a) Power - Accurate power meter (+/- 1%)
  - b) Power quality – power factor
  - c) Bearing temperatures
  - d) Vibration index
  - e) Sound - Microphone
  - f) Pressure differential of fan system (inlet/outlet)
  - g) Motor bearing temperature
  - h) Microphone
  - i) Open nodes (any 4-20mA): CO2 levels, carcinogens, humidity, opacity..
4. Demonstration of tomorrow's IoT Twin City fan solutions
5. Future expectations
  - a) Greater expectation; customers want more from their fans.
    - Will demand to know when to provide maintenance, and why -
    - Clients will be informed of pending failures before forced outages
    - Expect a professional support team to keep them out of trouble and help optimize their system.
    - Continuous Commissioning

- Specifications will require the delivery of key data :air temp, flow, pressure rise, energy used, power quality, sound levels, motor windings and bearing temperatures
  - Specify what trend logs, alarms, and graphical user interfaces, failure advisories
  - b) “Smart Fans” will become the standard
  - c) Monitors will be free with the fans
  - d) Software as a Service business models
6. Fan Efficiency Index and Utility Programs
- a) AMCA 207 – Fan System Efficiency and Fan System Input Power Calculation
  - b) AMCA 208 – Calculation of the Fan Energy Index (FEI)

$$FEI = \frac{\text{Reference Fan Electrical Input Power}}{\text{Actual Fan Electrical Input Power}}$$

7. Contact Information: Trinity Persful | Direct: 763.278.3921; Cell: 931.638.5186

## **Brainstorm Discussion: Industrial Sector Trends, Changes, Opportunities – p. 6 in packet**

*Desired Outcome: Gain insight from committee members about macro issues that threaten or provide opportunity for energy efficiency in the industrial sector and the future role of the committee.*

### **Key Questions**

- 1. What industrial changes are you excited or worried about?**
- 2. What changes are exciting or worrisome to your customers?**

### **Discussion**

#### Primary items shared

- Better regional collaboration on water and wastewater
- Baby boomer retirement and lack of backup/backfill
- Industrial assessment centers – could NEEA help with this? Maybe other centers around the country could help send some engineers towards the PNW (engaging with those universities that support/convene these)
- Automation of facility operations – implications for load profiles, EE opportunities, big change coming down the pipe
- Savings becoming harder at facilities due to incrementally shifting baselines – looking at underserved markets for new sources of savings
- Seeing more interactions with trade associations to educate their members (e.g. Hydraulic Pump Institute)
- Customer engagement from utility side – during check-ins, provide customer something of value and know what questions to ask the customer
- Fewer people doing more work; energy champions have 5 hats and business owners have more to worry about. Not as much in it for contractors as well, so harder to get them to engage. Small town issues.
- Manufacturers and trade allies – leveraging contacts with customers and contractors

- Streamlining in-house processes to make the work easier (e.g. facility engineers are so short-handed)
- Regional SEM effort provides continued opportunity for least-cost, no-cost alternatives

Secondary items (not shared verbally, but noted by individuals)

- Cybersecurity as more controls and systems are implemented (incl. compatibility of new controls with existing)
- Single large load (future viability)
- Lower avoided cost = zero cost effectiveness
- Industry reluctance to take on large projects due to fear of potential EPA permitting requirements
- Constant struggle between component and holistic level regulation
- More interest in O&M and SEM program
- Consistency with utility meter data outputs (SEM whole building)
- Permanent sub-metering (savings persistence, safety, continuous monitoring)
- Smaller savings - more projects needed to maintain savings)
- Diversity of industrial loads and processes
- Pump and fan optimization
- Data centers and cryptocurrency
- Shorter supply chains
- Indoor Ag – lettuce – grow + process in one setting

Additional feedback (Snohomish PUD provided via email after the meeting)

- Promote Programs to Majority of the Industrial Marketplace
- Help Identify & Initiate measures with customers & trade allies about advanced technologies above
- How can we streamline & simplify EE project processes to identify savings and issue incentives.
- Given that we want reliable savings: Question time to verify high reliability of savings vs large population of projects with good savings-level of M&V?

## Opportunity for Public Comment

None.

## Wrap up/Feedback on Meeting

- NWPCC:** Good that it was a shorter meeting, packed a lot in
- Energy Trust:** Emerging Tech presentations were nice; would have been great to have more time for the brainstorm
- BPA:** liked half day instead of full day and information sharing
- PSE:** liked half day; vendor presentations very helpful and informative – don't have to do every time
- Idaho Power:** like vendor presentations on technology and information sharing along with brainstorm activity – more time next time
- Tacoma Power:** Mix of meeting content was good and appreciated
- Pacific Power:** Didn't get to hear much NEEA updates today, always good to have a little of that for reporting back in our organizations

H. **Snohomish PUD**: agree with half day and technical presentations were helpful/insightful

*Note: The 50001 Ready presentation and discussion was held as a separate meeting. The notes and slides are available on Conduit via the following links:*

- Notes: <https://conduitnw.org/Pages/File.aspx?rid=4394>
- DOE Slides: <https://conduitnw.org/Pages/File.aspx?rid=4392>