

**Conservation Resources Advisory Council Minutes**  
**January 28, 2015**  
**Northwest Power and Conservation Council**

Tom Eckman, Northwest Power and Conservation Council, began the meeting by adopting the minutes and reviewing the agenda. Charlie Grist, NWPC, stated that technical analysis of supply curves is being posted and asked for the Committee's input by Feb 20. Lauren Gage, BPA, noted the amount of technical review and the short turnaround time and asked the Council for help prioritizing. Grist answered that pace, size, and costs are the most important parts. Eckman added that as far as pace is concerned the resources that look front end loadable are probably more important.

Don Jones, PacifiCorp, asked if there are any big changes between Plan Six and Seven. Grist explained that they have touched on that in presenting the individual measures. He also notes that there are not big changes but there are some i.e. TVs which has moved to the load forecast. He summarized that lighting is big and touched on other technologies.

Tina Jayaweera, NWPC, stated that the residential and commercial master workbooks keep a tally of all the 20 year potential and they pull in the Sixth Plan numbers for comparison. Grist reminded the CRAC to keep in mind new Federal Standards, local building codes and a lower load forecast.

John Morris, CleaResult, asked if the trend of overachieving conservation is expected to continue. Grist theorized that maybe the estimates were low. Wendy Gerlitz, NW Energy Coalition, pointed out that there is a range and the region commits to the middle but we have been hitting the high end of the analysis and hopes that trend continues.

### **Ramp Rates for the Seventh Plan**

#### **Charlie Grist**

Grist explained the difference between program year and plan year. Johnson asked for clarification. Grist stated that the RPM has a "governor" that dampens acceleration. Brendon O'Donnell, Seattle City Light, asked if after every year in RPM the ramp rate will be adjusted. Eckman answered that in a particular future ramp rate would adjust, but when combined with the market price risk adder the fluctuation will be dampened. O'Donnell asked if the Council is seeding the model with a ramp rate but you won't get the final until you pick a future. Eckman said that is correct.

Rich Arneson, Tacoma Power, asked if it was possible that a measure will not look cost effective to RPM until after five years. Eckman stated yes it would be cost effective over the course of the plan but not available until later. He stated that the RPM isn't the only tool used.

Hossein Haeri, Cadmus Group, asked if this is an economic ramp rate. Eckman said yes and today's task is putting a governor on how much the infrastructure could achieve at that price. Haeri asked what the price forecast looks like. Eckman said there might be 800 forecasts in the Seventh Plan and it is tested

over a range. We look for resource strategies that are robust along all the futures. He noted that the RPM will test scenarios with carbon constraints which will drive the value of renewables up.

Jones asked for the business case of why the Council reformed a subset of ramp rate [slide 3]. Grist answered that they are trying to be more consistent between lost opportunity and retrofit. Jones stated that the curves look different and for people that use them and backwards integrate them understanding the magic behind them is important. Grist stated that there is judgment behind this work. He pointed to NEEA's workbook with achieved ramp rates to see real curves. O'Donnell stated that he appreciates the smooth curves but stated that in the end it is an informed guess.

Haeri brought the discussion back to slide 2, asking if the program year is not always year one. Grist stated the start of the program could start at any time. Deborah Reynolds, UTC, stated she liked that modification.

Jones asked about stock turnover rates. Grist stated that the turnover rates drive the lost opportunity resources.

O'Donnell asked what makes the 2 Slow measures [slide 5] different than Max 60 [slide 4]. Jayaweera stated that there seems to be a barrier to adoption on the Max 60 curve. Grist asked for NEEA input. O'Donnell pointed out that the Max 60 looks like a NEEA "Before" curve.

Gage brought attention to achievements over the past five years compared to the ramp rates. She said some look great but some like heat pump water heaters give pause as the current achievements are .13% of the market. She stated that starting at a 6% rate with a technology that is not ready to go is concerning. Jayaweera answered that she put heat pump water heaters in this ramp rate because a new, low cost version hits the market this month. Jessica Mitchell, Snohomish PUD, asked what the replacement assumptions were for this technology. Jayaweera answered 12-15 years and asked if Walker's analysis accounted for that.

Gage stated that heat pump water heaters might be a special case but some commercial measures (commercial energy management) are in their pilot stages and will be hard to get to 6% in the first year.

Reynolds asked how the ramp rate interacts with the beginning program year. Eckman answered that if it was really expensive the program year would start later given the current market. Reynolds then asked if heat pump water heaters wouldn't start until they are at 6%. Grist answers no. Reynolds asked if it would be out in the future then. Eckman answered that it depends on the cost. Reynolds then asked if the decision to use program year changes which measures go into which ramp rates. Eckman replied yes and no and points to a carbon constrained future which would demand more aggressive starts.

Fred Gordon, Energy Trust, admitted that they kicked heat pump water heaters into commercial technology perhaps early but stated that they look at ramp rates as an aggregate. He stated that NEEA

has been trying to push the technology to the next level and it has been tough so getting to 6% by 2016 seems implausible to him. Gage asked if Gordon applies different ramp rates to other emerging measures that are really in pilot form. Gordon stated that in his world things are either emerging or in the broth with everything else. He acknowledged that the aggregate curves work for him but not for the Power Plan. Elaine Prause, Energy Trust, explained their curves and how they handle their ramp rate differently.

Grist explained the difference between a lost opportunity measure and retrofit and pointed out that the measure is closer to 4%. He reminded the group that it isn't 4% of the stock but of the replacements. For retrofit it applies to 4% of the remaining work to do. Gordon still felt that for water heaters 4% is a bigger number than our realm of experience.

Jayaweera stated that the numbers are 7,500 region-wide. Gordon calculated that that would put the number at 1400 which is still bigger than anything they've ever done. Grist reminded the group that it is a combination of the ramp rate and turnover rate. Jones stated that ramp rates are designed front, middle or end loaded so where you start them is important so maybe heat pump water heaters should be moved to Max 60.

Kevin Smit, NWPCC, gave follow up information on roof top controllers and VRF stating that in the Six going on Seven showed that some of the ventilation control measures were some of the biggest successes. Gordon stated that they had a discouraging pilot experience which may or may not be unique.

Arneson asked Jayaweera to talk about the residential behavior measure. She stated that it is Home Energy Report Program.

Haeri asked about the irrigation water management. Jayaweera stated that it is SIS. He wonders why it 6 Slow and perhaps it has run out of potential. Jayaweera stated that there is a lot of uncertainty.

Grist moved to 12 Med and pointed out lighting. Haeri asked where the learning thermostats fit in. Jayaweera answered that it's based on Energy Trust work. Jones asked about the electrical vehicle charger measure. Jayaweera called it very expensive.

Gage flagged the commercial energy management calling it in the nascent stages and called the ramp rate fast. Smit stated that this is a revised version of the Sixth Plan's commissioning and controls measure which is why it is more aggressive. Gage asked if this is SEM. Smit said yes and no: SEM can be used to achieve those savings but the measure is not designed around one specific program. Mitchell asked if this is an equipment or behavior. Smit said he may need to drill down more but achievements have been high and strong region wide. Mitchell asked the size of the bucket. Smit said about 60 MW. Grist stated that they already achieved half.

Grist moved to Even 20. Arneson wondered why weatherization isn't on this ramp. Jayaweera stated that it could have been but it gets harder as there are fewer apples to pick so that's why it's in 12 Medium.

Grist moved to 20 Fast. Gordon stated that there is still potential in showerheads but agrees with the ramp shape. Mitchell asked about sewage treatment and water supply, wondering if they are overlying the natural replacement cycle. Smit answered no it's custom retrofit. Mitchell stated that 12 years seems fast to achieve the vast majority of sewage treatment. Eckman stated that there was robust activity reported in Six going on Seven.

Tim Miller, Clean Energy Works, asked if weatherization goes back into the curve if a price scenario drives the potential up. Gordon admitted that there is more work to do i.e. in ceiling, wall and duct. Eckman stated that because of RBSA there is granular data on remaining data. Miller asked if that could push you to a different curve. Eckman said potentially.

Grist spoke about 50 Fast. Arneson observed that their review of acquisition rates for federal or military facilities and found that bureaucracy forced slower ramp rates with the exception of street lighting.

Grist summarized: Should heat pump clothes dryers get to 100% or not. Should commercial energy management start slower? Rooftop controllers might also need a slower start. Are we done with irrigation water management? And concerns about the unit count of emerging tech.

Gordon suggested a friendly amendment of newly commercial saying that they haven't established the volume market infrastructure yet and that water heaters are special case.

Grist asks Jeff Harris, NEEA, to speak about heat pump clothes dryers. Harris stated that the planning team is working on it but is not sure about the level of confidence in the technology. He said it is mature technology in Europe and a Federal Standard in Switzerland. He said he anticipates high market share for the non-heat pump version of ENERGY STAR dryers in the 30-40% range or higher.

Mitchell brought the conversation back to slide 3 saying that it looks like there would be a lot of conservation to draw from in the first 7-8 years and little at the end. Jayaweera answered that it is opposite if it is retrofit or lost opportunity. For retrofit there is less available as you go on but for lost opportunity you are capturing more of what has turned over. Grist stated that market prices make it dynamic.

Arneson asked if the workbooks will show what year the measures come in. Eckman said no that is purely RPM.

Jones asked for a way to back cast these ramp rates on to the Sixth Plan or how big an impact these had. Grist stated he wasn't sure how to do that. Eckman stated that ramp rates for the Sixth Plan was

important for the first year and then didn't matter because they capped retrofit. Jones stated that he didn't think they should devote a lot of time to but it makes for a good public display.

Bob Gunn, Synergy, suggested a friendly amendment to change program year to measure year. Eckman stated that it's technically the year the model starts acquiring which is long way from running program. Acquisition year seemed like an acceptable alternative.

### **Jeff Harris, NEEA, presents data on adoption rates**

Harris explained that the tier three heat pump water heaters are a better Tier 2 product priced at a discount. He said it shows that better product does not necessarily cost more but even so the projected number is small 3-5%.

Haeri asked if the percentages Harris is presenting are cumulative. Harris answered no they are snapshots for each year. Haeri asked for what explains the drop in ENERGY STAR refrigerators. Harris answered that ENERGY STAR specs changed. Haeri asked if it was a new measure. Harris said probably but pointed out the granular visibility into TVs and noted how quickly they moved.

Morris asked what it is about TVs that made them move so quickly and how can that impact other products we look at. Harris pointed to ENERGY STAR windows as another fast mover so the story is unique to each product. He continued saying with windows the industry was ready for a label with TVs the manufacturers had three different streams and didn't want to move to LEDs. We intervened at the retail buying level and offered money for each LED they sold.

Gordon stated that when drawing penetration curves the question is can manufactures be persuaded to position a product as a high volume low volume mass market product. He said we won on refrigerators but now there's a problem with one manufacturer is repositioning one tier as a premium product so the inflection of premium product to mass market is out of our control.

Dave Hewitt, consultant, said these stories are critical and wants to know who is documenting them. Harris answered that the stories are embedded in NEEA's market progress and evaluation reports. Hewitt said we have a responsibility to get these stories out. Morris agreed that the stories are important and compelling.

### **Commercial Lighting Issues**

#### **Charlie Grist**

Harris brought attention to slide 7 saying that barring a significant intervention it's anybody's guess if moving away from HP-32 W will happen. He noted they are working on getting acceptance of 28W and 25W bulbs but without their active digging the inertia will be hard to overcome.

Jones stated that absent of everything else program effects would get you to 32W and asked Harris what his forecast is. Harris answered that at the distributor level they are trying to get them to stop stocking them. Harris said they have 25% of market share for distributors but not even close for sales.

Reynolds paused on high performance bulbs and inertia. Harris stated that federal standards would cause everyone to go to the HP-32W. Harris said the minimal decision would be to buy the same tube at 32W but would get more light but you would have to think if you were going to go to 25W or 28W.

Jones asked about regional representation and CBSA and wondered how it reflects urban/rural. Grist says it is a regional average. Harris said they can split out rural/urban data. Jones cautioned against overweighting 25 and 28W.

Hewitt asked about assumptions for dimming ballasts and controls. Grist said he didn't in this analysis. Hewitt said if you have more lumens per watt then dimming could get you more savings. Grist stated that making a ballast change then you are in natural replacement.

Grist stated that they could move the baseline up and take the 25 and 28 out of the forecast. Jones asked if TLEDs are the real issue. Grist answered maybe.

Grist moves to slide 10. Gordon asked if the Council Forecast Baseline 2016 is turnover or stock. Grist said turnover. Gordon wondered how to triangulate between market factors, price per watt and other big market drivers. Grist said the DOE looks at sales which are driven by both turnover and new, which can't be segregated. He added that we may want to address that as we look ahead.

Reynolds asked about the 50% penetration for street and roadway lights. Grist stated that current saturation is 22% of stock by the end of 2015. He stated that penetration data from the CBSA is in the 2-6% range, but Seattle has recently converted to LEDs and Portland is expected to by the end of 2015.

Grist moved to slide 11 Fixture Replacement Rate. Gordon asked how much of these numbers were programs and might knock you to 4% and the 5% might be fast. Grist stated that there are new technologies available that might flip these things faster. Harris noted that the program effect is not zero and asked about cumulative floor space touched by lighting programs for the last 5 years. Grist stated that they know there is a huge difference from the lamps touched by programs and lamps that turnover but they don't know about fixtures.

Gordon said it would hard to figure out. Grist stated that tenant improvements and retail drive this. Gordon said there was a lot of talk about this in the late 80s and the lights stay the same. Grist agreed that maybe slower than 5% might be right. Harris said that 5% might be reasonable but we want acknowledgement that some of this is driven by program activity.

Grist asked for feedback on office space "de-lumenization" i.e., a 20% reduction in lumens. Harris asked if the lumen reduction in the base condition or the depreciated lumen. Grist answered that it means delivered lumens which takes lamp depreciation and fixture inefficiency into account. Jones asked for a description of which ones need a ballast change. Jones asked what the magic is behind the 20%. Grist said none.

Harris asked about even distributions and wondered if you have, for example, fixture, fixture kit and tube replacement you would weight them evenly. Grist replied something like that but it depends on the costs. Harris stated that the tubular fluorescent replacement market is huge 10 million a year and there is inertia in the market so tubular LEDs might become a larger share because they have a 10 million a year advantage.

Grist stated that this applies to a fixture change choice.

Grist moved to the lamp replacement market and laid out the options. Arneson asked about linear fluorescent calling them long lived and wonders how that would challenge LEDs. Grist stated the fluorescent market is changing and getting more long lived and stated that they will not model everything but want to look at cost effectiveness with and without lamp replacement savings.

Harris wondered if the dollars per kilo lumen and the lumen reduction guideline is comparing apples to apples between LED output compared to tube/ballast/fixture combination where there is a guess on optimal efficiency. Grist answered that the guess for optical efficiency for linear fluorescents is 75% and for CFL can is 60%. He continued saying that the DOE uses 70% and we thought that was too low. The CFL percentage comes from spec sheets where the numbers range from 35-80%.

Harris cautioned that the some of the solid state fixtures come with integrated lumen output measurement. Grist answered that they are using.94 on LED fixtures. Harris said that was good.

Grist said he will post the workbook.

Harris asked why Grist didn't include TLED replacements for embedded parking garages [slide 20] Grist answered that we ran out of time, but maybe we could. He also said that they don't have a good estimate of standalone parking garages which is a bigger concern.

Harris asked if the street and roadway numbers are residential or arterial as most of the wattage is in arterial. Grist stated that the estimate is more solid than last time with a pretty good estimate of the distribution of incumbent lamp wattage.

Harris asked about controls. Grist stated that controls measures will be applied in warehouse and open office and needs cost estimates on controls from NEEA. Harris stated that the solid state products coming in have the controls embedded and will go back to his team for cost data.

Arneson stated that he can get cost data too. Grist stated that the new codes demands controls for some rooms. Harris says just because it's in the code doesn't mean it gets in.

## **Agriculture Measures in the Seventh Plan**

**Tina Jayaweera**

Jayaweera explained LESA - Low Energy Spray Application which takes the sprinkler to 1-1.5 feet above the soil surface and sprays at a lower pressure (6 psi). Jones asked if the technology is crop dependent. Jayaweera answered that there is some crop dependency (barley) but is still a spray application so generally wide-spread applicability.

Reynolds asked who did the Farm and Ranch Irrigation Study (FRIS). Jayaweera answered the USDA. Harris asked about the applicability assumptions for the 26 aMW estimate for LESA. Jayaweera answered that she was conservative and thought 30%. Harris said he could support that as some crops need to be irrigated from above. Jones asked if the number was constrained by pivots. Jayaweera said yes. Arneson asked if crop rotation was taken into account. Jayaweera stated no.

Prause stated that a lot of savings come from changing out center pivots to drip irrigation and wondered how LESA fit into that model. Jayaweera stated that drip irrigation has more constraints than LESA. She then said that LESA would be the next step after a high pressure pivot went to a medium pressure pivot.

Gage wondered what ramp rate this fell under. She called it promising but thinks it belongs in the emerging technology ramp rate.

Gage asked if the Irrigation Pressure Drop [slide 10] is a different subset of LESA. Jayaweera said no, LESA takes it further. Harris stated that LESA would be incremental.

Jones stated that he didn't think the 10% didn't have any adjustments for SIS [slide 13]. Jayaweera admitted that the data set was small but thought the 10% had some baseline adjustments in it. Jones remembered coming up with a number of 5.7%. Jayaweera stated that the next RTF would look into it. Jones offered to help with research.

Harris volunteered more data from NEEA using sophisticated controls. Jayaweera asked if BPA knows about the data. Gage nods.

Bud Tracy asked if irrigation and water efficiency is applicable to deep wells and canals. Jayaweera answered yes. Tracy then asked how the Council distinguished between multiple pivots on a single pumping station. Jayaweera said the potential is by pivot. Tracy voiced concern as many have multiple pivots per pump. Jayaweera agreed and stated she will look for information from the FRIS.

## **Conservation Voltage Regulation**

### **Charlie Grist & Adam Hadley**

Grist expressed concern that not everyone is reporting their distribution system upgrades to Bonneville as the side of the utility responsible for these upgrades doesn't talk to the efficiency side and wonders how to estimate what is not being reported. Arneson stated it took several years for Tacoma to get on board with distribution efficiency and found reluctance to do the projects unless they were doing a

complete renovation of the substation so they co-opted the program into renovation activities. He noted that projects went faster than expected after that move.

Grist asked what the likelihood of those projects being reported is. Arneson answered that the focus was different so he is unclear.

Grist stated that there are utility specific factors that will be used for the largest utilities and then two sets of factors for smaller utilities. He said that Wyatt Pierce will check the numbers for PacifiCorp. Jones stated that his field work garnered different results.

Steve Brooks BPA spoke about utility-specific CVRs and Delta Vs noting that it estimates three-quarters of the potential is in IOU territory but then the potential gets grouped and split 50/50. He wondered if there would be opportunity to distribute potential differently. Grist said not for the supply curves but maybe after the fact if we have the pieces.

Adam Hadley, Hadley Energy, stated that that approach made sense to him but an adjustment might be needed across the board. Jones stated that PacifiCorp did the field work and would like an adjustment for what they found but not across the board.

Harris cautioned against blanket changes. Hadley wondered if R.W. Beck, Inc. study had any bias and stated he needed to speak to Pierce.

Tracy stated that he didn't want to question R.W. Beck or PacifiCorp's findings and across the board changes would be a mistake. He then discussed the difference between urban and rural utilities. Grist acknowledged that the standard practice of utilities makes a difference and pulled Seattle out because it was so different.

Dan Johnson, Avista, spoke about Avista's 5aMW savings calling it a system of systems that relied heavily on matching funds. Harris asked if the system was fully automated. Johnson said yes and it was custom. Harris stated that the NEEA study looked at different levels from manual to fully automated so the supply curve has a range of costs and a range of results. Grist stated that this is boiled into four measure bundles from simple to automated end-of-line voltage control with intermediates in between.

Harris stated that smart metering is making measuring voltage easier and less expensive but doesn't know how to reflect that. Grist asked Johnson how long the project took. Johnson stated that it started in 2009 and completed in 2012. He stated that it's going to be a feeder by feeder, business case approach as we try to roll this out as a new standard.

Hadley asked Johnson if Avista had AMI on the first 71 feeders they completed. Johnson answered that only the 13 in Pullman have AMI and the others in Spokane do not. Johnson then narrated the two projects with two different grants that they completed.

Hadley asked if they did this on their whole system. Johnson said the 13 feeders in Pullman represents about less than 10% which is where we captured the 5 aMW.

Grist asked the Committee if Even 20 is the right ramp rate. Brooks stated that he agreed with Johnson that it had to line up with capital investment cycle so it should be a slow ramp rate.

Tracy suggested using capital investment amortization cycle of 40 years as a tool. He thinks ramp rate should be slow but admits there will be substantial savings. Johnson wonders what the technology refresh cycle will look like. Harris stated that this will take a while and agrees on a stretched out ramp rate.

Jones suggested a ramp rate that starts at zero. Grist asked if 2Slow was appropriate. Jones said that's probably where you need to be. Arneson pointed out that it took several years working with our T&D group to get on the same page and in the pipeline. He said there might be more people in the pipeline now.

Smit wondered if you take it too slow it might squash any momentum. Gage shook her head no. Jones said that the ramp rate doesn't constrain progress. Harris stated that the 1937 utilities are affected 10 years out. Grist stated that they will pick something slow.

Reynolds asked if it is cost effective. Harris stated that the problem is that it will be bundled with capital improvements so it gets complicated from regulatory viewpoint. Reynolds agreed and thought that Even20 would be an appropriate ramp rate.

Jones asked if the workbook is available. Grist said it will be available by the end of the week. Brooks wanted it on the record that he agreed with the cost estimates of the four CVR measures but felt that actual projects were heavily weighted towards the more expensive measures.

## **Industrial Sector**

### **Kevin Smit, Ryan Firestone**

Jones asked for a review of the refrigeration and scrubber (atmosphere management) technology measures. Grist stated that the NW Food Processors have an engineer that could look at it and Martin Lott at Cascade came up with a lot of the Sixth Plan numbers. Grist reiterated that there are big holes in the IFSA data.

Jones asked for a top 10 wants list by industry to fill the big holes. Arneson stated that Foundry is a good example of that. Grist put Ryan Firestone on creating that list. Harris volunteered Steven Scott for information on industrial refrigeration.

Stan Price, NEEC, stated that historically it was hard to gather information out of this sector and we've done better. He states that he is uncomfortable with the notion that this is forecasted correctly and now

we just subtract from our first and best guess. He called for hard digging in to figure out if the remaining potential is the right number. He wants to look at industrial end use to see if there are the same results. Grist stated that it probably won't happen in the next few weeks.

Gage stated that BPA's portfolio distribution for energy management does not look like this [slide 9] and that is making her nervous. She wondered if Energy Trust is having a unique experience because BPA's team is working hard and not seeing that level of uptake.

Prause stated that Energy Trust is seeing 25% of their industrial savings in this area so it seems high from that perspective. Grist stated he could poke at the data but doesn't have the resources for a bottom up analysis.

Ryan Firestone pointed out the challenge of getting the energy management achievements from the Six going on Seven report is that there are a lot of achievements that are unknown but were assigned to energy management.

Ken Eklund stated that he expressed skepticism about energy management in the Sixth Plan noting that the US Dept of Energy used to fund best practices but that funding has disappeared. Arneson noted that one industry- air chemicals-that has electricity as their single largest expense and found that there systems were tightly coupled and there were no management measures available. He suggested a correction for certain chemical industries.

Tracy asked for a definition for industrial and commercial. Smit agreed that sector definitions aren't always clear.

Harris stated that the achievement on slide 9 is locked up in energy management and lighting and asked for a more robust approach of traditional baselines/potential for them. Firestone reiterated that to subtract achievement from potential they adjusted the saturation of measures in the model. Harris asked if the savings are from his model of a summary of reported achievements. Firestone answered this is the Sixth Plan model with an adjusted parameter. Harris stated feeling better about the data after that explanation. Harris asked for the data posted online.

Harris asked about motor standards. Smit said he has motor data. Grist said that motors aren't in because of standards.

## **Commercial HVAC and Other Measures**

### **Kevin Smit**

Harris disagrees with deleting Energy Recovery Ventilation [slide 10] because of its high cost and wonders about its size. Smit stated he got the data from Energy Trust Potential Assessment. Prause said that was recently updated and is probably not showing cost effective potential come out. Harris pointed out the different ERV potentials.

Hewitt suggested talking to Cathy Higgins about dedicated outdoor air systems and indirect evaporated cooling. Smit asked if it's complete replacement or retrofit. Hewitt said both. Grist said there was not a lot of product on the market. Hewitt agreed that it is emerging technology. Smit stated that he's concerned with overlap with the ERV.

Hewitt felt that the retrofit market for VRF will be for schools, restaurants and tenant improvements. Smit agreed especially with tenant improvements. Grist questioned the 5% penetration stating that he's hearing they are flying off the shelves. Grist asked for penetration information. Hewitt stated that it might go like clothes washers. He noted that Daikin is looking to penetrate the market and it could change fast.

Prause stated that Energy Trust has had a lot of inquiries for the product and might have data to share. She notes that modeling has been hard. Smit stated he found that modeling studies have results all over the map.

Jones asked if the air compressors might be activating dry fire sprinklers. Grist stated you see most in retail service: gas stations, car repair. Smit said he will look at it to eliminate over counting.

## **Embedded Data Centers**

### **Charlie Grist**

Gage hoped that the Council was integrating their data center information with NEEA's learnings. Grist stated that they are not. Harris volunteered data. Grist stated that they have three tiers of measures. Jones stated that CEE did some work on this too. Grist stated that the load is smaller but still big and is a tough market to crack. Grist stated that the baseline is moving in the model.

Gage noted that NEEA is reporting 62 aMW of technical savings and offered to send the data.

O'Donnell asked about stand-alone data centers. Grist said there is no potential on them yet. O'Donnell stated that he has a robust pipeline. Gerlitz asked about embedded turning into co-location. Grist summed up that there is potential and there will be a wedge for that.

## **Commercial New Construction**

### **Charlie Grist**

Harris cautioned about ramp rate stating it may go slow or quick driven by outside forces like codes. He notes that the industry tends to have inertia. Grist asked if it is supply curve.

Arneson cautioned that there are a lot of things that states mandate but don't deliver.

Jones stated that these could be new stock adds. Grist said he sees head nods around the tables. He notes that the private sector is taking up the idea and asks Hewitt for costs. Hewitt said there are only a

couple 100 examples and you have the best study. He notes that this is driven on the owner side and programs can drive it. Hewitt feels that 10% of California new construction will be zero –net energy and shouldn't be ignored for five years.

Prause stated they started a pilot and are hoping for 30 buildings. Hewitt stated the buildings average 5000 square feet and now they are 300,000 square feet and many are high profile. He called it the shiny thing after LEED Platinum.

Grist asked the CRAC to review the workbooks and closed the meeting.

#### Attendees on Site

Tom Eckman	Northwest Power and Conservation Council
Charlie Grist	NWPCC
Tina Jayaweera	NWPCC
Kevin Smit	NWPCC
John Morris	CleaResult
Fred Gordon	Energy Trust
Henry Lorenzen	NWPCC
Stan Price	NEEC
Rich Arneson	Tacoma Power
Jessica Mitchell	Snohomish PUD
George Pondorf	Snohomish PUD
Craig Smith	Seattle City Light
Bud Tracy	Unaffiliated
Deborah Reynolds	UTC - Washington
Lauren Gage	BPA
Don Jones	PacifiCorp
Wendy Gerlitz	NW Energy Coalition
Brendon O'Donnell	Seattle City Light
Hossein Haeri	Cadmus Group
Jeff Harris	NEEA
Bob Gunn	Synergy
Tim Miller	Clean Energy Works
Elaine Prause	Energy Trust
Bo Downen	Public Power Council
Danielle Walker	BPA
Jennifer Anziano	NWPCC
Carol Winkler	NWPCC
Lakin Garth	Cadmus
Dave Hewitt	Consultant

Attendees via Go-To-Meeting

Adam Hadley	Hadley Energy
Andrew Grant	Cadmus
Erik Boyer	BPA
Christian Douglas	Ptarmigan research
Chuck Murray	WA DOC
Cory Reed	Idaho Power
Eli Morris	PacifiCorp
Jennifer Eskil	BPA
Graham Parker	PNNL
Dan Johnson	Avista
Kathy Moore	Umatilla Electric
Larry Blaufus	Clark PUD
Lauren Shapton	PGE
Linda Esparza	Franklin PUD
Marcus Wilcox	Cascade Energy
Nicholas Drake-McLaughlin	Cadmus
Rebecca Nelson	Milepost Consulting
Ryan Firestone	Ptarmigan Research
Warren Cook	Oregon Dept of Energy
Christopher Wolgamott	Bonneville
Kathy Yi	Idaho Power

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