

Conservation Resources Advisory Council Minutes

November 13, 2014

Northwest Power and Conservation Council

Attendees On-Site

Bud Tracy, Unaffiliated Idaho
Deborah Reynolds, UTC
John Morris, CLEAResult
Kevin Smit, NPCC
Tina Jayaweera, NPCC
Steve Bicker, Tacoma Power
Ted Light, Energy Trust
Eli Morris, PacifiCorp
Lauren Gage, BPA
Wendy Gerlitz, NW Energy Coalition
Elaine Prause, Energy Trust
Jeff Harris, NEEA
Lakin Garth, Cadmus
Charlie Grist, NPCC
Tom Eckman, NPCC
Jessica Mitchell, Snohomish County PUD

Attendees via Go-To-Meeting

Warren Cook, Oregon Department of Energy
Margaret Ryan, PNGC Power
Danielle Walker, BPA
Eugene Rosolie, NEEA
Craig Patterson, independent
Tom Schumacher, Benton PUD
Jess Kincaid, Oregon Department of Energy
Sandra Elverud, PGE
Stacey Donohue, Idaho PUC

Dan Johnson, AvistaCorp
Patrick Keegan, Collaborative Efficiency
David Jackson, Lockheed Martin Energy Services
Van Ashton, Idaho Energy Authority
Jim Lazar, Consultant
Christine Hanhart, UCON
Chuck Murray, Washington State Department of Commerce
Ken Eklund, Washington State University Energy Program
Craig Smith, Seattle City Light
Kathy Moore, Umatilla Electric
Gurvinder Singh, Puget Sound Energy
Brian Dekiep, NWPCC, Idaho
Bo Downen, Public Power Council
Linda Esparza, Franklin PUD
Dave Warren, WA PUD Association
Cory Read, Idaho Power
Rob Currier, Emerald PUD
Larry Blaufus, Clark PUD
Dick Adams, PNUCC
Tomas Morrissey, PNUCC
Michael D. Martinez
Tom Eckhart, UCONS
Tyler Dillavou, BPA
Stan Price, NW Energy Efficiency Council

Charlie Grist, NWPCC opens the meeting, and introductions are made. The agenda is reviewed and minutes are adopted. He notes a place on the Council website now open for comments. Grist states that a study from Navigant about Demand Response will be sent to all of the Advisory Committees including the CRAC and asks for input. He notes that the next CRAC meeting will be on December 17th.

Grist recaps the last meeting. He re-addresses water spreading noting that, after consideration with the Council's legal staff, it counts as conservation. Tina

Jayaweera, NWPCC explains that BPA is conducting a study to discover how many acres outside of the Groundwater Management Area are using SIS and how much savings to expect.

Grist continues stating that financial parameters were set according to Council recommendations. Jim Lazar, Consultant, feels that is a concern.

Jeff Harris, NEEA, moves the discussion back to SIS asking if the policy for water use and conservation is changing. Grist explains that in the Sixth Plan the region was limited to the Columbia Basin Groundwater Area and the Seventh Plan would open that up.

Bud Tracy, Unaffiliated Idaho, is confused about the expansion stating that some areas deal with not having enough water. Grist explains that the issue is the increase in production. Tracy wonders why that increase is considered conservation. Grist states that it increases overall regional production.

Eli Morris, PacifiCorp calls for clarification. He asks if a measure can have no energy savings attached to it and still fall under conservation. Harris explains that it's no different than industrial production. An increase in output per kWh counts as conservation even if total energy use does not go down because output goes up. Tracy asks if Bonneville is considering the reduced generation that would occur if the water doesn't come down the Columbia. Jayaweera states that the current calculator takes that into account.

Six Going on Seven

Danielle Walker, BPA introduces Lakin Garth, Cadmus who presents the findings.

Setting Targets (slide 1.17)

Garth identifies the three utility segments that the study identified: cutting edge, close follower and tried and true. Wendy Gerlitz, NW Energy Coalition, asks if the study captures the size of the utility or its load. Garth answers that size of utility was included.

John Morris, CLEAResult, asks for a deeper dive into the segments particularly in the “cutting edge” bucket. Garth states that he doesn’t have that data readily available as it is qualitative. Morris thinks it would be helpful from a planning standpoint to have more data on what makes a cutting edge utility. Garth states they tried to look at how much savings each bucket represented.

Harris asks if Bonneville was considered one of the utilities. Garth answers no. Morris asks why they used only 24 utilities. Walker answers that the target of 25 respondents would capture some good information while remaining on budget.

Lazar moves back to slide 1.12 stating that he is troubled that survey participants represent 71% of regional load and only 63% of regional savings. Garth points out that the denominator includes NEEA initiatives and to calculate the finding they worked them out separately. Lazar states that clears it up for him.

Impacts of Codes & Standards on Established Programs (Slide 1.19)

Garth explains the slide. Grist asks if there is a fear of standards taking away programs or relief because utilities don’t have to do it anymore. Garth answers that it’s mostly the later. He says that most participants agree that Federal Standards are helpful at improving efficiencies in the region but it’s more challenging for the programs to achieve the savings needed to meet targets.

Barriers & Solutions to Emerging Technology Adoption (Slide 1.22)

Garth explains the slide. Deborah Reynolds, UTC asks about the last barrier: technology performance and wonders if that is “perceived” technology performance since they don’t actually know if there is a problem.

Grist asks if respondents said anything about standards taking out a portion of measure savings and leaving a more difficult and expensive piece to capture. He wonders how they structure their program work to make progress. Garth answers that he doesn’t remember any detailed answers but notes that respondents said they were less likely to do it on their own and needed regional support.

Harris says this reminds him of LEDs and other emerging technologies in the past and wonders how to represent them as a cost reduction over time. He suggests the probabilistic framework that the planning process uses might be helpful. Grist asks if he means to put them in a different supply curve. Harris says yes.

John Morris asks if the Council has segmented product types. He suggests looking at how quickly they are adopted by the market, for example CFLs and LEDs and adapting that to clothes washers and heat pumps.

Craig Patterson, independent, suggests that a set of product attributes can make things more scalable. Harris commits to look at his planning data base and see if he can bring any information forward.

Patterson asks about cost effectiveness saying it's a moving target relative to cost of the kilowatt. He notes that present rates are low and recession keeps usage low. He asks how the Council integrates these factors. Grist answers that the model stress tests the conservation cost effectiveness limit.

Garth continues the presentation. He concludes by asking for ideas emailed to him or Walker. In addition, Garth thanks everyone for providing 2013 savings and cost data and clarifies that they requested measure-level savings and measure-level cost, both incremental and incentive. He describes the different kind of data they receive and states that they are trying to "unwind" that data. He notes that they didn't ask for administrative costs because it would have added too much time to the project.

Grist asks for further questions or recommendations. John Morris wonders if you could add commissions to the stakeholders list or add cost effectiveness to emerging technologies. He notes that he will follow up with additional comments and questions.

Eugene Rosolie, NEEA, suggests looking for synergies, noting that one can't just focus on infrastructure and ignore the demand piece. Grist asks if that is something NEEA could help with. Rosalie says yes with emerging technologies but not necessarily with mature measures.

Grist reminds the group part of their job is to craft an action plan and this falls into that realm. Harris agrees that much in this report should feed into the action plan. He notes that the NW region has done much work in influencing building codes and national standards.

Tracy points to performance measurement and technologies noting that it would be good to see which ones didn't work. He expresses his discomfort with the study's sample breakdown of 58% program managers and 4% executives noting that programs managers need programs to administer so the results may be different if you talked to more executives.

Rooftop Solar Photovoltaic

Charlie Grist

Grist explains why Solar PV is at the Conservation Committee. Lazar brings up air conditioning shading benefits. He feels that should be eligible for the 10% Act Credit. Grist asks for more data.

Approach for the Seventh Plan (Slide 2.5)

Harris asks about the status quo reducing load forecast. He wonders if that is a frozen efficiency equivalent. Grist answers that the Council sees it growing over time to about 200 average megawatts and they are taking input on whether to freeze it or not.

Morris asks if this is customer-sided meter only or does it include utilities that could potentially micro grid. Grist answers that the purpose of the assessment is to see how much potential there is, how much it might cost and when it could be available. Jayaweera adds that the GRAC is looking at utility-scale solar. Tracy is

curious about the amount a utility is willing to pay. Grist answers that Massoud (Council staff) is doing a run with a reduced rate to test the sensitivity.

By 2012 over 10,000 Utility Customers Installed 66 MW of PV Capacity (Slide 2.6)

Lazar asks if the 66 MW are AC or DC. Grist answers that he doesn't remember. Lazar feels that it is a mismatch of data. Grist notes that this is mostly in Oregon.

Cost & Savings Inputs (Slide 2.10)

Because he feels 20% of capital cost is unreasonably high, Grist calls for input on administrative costs. Eli Morris asks to define those costs. Grist states that they are for the remaining potential. Morris then asks what the Council is doing for current programs and tax credits. Grist explains the method noting that it includes federal, state and Energy Trust incentives. Morris asks if those credits will stay in place or sunset. Grist answers that they are testing both options.

Rosolie mentions that much of this is being supplied by a third party and wonders how that will affect the numbers. Grist states that they only have national statistics which have shown a shift from 1/3 third party leasing to 2/3 third party leasing in two years. Grist notes the "cowboy" nature of the marketplace.

Grist asks for ideas on what to use for administrative costs. Jessica Mitchell, Snohomish County PUD, says she can provide some robust numbers. Rosolie suggests that the net meter is the program cost to the utility. Grist asks if he means using net metering as a proxy for program costs. Rosolie answers yes.

Tracy notes that each utility will have varying costs. Grist clarifies that he is looking for a cost at scale adoption.

Reynolds asks why PV administrative costs would vary from conservation program admin costs. Grist says that these systems cost \$25,000 so 20% is too big. Mitchell notes that, in WA State, program costs include administering incentives and other connection issues. She favors Rosolie's idea of using net metering.

Lazar interjects that the norm is to apply admin costs to less expensive technology. Reynolds asks if we are dividing by customer rather than dividing by dollar. Grist answers that he is looking for a reasonable representation of cost for administering at-scale rooftop PV. Lazar states that number should be in the hundreds not thousands. He notes that in Germany soft costs are half of what they are here. Reynolds thinks that she has allocated the costs by customer so she doesn't expect them to be in the thousands.

Proposed Cost Declines Based on Utility Scale Cost Curve (slide 2.11)

Grist explains the data. Lazar asks at what point this becomes a code requirement and how will that affect costs. Grist answers the Council takes up codes when they are adopted. Lazar expects this to become a code in sunnier zones. Harris agrees stating that California has a target to get to net-zero in residential buildings by 2020, and 2030 for commercial. He expects that to drive market costs. Grist thinks this could be analyzed in the MCS.

Lauren Gage, BPA, wonders about the difference between utility scale and the residential market. Grist states that he looked at follow up analysis and found the same curve.

Example Cost of Rooftop PV Energy

Grist explains the data. Lazar asks for clarification on how they are differentiating between a utility-scale resource and distribution level resource. Grist points to the marginal line loss contribution.

Total Potential Available (2.13)

Grist explains the two "back of envelop" methods used. John Morris asks if 111(d) could be used gauge potential or the appetite for utilities to compete with third party implementers for solar customers. Grist states that more a question of what's in the baseline assumption noting that's part of the entrepreneurial nature of this technology.

Preliminary Projection Consumer Uptake Rooftop Solar PV Peak (2.17)

Grist presents findings and asks for input. Lazar feels that it is low on the commercial side, pointing to the aggressiveness of big box retailers like Walmart, Costco and Kohls. Chuck Murray, Washington State Department of Commerce, states that WA is currently reviewing their incentive programs and thinks that might lead to larger commercial systems. John Morris says he saw an article on APS renting rooftop space, installing panels and paying a flat rate of \$30 a month. Grist again notes the “wild west” and load shape-changing nature of the resource.

What Max Pace of Development (2.19)

Grist presents his data noting that he needs input for the program ramp rate. Harris feels this is already a mass market product and the ramp rate will be affected by how attractive the financial deal is and not limited by infrastructure. He notes that in California third party agents are delivering a lot of volume.

Harris further states that commercial is a different animal than residential noting the amount of square footage available. Therefore, he feels the Retro in 20 curve looks reasonable. Ted Light, Energy Trust, agrees with Harris noting that they have a separate incentive tier for third party.

Gage moves the discussion back to cost asking if you can model costs over time or do you have to choose one number. Grist answers he is not sure how it will go to the RPM but notes that the Council can do model cost declines in other generating resources. Gage asks if that’s true for lighting too. Grist answers that the Council is proposing to fix the lighting cost decline and freeze it. Gage asks if it will be modeled as a generating resource. Grist says that’s his thinking at this point.

Tom Eckman, NWPCC, explains how it is different than the standard EE supply curves. Grist mentions the feedback tariff and how much ends up on the grid. He notes that some flat roofs are warehouses and they will generate surpluses. Harris agrees saying this is another distinguishing factor between residential and commercial. Grist thinks maybe we should separate them.

Reynolds states that Walmart sees this as a cost offset so she agrees with Harris's comment. Lazar states that many of these big box stores own their own buildings but there has to be a change in marketing to get to the other big, flat roofs.

Summary (slide 2.20)

Grist sums up stating that he hears that the approach is mostly correct. Shading benefits will have to be taken into account. Program admin costs will come from Energy Trust, Snohomish and others. The CRAC approves of using three climate zones.

Grist notes that there is some concern that the long term forecast model approach doesn't reflect enough commercial adoption. He asks how the CRAC feels about the 200 average megawatts total over 20 years. John Morris thinks that number is conservative. Tracy states that it depends on incentives but he thinks it's high.

Grist continues stating that the Council will differentiate between the commercial and the residential. Harris brings up looking at California sources for the cost decline curve.

Overview of Steps to Develop Supply Curve Workbooks

Grist gives a high level refresher. Gage asks about program deployment and wonders how momentum savings and program savings interact and are measured. Grist says it's looked at measure bundle by measure bundle. He admits its uncertainty and emphasizes the need to look at baseline assumptions. Gage asks if that will be another assumption on top of the ramp rate. Grist says we try to freeze at a certain spot.

Gage does not think that the ramp rate and the program deployment adjustment are the same thing but feels they are being represented as the same. Grist notes that there was cheap conservation in the Sixth plan but was unrealistic.

Gage asks about the quantity available annually for the ramp rate. Grist says the Staff has individual program ramp rates that are applied to programs. He states that Staff adds up all total potential over the year. Grist states that we might need another discussion. Kevin Smit, NWPCC, notes that some of these topics are still in discussion internally.

Eli Morris wonders if measure level ramp rate is the way to go. Grist says that could be a lively conversation. Jayaweera says we need to start at the measure level and the CRAC could help further inform us. Smit says with some measures we are right on.

Steve Bicker, Tacoma Power, agrees with Jayaweera, stating that a ramp rate for an aggregate group of measures isn't real. He suggests using actual measure ramp rates.

Overview of Seventh Plan EE Measure Workbook Structure

Smit presents the data on the Workbooks. He explains the Measure Input Output section (Slide 4.7, 4.8)

Bicker asks about the lack of a benefit cost/ratio column. Smit explains that it is a ProCost output, but not used in the 7th Plan. Grist explains that the Staff takes the levelized cost to the RPM not the benefit cost/ratio. He continues that a market price adder comes after the RPM.

Elaine Prause, Energy Trust, asks if the Council assumes a steady horizon for levelized costs. Grist answers yes and explains the process. Smit adds that ProCost helps take care of the math of that problem.

Smit continues the presentation.

SC Results Worksheet Structure

Harris asks when the measured load shapes, savings and marginal costs are fed into the workbook. Grist states that the Staff is thinking about this like "bands of

cost.” He explains the thought process, noting that a new piece of software, called the “bundler-upper,” will take the workbook sheets and bundle them into cost bins and years with maximum annual uptake pieces per year. Harris asks if shaping is on a four by 12 matrix. Grist answers no, it’s two by 12.

Grist mentions that the capacity calculations will be done differently in the Seventh Power Plan. He explains the process. Harris notes that in the past he used a local distribution system. Grist says ProCost can use both; a transmission peak and a local distribution peak. Harris approves.

Smit shows the live workbook. Grist states that these will be posted and invites comments on them. Jayaweera stresses the ramp rates, noting that they were not as vetted as they should be.

Residential Draft Savings

Tina Jayaweera presents the data

Tom Eckhart, UCONS asks what Jayaweera used to get the 90 lumens/watt and the cost of lumens/watt (slide 5.4). Jayaweera answers that the CFLs were not projecting much movement so that’s why they focused on LEDs. Grist adds that the curve came from the DOE’s PNL cost reduction and efficacy increase.

Jayaweera continues the presentation. Harris expresses confusion over slide 5.6. Grist explains that it shows the value of running a program today with a 90 lm/W LED assuming it goes away in four years. Harris asks about the market average. Jayaweera points to the two, pre-2020, baseline cases noting that the RTF currently assumes them.

Harris asks if you assume a change in market mix as you approach 2020. Jayaweera answers no. She considered the increase in efficacy and decrease in cost for LEDs and the replacement advantage. Harris states that effectively the market average is increasing. Jayaweera agrees but notes that it is not a level of sophistication included in this chart.

Harris wonders how the numbers change if a change in market average isn't assumed. Grist states that it comes from less bulb replacement savings.

Eli Morris asks why the cost relative to a CFL change by year. Harris explains the replacement cost; noting that these are levelized costs that include the non-energy benefit of replacement lamps. After 2020 those non-energy benefits are zero because of Federal standards.

A discussion about the lifespan of CFLs begins. Jayaweera explains that a CFL installed in 2016 will last through the 2020 standard. Eli Morris asks why you wouldn't get five years of savings over the CFLs life. Jayaweera says you could. Harris says the decision to install it came before 2020 so the incremental cost and savings should be aligned. Eli Morris acknowledges that either way it would be expensive.

Gage asks if there would be savings if your post 2020 baseline is 45 lm/W but LEDs are 90 lm/W. Jayaweera states that the savings would be \$55. Gage then asks for clarification on the middle section of the slide. Jayaweera explains.

Gerlitz asks if the chart is showing two different baseline assumptions then why are we looking at the first column. Jayaweera states it speaks to how fast and furious LEDs are coming into the market. Harris asks if she assumes the market will be saturated with 90 lm/W lamps by 2020. Grist states that this is a "what if" scenario that the CRAC asked for at the last meeting.

Harris then asks about the 2016-2019 period in the 45 lm/W column set. He says that you assume an average market baseline but when you hit 2020 that baseline jumps up so the savings continue above 45 lm/W. Jayaweera agrees. Grist adds that it aligns with the load forecast. Harris says it seems in line with how the market will proceed.

Eckhart asks what the measure life assumption for the 90 lm/W LED. Jayaweera answers 12 years. Harris asks if the load forecast uses a continuing growth in LEDs

over time. Grist states the residential forecast goes to 45 lm/W by 2020 and freezes. Harris says historically the Council's frozen efficiency forecast start earlier than five years out. Grist says it's a known standard. Harris agrees that that is consistent.

Bicker rephrases the data presented in a visual way. Jayaweera explains that the standard change is the 45 lm/W. She points to the opposite extreme where the market is taken over by high efficiency LEDs noting there is no room for a program there.

Bicker says there's no standard today as EISA 2020 is in the future. Grist explains with a chart he drew on the whiteboard. Bicker understands the new graph.

Harris explains the graph again. Bicker understands. Jayaweera suggests coming back to this information in the future. She admits that the baseline for 2020 should be between 45 and 90 lm/W. Eli Morris asks what the delta looks like if the forecast assumes 45 and we assume 60. Harris agrees that that is the underlying policy question. He explains the difference between a floating and frozen baseline. Eli Morris asks again how do you count it and what does our load look like. Jayaweera says in either case we have to discover what it really is and make an adjustment.

Harris asks if the Council plans to change the framework to reflect a naturally occurring baseline. Grist states you are guessing at the baseline either way, so you have to look at the marketplace after it happens. Grist then states that he prefers to freeze it for consistency. Harris states that Federal standards and market momentum make it challenging. He thinks it's a key issue for utilities' program targets. He notes that if you're wrong you miss targets.

Grist reminds the CRAC that the original proposal called on the Council to forget between now and 2020. He explains that the columns on the left show how it looks as a resource buy.

Harris states that from a societal perspective, it's buying cost regardless of who's paying for it. The second set of columns is reasonable buy for the region if it's high efficacy.

Grist asks for opinions on using a 45 lm/W baseline for 2020. Gerlitz feels that using the existing standard is more consistent with the way the Council treats other resources and a better approach. Grist notes head nods in the room.

Eli Morris notes that they are using a 60 lm/W baseline in their assessment but agrees with a 45 lm/W and thinks it's still worth pursuing lighting. Patterson agrees.

Jayaweera states the plan is not final for a year. Grist asks for market data on what's being sold. Bicker states we are making assumptions and have to be flexible. Grist agrees that we can adjust.

Source of Key Parameters

Jayaweera continues the presentation. Gage asks about using NEEA's shelf surveys for current market saturation for lighting. Jayaweera admits that there is no good flow data. Gage notes that Carrie Cobb has data on how to weight the shelf surveys. Grist asks if new shelf survey data is coming. Harris says there is but notes you still can't know if LEDs are replacing CFLs or incandescent bulbs. Harris suggests a quick RBSA home survey that would find a 2014 snapshot of the data. Grist says the last study he saw from DOE Navigant showed less than 2% saturation. Harris says the NW is different than the rest of the country. He will follow up with more shelf survey information.

Desktop Computers (5.8)

Jayaweera continues. John Morris asks how the Council tracks desktop units for business. Grist notes that new data from the commercial building stock assessment has data in several formats. Harris states that the residential data was informed by the RBSA. Jayaweera notes that the number of desktops changes over 20 years.

Showerheads (5.10)

Jayaweera presents data including a change in the definition of a low flow showerhead. She notes that the Sixth Plan only looked at electric water heaters and the Seventh will look at electric and gas. Harris asks for clarification on the water heaters. Jayaweera notes that there is better data from the RSBA and explains further.

Harris states that would imply higher savings. Jayaweera agrees but notes the higher flow-rate showerhead and the evolved method of calculating savings. Harris asks if this is reflective in the RTF current assumption set but with any kind of water heater and a direct install electric program would garner more savings. Jayaweera agrees. Bicker asks if the Council assumes we would not do a direct install. Jayaweera clarifies saying if every home, with either a gas or electric water heater, installs a low flow showerhead the average savings would be this.

Eli Morris asks if these values are straight from RTF. Jayaweera answers yes they have a 1.5 gpm which operates at a 1.35. She further notes that most of the information comes straight from the RTF with the exception of some data that she updated, for example the electric water heater saturation.

Patterson asks how much of the savings are verified with real life noting work he did in the 90s with flow meters. Grist answers that the RTF gets empirical data on performance using 1400 homes in the region.

Bicker asks if the RBSA found acceptance of the 1.5 gpm showerhead. Jayaweera answers that it looked at low flow showerheads generically.

Jayaweera notes that bathroom aerators are new to the Seventh Plan. Eli Morris asks if the RTF will review aerators. Grist says we hope to vet it at the RTF.

Advanced Power Strips

Harris asks for an explanation of power strips. Jayaweera explains the three types occupancy sensors, load sensing and infrared and their uses. Harris asks if the

Council is assuming a mix. Jayaweera says we look at savings incremental to each other and explains further. Harris raises the policy question: at what point do you stop “thin slicing” the savings. He would like to see no clear demarcation in showerheads but notes it makes sense for power strips. He sums us saying the question remains, when do you slice and when do you bundle. Eli Morris asks if the levelized costs are incremental. Jayaweera says yes.

Single Family Weatherization

Jayaweera presents data. Bicker asks if the bundle of weatherization measures in the Seventh Plan includes heat recovery ventilation. Jayaweera states that it doesn't include HRV but does include infiltration control right now.

Eli Morris asks if the numbers reflect electrically heated homes only. Jayaweera says yes. Grist adds that there could be a big difference of savings for a heat pump house.

Grist notes that there are about half the savings available from the Sixth Plan and it's more expensive.

Embedded Data Centers

Grist begins the presentation.

Bicker asks if this information was in the Sixth Plan. Grist states that they had Server Virtualization Measure and now they are looking at it from a data center point of view. He notes a big question is will that load stay in that building and grow or move to the cloud.

Gerlitz asks if there are differences of efficiencies in the types of data centers. Grist states that the model can run with differences. Bicker wants to hear more about storage and servers growing through 2030. Grist answers that IP traffic is growing 20% per year. Bicker asks if the cooling data is specific to the Northwest. Grist states yes.

Projected Growth in Embedded DC Loads

Lazar asked if servers are being replaced or moving to the cloud. Grist states this holds the cloud constant in this chart.

Baseline Forecast Issues

Grist poses the questions and proposes holding the baseline constant with no shift to the cloud. Reynolds suggests that places that go to the cloud will keep their server rooms as backup for a long time. Grist states he hears different stories.

What is the Technical Potential?

Grist presents data saying he feels the potential is the middle arrow. He asks for feedback. Tracy agrees. Bicker asks if the potential in the first 10 years will not be counted because it won't last. Grist says we could count it but I was taking a conservative approach. Bicker acknowledges it would make the target bigger.

Conservation Issues: Need CRAC Feedback

Grist states this is limited to embedded data centers only noting that enterprise and dedicated data centers have potential but business incentives will drive efficiency. Gerlitz disagrees with that argument noting that it often doesn't work with other industrial efficiencies. She points to Energy Trust work to prove her case.

Stan Price, NW Energy Efficiency Council, agrees with Gerlitz. Grist states that we some sources of data to do a credible analysis. Tracy again lobbies for the middle road, calling it the safest way to look at this.

Grist moves to the technical potential. Eli Morris asks if CBSA captured the age of equipment. Grist says no. Bicker asks if big players swap out every four years. Grist states that is what the consultants came up with. Bicker asks if there a sense of the swap rate for embedded server closets. Grist replies no. Gerlitz feels a six year replacement rate is a reasonable assumption. Bicker agrees.

Grist asks how to reflect savings over time. Prause asks if there is confidence around yearly improvement. Grist states the consultant feels Moore's law has been around for 30 years. Jayaweera qualifies that they felt confident for the next four to five years and after that nobody knows. Bicker feels hesitant stating that as a person that manages goals and budgets it gets complicated. He pushes toward realistic conservativeness. Grist reminds everyone that if there is a push to the cloud the load will move. He reiterates the uncertainty of that happening.

Rosolie agrees that this is a hard call and wants to err on the conservative side. He suggests talking to utilities with server rooms for more information. Bicker calls for a middle road approach. Grist notes that there's a need to focus on the equipment adding that the ENERGYSTAR point is big. Grist notes that these businesses are motivated by client satisfaction, not by energy savings and often don't pay the bill.

Embedded Data Centers

Eli Morris asks if the data is a blend of the different measures or moving things to the cloud. Grist measured from the nadir all the way to the cloud. Morris asks if all of the measures are low cost. Grist states that he didn't get solid cost estimates from the consultants because it's cheap. Gerlitz asks if it varies over the average measure life. Grist explains it's cheap even over a short equipment life.

Rosolie states that you have think about the cost of the measure even though it's cheap noting that these are custom projects. Grist admits he is not sure how to think about the program design.

Eli Morris asks about much the technical potential would increase if it moved to the cloud. Grist says the tool allows us to look at the efficiencies. Morris asks if these are the net energy savings. Grist answers this assumes that everything in embedded data centers stays in embedded data centers except for the lower line.

Bicker asks where the load would move if everything went to the cloud. Grist says they have no idea. Reynolds says you are holding the load constant. Grist says yes

in this scenario noting that the Northwest is a locus for data centers. Grist moves on and notes that the Council will take comments. He notes Gerlitz comment not to ignore big data houses and some cautions about programs and reducing if it's more than a Kilowatt hour per square foot.

Commercial Sector: Preliminary Seventh Plan Potential Estimates for Selected Measures.

Smit presents **Commercial Cooking** data. Eli Morris asks if the chart represents the number of units remaining to be done. Smit says he will double check the data. Grist admits that the Sixth Plan data is rough. Smit is confident with the numbers that are there. Morris asks if fryers are a new measure. Smit answers it was there but had no potential. Jayaweera notes that fryers were not included in the Sixth plan.

Grist sums up going back to the agenda. He calls for comments. Smit states that there will be more work on industrial to show at the next meeting.

Rosolie notes that a number of RTF measures come with savings related to specifications. He asks if that gets figured into the ramp rates. Grist restates the question and says it relates to how you bundle and put them together. He says we look at it measure by measure to estimate the total regional potential. He explains further saying that they look at it bundle by bundle and their respective ramp rates. Rosolie says okay.

Eli Morris asks if you look at showerheads as a lost opportunity. Jayaweera notes that it's hard to know but she went with retrofit. Morris says it might not matter but it does matter how you assess cost and savings. Jayaweera states that the costs and savings were incremental from a 2.5 gpm. Morris notes that it traces back to the bottom efficiency. Jayaweera states it's a federal standard baseline.

Grist says we need to clarify in our work when we make judgments like this.

Grist asks for more input and information and closes the meeting.