

Conservation Resources Advisory Council Minutes
May 1, 2015
Northwest Power and Conservation Council

Tom Eckman, NPCC, opened the meeting at 9:30. Introductions were made. Both the agenda and past minutes were adopted. Charlie Grist, NPCC, reminded the group that there are several opportunities to see initial RPM runs.

Momentum Savings

Presenter: Carrie Cobb, BPA

Cobb explained the Momentum Savings Criteria [slide 2].

Jim Lazar, RAP asked how non-electricity benefits are included in the TRC cost-effective analysis [re bullet 2]. Cobb answered that they follow Council guidance.

Linda Esparza, Franklin PUD, when the data on [slide 6] showing that BPA is 86% of the way to 174 aMW ends. Cobb answered two weeks ago.

Wendy Gerlitz, NW Energy Coalition, asked if the Standards bucket on [slide 9] is Federal Standards. Cobb answered Federal except for NEEA's battery charger analysis which is from Oregon.

CFL Savings, 2005-2009 [slide 11]

Grist explained that the Council uses a frozen efficiency baseline while NEEA uses a moving baseline. Jeff Harris, NEEA, added that the net market effect savings designated by NEEA are the result of market impacts generated from NEEA and Utilities programs.

Steve Bicker, Tacoma Power, added that it's only found in areas where NEEA has initiatives. Cobb agreed.

Brendan O'Donnell, Seattle City Light, stated that for many 1937 utilities their NEEA savings are against the fixed line baseline. He asked if momentum savings are encapsulated in that. Cobb answered that it is one large number that is trued up to your baseline but not broken out between net market effects versus momentum.

John Morris, CLEAResult, asked how the momentum savings are calculated. He asked if it's from the Power Plan baseline to the NEEA baseline then NEEA's net market effects are added. Cobb answered yes and explained that this is where analytical decisions that she calls the "Cobb method" are made to ensure there is no double counting.

Bicker asked if these are first year savings. Cobb said yes.

Gerlitz asked if savings assume that everything in the NEEA baseline happened or if it is substantiated with research. Cobb explained that the NEEA planning and research staff collect sales data, evaluate it and compile it into their ACE model. She stated that the results are reviewed quarterly.

Bud Tracy, unaffiliated, asked if the calculated savings of CFLs are for sold or installed bulbs. Cobb answered that NEEA has bins for storage and breakage along with numbers for the population turning over. Harris and Cobb explained the socket model and the savings derived from sales do not assume that every CFL is an incremental CFL. Tracy stated that many CFLs were purchased and distributed and never installed or installed and replaced with incandescent. Cobb stated that the RBSA trues the data and was incorporated in the NEEA model.

Eckman explained the rigor of the RBSA's methods. Tracy stated he was encouraged by that. Grist reminded the group that it is hard to unravel total market effect.

Eli Morris, PacifiCorp, asked about the percentage of savings from residential water heaters standards on [slide 13] considering the standard is only two weeks

old. Cobb explained that it is a big standard but there is uncertainty and the number may change. Fred Gordon, Energy Trust of Oregon, asked if there is a standard assumption for how long it takes for the shelves to clear. Eckman answered that the first year is more important. Gordon stated that his group usually says six months.

Gordon asked if the primary focus of BPA's market research on HVAC [Slide 15] is on heat pump sales, ducted and ductless. Cobb stated that they are looking at air source heat pumps.

Post 7th Plan/ Savings will change with new baselines [slide 18]

Gerlitz asked if the savings depicted in this slide are illustrative. Cobb said yes and that baselines are rising and that will impact momentum and program savings. Eckman stated that the takeaway is that the line that splits program savings and momentum savings is driven by action over time. Eckman also said that timing matters and the Council's baseline gets updated every five years instead of a CPA which is updated every two.

Stan Price, Northwest Energy Efficiency Council, commented that he is skeptical and it feels like you're operating under different rules to assume these savings. Eckman stated that they have been trying to measure what is outside of programs and pointed to the T-12 to T-8 example. Cobb stated that there are certain measures, i.e. custom projects and commissioning, that do not lend themselves to market analysis.

Price felt that this would explain a small number but called the outer edge "wow." Eckman explained that it comes from six years of a frozen baseline. Price stated he understood Eckman's point but still remained skeptical.

Grist called Price's skepticism warranted. He pointed to Cobb's working group that reviews underlying assumptions and called for more help. Bicker asked for reassurance that there is regional empirical research and that will keep the whole from being greater than the sum of the parts.

Cobb called for help reviewing the research as the research is often innovative.

Gordon stated that the Power Plan is not a good tool for judging the value of programs because it includes everyone's work. He stopped short of calling the results counter intuitive but stated that they are something that no one can take credit for.

Gordon brought up NEEA's prediction that the TV market is changing again. He wondered what would happen to the savings then. Grist stated that they have a growing load for ultra hi def TVs in the baseline.

Bicker asked how utilities should report data to the EIA and other national aggregators noting that it is not the "apples" that they are counting. Cobb agreed that there are very different baseline methodologies. Eckman agreed with the statement.

PNUCC 2015 Northwest Regional Forecast

Presenter: Dick Adams

Gerlitz asked what was used for savings in **Savings re-Estimated Regularly** [slide 4] for utilities that don't use CPAs. Adams stated that each utility gives PNUCC information and BPA provides information for smaller utilities. Gerlitz asked how BPA gets that information as her organization has had issues getting information. Adams stated that for Washington it's linked to 1937 requirements, for larger non-BPA it's in their IRPs but he's not sure how BPA develops their values.

Aggressive Demand-Side Continues

Eckman asked if the 900 MWa of annual energy savings includes NEEA. Adams answered that it probably has a little NEEA savings in it but the vast majority is from utilities.

Utility Programs are Foundation

Eckman stated that State Clean Air agencies will be collecting data as per 111d and wondered if there should be an action item about how to calculate normative savings in a clear way.

Adams encouraged Eckman to explore that in the Seventh Plan as there is no simple answer.

Jessica Mitchell, Snohomish Co. PUD stated that there is a lot of complexity in tracking and reporting but she is not sure it adds value. She stated her feelings of hesitancy about increasing the complexity in tracking and reporting and asks the CRAC and Council to think at a higher level.

Break

Conservation Potential Assessment Comparisons

Presenters: Charlie Grist, Tina Jayaweera, Kevin Smit, NPCC

Gerlitz asked how the CRAC chose utilities to survey. Jayaweera answered that they sent the survey to all IOUs and most of the larger Publics and the ones in the list [slide 2] are the ones that responded.

Lauren Gage, BPA, asked for some context and background for why this assessment was done. Jayaweera answered that it comes at the request of Don Jones Jr. from PacifiCorp who asked for NWPCC data for comparison. Jayaweera stated that they decided to expand the numbers more broadly from there.

Total Technical Achievable Potential [slide 3]

Gordon pointed to the fact that Energy Trust is a low outlier in 20 years. He asked if there is an idea of technical potential multiplied by deployment curve that could

be benchmarked against IRP planned savings. Jayaweera answered that these are achievable technical and include the 85% max and ramp rates. Eckman stated that the 10 year number is more important.

Residential Technical Achievable Potential [Slide 4]

Bicker stated that he was surprised by Tacoma's savings per capita data point (2477 kWh). Grist asked if that could come from a lot of electric heat. Bicker said yes but the bulk of their future potential is in commercial.

Residential Top-10 Measures (yr 10) [slide 5]

Eli Morris asked if this is just the top 10 and if there are other measures. Jayaweera stated yes; these are just the Council's top 10. Gordon stated there is skepticism about the RTF number for advanced power strips. Grist mentioned that solar water heaters brought up other questions. Mitchell stated that it is just too costly.

Spread of Levelized Costs-Weatherization [slide 6]

Gerlitz asked if the 100-110 bar is one item or a bundle of items. Jayaweera answered that it is probably several things. Grist stated the data are posted on line.

Commercial Top-10 Measures (yr 10) [slide 9]

Gordon stated there might not be exterior lighting left to go after and data center's load can't be forecasted because no one knows where they will land. He said that smart plugs are a limited universe. Finally he said that they are piloting VRF to see if they can make it more generic.

Grist stated that smart plugs look like a proxy for turning electronics on and off which can be done with other technology and should be thought of as a target.

Jayaweera stated that street and road lighting is treated as industrial in some cases.

Ken Nichols, EQL Energy, asked how cost capacity value gets into these numbers. Jayaweera stated that for the Seventh Plan they include a capacity benefit and explained the process. Nichols asked about controllable or flexible capacity. Eckman stated that the RPM measures quarterly not hourly so they can't get sub hourly flexibility yet.

Mitchell stated that they have the transmission deferral benefit adder in their CPA. She noted that in their 2013 work they didn't have 8760 load shape comparisons but they will in 2015. Bicker stated that 8760 is in his so there is some load shape sensitivity. Gordon stated that they steal the Council's load shaping as an overlay.

Eli Morris stated that their IRP models the T&D benefits and the same benefits the Council uses on an hourly basis. He stated that the CPA and the levelized costs they provided don't have those benefits. Grist called that an important distinction as cost is a big driver.

O'Donnell stated that they mimicked the Sixth plan in incorporating the capacity savings and T&D benefits. But for their current CPA, he said they are looking at a network of 440 buildings in downtown Seattle to see potential capacity savings of the distribution network. He concluded by saying regardless of how granular our load shapes are we don't have a great understand of conservation's benefit to peak.

Eckman stated that we don't yet know how we're going to influence those shapes with controls. Nichols stated that he is working on lighting controls and variable frequency drives with controls to manage distribution feeders.

Residential Potential by End-Use [Slide 13]

Grist pointed to the diversity of potential in HVAC and lighting by CPA. Gordon wondered how much of that is influenced by the currency of information on LED technology and the CFL baseline. Mitchell admitted that those were both big factors for her when doing their CPA. She then asked if these are the 20 year projections. Smit answered yes. Bicker asked when they were collected. Jayaweera stated a few weeks ago. Bicker stated that it's changing. Smit said they were aware of that but this is the most current data received. Grist reminded the group that these are normalized to 100%.

Commercial Potential by End Use [slide 14]

Gordon stated that a big variable is the viability of rooftop tune ups. He stated he is pessimistic as their rooftop pilot crashed and they are not sure about clamp-on systems. Grist stated that much of the savings are coming from VRF. Gordon asked if SEM is represented by the grey bar. Smit said yes and they call it by a different name.

Bicker stated he was surprised to see process loads in commercial. Jayaweera stated that it was probably waste water. Grist pointed to the Council's small sliver for water heating because they didn't have time to look at heat pump water heaters. He called it a hole in their work.

Gordon suggested looking at electric saturation in places that use a lot of hot water. He felt that the people who use electric hot water don't use a lot. Grist stated they looked and it was a bigger number than they thought but didn't get their hands on it this time.

Conclusions [slide 17]

Gordon stated he was struggling with the last bullet, **low hanging fruit continues to appear**. He feels they getting these savings is more complex than replacing light bulbs.

Bicker stated that the low hanging fruit is moving into NEEA initiatives where products need a nudge and utilities aren't doing that much anymore. Eckman stated that may be a good characteristic to identify in market transformations.

Gage thanked the staff for the report and then stated that she is confused by the energy management characterization. She stated that it looks out of line with what utility programs have learned in the last 5 years. She stated that the Council uses big arms and the utility programs use smaller ones and the 60% savings for energy management feels disconnected. She wondered if it's semantics or categorization. Smit stated there are a lot of things called energy management in the graph and offered to spell them out individually. Smit suggested coordinating with BPA to best present the information.

Grist asked if her question is industrial or across the board but agreed that they should be give it attention.

Price said that the beginning of the report has everyone in about the same spot but the end shows that everyone takes a different road to get there. He wondered if that was caused by the diversity of the customers and opportunities of the utilities or if the destination point is pre-ordained.

Gordon observed that not everyone has the same size buckets and if they were standardized it might look the same. He then said that for forecasting you are looking for convergence of diverse approaches as no one can really forecast. He felt reassured by the report.

Lunch

Scenarios 1B and 2C Key Findings

Presenter: Ben Kujala, NPCC

Cumulative Conservation (MW)–Scenario 1B

Mitchell asked if the capacity was on average. Kujala answered that it is system peak need. He added that hydro systems call for extra care with system peak need.

Cumulative Conservation (aMW) in 2035

Grist pointed out that the total energy in the supply curves for RPM is over 5000 aMW but it is developing between 3600 and 4000 aMW in most cases.

George Pohndorf, Snohomish Co PUD, asked how far the RPM model looks out when considering conservation. Kujala answered that the model has a 20-year horizon and the action plan has 5. He then explained that the model looks back two years to get an idea of current market prices.

Total RPS Average Additions

Grist called attention to the “ski jump” where no renewables are built until 2024, peaks in 2027 and falls in 2030. He asked for an explanation. Kujala stated that the model looks at REC banking. He stated that the requirement starts in 2020 in WA but the RECs get used first. He also stated that OR requirements are more liberal.

O’Donnell stated that the tip of the ski jump mirrors SCL’s expected purchase.

Summer Peaking Capacity of New Resources-Least Cost Strategy Scenario 1B

Allison Mace, BPA, asked how existing DR resources are included in the model. Kujala answered through the load forecast. O’Donnell stated that the DR build out looks complete by 2020. Kujala agreed saying that it happens early on.

Harris asked Kujala if the timing of the thermal build out represented on the slide corresponds to the closing of Boardman. Kujala said yes. He stated that, with caveats, about 10-15% of the futures need a thermal build in response to coal retirements.

Eli Morris asked what the projected summer peak of the region is. Kujala stated he didn't know off the top of his head but the 8000 MW represented on the slide is not a requirement.

Bicker asked if the order of the resources represent a weighted average across the futures or is it random. Kujala answered random. Bicker then asked if he has a sense of a weighted average order. Eckman answered that energy efficiency and demand response lead while thermals come in later.

Kujala stated that the model prioritizes cost.

Least Cost Strategy vs Least Risk Strategy Scenario 1B

Gordon noted that the lines are not that far apart calling it remarkable. Tracy asked if this slide represents a regional commitment to carbon. Eckman stated this represents the cheapest solutions and carbon is not in this scenario.

Esparza asked what is larger or smaller than the 90th percentile. Kujala stated that the 90th percentile represents the view of a reasonable target for an emissions requirement as you can't get to 100% certainty.

Cumulative Conservation aMW in 2035 – Scenario 2C

Lazar asked if the Council is constrained by the Federal obligation to use a \$37 social cost of carbon. Eckman stated that there is a scenario with a social cost of carbon. He said Council guidance imposed a 3% discount rate.

Least Cost vs Least Risk Strategy Scenario 2C

Gordon summarized that the response is conservation, substitution among gas plants and some more renewables built. Kujala stated that he saw more combined cycle plants built and/or heavily dispatched.

Gordon stated that in California states might go for a higher RPS maybe the carbon scenario would be a good place to show that. Eckman and Kujala disagreed. Kujala reminded Gordon about the liberal REC banking policies.

Mitchell questioned how the least cost/least risk could be so similar. Kujala stated that the Sixth Plan had a higher range of uncertainty because of load while the Seventh Plan has a flat load risk.

Bicker restated Kujala's statement: a common set of drivers is useful to both objects. Kujala stated that a large caveat is one of the 800 futures will prove him wrong.

Gerlitz stated that conservation is least cost/least risk so that's what the model is choosing. She stated she's interested in the 10% outliers of most expensive futures to see what beyond conservation is changing. Kujala stated the lack of interesting differences is part of the overall message and needs to be looked at first. He continued saying that after that they can look into individual futures to see a finer grain.

Grist asked for more suggestions like Gerlitz's.

Gordon asked if the potential of climate change on loads and hydro systems were integrated. Kujala answered that because of its complexity it isn't integrated. Eckman stated that there will be two sensitivity studies that address the issue.

Harris revisited the tails of the 90th percentiles, re-stating that the model chose to build more gas-fired generation in those cases. He asked if there is a scenario that would prohibit that activity. Kujala stated that there are scenarios that have that but you could violate standards that are in place and penalties would kick in. Harris stated that he thinks there is more DR available than what is in the model right now and suggests looking for it. Eckman explained that the penalty tells the model to hunt for solutions elsewhere.

Harris stated this is an important public policy point but still feels it's worth pulling out the specifics of a non-thermal future. John Ollis, NPCC, stated that there is a lot of available DR that the model is not picking. Ollis acknowledged there could be more DR but there is a fair amount of DR in the model that's not chosen even with the extreme penalties. Kujala stated that the thermals could also be built as an energy requirement.

Harris stated that those efficient thermal plants probably have a cost of energy that is less than \$100+ per MWh of energy efficiency. Eckman agreed.

Eckman brought attention to Scenario 3A and 3B which will push the limits of technology and restrict everything to carbonless investment. He said they will also look at emerging technologies.

Eli Morris referenced the peak capacity/conservation slide saying he was surprised that it looked the same in the summer and the winter. Eckman stated that it's built up from the supply curves but the capacity benefit of energy efficiency is modeled with the same variable across all seasons. Eckman called it a limitation of the model. Eli Morris felt that the summer peak might be overstated. Grist and Kujala stated they would follow up.

Gordon asked for a comparison between demand management and energy efficiency.

Kujala showed the group a model run.

Harris asked if Gordon meant that once they got to the final mean conservation build out scenario that you find out the avoided costs and benefits are from the avoided energy versus avoided capacity. The room agreed yes.

O'Donnell stated he's not sure they have the resolution to show what demand savings look like. Harris stated that the cost to enable DR for energy efficiency measures is not in the curves but could be small.

Kujala stated they might be on the conservative side when representing DR but have made great strides. His goal for the Seventh is to have a good sense of the supply. He stated he is looking for comments between draft and final.

Harris stated that if there is interactivity between energy and demand for these resources it could go in either direction and might leverage the energy side of the resource. He gave the example of a larger size tank for a water heater.

Kujala went inside the model. Harris stated that it might be a good policy point to ask what the cost to the system would be to take that risk of not adding thermals. Eckman stated that we will see some of that in other scenarios.

Harris asked about the represented potential being 85% of 85% and wondered if the remaining 15% is ever banked. Eckman stated no.

Level 2 Emerging Technology Scenario

Presenter: Grist, Smit, Jayaweera

Gordon asked for a definition of Level 1 emerging technologies. Grist stated that they are in the supply curve because we have a good idea of their cost and amount available.

Mitchell asked if Combined Heat & Power [slide 5] was not in the supply curve but in competition with EE. Grist said yes and it could help with the “fill in the hole” scenario. Eckman explained how CHP was treated in the past.

Dave Hewitt, consultant, stated that it is possible that the policy will say no carbon vs reduced carbon. He said that NY is doing aggressive work on CHP for grid protection.

Gerlitz asked if the presentation is looking at technology that would be run in an emerging supply curve. Eckman stated it wouldn't be run but will provide

information on how we might supply the system in a way that will reduce carbon. Gerlitz stated that have 1000 aMW of economic supply that is not identified is puzzling. Eckman stated that CHP cannot be identified in a site specific way. Nichols agreed with Gerlitz saying that you're making guesses throughout the plan and this is significant potential.

Gordon stated that they define this as efficiency because the spark spread is unpredictable and volatile. He felt there is not much actual potential here.

O'Donnell stated that SCL also treats this as conservation but only puts it in their supply curves based on specific potential. He concluded saying it requires a knowledge of specific facilities. Eckman stated it may evolve for other reasons but it is still nascent. Mitchell echoed O'Donnell's statement. Jayaweera stated that market potential is different than technical potential.

Gordon asked if ramp rates for distributed solar pv [slide 6] are tuned to CA. Grist answered that these are higher than what CA has done for the last three years and pointed to the complications of distributed solar pv. Gordon agreed. Grist stated it would be a good place for potential action items.

Lazar pointed to the shading benefits from solar on air conditioning. Grist recalled that information from past CRAC meetings but stated that it didn't make it in. Esparza added that the penetration in the short term is driven by incentives. She called that short lived unless state law changes. Grist explained the load forecast. Eckman reminded her that this is looking at what will compete with high cost energy efficiency.

Gordon stated that there is now an UL listed CO2 Heat Pump Water Heater. Bicker stated that there is a hydronic heated test house in Tacoma, along with Bellingham and it's performing well.

Gordon asked if interior glazing for windows are in the supply curve. Jayaweera answered yes for commercial.

Lazar stated that he was delighted by the technology forecasting. He stated that BPA's list adds up to over 16,000 aMW of savings which makes him skeptical. He asked what the relationship is between this list and BPA's is. Jayaweera stated that many items in the BPA list are what the Council calls level 1. She stated that they captured the big drivers in either the standard supply curves or this shortened list. Grist stated they looked through that list and others he asked for any items they might have missed. Smit noted that the baseline is often different in the BPA list.

Emerging Technology: Key Trends and Opportunities

Presenter: Dave Hewitt

Gerlitz stated the NW Energy Coalition hired Hewitt to explore what would happen if emerging technology came in faster or cheaper than planned.

Gordon suggested that the riddle for the next five years is controls and the feedback from them. He called SEM akin to that and stated that we don't know what the curves look like.

Tracy asked if federal subsidies were driving the volume of Zero Net Energy buildings. Hewitt answered no but many have PV on them which is subsidized.

Price asked where we think that the building stock gets to in 2035. Grist called attention to the ultra-low energy office buildings stating they run 20,000 btus a sq. ft. Grist stated that these are all electric buildings which comes to 6-8 KWh per sq ft. He admitted that there are not many all electric buildings in the northwest; however the savings are 4 KWh per square foot.

Hewitt stated we know how to get there with new building stock if there is the will and the money; however there is no methodology for a retrofit method. Hewitt felt that community solar was a more likely scenario.

Price stated he never thought we would get all the buildings down to this standard but is dismayed with the progress over the last 30 years. Grist stated he was impressed with the findings of the CBSA that the total EUI of gas and electric combined are not much different. Gordon suggested looking at other surveys to see how EUI's have evolved.

Tracy asked about storage and batteries. Hewitt stated they don't have storage and are backed up by the grid. Tracy asked how you justify the utility investment. Hewitt stated people are working on it. Eckman agreed it's an issue.

Action Plan: Initial Scoping

Presenter: Charlie Grist

Margaret Ryan, PNGC, asked if the data collection could be included in the action items. Eckman said yes and pointed to similar action items in the Sixth Plan. Ryan stated she was looking for a way for the region to create a regional data repository. Eckman called it grand idea.

Mitchell liked the idea but was put off by the amount of data. She suggested paring the number strategically.

Gordon stated much of the emerging potential is about devices that talk to each other and multiple controls. He said instead of collecting data resources should be given to creating open source third party validators.

Grist asked Ryan what kind of data she wanted. Ryan answered not building data but data that starts at the utility/user on up, like the PTR, i.e. WH savings, reporting on progress.

Jayaweera suggested reading the Sixth Plan action plan and the MCS overview before the next scheduled CRAC meeting. She stated that Kujala's slides are available on the CRAC website under the day's agenda. Eckman reminded the group that there are opportunities to look at all of the Scenarios.

Eckman ended the meeting at 4:00

Attendees on Site

Charlie Grist	NPCC
Tom Eckman	NPCC
Kevin Smit	NPCC
Tina Jayaweera	NPCC
Adam Schick	Energy Trust of Oregon
Lakin Garth	Cadmus
Danielle Walker	BPA
Shani Talia	UCONS, LLC
David Hewitt	Consultant
Shauna McReynolds	PNUCC
Margaret Ryan	PNGC Power
Craig Smith	Seattle City Light
Hossain Haeri	Cadmus Group
Fred Gordon	Energy Trust of Oregon
Linda Esparza	Franklin PUD
Steve Bicker	Tacoma Power
George Pohndorf	Snohomish Co PUD
Brad Cebulko	WUTC
Jessica Mitchell	Snohomish Co. PUD
Brendan O'Donnell	Seattle City Light
John Morris	CLEARresult
Allison Mace	BPA
Dan Johnson	Avista
Eli Morris	PacifiCorp
Jess Kincaid	OR Dept of Energy
Bud Tracy	Idaho unaffiliated
Dick Adams	PNUCC
Wendy Gerlitz	NW Energy Coalition

Carrie Cobb

BPA

Stan Price

Northwest Energy Efficiency Council

Attendees via Go-To-Meeting

Ben Barrington

Cadeo Group

Chelsea Wright

EES Consulting

Doug Bruchs

Cadeo Group

Jeff Harris

NEEA

Jim Lazar

RAP

Ken Nichols

EQL Energy

Larry Blaufus

Clark Public Utility

Lauren Gage

BPA

Nicole DeSasso

Navigant

Rob Carmichael

Cadeo Group

Scot Davidson

Clean Energy Works

Gurvinder Singh

Puget Sound Energy

Travis Walker

Cadmus