

**Northwest Power and Conservation Council
Demand Response Advisory Committee
June 20, 2018**

Tina Jayaweera, NWPCC, began the meeting at 9:30 with introductions and a review of the agenda. There were no corrections to the March 15, 2018 minutes.

History of DR in the Region

Lee Hall, BPA

David Nightingale, WA UTC, asked what caused the loss of a cable on Orcas Island [Slide 4.] Frank Brown, BPA, answered that it was caused by a fishing boat anchor. Jayaweera asked if the 2009 Smart Grid demonstration was driven by a national wave of interest or a regional driver. Hall answered that in 2009 both the American Recovery and Reinvestment Act (ARRA) passed which provided funds for technology and the Gridwise project allowed for the concept of transactive control.

Rob Pratt, PNNL, added that recession relief provided funds to shovel-ready projects.

Ollis called the chart instructive and asked if the ebb and flow of projects matched the ebb and flow of economics. Lee said yes, saying this work is all about the price point, investment, and risk and not just the technology.

Ahlmahz Negash, Tacoma Power, asked about the benefits to customers [Slide 7.] Hall answered that customers could bid into the auction and make money and not be locked into a price. Negash asked if the benefits to the customer were of the same order as to BPA. Hall replied that \$1.8 million went to the utilities over two years.

Brown clarified that \$1.6 million went to utilities or direct serve and \$200,000 went to administrative costs. He noted the unusual market at the time and the diverse loads—water heaters, steel mills, residential space heaters—that were tapped. Negash asked which publics participated. Brown answered mostly smaller publics like Flathead Electric, Milton Freewater, Oregon Trail, McMinnville, Orcas Island, and Ohop.

Nightingale asked if lessons learned could be used to estimate a seasonal price if reintroduced. Hall replied that the cost model is used in the resource plan to determine the need for DR with some play in the summer time.

Pratt asked if this was driven by wholesale California summer prices. Hall answered yes, as it takes hydro flows, market prices, energy efficiency, and demand response into the cost curves. Pratt asked why it doesn't show up in the winter peak. Hall did not know but suggested that energy efficiency covers winter.

Jayaweera asked what DA is on [Slide 10]. Hall answered Distribution Automation. Nightingale asked about hybrid vehicles. Hall answered that they were not used in that role at the time, it

was more about setting up charging stations.

Ollis asked if the 100% performance on [Slide 13] was prescheduled or shorter termed notification. John Steigers, Energy Northwest, answered that it was effectively a 30-minute ahead, noting the extra efforts that made the project successful.

Bob King, Good Company Associates, asked why DR would produce bad results [Slide 14.] Hall answered that it has to do with flows and crossing the flow gate. King asked if this was caused by limitations of the flow gate. Brown answered yes, one particular flow gate on the I-5 corridor can get congested for a few hours every summer. Brown asked if it was worth \$1Billion to solve one particular problem that happens for one hour every few years.

Ollis called this map telling, not just for DR but general resource planning too. He lamented that generation often is sited agnostically and not necessarily where it can help the transmission system.

King asked if this shows a non-wires solution in the southern segment makes sense over a \$1Billion investment. Hall answered yes, that's what we're doing. Brown answered that DR south of the flow gate helps and explained the complications of making and curtailing deliveries. Hall pointed to 14 flow gates that further complicate the picture.

Negash asked about the timeline for the DR valuation model [Slide 20.] Hall said a basic model, without all of the inputs and outputs, should be ready by September 30. He continued, saying it's a cost/benefit analysis for a program that can use DR or energy storage. Negash asked about "cross-agency teams." Hall explained that the teams were within Bonneville. Negash noted that Tacoma is doing the same. Hall offered to compare models.

Pratt called the availability of transmission study that led to the need seminal. He asked what the acronyms PTDF and GCL mean [Slide: 16.] Hall answered that they are Power Transmission Distribution Factor and Grand Coulee. Brown explained PTDF further.

Nightingale called the process exciting and asked about how it might be administered. Hall stated that BPA is looking at different opportunities and options and remains open to other ideas. Nightingale stressed that administrative overhead becomes less expensive at the regional level.

Ollis moved to [Slide 7] calling it amazing how fast projects responded to an emergency. He asked what the context of that situation (price uncertainty) is for now. Hall was reluctant to make any prediction about future high prices but said this addressed a particular issue and now there is a need to address long term capacity issues. Pratt noted that this was coincident with the CA energy crisis.

BREAK

Value of DR to Defer T&D Investment

Tina Jayaweera, NPCC

Activity on COUN-12

Hossein Haeri, Cadmus, asked if studies by E3 that investigated the value of DR for avoided T&D costs were examined. Jayaweera answered no. Haeri said they are available from Nevada PUC.

Tomás Morrissey, PNUCC, noted that modeling DR gets tricky due to different regional conditions and restraints.

Council Staff's Proposed Methodology (from PacifiCorp)

Negash asked how the locational proxy is applied. Angela Long, PacifiCorp, explained that the average of all of the locations is used. She offered to get back to Negash with more specific questions. Ollis clarified how the Council would use this methodology for the entire region.

Haeri asked if Ollis is looking at historical or planned investment data. Ollis answered both as investments are lumpy.

Hall asked why they wouldn't apply the same locational proxy to transmission planning. Ollis called this a great question that staff asked as well. He answered that the model doesn't get into distribution so the locational proxy is needed. For transmission, he continued, there may be a cleverer way to go about it.

Long said PacifiCorp staff is also looking for the best approach and noted concern about valuing shared transmission lines likened to a super highway. She offered to share results.

Hall noted that BPA non-wires modeling looks at specific projects, asking if the business case supports DR, batteries or DER, which is location specific. Jayaweera countered that a non-wires application is different and this is more analogous to the slow-build of EE. Long said this value was used for planning and non-wires is more location specific.

Ollis stressed that as the Council is generic and agnostic, staff is forced into a planning method over an implementation method.

How to Use for DR?

Long confirmed that PacifiCorp only applied this on Transmission to be consistent with the Seventh Plan but would probably apply it to both.

Tony Usibelli, WA Dept of Commerce, asked if there was a feel for how the various magnitudes would impact model outputs. Jayaweera answered that Seventh Plan modeling removed T&D deferral from the EE levelized cost and it didn't make much of a difference in the portfolio analysis. She said it did impact selection of EE resources on the implementation side and showed preference for resources that saves KW on winter evening peak.

Usibelli asked if staff looked at what value was needed to create a significant portfolio change. Ollis said that they added the distribution credit and the model bought more DR over EE, but various Advisory Committees didn't not feel that the signal was appropriate. Ollis added that the Seventh Plan did not have a DRAC and doesn't know how this will affect the Eighth. Morrissey commented that values were not applied symmetrically in the Seventh Plan so when Deferral credits were set to 0 it picked DR because it was the next less expensive resource to build. He suggested that this may change if they are applied symmetrically.

Hall asked if there has been outreach outside the region. Jayaweera pointed to work with the National Grid in MA which generates a AESC report every three years. She noted that the approach was similar but didn't use a locational proxy. Hall asked what values they used. Jayaweera answered that the report had a utility survey and some were close to \$100/KW-yr.

Long stated that outside applying a locational proxy, applying the T&D credit to DR makes sense to her. She addressed Morrissey's comment saying from an IRP perspective a lower T&D value could result in lower EE, but it might not always be the case because of varied factors. Ollis clarified that Staff looks at all of the resources as well.

Pratt said that the BPA study suggests the answer to the first question, Can DR defer Transmission? is yes and the locational proxy is not 0. He then said he feels that if we were to do this "right" we would repeat the study for every flow gate. Hall said they do. Pratt asked why those numbers aren't used to peanut butter every flow gate in the region. Hall explained that the display is dynamic, this could risk reliability violations along with other issues. Pratt agreed that this is easier said than done but using a snap shot of the past and today could be a way to get at long-term answers. Hall said BPA transmission planners do take load growth planning into account but this is a complicated business. Ollis said this conversation is similar to talk in the SAAC.

Nightingale addressed distribution and location saying calculating for every circuit is unlikely but suggested getting a percentage of distribution circuits in need of an upgrade in the next 5-10 years from partner utilities to create a prototypical circuit. Jayaweera stated that Idaho Power did that three years out and we are planning out for 20 years. Nightingale said there is no reason not to do focused, distribution-level EE programs. Jayaweera agreed but called that too granular for regional planning. She said this question will be presented again at the next DRAC meeting.

LUNCH

DR as a Portfolio Resource for Adequacy

John Ollis, NWPCC

Council Analytical Process Flow

Morrissey asked if the model looks at event duration for capital expansion. Ollis said the RPM sees DR as something to meet capacity adequacy with low, sometime negative, energy content. He continued saying the RPM doesn't look at event duration but picks from price bins.

Negash asked if the model will put out the characteristics of the portfolio and what duration it has to meet. Ollis answered not exactly and explained how models pass information. Morrissey called GENESYS "weird" and asked about the RPM's logic. Ollis called it a high-level dispatch that focuses on capital expansion and does not look hour by hour.

Long asked how costs were developed and if saturation rates were included on [Slide 6.] Ollis said administrative, software and equipment were included in the cost development and he will show her an on-line link to supply curve saturation rates.

Pratt asked if there was any account for needing to buy more DR than will be available [Slide 8.] Ollis answered yes and this slide is a way to illustrate how much is available. Hall stated that this shows potential by cost bin that adds up to 2800MW. Ollis cautioned that the numbers are not additive across seasons. Ollis explained that you still have to acquire more capability, but [Slide 7] shows how much you pay and how much you get when called upon.

Long moved back to [Slide 8] saying the 1246MW is what you need but you must acquire more to meet the full potential. Ollis said this is not what you need but what you could get for a single peak hour in the winter if you bought the entire first bin. Jayaweera likened it to bin one has a winter nameplate capacity of ~1300-1400 MW, where the amount that gets acquired is the 1246 MW.

Long asked if the assumptions were listed anywhere. Ollis said they are all on-line. Long then asked about summer percentages. Ollis said they are also there.

Carl Linvill, RAP, asked about the growth from 21 to 30 and wondered if controlled appliances played a role. Ollis didn't know but suspected it had more to do with load growth and programs ramping up. Linvill moved back to [Slide 7] to look at water heaters. He wondered if a standard was implemented to migrate them on the second slide. Ollis didn't think so, saying the potential was broadly split.

Negash asked if a capacity factor was imbedded in the numbers. Ollis answered yes.

Morrissey asked if the single peak value for [Slide 8] is on peak or one hour. Ollis answered these are single-hour peak. Morrissey asked if a longer duration was looked at. Ollis said this could be a deep rabbit hole, noting issues with knitting models together, but predicted more fidelity for the Eighth Plan.

Hall asked if all costs were embedded in these price bins and what factors effected the costs. Ollis called that a loaded question, noted that the BPA study was good but didn't remember the costs. He suspected that it was more detailed and called incentive costs a hot-button topic that

ended with a hybrid approach of taking the minimum incentive value. Hall called that important as incentive costs are a large part of the program.

Long voiced concern over the costs, calling them low. She asked that they be re-examined. Jayaweera stated that these are Seventh Plan numbers and everything will be revisited for the Eighth. Hall suggested that 40% of winter DR coming in at \$25kW-yr is high. Jayaweera added that costs include deferred T value. Ollis further defended the findings that even without the deferred T value included, the RPM selected a similar amount of DR.

Hall asked if the T&D is a cost or a benefit. Jayaweera answered that it's a negative cost. Hall indicated the BPA levelized costs are not net. Nightingale suggested putting an asterisk on the slide to make the calculations clear. Ollis agreed.

Negash asked if Aurora had DR duration [Slide 15]. Ollis said it did but it wasn't perfect. He noted that it now better allows for duration.

Hall asked about market reliance [Slide 16.] Ollis said market reliance is tricky as the RAAC doesn't yet agree to increased market reliance. Hall said BPA's resource planners have the same issue.

Morrissey said people are taking guidance from the Seventh Plan now which gives him pause [Slide 17.] Ollis said the Council still stands by the Seventh Plan. Hall asked about the Mid-Term Review. Jayaweera moved to the next agenda item.

Seventh Plan Implementation

Tina Jayaweera, NWPCC

Mid-term Assessment

Morrissey stated that the inputs for DR in the Seventh Plan were not created in a process in line with the other resources as there wasn't yet a DRAC. He asked if anything would be done for the Seventh Plan assessment. Jayaweera said that it's not an update but comments about updates will be added. Ollis said the previous presentation tried to address this issue and prepare for Eighth Plan DRAC work. Morrissey said its important to be cognizant that the Seventh Plan is still a working document.

Charter Renewal: 2018-2020

Hall said five things should be considered for the mid-term assessment:

1. Accelerated development of California's solar market
2. Assumptions for DR total resource cost should be updated, possibly from the Cadmus study
3. T&D deferral is important as it changes the modeling dynamic
4. Transmission plays a role, even though it's not part of the Council.
5. BPA has a new strategic plan with a pillar of financial health and the Council should consider this

Ollis called these the foci for the Eighth Plan.

Pratt voiced concern over a resource that will be chosen once every 10 years. He noted that it will be in reserves most of the time but how can we rely on it if it's not being exercised. He then asked about a bad year where DR is used, wondering how much will be used and in what pattern. Ollis admitted that the Seventh Plan didn't have adequate fidelity but the Eighth Plan should provide a better view. Nightingale asked if DR should be quantified as a value to the benefit stack when it mitigates emergency needs. Ollis called that a valuable perspective but emergency measures are outside the regime under the current adequacy structure.

Pratt suggested that if we bought a resource we should use it. He added that this is a way to gain value while testing a resource. Ollis said the RPM dispatches DR at \$110/MWh which is high. Hall stated that BPA is thinking about the impact of EIM and moving DR across BAs. Hall then pointed to Bonneville's new strategic plan which lists EE and DR as ways to stay competitive and valuable to customers.

BREAK

Looking Forward to the Eighth Plan

Nightingale asked where the heavy need is for the DRAC [Slide 2.] Ollis said Q2 2019 will have heavy engagement. Jayaweera added that the DRAC will continue to have quarterly meetings but can add more if needed.

Hall stated the issues on [Slide 3] have all been addressed at Bonneville and suggested using that work to launch this effort.

Adam Schultz, ODOE, asked about the binning strategy, suggesting using three different DR products. Ollis said this was attempted last time and the price differences were huge. Schultz said this could be four bins with three layers. Ollis agreed that more bins are desirable but slow model run time.

Nightingale confirmed that the models don't have the granularity to explore EIM/DER overlap. Ollis answered that that applies to the RPM and the new GENESYS will look to outside markets and regional BAs with more granularity. Jayaweera cautioned that GENESYS is hourly and the RPM is quarterly. Nightingale felt there was enough NW EIM data to get an average value. Ollis noted difficulty finding public, planning-level data.

Long said PacifiCorp is looking at EIM and finding specific requirements makes it hard to quantify impacts regionally. Ollis agreed. Nightingale suggested staying at the BA level to get average values. Ollis said signing an NDA hurts the Council's transparency.

Jeff Harris, NEEA, pointed to timing and asked if there is any thought to longer events and thermal storage-related options. Ollis said these are being considered in GENESYS. Harris

likened this to the chicken/egg conundrum as manufacturers don't want to transform unless there's a price signal but there's no price signal without transformed product. He asked the group to consider what this would be worth to the system.

Hall said six- or twenty-four-hour products can be managed with strategies but must be de-rated for modeling. Hall then asked about EE/DR order of operations as he imagines EE/DR complimentary programs like a thermostat. Jayaweera agreed but pointed to competing products like CVR and DVR.

Long asked if there is any consideration of quantifying additional DR benefits like frequency response and energy storage. Jayaweera answered that Cadmus is developing a list of potential DR products and Ice Bear (energy storage) is a product on the list. Ollis called storage a hot topic. He added that he is working on a signal for flexibility but may not get to frequency response.

Hall noted that PGE is using their battery for some frequency response. He suggested looking at where we want storage to be versus what we think it will get to, then asking if it's worth modeling. Ollis called this one of his favorite topics and he looks forward to modeling these hot button scenarios. Pratt stated that a PGE study revealed an 800MW need for flexibility to operate their grid.

Nightingale pointed to 15,000 EVs in King County with 60kWh batteries, noting that this resource could overshadow everything else. Ollis said they are aware and looking into it.

Harris addressed the cost input side of modeling, noting the tiered approach. He said renting EV batteries is affordable and should be investigated. Ollis admitted he is limited in the way he can look at EVs but the Demand Forecast group is investigating. Long asked if there is any consideration of EVs with time of use rates. Ollis said this is better discussed with Massoud Jourabchi, NWPCC. Long offered data from a pilot program running in Utah. Ollis said that would be great.

Pratt said he's been run out of rooms for discussing grid interaction with EV manufacturers. Harris felt busses might be different. Pratt suggested reaching through the consumer.

Jayaweera said to expect a Doodle Poll about the next meeting at the end of July and called for agenda topics. She closed the meeting at 4:00.

Attendees

Tina Jayaweera	NWPCC
John Ollis	NWPCC
Jeff Harris	NEEA
Ahlmahz Negash	Tacoma Power

Clint Gerkenmeyer	Energy Northwest
Nadine Hanhan	OPUC
Bud Tracy	Consultant to Idaho
Hossein Haeri	Cadmus
Lee Hall	BPA
Brenda Chew	SEPA
Rob Pratt	PNNL
Zeecha VanHoose	Clark PUD
Jennifer Light	NWPCC
David Nightingale	WA UTC
Adam Schultz	ODOE
Angela Long	PAC
Tomás Morrissey	PNUCC
Tom Brin	BPA

Attendees via Webinar

Carl Linvill	RAP
Dan Patry	Oracle
Danielle Walker	BPA
Kiley Faherty	PSE
Frank Brown	BPA
Gwen Resendes	BPA
Mike Hill	Tacoma Power
James Gall	Avista
James VandenBos	BPA
Jennifer Finnigan	Seattle City Light
Joan Wang	Cadmus
Kathy Wagner	PGE
Ken Dragoon	Ecofys
Malcolm Ainspan	NRG
Marisa Lee	ASWB Engineering
Chuck Matthews	BPA
Melanie Smith	BPA
Nathan Kelly	BPA
Quentin Nesbitt	Idaho Power
Will Price	EWEB
Riley G. Peck	ICNU
Gurvinder Singh	PSE
Tony Usibelli	WA Dept of Commerce