

**Northwest Power and Conservation Council
Systems Analysis Advisory Committee
December 9, 2020**

John Ollis, NWPCC, began the meeting at 9:30. Chad Madron, NWPCC, reviewed best practices around the Go-to-Webinar interface. Ollis asked for comments on the November 30 minutes. There were none. Ollis said they will be available for feedback on the minutes after the meeting.

He also said there may be time to further discuss potential outputs from the redeveloped GENESYS at the end of the day.

Overview of Updates to Regional Portfolio Model

Ben Kujala, NWPCC

Kujala walked through the methods updated to resolve issues in the model regarding the intra-quarterly electric price logic and the quarterly electricity price distributions.

Ollis wondered if the price distributions on [Slide 7] are reflective of all hourly prices in their respective quarters not separated by on and off peak. Kujala answered yes.

Fred Heutte, NW Energy Coalition, said the persistence of below zero pricing is driven by federal tax credits [Slide 12.] He said those credits will expire and wondered what was driving negative pricing in the out years. Kujala said this will be explored later in the presentation but teased that REC prices and meeting RPS are big drivers. He also noted that past statements from BPA about selling power at a negative price represent the past and this is a forward look into a different world.

Ollis pointed to difficulties in getting the model to build renewables and not curtail them and how a reasonable REC price forecast solved the issue. He said the issue is similar in the RMP and RPS requirements.

Heutte said he looked ahead to the effect of negative prices on EE and wondered if the relationship between short-run marginal prices and long-run value and

incremental cost is breaking down and how that will affect the price curve of the future resource mix.

Sashwat Roy, Renewable Northwest, asked if the second bullet under “Some challenges remain that also existed in the lognormal convolution approach” is a modeling constraint issue or if it selects thermal resources without respecting constraints like minimum up and down time. He wondered if that means the model will select resources that might not be available.

Kujala said this has always been part of RPM which approximates the dispatch of a thermal resource. He said this was an okay way to look at capital expansion but noted that strategies must be re-examined with constraints.

First Look at Baseline Conditions RPM Results

Ben Kujala, NWPPCC

Kujala presented a preliminary, early look at baseline conditions results in the RPM. Kujala noted the impact of the electricity price forecast on the resource build, highlighting the significant build of renewables and gas and small build of EE. Kujala walked through the renewable curtailment, RPS requirements, imports/exports, GHG emissions, and penalties and end effects reflected in the model logic.

Heutte called the outcome for EE quite shocking [Slide 15] and wondered what drove those results. He then said he doesn't view curtailments as a bad thing, but sees it as a signal for other needs like additional transmission, more flexible resources like DR and long-term storage. Heutte said the import/export issue leads to transmission capacity and wonder if market design could lead to improvements.

Heutte then addressed the unintended consequences of RPS and REC policy, saying advocacy groups like his need to think this through. He noted being surprised to see it show up in the modeling and wondered about the real-world systems consequence. Kujala stated that this is a pricing model with curtailment driven by market price.

Kujala opened the model.

Heutte confirmed that the model assumes that RECs are unbundled and wondered about the different rules for unbundled RECs in Oregon and Washington. He asked if the model assumes all RECs are unbundled or if there are some constraints. Kujala explained that the model assumes that RECs are fairly transportable within the region. Ollis called this an enhancement to the model.

Tomás Morrissey, PNUCC, asked if there is a carbon damages value and if so, what it is. Kujala answered yes but said it is not affecting the dispatch of the resources. Morrissey asked if it affects resource selection. Kujala said as they test different portfolios, they find that more emissions create more affects to the portfolio cost but not the dispatch.

Ollis said it is probably part of the value stream of every resource but there is no way to pull out an individual resource. Morrissey asked for a ball park number. Ollis thought it would be close to the mid-level social cost of carbon, around 60. Kujala cautioned that it is not clear as a new, efficient gas plant can be used to reduce emissions and cost.

Villamor Gamponia, SCL, asked if the RPM distinguishes between residential, commercial and industrial EE programs and if it can show the marginal value of EE with respect to RA and RPS. Ollis answered no, explaining that EE is bundled by price and the EE team usually does some work after the fact to get a better value.

Kujala then said they can show the marginal value of EE with respect to RA and RPS. He said the standard logic of doing EE to defer the need to build renewables might not be the story the model is telling. Ollis said this is being further explored.

Heutte thanked staff for the walk through of the early stages of a work in progress. Still, he called this initial picture, with lots of gas, a lot of renewable curtailment and not much EE or DR, hard to swallow. He asked if there were issues with unconsidered model inputs or model artifacts that might be driving these results.

Kujala said the model is showing the addition of policies, any one of which could change in the future. He added that this is showing present day rules pushed forward into a very different energy world. Kujala said it's hard to imagine that

these rules will persist but it is also hard to come up with an alternative assumption. He agreed that it's difficult to believe that electricity markets will behave the same with so much negative pricing but didn't know what alternative assumption to make.

Ollis agreed with Kujala's assumptions, adding that the same is true for AURORA.

Ben Fitch-Fleischmann, Northwestern, said given the model assumptions this outcome makes sense and asked Heutte if his concerns were with the results and the policies or the assumptions that the policies will stay in place. Heutte said RECs are a flexibility mechanism used to achieve RPS goals, yet it now looks like the tail is wagging the dog.

Heutte continued, saying a criticism of the Seventh Plan's high-renewable sensitivity scenario was the large amount of gas build. He said his organization recognized overbuilding the system in both ways and thought it was the classic GENESYS's inability to reflect flexibility. Heutte said seeing a decrease in customer-side resource this time is unsettling.

Roy asked if there was a specific reason why more storage resources weren't selected to address renewable curtailment. Ollis pointed to a limitation of understanding around the fundamentals behind curtailment. Ollis thought a model that understood hour-to-hour system behavior would do better with energy-limited resources. He thought the RPM does a fair job of this but is still limited.

Kujala pointed to the amount of storage and DR that the model does pick up, noting that there are a lot of other factors as well.

Heutte asked how much DR is available 10 years out. Kujala said period 18-22, representing approximately the end of the action plan period, has between 500 and 750MW. Ollis pointed to added DR/EE elasticity which reduces DR. Heutte called that a fair point but didn't expect the same result after a complete rehaul of the DR numbers. He also noted that there is a lot more DR out there and battery storage is unlimited, yet the model isn't picking either even though they cost about the same or less than a gas plant.

Ollis said staff has similar concerns and pointed to RPM limitations with understanding the new, intra-day fundamentals. Heutte suggested looking at a test year or two with a chronological GENESYS check/recheck to tease out different results. Ollis said he intended to do something similar, cautioning that there is a lot to examine.

Morrissey voiced an interest in seeing a sensitivity that delays gas builds. Kujala admitted that the inputs are older but said they are looking for a general signal and taking out the gas would lead to different results. Morrissey thought it would be interesting to compare costs between a system with lots of gas versus less. Kujala said a lot more sensitivities and scenarios are coming but staff is trying to find the most reasonable baseline.

Ollis asked for SAAC input around gas limitations for staff to present to the Council in their upcoming meeting.

Heutte asked that staff ensure that CETA requirements are fully reflected as well as Oregon utilities lack desire to build new gas. Kujala recalled that the clean energy requirement shows that there is enough to satisfy CETA and utility requirements.

Kujala then noted that gas plants are being built but don't necessarily run that often. Heutte asked for a rough estimate of the approximate annual capacity factor of the peakers and combined cycles. Kujala said in general 25% on peak and 5% off peak, leading to under 10% when weighted.

Ollis added that on peak is only four evening hours in the RPM. Heutte confirmed that this is a price peak and not a traditional high/low load hour look. Kujala agreed, adding that past realities don't make sense in the future.

Heutte voiced surprise that the RPM is not showing a very different result than AURORA. Kujala answered that the models are based on past parameters like the marginal price of gas. He said that theory and economics fall apart in the future world, even though we are still using those models. Kujala agreed that it's a challenge.

Shauna McReynolds, PNUCC, wondered if there was a way to isolate the desirable characteristics of a gas plant and set up the modeling system to look for non-gas resources that mimic those desired characteristics. Kujala said that makes sense, adding that newer gas plants have the much lower emissions the models look for, and a research mandate like that could reveal a lot. McReynolds called those potential learnings valuable. Ollis said he will pass that suggestion along to the Council.

First Look at the Redeveloped GENESYS Results

John Ollis, NWPCC

Ollis walked through preliminary results out of the redeveloped GENESYS model, reflecting climate change hydro and load and the market, which relies on the previous AURORA work.

Heutte noted that BPA now carries less wind and necessary reserves and wondered if the modeling is showing anything outside of the normal approach. Ollis said public reserve amounts are counted and the event on the [Slide Deficit Analysis for PC12032020] would probably not happen as utilities in the EIM are holding a more nuanced number of reserves. Ollis added that this is showing there can be tightness in a system where you see significant forecast error in renewables or load. He also asked for any updated reserve information.

Heutte said okay, but argued that there is plenty of uncommitted, un-dispatched thermal around and renewable swings like this mean you have to hold reserves. Ollis agreed, saying it comes down to how you value inputs. Ollis added that staff has a static view of reserves as opposed to a more dynamic look.

Heutte said this reminds him of what's happening in CA adding that some mid-day solar curtailment may be caused by more expensive gas running for the late afternoon ramp. Ollis thought that might be true.

Morrissey asked if the redeveloped GENESYS ARM studies assumes all of the resources AURORA calls for also get built throughout the WECC or if the market is constrained. Ollis said the baseline shows all of the extra-regional builds but not the intra-regional builds.

Ollis agreed that there is still a huge build in 2022-23 and there is still a high curtailment record. He said this points to a lot of little problems. Morrissey reiterated his discomfort with the size and speed of that build. Ollis agreed, saying there will be scenarios to explore that discomfort around this baseline.

Ollis added that he has taken stakeholder concerns to the Council and they remain comfortable with the baseline. Ollis said he could relay further concerns. Morrissey said he will think about his response and talk again offline.

Kujala clarified that the Council wanted to see the implications for the region but were not necessarily comfortable with the baseline. Ollis agreed.

Ollis discussed upcoming meetings and adjourned at 12:30pm.

Attendees via Go-To-Webinar

John Ollis	NWPCC
Ben Kujala	NWPCC
Chad Madron	NWPCC
Tanya Barham	Community Energy Labs
Leann Bleakney	NWPCC
Frank Brown	BPA
Aaron Bush	PPC
Gillian Charles	NWPCC
Zhi Chen	PSU
Robert Diffely	BPA
Ben Fitch-Fleischmann	Northwestern
Villamor Gamponia	SCL
Andrea Goodwin	NWPCC
Eric Graessley	BPA
Jared Hansen	Idaho Power
Bill Henry	
Fred Heutte	NW Energy Coalition
Mike Hoffman	PNNL
Charlie Inman	PSE
Massoud Jourabchi	NWPCC
Torsten Kieper	BPA

Shirley Lindstrom	NWPCC
James Litchfield	independent
Ian McGetrick	Idaho Power
Shauna McReynolds	PNUCC
Tomás Morrissey	PNUCC
Elizabeth Osborne	NWPCC
Sashwat Roy	Renewable NW
Bill Saporito	Umatilla Electric
Adam Schultz	ODOE
Tim Sheldon	WA State Senate
Peter Stiffler	BPA
Tyler Tobin	PSE
Marissa Warren	Idaho OER
Cindy Wright	SCL
Brian Dekiep	NWPCC
Will Price	EWEB
Dhruv Bhatnagar	PNNL
John Lyons	Avista Corp