Northwest Power and Conservation Council
Systems Analysis Advisory Committee
September 2, 2020

John Ollis, NWPCC, began the meeting at 9:30 am. Chad Madron, NWPCC, explained how to best use the Go-To-Webinar platform. Ollis thanked everyone for attending the meeting, reviewed the agenda and asked if there were any questions, comments or corrections on the minutes from the August 5th meeting.

There were no comments.

Associated System Capacity Contribution Results
John Fazio, NWPCC
Fazio presented a quick refresher on the ASCC, including how it is calculated, problems with calculating single-resource ASCC, and solution of calculating an ASCC array for multiple combinations of potential resource additions. For 2021 Power Plan, ASCC array will be used and RPM modified accordingly. Fazio walked through how the ASCC array was created, including an explanation of the different generic resource types used, and noted the use of climate change forecast modified flows and climate change forecasted temperatures and the effects of that climate change data on the ASCC. Lastly, Ollis explained how the ASCC Array will be used in the RPM.

Ben Fitch-Fleischmann, Northwestern, asked if the curtailment on [Slide 7] refers to shedding load or curtailing wind or other VERs. Fazio answered that this doesn't represent an actual curtailment but a situation where a utility might have to take an extraordinary or expensive action because it cannot meet load.

Kathi Scanlan, WA UTC, asked why Montana Wind and Southeast Washington Wind were combined into one category (Wind 1) on [Slide 8.] Ollis explained that Montana and SE Washington Wind shared similar enough characteristics and attributes to justify combining them. He also noted that this was covered in past SAAC meetings and offered to send her the presentations. Scanlan thanked him.

Tomás Morrissey, PNUCC, asked if the Max resource Levels used to create the ASCC table represent the Max available for buildout in 20 years. Fazio answered no, but when the acquired resources exceed the max, the ASCC value will be held constant beyond that point. Fazio clarified that those maximums do not set the levels of how much the RPM can add but are simply used as a way to create the ASCC array. Ollis agreed, noting that this was discussed in detail at the April and May SAAC meetings and posted a link to the presentations.

Rob Diffely, BPA, asked how many hours were assumed for pumped storage. Ollis answered eight hours.

Fred Heutte, NW Energy Coalition, asked if the table on [Slide 9] is available to the public. Fazio answered yes.

Fitch-Fleishmann asked about all of the zeros in Q2. Fazio said that because of the method used to calculate ASCCs, when there are no curtailments, the ASCC cannot be calculated. Generally, in the Spring the model sees no curtailments, so perhaps we should replace the zeros with NA for clarity. Fitch-Fleishmann then asked why some resources have non-zero values in Q2. Fazio explained that in order assess the ASCC table for very large resource additions, he had to remove the market supplies in some cases to artificially raise the LOLP. Fazio offered to look at individual rows with Fitch-Fleischmann offline. [Subsequent to the meeting, Fazio reexamined the zero values in the ASCC array and discovered an error. Under some conditions, the curtailment duration curve for the reference case crossed the probability axis (x-axis) at the same point as the study cases. Due to the methodology used, under these conditions, the calculated ASCC value is zero. To correct this, the methodology was altered to use the last non-zero point from the study case curtailment duration curve to assess the ASCC value. This alleviated the problem and all the zero ASCC values became positive non-zero values. The only times that an ASCC value should be zero is if the reference case has no curtailments or if the study case curtailments are worse, which means that adding a resource makes the system less adequate.]

Heutte asked why outliers drive the climate change lower on [Slide 11.] Fazio answered that the climate change data creates some situations where there is no curtailment in Q1 or Q2 because of higher temperatures, lower loads and abundant water. Fazio agreed that he should take the zeros out as they are not zero ASCC values. [See note above.]

Scanlan clarified that Montana wind is modeled as Wind 1 [Slide 17.] Ollis said yes, adding that he can adjust a resource's capacity contribution if it's determined that the ASCC is off.

Tanya Barham, Community Energy Labs, called this a sensible approach but was interested in what other stakeholders thought. She then asked if dynamic peak is addressed here. Ollis said he will go over dynamic peak later in the presentation.

Fitch-Fleischmann acknowledged the complexity of the problem. He then asked how it will be handled with three or more resource types when some combinations are synergistic while others are antagonistic. Ollis offered to show him the math before explaining that the ASCC array tries to illustrate that synergistic/antagonistic effect.

Ollis opened the spreadsheet to explain the bounds of the multilinear interpolation. Fitch-Fleischmann asked to see the array with lots of energy and different types of storage like battery and pump storage. Ollis showed the array. Fitch-Fleischmann asked if the ASCC applies to the entire portfolio. Ollis answered yes, adding that it is not linear and the load is the same for all.

Villamor Gamponia, Seattle City Light, asked if the composite ASCC is also calculated for 2035 and 2040. He also asked if a higher load would lead to a different composite ASCC. Fazio answered yes, explaining that the ASCC is a function of the generation pattern and load shape. However, Fazio didn't think they would be significantly different. Ollis agreed, saying the ASCC Array is a project management solution that works because the region's load shape hasn't changed much. He acknowledged that if the load shape changes a lot it might be worth reexamining the solution.

Gamponia countered that electrification might change the load shape. Ollis agreed, in principle, but argued that there might also be a cadre of new resources on the supply side. Ollis said staff might have to further modify tools and approaches for the next Plan.

Fitch-Fleischmann thought this approach is worth the pain. He then went back to his earlier question, noting that adding 2000MW of battery actually lowers the total ASCC. Ollis agreed that could happen and said he will look into it.

Heutte asked what happens if the interpolation is not linear. Ollis said it won't matter much. Heutte agreed, saying it's not a full optimization but a good start.

Discussion of the Buildout for the 2021 Power Plan Draft Wholesale Electricity Price Forecast
John Ollis, NWPCC
Ollis provided a refresher of the recent AURORA buildouts, which were unexpected considering the current regulatory environment and signaled that some changes in the parameters/methodology were necessary. Ollis provided a useful reminder that the WECC-wide buildout would be used as just a step for getting a good price forecast for the RPM, and highlighted a point for all to consider while looking at the buildout: need to make sure what we are testing in the RPM fits within the broader WECC in a reasonable way in terms of market dynamics. Ollis then walked through the recent methodology changes in AURORA and the resulting buildout.

Morrissey asked if the AURORA buildout informs any of the adequacy models [Slide 3.] Ollis answered yes, saying it will be discussed further in the presentation.

Heutte asked for a definition of the dynamic peak credit [Slide 13.] Ollis explained that it's kind of like an ASCC Array for AURORA, calling it the peak contribution over a top number of hours.

Morrissey asked if Ollis considered running [Slide 17] without the more aggressive California load forecast. He then asked how these numbers compare with any utility's ARORA buildouts. Morrissey commented that he's uncomfortable with the prediction of adding 30,000MW of gas.

Ollis said he is also uncomfortable with this, adding that he has reached out to almost every other AURORA user he knows and no one could offer any insight about the buildout.

Morrissey asked if the climate change data is just for the Northwest of if it's WECC-wide. Ollis said it's just for the Northwest. Ollis said he understood Morrissey's discomfort with the California load forecast but stated that the CEC forecast is usually what the region uses and is part of the AURORA update.

Morrissey asked if you get the same results by running AURORA 2020. Ollis said yes, AURORA views the WECC as deficit. Morrissey asked if the Council agrees with this. Ollis said he doesn't speak for Council members, but he finds that different regions in the WECC are deficit and lean on each other. Ollis said that seasonally, California looks tighter than before, adding that he is using the middle CEC predictions, not the high predictions.

Heutte said there will be a lot of buildout no matter what and the model will pick what it knows. He said there's a lot to chew on but the big issue is that the model wants to build so much so fast. Heutte said the Southwest seems to be handling the situation well, just as in the Northwest.

Ollis noted that the CPUC buildout for California looks very similar to this and that leads to other questions like: Will CA policy cause everyone to build out? How much will be exported? What does it mean for planning reserve margins?

Nora Xu, PGE, called the plot on [Slide 14] helpful and said she expects storage buildout to continue through time. She agreed that this is challenging, saying not continuing the storage buildout through time doesn't make intuitive sense. She also said the cost of resources might be dictating the wind/solar split adding that the data changes really quickly.

Ollis said he also expected more storage, adding that solar + storage does not reflect the nameplate value perfectly, moving to [Slide 12] to illustrate. He said that there are actually 60 GW of battery being added.

Xu asked if storage in Solar + Storage charges from its associated solar only or from everything. Ollis recalled that the model assumes it's charging off of another solar signal.

Morrissey thought there was a possibility to see this amount of buildout by 2025, but not a high possibility. Ollis agreed, lamenting that there was nothing much more he could do while still meeting the planning reserve margins. Morrissey suggested tweaking the planning reserve margin. Ollis said he has, using [Slide 14] of an example of what that looks like. Morrissey called that helpful.

Heutte called the current CA situation an experimental view of what the future may look like, saying the issue is after sunset [Slide 19.] He noted that the state is building a lot of batteries and SW exports fell as Phoenix had record high temperatures. Heutte also spoke of spiking gas prices.

Heutte said it looked like CA figured out how to curb demand by nearly 8%. He called Demand Response a stranded asset and asked if the region is taking DR seriously enough. Ollis said staff and the SAAC needs to look at the characteristic of all the resources in great detail.

Shauna McReynolds, PNUCC, confirmed that the ultimate goal is 1. getting to a regional price and availability. She appreciated examining all of the different paths and asked how much of this information will be part of the Plan.

Ollis appreciated the high-level questions, saying the region probably can't continue planning separately from the WECC in a way that's cost effective. Ollis agreed that prices and avoided emission rates come from this work. He also said the Plan and redeveloped GENESYS can address this directly.

Gamponia addressed Heutte's earlier comment, saying DR's capacity contribution in AURORA may need to be accounted for if it's not already. He said it may also have to be increased if it is there already. He then said DR programs might not be enough and the battery capacity contribution may also need to be adjusted. Ollis said he cannot model additional EE or DR outside the region that is not already part of the load forecast. He then added that it would be a substantial lift to do that in the region although there may be a hybrid approach, i.e. seeing a strong battery signal, that could capture the same effect.

Ollis asked the room what they thought of [Slide Output more than Requirements on Policies/Goals]

Barham said she doesn't know about AURORA but is definitely seeing something similar in large markets with high levels of renewables.

Ahlmaz Negash, Tacoma Power, reports seeing this in her runs as well.

Eric Graessley, BPA, stated that he has seen something similar but these are substantially higher levels of curtailment.

Elizabeth Hossner, PSE, had the following back and forth conversation with staff in the Questions Bar.

Elizabeth Hossner, PSE, asked if anyone looked at the capacity factors of the Natural Gas Plants. She found that plants provide the lowest cost capacity but over time the capacity factors are very low. Hossner added that they are there for capacity as needed but provide very little energy.

Ollis answered that Council staff is also seeing very low capacity factors on new and existing thermal plants and are coming to the same conclusion that they are being built for capacity.

Hossner asked if the new model runs were able to meet the RPS/clean energy requirements, noting that previous runs had fewer renewable resources. Someone wrote that it was able to meet all policy requirements.

LUNCH

Wholesale Power Price Forecast
John Ollis, NWPCC
Ollis noted at the outset again the relevance of the price forecast and avoided market emissions rate for RPM. Ollis then walked through the pricing associated with the buildout discussed above, which included climate change data. Ollis then transitioned into a discussion on the avoided emissions rate, giving a brief recap of the methodology and how we are thinking about the emissions rate for the 2021 Power Plan; provided recent study results; a staff recommendation to change the rate methodology for the plan; and a reminder of how used in the RPM.

Morrissey asked if the rest of the WECC is also under climate change conditions [Slide 27.] Ollis said yes for California and parts of Canada, adding that he couldn't find out about other regions.

Graessley asked what the 2030 capacity expansion shadow price was for the RPS/Zero carbon constraints [Slide Daily Mid-C Price Shape – Winter Quarter 2026 and 2041.] Graessley guessed the shadow prices would be low if PRMs caused a large wind build and wondered if this would be a reason to re-examine the $23 assumption.

Ollis said the shadow prices are about $52/MWh in 2030 for clean requirements and $47/MWh for the RPS. Ollis said prices go up a bit from there but shoot really high by 2045 because of the scheduled retirements of the Palo Verde nuclear plants.

Gamponia asked if renewable curtailments and hydro spills might be expected for [Slide Daily Mid-C Price Shape – Spring Quarter 2026 and 2041.] Ollis answered yes, adding that it already happened in AURORA.

Xu voiced surprise that the RPS constraints, which are lower than the clean constraints, would also be binding [Slide Daily Mid-C Price Shape – Summer Quarter 2026 and 2041.] She thought this might affect the negative bid adder assumptions. Xu suggested considering whether functioning markets will exist as we know them with consistent negative annual prices.

Ollis agreed with Xu's comment saying something about markets will have to change

Xu said she's also wrestling with this question and practical modeling offers two directions depending on why the prices are needed. She said clean energy targets usually outstrip RPS requirements so if the clean targets are met the RPS goals are no longer binding. Because of this, Xu expected the shadow price to be $0.

Ollis said California’s increased load requirements may be driving higher RPS requirements. He added that the clean target shadow price is almost always higher than the RPS. Xu then asked if the same negative bid adders are used in all the regions. Ollis answered that in the past he’s used an expected average view. He then asked the SAAC to share any available public data to provide information for an underlying analysis.

Xu wondered if WA wind generation would be willing to pay the REC value if CA’s RPS is binding but WA’s is not. Ollis argued that doing this WECC-wide might mean that CA builds Northwest wind for their own needs. He did agree that exploring the bit adder might be a good idea.

Heutte said this illustrates a different market paradigm and wondered if market structures will change. Heutte noted that the price peak happens in hour 22 for summer, which is after sunset. He said this puts a price on incremental need as opposed to pricing the full stack at all times. Heutte concluded by saying this result spotlights where the region needs flexibility and availability.

Fitch-Fleischmann confirmed that “shadow price” means the implicit value of relaxing the constraint. Ollis said yes, adding that in AURORA the shadow price is related to clean and RPS constraints. Ollis cautioned that there are endogenous considerations that make it a less pure shadow price.

Heutte said that [Slide 34] was not out of reach, acknowledging that there is more steel in the ground but adding that there are no fuel costs. Huette agreed that these are big numbers but not that scary and pointed to the value achieved by modernizing the system. Ollis agreed that these costs are higher but other objectives are achieved.

Fitch-Fleischmann recalled presenting a similar price forecast to his commission and hearing from some that it is a total outlier. He expressed gratitude that Council Staff is finding the same issue and asked if this result is preliminary and when can he show this to his commission.

Ollis said it’s up to the Council to finalize this but his data is public and always sharable. Ollis said that he is open to SAAC and other stakeholder input but there’s not much more he can do in AURORA.

Heutte examined old California ISO data and found that peak in S. CA is at 8pm, more than an hour after sunset. He said this shows that the market is already diverging from older expectations. Ollis agreed that prices are going this way and time of day and adequacy matters. Ollis was also comforted that his CA build looked similar to the California agency’s CA build.

Fitch-Fleischmann approved of the recommendation on [Slide 41] to change the WECC avoided carbon emissions rate methodology for the 2021 Plan. Morrissey also approved asking if the system will be built as a base case and then run with a 5000MW drop. Ollis said yes. Morrissey approved of the approach.

Morrissey confirmed that the RPM has an understanding of on/off peak and no longer just works with 16-hour blocks [Slide 42.] Ollis said yes, on peak is hours 19-22 or 6-10pm and off peak is the rest.

Morrissey asked if there will be a winter morning peak. Ollis admitted that he hasn't looked there yet and was hoping not to for this Plan. Ollis said the additional winter hydro in the climate change forecasts make this point somewhat moot.

Market in the Redeveloped GENESYS
John Ollis, NWPCC
One downstream impact of the price forecast (above) is that it helps guide the market buildout in redeveloped GENESYS. Ollis walked through the market considerations (Market bins) in the redeveloped GENESYS model, including why it matters for adequacy.

RPM Futures Methodology
John Ollis, NWPCC
Ollis focused on electricity price futures, reviewed how and what risk is assessed in the RPM and methodology changes since the 7th Plan as well as additional issues and potential additional changes that may be needed (i.e. negative pricing; reexamination of the methodology).

Morrissey asked for an example of how negative pricing can throw a wrench into the RPM [Slide 17.] Ollis moved back to [Slide 14] to explain that the interdependent factors are meant to function with positive prices and talked through the math. He said using log space is an issue but big changes might delay the Plan.

Morrissey called that helpful, and asked what percentage of the AUROA buildout would be negative in the RPM. Ollis said it's happening a lot [Slide 10.] Morrissey suggested transforming everything upwards as a possible fix. Ollis agreed, but pointed to possible issues with the equilibrium pricing logic. He thought it would be an intense lift but put it on the list of possible solutions.

Approximating a REC bank—2021 Power Plan
Ollis explained the need to know the initial REC bank balance, what's changed since the 7th plan and the 2012 Power Plan REC bank estimate.

Ollis asked for additional sources to find approximate/forecasts of REC banks, with a focus on WA utilities to be sent to him or Gillian Charles, NWPCC. He also asked if the SAAC was okay with the 5000 aMW estimate.

Ollis reviewed upcoming meeting topics and adjourned at 3:30pm.

Attendees via Go-to-Webinar

John Ollis	NWPCC
John Fazio	NWPCC
Chad Madron	NWPCC
Tanya Barham	Community Energy Labs
Leann Bleakney	NWPCC
Frank Brown	BPA
Aaron Bush	PPC
Rob Diffely	BPA
Ben Fitch-Fleischmann	Northwestern
Karen Flynn	Idaho Power
Villamor Gamponia	Seattle City Light
Andrea Goodwin	NWPCC
Eric Graessley	BPA
Fred Heutte	NW Energy Coalition
Mike Hoffman	PNNL
Elizabeth Hossner	PSE
Charlie Inman	PSE
Massoud Jourabchi	NWPCC
Dave LeVee	PWRCast
Shirley Lindstrom	NWPCC
John Lyons	Avista
Jennifer Magat	PSE
Shauna McReynolds	PNUCC
Tomás Morrissey	PNUCC
Ahlmahz Negash	Tacoma Power
Paul Nissley	Seattle City Light
Elizabeth Osborne	NWPCC
Kathi Scanlan	WA UTC
Adam Schultz	ODOE
Tyler Tobin	PSE
Cindy Wright	Seattle City Light
Nora Xu	PGE
Zhi Chen	PSE
Brian Dekiep	NWPCC
Barbara Miller	US Army Corps of Engineers
Sibyl Geiselman	Avangrid
Ian Mcgetrick	Idaho Power