

**Northwest Power & Conservation Council
Resource Adequacy Steering & Technical Combined Meeting
July 16, 2021**

Richard Devlin, NWPCC, began the meeting at 9:00 am by reviewing the day's agenda. Rob Petty, BPA, thanked attendees for their time and attention. Chad Madron, NWPCC, explained how to best interface with the Go-To-Webinar platform.

2021 Power Plan Resource Adequacy Assessment

Fazio reviewed PNW resources and loads and addressed concerns about the redeveloped GENESYS. He presented the Resource Adequacy assessment and reviewed next steps.

Tomás Morrissey, PNUCC, asked if the nameplate capacity values of the resources found on [Slide 3] are from 2025 or today. Fazio answered 2025 but offered to recheck. Morrissey thought the coal value looked high. Fazio said he will check.

Scott Levy, Bluefish, asked if some of the Klamath Generation projects are soon to be retired. John Ollis, NWPCC, noted that the Klamath projects mentioned are natural gas projects, co-generation plants and a couple of peakers. He also wrote in the question pane that here are 4 Klamath hydro plants that have retired as of 2021 in our [database](#).

Levy wrote that he remains hopeful that an Appendix of the Draft Power Plan will include a list of cost assignments to River Constraints and a frequency of each being violated in the question pane.

Philip Popoff, PSE, asked how intermittent resources are dealing with peak capacity for the summer and/or winter [Slide 6.] Fazio stated that the last slide of the presentation identifies the effective load carrying capacity (ELCC) for the different types of resources.

Therese Hampton, Public Generating Pool, asked about the logic behind not including FOR or MOR in the winter/summer resource capacity. Fazio answered that it is about mirroring the planning reserve margins that utilities use to ensure capacity. He added that it accounts for variable renewable resource generation, load variations, and forced outage rate and he calculated surpluses.

Hampton clarified that if she wanted a 12% surplus during the summer peak the chart shows that she is short. Fazio agreed, adding that the calculations do not include market resources, IPPs, and count the lowest hydro generation which, in this case, has a 3% chance of occurring. Fazio added that load-resource balance is not a good measure of adequacy.

Rob Diffely, BPA, confirmed that this data uses climate change hydro for loads. Fazio confirmed.

**RA 2025 Hydro Generation Comparisons with Historical Data
Dan Hua, NWPCC**

Hua addressed stakeholder concerns about the new GENESYS model including the fact that it generates more annual average hydro than the 2019 BPA White Book, produces more monthly energy than the White Book and displays greater hour-to-hour flexibility at individual hydro projects.

Ben Fitch-Fleischmann, Northwestern, asked why the months one through four variations on [Slide: Hydro-Generation Comparisons for Climate Scenario A] are very small. Hua said the EIA has 20 years of data as compared to 80 years of historical, while the peach box (GENESYS) has 10 years of data.

Ollis added that it is looking at hydro generation, which is economic and not total hydro flows, so there is not a direct correlation. He said all the hydro plants are seeing the same economic conditions and some might choose to spill.

Fitch-Fleischmann asked about other months and scenarios where the model found larger ranges as compared to the EIA White Book's smaller. Hua thought it might be due to population use. Fazio pointed to the extensive work in choosing the three Climate Change data sets out of 19 that were close to the range of historic flows. Fazio added that this is only 10 years of data.

Popoff asked what the dots on the chart represent. Hua said they are outliers in respect to their own distribution.

Tomás Morrissey, PNUCC, voiced concern over the hourly side versus the monthly [Slide: Hydro-Generation Comparison for Ensemble Climate Scenarios A, C, G] saying the projects are displaying unusual amounts of flexibility compared to historical. Ollis said it is hard to compare flexibility without more detailed analysis, but he will show broad comparisons in the afternoon session.

Fazio addressed Morrissey's concerns broadly about projects showing 0 generation, saying a minimum turbine flow was added to fix the issue. He said the variations of low to high will be addressed in the afternoon session.

Morrissey confirmed that the hourly data will be shared. Ollis said this will be addressed on a plant-by-plant basis in later sessions but assured that it doesn't change the high-level result.

Fitch-Fleischmann observed that the EIM White Book data around high variability corresponds to high average output, but this is now gone from the GENESYS data where there are high output levels but low variability. He asked if staff agree with this observation.

Ollis said there would be high levels of flow in months one through seven, but this chart represents generation where there is significant surplus, and it might be advantageous to spill. He said this could be explored in the afternoon session.

Hua added that the water forecast comes out in January which may account for the variance.

Villamor Gamponia, SCL, asked if staff used any statistical tests used to determine the statistical significance of differences in hydro variations, in the question pane. Hua answered no.

Popoff addressed variability, clarifying that part of the reason why there is smaller variability is due to smaller data sets. He said he is uncomfortable with using only 10-years of data. Fazio said the important factor is the variability in the modified stream flows while generation can be affected by a lot of things. Fazio agreed that this is a different lens and has been covered in past RAAC/SAAC meetings. He concluded that staff feel comfortable in the variation in the fuel for the hydro system.

Hua added that 30 years of information (2020 to 2049) would be more appropriate, but the temperature jumps drastically by the decade and stream flow pattern changes more rapidly from decade to decade. He doubted that we will see 2030s temperatures and flows in the 2020s. Fazio said the historical data shows similar reason to use 10 years.

Popoff summarized that generation picture should not be confused with the stream flow picture. Fazio agreed.

Levy stated that GENESYS uses 30 years of data and wondered if that is being added together three times for A, C, and G. He pointed to the large number of outliers in January through June in the GENESYS model and wondered if they were curtailments or spill. Fazio said you cannot assume they are correlated to curtailments or spill, and you need look at each year.

Shauna McReynolds, PNUCC, asked what the biggest impacts are on [Slide 18]. Fazio said this will be quantified later in the presentation.

Levy noted a comment from CRITFC that the third point on [Slide 18] about Hourly Hydro Generation and Flexibility being suspect, noting that flex spill projects possibly kill a lot of fish. He suggested limiting that in the first two projects. Fazio said the study assumes that all the non-power constraints stay the same. He said there is a possibility that will change.

Hampton said the assumptions about market availability is a significant driver to the changes on [Slide 24.] She said reliance on imports has created anxiety in the desert SW and CA and asked how imports have been modeled. Fazio moved to [Slide 20] and said the 1250MW limit is about 10% of total transmission.

Ollis agreed about the concern over market risk which is why there are limits. He said market fundamental apply over and above the limits. Ollis discussed the modeling and granular supply curves used but agreed there are other risks. He added that this committee agreed that was a limited resource to dig into. Because of this limitation the 1250MW was used.

Popoff voiced discomfort with the classic GENESYS showing 22.6 LOLP and the new model showing 0. He asked if climate change data was used in the classic model. Fazio answered yes. Popoff said that helps.

Morrissey thought it would be interesting to see the prices that the model sees. Fazio said he can show those.

McReynolds observed that there was a lot of time spent with the classic GENESYS debating availability and she was not convinced that the group has captured all the uncertainty. She thought this needed further review. Fazio said all uncertainties are not modeled and the high load case has not yet been modeled which might show a higher LOLP.

Fazio offered that those individual situations show that thermal units are not fully utilized. Ollis added that the classic model didn't show stochastic transmission either. He said more market limits have been introduced.

Aliza Seelig, SCL, asked if the fixed market purchase in the Classic GENESYS is a blunt instrument for a stochastic analysis, in the question pane. She wrote, in your opinion is this a more conservative way of handling market purchases. She added that conservative being tends toward higher LOLP or is it hard to say at this point for this sensitivity.

Fazio agreed that this is a blunt instrument that leads to a higher LOLP, referencing the aftermath to the 2001 energy crisis.

Diffely noted that the reason there is less flexibility in the classic model is because it violates refill. Fazio disagreed, saying 1000MW does not violate refill. He added that the new model does not borrow from the future but takes the true, full range of reservoir space into account.

Nicolas Garcia, WPUDA, asked about thermal resources being used less in the new GENESYS [Slide 30.] He thought this was counter to what he heard at previous Council meetings that said thermal would be used more and with more volatility.

Garcia then suggested including some carbon issues and wear and tear friction when deciding to run thermal generators.

Ollis said he wasn't sure what previous analysis showed more thermals running but he agreed that they are vital to keeping the system adequate. He said he is seeing lower capacity factors than historical. Ollis said the model can include carbon and wear and tear costs, but he needs more data.

Levy referenced a presentation by Northern Grid that shows the CA grid at 99% capacity which leads to skepticism about the WECC buildout. He asked for a sensitivity that allows imports to go to 5000MW and 0 to better inform people reading the Plan.

Ollis said there were sensitivities with no external buildout and did not see drastic results. He said the external is not fundamental to adequacy, but it is to unit commitments and economics. He said a market level of 0 would not run the model well, saying we sometimes import to our region to help Canada. Levy thanked him for the answer.

Seelig wrote recommendations in the Question pane: SCL recommends an RA analysis in the study year (2025) and a future year that picks up more changes in supply and demand (far enough out to consider the timeline for new transmission builds from today). Additionally, SCL has appreciated output similar to the 2024 RA study that included monthly frequency, duration and magnitude statistics. Ollis said he will pass this to Fazio.

BREAK

Charts for RAAC/SAAC

Rob Lothrop, CRITFC, wrote, CRITFC has expressed concerns about assumed flexibility of the hydro system to integrate renewables, including effects on ramp rates and daytime flows as the projected solar build-out advances in future years. Hourly fish flow constraints are a relatively new matter in salmon/hydro management and largely confined to the Corps' Snake dams in the fall for the time being. My question is whether adjustments to assumed hydro flexibility could be a crude proxy for some range of potential future hydro/salmon constraints that have yet to be instituted, such as hourly flow constraints in the mainstem Columbia River during juvenile and adult salmon migration seasons? Or would it be preferable to set hourly constraints in the hydro ops portion of the model to understand the sensitivity of RA outcomes to this kind of constraint?

Ollis said that past modeling is consistent with what the Fish and Wildlife program sees, and this question looks towards the future effects of flexibility. Lothrop agreed, adding that earlier modeling shows this problem a decade out. He said that Ben Kujala, NWPCC, would ask for some constraints but Lothrop conceded that that is out of his limited abilities.

Ollis thought this could be approached in the future depending on stakeholder and legal input.

Ollis then addressed an emailed question about concern over the new GENESYS results including forward transactions and interchange energy. Ollis said the redeveloped GENESYS has no forward transactions set but multiple time frames for transactions and a true up model. Ollis said the redeveloped model establishes most of the regional position in the day-ahead portion.

Diffely asked about the full capacity of the Mid-Cs [Slide 6]. Ollis did not know and offered to check. Ollis said he surprised by the high range but said they're seasonally constrained and do have flexibility.

Morrissey asked if simulated data is from a specific model or from all three combined over the years. Ollis thought it was 10 different hydro conditions, and no different wind conditions from CAM ESM.

Morrissey asked if he looked at medium and max. Ollis said he did in the spreadsheet and noted that the max is larger. Ollis offered to look more up. Morrissey thought it would be fun to see Rocky Ridge.

Tom Haymaker, Clark PUD, wrote that 4800 MW is capacity of Mid-C Non Feds in the question pane, while Levy wrote Nameplate Capacity of mid-Columbia hydropower projects: Wells (774MW), Chelan (48MW), Rocky Reach (1300MW), Rock Island (629MW), Wanapum (1220MW), Priest Rapids (950MW) that total 4921MW.

Ollis showed Rocky Reach hydro generation in the model along with other projects to address Morrissey's concerns.

Haymaker wrote that he was not counting Chelan Hydro as it is not on the main stem. Ollis commented that he also did not count Chelan.

Garcia noted that Ollis said that people may not optimize for price only, saying this was his earlier point. Garcia said he was having trouble understanding Ollis' statement that this would make the system more adequate rather than less.

Ollis said there could be inefficiencies but was referring to utilities having reserve obligations and the model optimizes more than reality. He stressed that this is about adequacy and the assumptions are conservative. Ollis added that an optimization model doesn't have all the tricks of an operator and the model is probably too constrained.

Kujala added that it comes down to the concept of reserves and on a planning level it could be a conservative operator. Kujala noted that when adequacy is driven in part by forecast error, the more resources that are up and turned on the more adequate the system is going to be.

Garcia said a utility with a reservoir has a water budget and will behave accordingly but forecast error may be wrong and that utility may use up water they need. He asked if the model could handle decisions made that don't relate to the economic value of the power at that moment. He was worried that these individual decisions may not be fully captured by the modeling especially during weather extremes.

Ollis said this model does a better job than past models, noting the Seventh Plan's showing the rise of renewables and CA's issues. He pointed to the model showing more unit commitment issues and noted that there could be more. Kujala added that there needs to be a sense of reserves and there have been runs where reserves are increased to duplicate uncertainty and friction.

McReynolds reiterated the need for strong expertise when looking at individual operations and projects. Kujala said they have contracted with outside experts including Gwendolyn Shearer and Mike McCoy. He noted that experts with hydro flow and production cost model experience

are limited but they spoke to a broad range of experts. Kujala added that all the information is public.

Levy said the black line on [Slide: Total Outflow vs Hydro Period] is high and wondered why we are seeing that. Kujala answered that it is part of the climate change data and coordinated efforts. Kujala answered that the chart is hydro years with April and August split. Levy asked that the months be labeled.

Morrissey asked to see Bridger 4 and CGS.

Levy suggested looking at Little Goose or Lower Granite in the spring to explore the bathtub effect associated with flex spill. Kujala suggested looking at historic as well. Levy again stressed the problem with this for fish. Kujala said the Fish & Wildlife program assumptions are used and the model will help with the new Fish & Wildlife programs.

Egerdahl stressed that the model is not intended to show the value of any individual project and asked to refrain from making such comments. Ollis and Kujala agreed. Egerdahl said there is nothing in the model about fish mortality and asked to keep to the RAAC scope.

Levy said that the costs could be put in. Ollis said that staff is trying to inform further conversation and do SAAC work as well and explore the bounds of the model. Egerdahl said the revenue that each company gets through sales is not part of the model. Ollis agreed. Levy appreciated the direction.

Ollis then showed regional imports and exports.

Diffely asked how incremental solar will be coming into the GENESYS model. Ollis said the actual build is in the market supply price bins, adding that there will be no additional resources added except for EE. Ollis added that Canada gets a lot of CA energy, hitting the 1250MW limit almost every day.

Ollis pointed to the three-day webinar on August 4-6 for a detailed walk through the model and adjourned.

Attendees via Go-To-Webinar

Richard Devlin	NWPCC
Rob Petty	BPA
John Fazio	NWPCC
John Ollis	NWPCC
Dan Hua	NWPCC
Massoud Jourabchi	NWPCC
Rob Diffely	BPA
Steve Andersen	Clark PUD
Kate Anderson	Sightline

Dhruv Bhatnagar	PNNL
Glenn Blackmon	WA Dept of Commerce
Leann Bleakney	NWPCC
Ian Bledsoe	Clatskanie PUD
Frank Brown	BPA
Aaron Bush	PPC
Pat Byrne	BPA
John Chatburn	Idaho OER
Zhi Chen	PGE
Ted Drennan	NW Natural
Rick Dunn	Benton PUD
Ryan Egerdahl	BPA
Ben Fitch-Fleischmann	Northwestern
James Gall	Avista Corp
Villamor Gamponia	SCL
Nicolas Garcia	WPUA
Christine Golightly	Crifc
Eric Graessley	BPA
Spencer Gray	NIPPC
Therese Hampton	Public Generating Pool
Randall Hardy	Hardy Energy
Elaine Hart	Moment Energy Insights
Thomas Haymaker	Clark PUD
Bill Henry	dJoule LLC
Fred Heutte	NW Energy Coalition
Mike Hoffman	PNNL
Elizabeth Hossner	PSE
Charlie Inman	PSE
Steve Johnson	WA UTC
Anthony Jones	RME Con
Tom Kaiserski	Montana
Shay LaBray	PacifiCorp
Scott Levy	Bluefish
Shirley Lindstrom	NWPCC
Douglas Logan	independent
Rob Lothrop	Critfc
John Lyons	Avista Corp
Jennifer Magat	PSE
Garrison Marr	Snohomish PUD
Lauren McCloy	NW Energy Coalition
Shauna McReynolds	PNUCC
Barbara Miller	US Army Corp
Tomás Morrissey	PNUCC
Heather Nicholson	independent

Elizabeth Osborne	NWPCC
Craig Patterson	independent
Philip Popoff	PSE
Will Price	EWEB
Sashwat Roy	Renewable NW
Bill Saporito	Umatilla Electric
Barron Sawyer	Outlook
Adam Schultz	ODOE
Paul Schulz	Montana
Aliza Seelig	SCL
Jason Sierman	Oregon
Jamie Stamatson	Montana
Greg Strang	Idaho Power
Tyler Tobin	PSE
James Vanden Bos	BPA
Cindy Wright	SCL
Jim Yost	NWPCC
Joni Zenger	Utah
Ahlmahz Negash	Tacoma Power
Lea Fisher	Public Generating Pool
Wendy Gerlitz	PSE
Max Greene	Renewable NW
Lori Hermanson	Avista
Michael Louis	Idaho PUC
Ian McGetrick	Idaho Power
Kristin Raper	Idaho PUC
Selisa Rollins	BPA
Tony Salman	Connected energy
Veronika Vazhnik	Idaho OER
Jim Waddell	independent
Marissa Warren	Idaho OER
Brian Dekiep	NWPCC