Northwest Power and Conservation Council
Resource Adequacy/Systems Analysis Advisory Committees
January 8, 2021

John Fazio, NWPCC, opened the meeting at 9:00. Chad Madron, NWPCC, reviewed best practices around the Go-To-Webinar platform. Fazio reviewed the day's agenda.

Resource Adequacy Assessment, Classic GENESYS versus Redeveloped GENESYS
John Fazio, NWPCC
Fazio reviewed differences between the two models to explore why they produce different results and why the redeveloped GENESYS is a more appropriate, accurate option. He presented the 2025 RA Assessment using classic GENESYS with the additional IPP availability and proposed revisions to the reference case assumptions. Fazio then moved into Classic versus Redeveloped GENESYS RA results, touching on enhancements in the redeveloped model, the anticipated effects of those enhancements on the LOLP and aligning market assumptions in both models.

Fred Heutte, NW Energy Coalition, called it concerning that the model is not picking up all of the EE using the draft 2021 Plan hourly shapes and savings numbers [Slide 3.] Fazio stated that the presented numbers are Seventh Plan target numbers and the draft numbers will remain draft until more there is more confidence. Heutte called that fine.

Heutte then addressed the in-region IPP numbers, noting that they influence outcome. He asked about the summer hours of availability for IPPs, wondering if this is how much energy we can expect because we can shift hydro or if this is more a caution about double counting. Fazio called it an educated guess about the SW surplus and when IPP market would be available for NW use. Fazio said he was a bit conservative with mid-day SW market availability and took NIPPC's comments about availability into account. He added that NIPPC agreed to limit IPP and SW resources during the evening ramp. Fazio concluded by saying the dynamic new model will be more appropriate.

Heutte approved of this approach, adding that transmission costs need to be taken into account as well. He then noted that Mid-C throughput has dropped in half over the last five years, theorizing that much has migrated to the EIM. Heutte thought this would lead to more volatility and higher Mid-C prices and wondered what that meant for the modeling. Ben Kujala, NWPCC, stated that production cost models are not analogous to market trading, adding that the EIM is actually making reality more like the models rather than less.

Nicholas Garcia, WPUDA, noted seeing more location-specific concerns [Slide 7] and asked about the chances of a subregion having a supply constraint due to transmission. Garcia also asked if that should be noted in the recommendations. Fazio said the new model will show concerns in different BA bubbles that would become part of the Plan.

Mohit Chhabra, NRCD, asked if unpicked, cost-effective EE capacity will still be on the table if the model identifies a capacity need. Fazio pointed to the difference between a RA assessment and a Power Plan, calling the RA assessment an early warning system, while the Power Plan works to fill gaps. Fazio suggested contacting the EE team for more information.

Spencer Gray, NIPPC, reiterated that in-region IPPs generally feel that the more reliable price differential between Mid-C and SW has eroded and operators no longer assume they will be dispatching there in the summer. He then moved to [Slide 5,] voicing interest in how much the LOLP jumps when moving from the proposed new reference case to sensitivities. Gray added that utilities and regulators should know that most thermal IPPs are available for contract if load-serving entities would like.

Fazio agreed that Case 4 would alleviate problems but the redeveloped GENESYS will remove some guesswork and market price dynamics will determine power flows. Gray agreed that has more analytical rigor but pointed to policy choices that will be based on this assessment.

Garcia pointed to human error causing CA's supply issue and asked if any human error will be considered along with forecast error [Slide 9.] Fazio answered no, stating that he needs a probability density for modeling. Garcia countered that acknowledging events like this are important. Fazio agreed that many unmodeled factors may cause problems and it might make sense to make them visible.

Garcia then asked about the effect of wildfires on out-of-region supply. Fazio acknowledged that this is an issue but can't be quantitatively modeled. He thought this could also be mentioned in a narrative.

Rob Diffely, BPA, asked how many games are running in both the new and classic GENESYS [Slide 13.] Fazio answered that he's running 30 years 30 times for 900 games in the classic GENESYS and 180 in the redesigned model. Fazio said more games will be run as they clear up issues.

Scott Levy, Bluefish, corrected Fazio, stating that high gas doesn't kill salmon smolts but gives rise to "Gas Bubble Trauma" that may, or may not, have a delayed mortality effect.

Kurt Miller, NW River Partners, asked if the new GENESYS gives a view of what hours imports are flowing and if he sees anything troubling during California's super peak hours. Fazio said he has yet to do an extensive analysis of this but he is not seeing anything curious about magnitude, direction or timing.

Miller then asked if GENESYS has a view into intra-hour ramping issues. Kujala explained how the redeveloped GENESYS treats this issue by holding enough resource in the hour-ahead stage to get through the hour with or without EIM, followed by a true-up.

Miller recalled that CAISO was locked out of the EIM over the summer because they didn't have enough resource adequacy to bring to the table. He asked if the model understands that the intra-hour ramp will be much higher than normal in the morning. Miller then asked how wind forecasts will be handled during ramps.

Kujala said the model takes wind forecast error into account and *explained the process*. He stressed that reserves are an input and not optimized model elements. He said the model can handle different reserve products but the challenge is getting data. Mill approved of this solution, suggesting the model adds additional reserves for the unknown ramping hours in the northwest. Kujala said there is a reasonable reserve level for today's world but the future holds different challenges with adapting reserves.

Diffely asked if the redeveloped GENESYS includes planned or forecasted resources. Fazio said he is using the same resource assumptions for all studies. Diffely asked about out-of-region resources. Fazio said they are different as the classic GENESYS has just one resource while the redesigned model includes blocks of out-of-region resources and loads.

Diffely asked if they are blocks of existing resources. Fazio clarified that assumed CA solar is in place for 2026 in AURORA. Diffely said this is different from the classic GENESYS and asked for the data. Fazio said it's from the SAAC and offered to follow up offline.

Garcia noted the push to remove thermal resources from the mix in OR and WA. He pointed to the model's ability to look at spatial considerations and suggested highlighting areas where thermal resources are key. He used Clark PUD's River Road plant as example, saying this could be important information for policy makers. Kujala stressed that the model could get at pieces of that question but a more complete picture would come from a model that has a full view of transmission.

Garcia agreed but pointed to some who would say you can make these changes and not effect reliability. He thought the ability to bring actual studies to the table would be helpful in making good policy decisions.

Sashwat Roy, Renewable NW, asked if there is consideration for a sensitivity based on planned resources outlined in recent IRPs in the 2021-2026 timeline. Fazio stated that Fred Heutte, NW Energy Coalition, offered to do this work and PNUCC is helping. Roy indicated that he would also like to help with the effort.

Heutte noted that he's seeing a lot more storage coming on line, pointing to at least 1500MW in CA and a proliferation of hybrid resources. He thought this would improve availability for NW imports, except for when the entire West is very hot or cold. Because of this ability to time shift, Heutte thought constraints on imports could be rethought. Fazio said these numbers represent RAAC best guesses and he is far from stochastically modeling the whole west

BREAK

Hydro-Projects Constraints in the Redeveloped GENESYS
Dan Hua, NWPCC
Hua reviewed the constraints placed on the classic GENESYS by HYDSIM and how hydro is regulated in the new model. He explained that the new model's weekly time steps are derived from HYDSIM while the hourly time steps come from work with BPA.

Fazio asked if the maximum forebay drawdown limit is 1.5 feet an hour or day [Slide 10.] Gwendolyn Shearer, Cascade Access, confirmed that it is per day.

Levy referenced [Slide: GENESYS Hourly Final Storages] to discuss the sloshing, bathtub effect knowns as seiches. He said it looks like seiches have occurred in the system over the last two years because of the 1.5-foot bounce discussed on [Slide 10.] Levy understood that this is a way to use the hydro system as storage but said it also confuses and stresses fish.

Levy stated that the Lower Granit does go to zero turbine outflow quite often [GENESYS Hourly Total Flows.] Fazio called for more information on conditions (physical, operational, etc) that cause this as the goal is mimicking real life operations. Levy offered to send information.

How RPM Simulates Imports and Exports
Ben Kujala, NWPCC
Kujala explained that the RPM is largely based on economic commodity pricing theory and how it incorporates simulated futures based on a range of prices from AURORA. He explained the dispatch of generating resources based on price, which includes turning quarterly prices into hourly, calculating total generation based on those hourly prices and adding generation to compare to net load. Kujala stressed that load is net of EE.

Kujala walked through import/export limits from the 7th Plan and the results of potential changes, highlighting the changes in imports.

Morrissey asked how the RPM knows when to import or export, pointing to spring hours with almost no imports. He worried about the model sending power out of the region when other entities were also trying to do the same. Kujala said that will be discussed more fully in the next presentation but outlined the process using existing wind with a PTC and REC versus a new solar plant as example. He said even if export limits are set high, the model still curtails in-region renewables because of native prices generated in AURORA.

Morrissey asked if the RPM sees a Mid-C price. Kujala answered yes.

Levy asked if the 1.5 foot per day constraint on Grand Coolie could be put on any project and if that constraint could be smaller, like an inch. Kujala said yes, but there would be challenges with convergence if the constraint was too unusual.

Levy asked for an explanation of convergence. Kujala explained the inter-relations needed for the model to solve a problem without creating other issues downstream, likening it to the tail

wagging the dog. Levy referenced the 1.5-foot range discussed earlier, saying it effects the river for six miles and asked that this be explored in the future.

Update on Baseline Conditions in the RPM
Ben Kujala, NWPCC
Kujala walked through recent data updates and changes made due to Advisory Committee input, stakeholders input and dozens of test runs. He stressed what baseline conditions are and are not and how narrative drives scenarios work. Kujala explained what is impacting results, starting with the social cost of carbon.

Heutte asked about how Washington's CETA requirements will be assessed [Slide 10.] Kujala explained how it will be incorporated into the RPM, saying emissions will be valued at the social cost of carbon and added to the net present value of the portfolio cost. He then said RPM's optimization looks at alternative resource strategies.

Heutte thought including the social cost of carbon might have a masking effect on pricing. Kujala said the social cost of carbon is by far the largest driver in renewable builds. Heutte asked how the model handles CETA from 2030 onward. Kujala said the requirement is in the model and RPM has logic to use a REC to meet a clean requirement. Heutte hoped this would lead to a future discussion about what's driving the cost of RECs.

Diffely noted that the RPM found a near-term need for natural gas because of an adequacy signal generated by the classic GENESYS. He said the redeveloped GENESYS is not finding an adequacy problem which will lead to a different answer. Kujala agreed that it's possible but stressed that the social cost of carbon is not a dynamic when it comes to adequacy. Fazio cautioned that the LOLPs from the new GENESYS might not be lower.

Garcia addressed the earlier comment about resource adequacy, saying it doesn't address what individual utilities are facing. He thought the ability for the model to identify different LOLPs for different BA bubbles was important information. He asked about plans to account for different, or nonexistent, state policies. Kujala said staff aggregate policy up when it makes sense with a goal of creating a reasonable, regional solution.

Garcia asked what cost of carbon is being used. Kujala answered that they are using the 3% Washington CETA number.

Heutte asked why the DR doesn't change. Kujala said gas becomes cheaper and the DR balances against that. Kujala cautioned that this should be taken with a grain of salt as it wasn't the focus of this test.

Tanya Barham, Community Energy Labs, confirmed that DR is more effected by the adequacy attributes of gas peakers. Kujala stated that adequacy is just one of the signals generated by the model and it doesn't interplay with the social cost of carbon much.

Gillian Charles, NWPCC, explained how the GRAC worked on the resource build rate [Slide 11,] saying the need is different from past Plans. She said these best guesses are modeled as constraints but shouldn't be considered constraints in the real world.

Roy asked if increases in storage and hydro were also observed [Slide 12.] Kujala said the build rate of all non-gas resources were doubled but also adding that removing new natural gas may not be the best sensitivity to see more storage builds as the model is not picking solar + storage. Barham confirmed that the model encourages overbuilding and curtailing solar. Kujala said yes.

Steve Johnson, WA UTC, wrote the following in the question pane: "I am adding this comment for the record to correct the less than clear statement I made during the RAAC Steering meeting on December 11, 2020. I am not asking for a response or for a discussion during this meeting. I say this while emphatically stating that many groups working on resource adequacy within their purview of the Western Interconnection are doing very good work. Unfortunately, the horizontal (Western Interconnect footprint) or vertical (jurisdictional authority) limitations of the institutions at work will ultimately foil their efforts. On the positive side, within the Western Interconnect we have many very capable organizations with expert staff and expert localized understanding of the portion of the Western Interconnect they are examining. I encourage the Counsel to continue their good work so that when a unified effort across the Western Interconnection forms its critical knowledge and expertise can be utilized. Thank you all for the great and very detailed work."

Eric Graessley, BPA, asked how renewable builds driven by requirements interact with AURORA builds saying it feels like double counting [Slide 14.] Kujala said carbon cost is the biggest factor in renewable builds but is not the only thing. He said the external electricity prices have an emission rate that decreases with the build of resources. Kujala said the model prefers building in-region because of the direct displacement of carbon.

Questions/Discussion

Graessley noted that the last Council meeting included a discussion around changing the penalty price for relaxing RPS/clean policy. He acknowledged that it's not as much of a driver, but was still curious about the outcome. Kujala said that is more model tuning that needs to be done.

Heutte praised this work and noted that there was and is capital and technology to complete huge builds. He suggested the next SAAC talk about any other factors that test model sensitivity. Kujala said he pulled these out for a high-level look at what is driving results right now. Heutte asked for a sense of what factors are not moving the needle so the group can generate other ideas. Kujala said this should come from scenario work and this is a basis for comparison.

Garcia pointed to WA's move towards electrification, saying it will double demand. He agreed with Heutte's point about existing technology and capital to build resources but was

unconvinced about the political will to support transmission needs. Kujala said the RPM is not the place to check system operations and cautioned that this is just the first step. Garcia agreed but pointed to the challenge of working with legislators trying to choose a path when we're not even sure if present choices maintain a reliable, affordable electric grid.

Madron pointed to future SAAC meetings with more on the way. He adjourned at 1:15.

Attendees via Go-To-Webinar

John Fazio	NWPCC
John Ollis	NWPCC
Ben Kujala	NWPCC
Chad Madron	NWPCC
Daniel Hua	NWPCC
James Adcock	The Mountaineers
Tanya Barham	Community Energy Labs
Leann Bleakney	NWPCC
Frank Brown	BPA
Morgan Brummund	Idaho OER
Aaron Bush	PPC
Pat Byrne	BPA
Rob Campbell	Northwestern
Gillian Charles	NWPCC
John Chatburn	Idaho OER
Zhi Chen	PGE
Mohit Chhabra	NRDC
Robert Diffely	BPA
Connor Edwards	BPA
Ryan Egerdahl	BPA
Villamor Gamponia	SCL
Nicolas Garcia	WPUDA
Sibyl Geiselman	Avangrid
Eric Graessley	BPA
Spencer Gray	NIPPC
Jared Hansen	Idaho Power
Tom Haymaker	Clark PUD
Fred Heutte	NW Energy Coalition
Chad Ihrig	Franklin Energy
Steve Johnson	WA UTC
Massoud Jourabchi	NWPCC
Tom Kaiserski	Montana
Torsten Kieper	BPA
Scott Levy	Bluefish
Jimmy Lindsay	PGE
John Lyons	Avista
Ian McGetrick	Idaho Power
Kurt Miller	NW River Partners

Tomás Morrissey	PNUCC
Elizabeth Osborne	NWPCC
Patrick Oshie	NWPCC
Selisa Rollins	BPA
Sashwat Roy	Renewable NW
Kathi Scanlan	WA UTC
Kelli Schermerhorn	Northwestern
Gwendolyn Shearer	Cascade Access
Jaime Stamatson	Montana
James Vanden Bos	BPA
Marissa Warren	Idaho OER
Brian Dekiep	NWPCC
Will Price	EWEB
Douglas Logan	independent