Northwest Power and Conservation Council
Resource Adequacy Advisory Committee (Technical)
March 23, 2023

John Fazio, NWPCC, began the meeting at 9:00 by introducing Dor Hirsh Bar Gai, NWPCC. Fazio stated that Hirsh Bar Gai will be taking over the committee after his retirement at the end of the month. Hirsh Bar Gai wished Fazio well and stated how excited he was to be heavily involved in the RAAC.

Rob Diffely, BPA, congratulated Fazio after between 13 to 14 years of working together, saying he will be missed. Chad Madron, NWPCC, then explained how to best interact with the Go-to-Webinar platform before roll call.

Fazio reviewed the agenda, pointing to a link to 60-slide presentation of background information about transitioning to the multi-metric Resource Adequacy standard. He apologized for not getting some of the material up sooner.

The Council's Multi-Metric Adequacy Standard
John Fazio, Dor Hirsh Bar Gai, NWPCC
Before beginning the presentation, Fazio thanked the group for their kind words about his retirement. He then assured the room that he was not going away but will continue to attend meetings as an interested party.

Blake Scherer, Benton PUD, objected to using animation in slides as the posted presentation PDF only shows the first slide [Slide 11.] He called this confusing. Hirsh Bar Gai apologized and promised to update the presentation.

James Adcock, independent, voiced his skepticism about the hardwired 3000MW limit and the downscaling of the climate models that appears to be creating artificially fat tails. He said this will lead to more modeling failures than reality. Adcock also expressed skepticism around the high limits of system reliability calling them disconnected to the reality of a rate payer who experiences dozens of short-term failures all the time.

Adcock said he has heard utilities talk about building new natural gas peakers which would go against climate goals, adding that the problems with overbuilding should be stressed. He spoke about the mortality cost of carbon which one utility estimates at 5000 human lives a year. Adcock said these issues need to be thought through more carefully, so the region doesn't end up with a bunch of new peakers.

Fazio thanked Adcock for his skepticism saying it's the reason we have these committees, adding that his concerns will be noted. He said staff tries their best to reflect real life power system operations and Adcock is not the only stakeholder concerned with the climate change data. Fazio said the goal is to look for biases and all comments are appreciated even though staff are trying to make the most accurate representation of the system.

Fazio then said the distribution system is beyond Council control but hoped that if the aggregate system is adequate then utilities can build a distribution system that doesn't have two or three outages a year.

Adcock said the was trying to keep modelers humble because talking about a one in 40-year failure rate doesn't reflect reality and makes him nervous. Fazio countered that this work is talking about different scales, like losing the city of Seattle or the energy crisis of 2001 where we lost 2500 MW of load.

James Gall, Avista, asked how the model looks at duration and frequency and if it prioritizes one over the other. Fazio said there is no logic to do that. John Ollis, NWPCC, further explained logic in the new GENESYS but said there is no order of operations.

Gall asked if the model creates lower duration outages in exchange for more frequent outages. Fazio said not explicitly. Ollis explained that if there was a lower cost outcome the model would choose it, but all outages have the same penalty. Ollis admitted that there may be some nuance depending on where this happened in the model but assured Gall that there is no real exchange.

Interactive Excel Threshold Visualization

Renchang Dai, PSE, asked if a utility could set different limits if they choose to adopt these proposed metrics. Fazio answered yes, of course. Hirsh Bar Gai agreed saying this is more for the region. Fazio added that the idea is not for all utilities to adopt these standards, and this will be translated into a planning reserve margin that will be easier to compare with utility planning reserve margins.

Discussion on Setting Limits [Slide 16]

Joel Nightingale, WA UTC, asked how having a range, as opposed to a threshold, for limits (e.g., 0.1 to 0.2 LOLEV) impact whether a portfolio is deemed "adequate" or "inadequate" in the chat. Fazio pointed to advantages to having a range, pointing to early work at the Resource Adequacy Forum that had a middle ground to differentiate really inadequate systems to those that might be on the boarder.

Nightingale followed up, asking what analysis went into the width of the range, for example why choose between 8-12 hours versus 9-11. Fazio said that came out of discussions of what we can tolerate without experiencing serious harm. He called it expert best judgment.

Gall commented that the LOLEV should be mandatory to pass in the chat box. He then wrote that, he preferred that the other three metrics also pass, but conceded that it should be at least two or three, depending on the level. He then wrote that he's concerned that the model could attempt to minimize outages in a way that minimizes adequacy issue.

Gall also wrote that duration of outage should differ depending on season, as extreme hot or cold has similar but different consequences.

Fazio asked Gall to talk more about his concern that the model could attempt to minimize outages in a way that minimizes adequacy issue. Gall referenced his earlier question, saying models try to solve for a cost but if costs are similar it will try to levelized the issue out which is why you need all the metrics. Gall then said this could make your problem seem smaller than it really is because the region has a lot of hydro storage.

Fazio confirmed that Gall's concern was the model taking measures that wouldn't happen in the real world. Gall agreed, pointing to close calls when the system is very adequate. Fazio agreed, saying they tried to make the model as accurate as possible from the start.

Gall then noted that the WRAP deems a system is inadequate if the LOLEV is not met. Because of this Gall thought the LOLEV should perhaps have some priority.

Gall then addressed duration, saying longer winter outages in other states led to more damage and higher economic costs for customers. He said summer brings different issues and reminded the room that a cold event in Seattle is different than a cold event in Spokane. Fazio agreed, pointing to the objective of looking at timing and realizing there should be seasonal metrics.

Adcock asked how losing power to a city is fundamentally different from losing power to hundreds of thousands of suburban or rural ratepayers, adding that that is something that happens fairly frequently. Ollis reminded the room that staff does not model distribution outages. He then said there is no difference from a bulk power perspective, and they use a "city" as an example to talk about the outage's order of magnitude.

Adcock called his objections a "sanity check" about the thinking on a system basis. He said we survive events similar to "losing a city" all the time but are not willing to address them, calling this a problem with our logic and thinking. Fazio reiterated that using "loss of a city" is an example and is not fundamentally different than losing power to hundreds of thousands of suburban or rural ratepayers. He said they are modeling bulk power system and if it's inadequate utilities will have problems. Fazio reiterated that they don't model specific outages and each utility has to ensure that they can get that power to their customers. Adcock stressed that if we are solving the wrong problems then we are solving the wrong problems and staff should think about it.

Dai noted that a different resource mix will result in a different ELCC. He wondered if the Council calculated the ELCC of resources as well. Fazio answered yes, the ELCC of portfolios of new resources are fed into the model and explained the process for calculating the ASCC.

Dai expressed interest in the comparison. Fazio said he would share that.

Ollis explained that the ELCC comes out of the adequacy modeling work as it is an hourly model.
Rick Williams, PSU, asked how this RA standard would apply to recent public power safety shutoffs policy of BPA and other transmission providers including path disruptions between the northwest and CALISO via email. He also asked about the seismic risks of a projected Cascadia event.

Williams also suggested, from a community perspective, looking at the human cost of high consequence extreme events that results from more frequent extended outages that may not be considered by back-to-back exclusions. Ollis was not sure about this question.

Fazio was not sure about how the public power safety shutoffs work. Hirsh Bar Gai pointed to multiple layers of analysis including role of the market. He noted work that looked at different portfolios and transmission during times of stress to capture this information. Hirsh Bar Gai said knowing these market stressors could help us get to adequacy thresholds. Ollis reiterated that staff is aware of the risk and are trying to think about how to model it stochastically with market information.

Ryan Egerdahl, BPA, said he was not an expert on the public power safety shutoffs policy but called it disconnected to whether BPA or other generators have enough power to serve load. He reiterated that it is not about Resource Adequacy but about grid safety. Egerdahl said the same is true for household-level outages, stressing that Resource Adequacy is about generation and not about solving distribution system problems in suburban/rural areas.

Ollis agreed that staff is not rescoping for the distribution system, but they do acknowledge system value in the planning. Ollis then said the goal is to have an adequate, reliable system and some of that reliability is deliverability which is why they look at the distribution system. Egerdahl agreed but cautioned that the work is a slippery slope.

Aliza Seelig, PNUCC, noted that this work looks at one portfolio, but a Plan would look at many which would have different solutions. She asked if this plays into what the group is trying to accomplish. Fazio answered that they look at methodology, load forecast, fuel prices, supply curves, and resources and then use the Adequacy model to determine adequacy and what we should be planning to (a planning reserve margin) and the effective capacity contributions. He explained that this information is then fed into the capital expansion model.

Seelig asked if the capital expansion model is regional. Ollis said this will be discussed further in the upcoming SAAC but explained that the capital expansion model is broadly regional with a little delineation between the East/West. Ollis then explained how they delineate a bit further but pointed to future work that will create a more granular capital expansion model to get the locational value of resources. Seelig thanked him.

Adcock said we used to talk about a one-in-20-year-system and now you are moving to a one-in-40-year system. He said he keeps bringing up the ratepayers as a sanity check because if you

can't deliver power to ratepayers with anything near a one-in-40-year failure rate then why design it to that rate. Adcock suggested a one-in-10-year, or one-in-20-year rate to better reflect the quality of the system. He asked why we are forcing ratepayers to build more and more peakers when they do not get the benefit.

Fazio said the 5% LOLP can be translated into a one-in-20-year metric but pushed back against the notion that the Council is moving towards a one-in-40-year system. He explained the 5% LOLP and said the one-in-40 level of risk is when you have to use an extraordinary emergency measure. Fazio concluded by saying they are moving to a different measure of Adequacy but not changing the standard.

Adcock said rolling blackouts caused by failure to mitigate still translates to poor ratepayer experience and repeated his question about moving to a one-in-40-year system. Ollis acknowledged Adcock's point about the ratepayer investment but reiterated that this work is about the bulk power system and infrastructure investments are different. Ollis stressed that infrastructure is considered but is not in the purview of this committee. Adcock called it a terrible mistake to pretend these actions don't have reasonable significance at all levels, including the cost to ratepayers and possible failure to meet climate goals.

Adcock asked staff to always remember that these abstract actions have real, concrete consequences to everything that is happening to the utility systems in the Pacific Northwest. Ollis said he will pass these concerns on to Council Members.

Dai mused about the interactions of resource peak contributions, particularly around adding wind, solar, and battery. He asked Fazio to elaborate. Fazio stated that the GENESYS model doesn't use ELCC but models hourly hydro and thermal and wind and solar based on projections. He said the capacity expansion model doesn't model those resources with their dynamics, so they use portfolio ELCC or ASCC approach. Fazio thought this would work for individual utilities.

BREAK

Scherer called the example on [Slide 19] confusing saying previous examples showed a PRM that needed capacity, but this example does not. Fazio understood, explaining that the capacity needed for adequacy is not the same as PRM. Fazio said weatherized load will vary and in the past PRM were developed using a building block approach that started with weatherized load. He said that deterministic approach is not the right way to calculate PRM.

Fazio then reviewed the alternative hourly, Monte Carlo approach and how they get to a 5% LOLP to create an adequate system. He then discussed the way to estimate the appropriate capacity to create an adequate system and create a PRM.

Scherer thanked him for the explanation. He then asked how to find the "minimum PRM" for all iterations. Fazio said uncertainties are incorporated into the analysis and systems will be adequate based on set thresholds.

Brittany Andrus, WECC, confirmed that the capacity needed for adequacy is the guestimate, so you don't have to run a full Monte Carlo. Fazio clarified that it is so he doesn't have to run iterations of the Monte Carlo, but he will still have to run a Monte Carlo simulation.

Andrus then asked if there is an assumption that a certain combination of solar, wind, and peaker would deliver a certain capacity number and then that number is entered into a model. Fazio stepped through his process of estimating how much capacity to add to get to an adequate system. Andrus thanked him saying she could picture the capacity shortfall duration curve moving to the left.

Scherer said that [Slide 7] shows this process.

Tyler Tobin, PSE, agreed that the 5% LOLP is a good check but asked if it was possible to extract the PRM for a portion of the region for comparison. Fazio thought it might be possible to look at individual zones but urged utilities to do their own analysis. Ollis suggested having individual conversations with utilities when they start really digging in as the interpretation of a zonal shortfall requires a nuanced discussion. He said he was happy to discuss more offline.

Dai asked how the region can co-exist if the Council uses different metrics than utilities. He wondered how curtailments will be allocated. Fazio was not sure about allocating but said the Council can calculate the resulting value based on any adequacy metric a utility might use.

Scherer commented that WECC is doing PRM work at the BA level.

Balancing Reserves Discussion
John Ollis, NWPCC

Dai noted that different utilities use different methodology to calculate balancing reserves [Slide 23] including using net load variabilities and net *load* (not sure if that's what he said) curves. He explained the process and then asked what the Council is doing and if there is any standard or guidance for utilities.

Ollis understood the methods Dai referenced, calling them reasonable. He said Council staff relies on public data from utilities for a planning level estimate. Ollis said if he had access to the kind of data individual utilities use, he could use these methods, but that information is not public.

Dai wasn't sure if the information was public or not but thought that any balance reserve calculation needs to follow regulator policy *but was not sure if there was any standard or guidance that was needed to follow.* Ollis thought Dai's methods were reasonable but not

appropriate for Council work because the data may not be available. He asked for anyone to answer as it would better than poll data.

Ollis asked members to consider the questions on [Slide 23] and email comments as meeting time is short.

Fazio thanked the committee for their participation and skepticism. He asked for more thoughts and questions, saying they will be added to the minutes. Madron thanked the members and Fazio for all his work. Ollis and Diffely agreed.

Hirsh Bar Gai also thanked Fazio and the room adding that he is excited for the work ahead.

Fazio ended the meeting at 12:00pm.

Questions and Comments from the Go-to-Webinar files
Fred Heutte, NW Energy Coalition, thanked John Fazio and asked to know when he updates the metrics for life, the universe and everything! Fazio answered: 42.

Craig Patterson, independent, asked: Can you speak to the difference between a build out of centralized verses decentralized energy sources and their impacts on potential inadequacy? A staff member answered: More broadly we do see the locational value of resources from an adequacy perspective. We have not done an explicit study highlighting the differences other than what we explored in the scenarios of the plan and adequacy study, but we have certainly seen value in investing in resources that defer transmission and distribution investments and help maintain adequacy. Is that helpful?
Patterson answered: Somewhat. I believe there needs to be far more research on the multi-dimensional aspects of centralized verses decentralized. Hopefully that further clarifies my question. A staff member answered: We agree. We will be digging into the value of distributed versus utility scale resources in our next Power Plan. We are working on updating our analytical tools to be able to assist in the analysis.

Attendees via Go-to-Webinar

John Fazio	NWPCC	Dor Hirsh Bar Gai	NWPCC
Chad Madron	NWPCC	James Adcock	independent
Brittany Andrus	WECC	Mike Babineaux	Northwestern
Larry Becker	NW Power consulting	Glenn Blackmon	WA Energy Office
Frank Brown	BPA	Greg Brunkhorst	Tacoma Power
Pat Byrne	BPA	Hailey Choi	BC Hydro
Nan Dai	BC Hydro	Renchang Dai	PSE
Robert Diffely	BPA	Brian Dombeck	BPA
Ryan Egerdahl	BPA	James Gall	Avista
John Goroski	Flathead Electric	Fred Heutte	NW Energy Coalition
Michael Hill	Tacoma Power	Massoud Jourabchi	NWPCC

Kathy Lee	BC Hydro	John Lyons	Avista
Jennifer Magat	PSE	Verene Martin	SCL
Heather Nicholson	Orcas Power & Light	Joel Nightingale	WA UTC
Paul Nissley	SCL	Megan Olson	Northwestern
Elizabeth Osborne	NWPCC	Craig Patterson	independent
Damon Pellicori	Northwestern	Sashwat Roy	Renewable NW
Blake Scherer	Benton PUD	Amanda Sargent	WECC
Aaron Schwartz	RMI	Aliza Seelig	PNUCC
Jaime Stamatson	Montana	Tyler Tobin	PSE
Saul Villarreal	SCL	Rick Williams	PSU
Barbara Miller	US ACE	Ted Drennan	OR PUC
Elaine Hart	MEI	Ian Mcgetrick	Idaho Power
Sophie Meyer	Form Energy	Elaine Prause	WRAP
Amy Pryse-Phillips	BC Hydro	Landon Snyder	Snohomish PUD
Alex Swerzbin	PNGC Power	Barbara Walters	CBS