Northwest Power and Conservation Council
Generating Resources Advisory Committee/Systems Analysis Advisory Committee
August 20, 2019

Gillian Charles, NWPCC, began the meeting at 9:00am with introductions and a review of the agenda.

Review of existing power systems, coal retirements, and policies
Gillian Charles, NWPCC
Dave Nightingale, WA UTC, confirmed that the term "regulations" on [Slide 6] broadened to include statutes adopted by legislature. Charles answered yes.

Michael O'Brien, Renewable Northwest, asked about the energy consumption threshold a company with decarbonization goals has to meet to be included in the analysis, noting that some companies are bigger than actual towns. Charles said there's room for staff judgement. John Ollis, NWPCC, cautioned that quantifying company goals might be a challenge, in part because of supply chain and in part because they are non-binding. Fred Heutte, NW Energy Coalition, urged considering large company loads, like Microsoft's, pulling away from utility loads in the future.

Nightingale wondered if the baseline might include a "more aggressive than current policy" scenario [Slide 7.] Charles said that might be considered.

Rob Diffely, BPA, asked how PURPA and qualified facilities will be estimated, adding that it will be difficult to know what will move forward from the development queue. Charles agreed, saying there will be staff judgement and she will be coming to the GRAC for insight.

Existing PNW System: "State of the Region"
Rebecca Smith, ODOE, asked if the [Council's Power Supply Map] is limited by the 1MW threshold. Charles answered yes.

O'Brien asked if the repowering of wind described in IRPs will be captured as part of the base case and project database Charles said she is only aware of PacifiCorp's repowering plan – which will be incorporated in the Plan base case - and asked for information if other projects are also being repowered.

Charlie Black, Consultant for Invenergy, remarked that 2011 was a good hydro year [Historical Energy Production in the Northwest %] and the thermal production was backed down. Charles agreed.

Nightingale asked about the status of Colstrip 3 and 4 on [Slide 14.] Charles said they only included announced retirements and discussion is ongoing. Heutte was amazed by the amount of small, old industrial coal plants on [Slide 16.] Charles said their annual output can be found on the Council database.

Coal Retirements in the WECC
Black wondered if [Slide 21] reflected Tri-State GNT members pushing hard to end their coal contracts. Charles wasn't sure but said it would be included if there was an announcement. Black suggested keeping an eye on fast-moving developments in Wyoming, Colorado and New Mexico.

Tomás Morrissey, PNUCC, asked if a higher retirement scenario is being considered for the 2021 Plan. Charles said yes, adding that details are coming later in the presentation.

Diffely said coal-to-natural gas conversions are ultimately repowering the site [Slide 23.] He asked if gas can be used in a 1960s boiler. Charles said its more of a brownfield than a repower and referenced duel-fuel capabilities in Alberta. Mike Starrett, NWPCC, added that older units are typically the best match for coal-to-gas conversion in part because they are already inefficient and are not running regularly, noting also that efficiency will go down further when converted. Heutte asked which plants have duel fuel, as they would be good for resource adequacy. Charles said she can look it up unit by unit.

James Vanden Bos, BPA, asked about weighting individual scenario results when putting forward a final resource strategy for the Plan [Proposed Coal Retirement Scenario: 2021 Power Plan.] Ollis said there is no specified weighting, that the decision is ultimately up to the Council members and the results from each scenario are meant to inform their decision, and that he will discuss methodology later in the day.

Smith wondered how PGE and PacifiCorp's stakes in Colstrip 3 and 4 and the real WECC retirement date of 2035 will affect the regional 2026 date. Ollis said the goal of the scenario is to test what would happen if more coal retired earlier than expected.

Black said Washington utilities can no longer deliver coal energy to their customers or include coal in their rate base by 2025 and predicted that the 2021 base case will have more retirements than what is currently formally announced today. Charles agreed that it may be possible.

Heutte said OR and WA have a "no coal by wires" rule, and pointed to WY's ongoing rulemaking as proof that coal plants could keep running. He asked which of PacifiCorp's plants are counted as in the region. Charles answered Bridger and a part of Colstrip adding that she has more information about WY policy in upcoming slides.

Clean, Renewable, and Carbon Policies: In-region and WECC-wide
Heutte cautioned that greenhouse gas is not just CO2 and the GRAC will have to grapple with methane at some point [Slide 27.] Charles said CO2e would be tracked in the 2021 Plan.

Almahz Negash, Tacoma Power, said [Slide 29] includes hydro in 2030. Heutte agreed, adding that CETA is a clean energy standard and not an RPS so the ramp will be different. Ollis said this will be reexamined when it's time to model, adding that it's a real concern.

Orijit Ghoshal, Invenergy, asked for more detail on alternative compliance payments and different penalty structures. Charles said she is looking for feedback on these issues from the GRAC. Starrett said converting vehicle electrification and other similar non-energy opportunities to a MWh equivalent that can be used to offset the 20% of non-clean generation will be challenging and decisions from the WUTC in implementing the law will be critical.

Smith clarified that most RECs after 2016 have a five-year shelf life but a few projects have more [Slide 31.]

Morrissey said Avista has a clean energy goal similar to Idaho Power's [Slide 33.] He also felt that the Idaho Power served more than 20% of the state. Charles said she would check that number. (She later confirmed the number is 73%.)

O'Brien asked if Canadian coal can continue past 2030 if they have CCS [Slide 48.] Charles said yes but will check.

BREAK

Incorporating Policies and Potential Implications (Part 1: Mostly Modeling)
John Ollis, NWPCC
Black asked if the RPM looks at capacity expansion triggered by market clearing prices or by more traditional, system minimum revenue requirements [Slide 6.] Ollis explained that, to some extent, it optimizes for both and explained the process. Ollis stressed that the spot market is not well represented due to modeling granularity and the fact that the NW is somewhat shielded against substantial volatility by the hydro system. Black pointed to restructured power markets and suggested going beyond a "one utility resource adequacy" approach. Ollis said that would be difficult to reflect or model a single ISO footprint as the rules for such a market are not known since it does not today exist.

Diffely asked if the AURORA inputs on [Slide 9] are for out-of-region resources. Ollis said the Aurora is primarily for an external electricity price forecast that the region sees and that the RPM is the primary tool for looking at resource expansion within the region specifically.

Negash asked if the 1st and 2nd method are fully active on [Slide 10] or if just a portion of state RPS is applied to the WECC. Ollis said the 1st and 2nd method stack restraints on each other. Negash asked if the results are more than method 1 and 2 combined. Ollis said they are doubled and he is looking into the results.

Morrissey asked if RPS percentages of load are adjusted to reflect sales. Ollis said yes in the RPM but not in AURORA, saying it could be explored. Heutte asked for further explanation

about sales versus load. Morrissey said sales could be less than line loss. Ollis was not sure how AURORA reflected losses.

Heutte asked how much the 3rd method overbuilds. Ollis said 100% more. Heutte said that's more than overbuild and asked how the model is tested. Ollis explained by example. Starrett thought the first method was more conservative and asked what the output of the second method was. Ollis said it was similar, disagreeing that the first method is inherently more or less conservative.

Garrison Marr, Snohomish PUD, asked if an outcome seen in the AURORA model was a build of thermals across the border from a state where they are not allowed but still could be dispatched to meet system energy needs. Ollis said that it was and that more details would be shown later in the day

O'Brien [Slide 12] asked if the RPS levels and Clean Energy Targets are a floor or ceiling in the modeling. He also asked if "surplus" means surplus to those targets or surplus to the system. Ollis said AURORA builds to the least cost solution and the floor will meet the constraints. Ollis added that overbuilding/underbuilding addresses where the resources are and what they serve.

O'Brien asked if any of the methods take unbundled RECs and requirements into account. Ollis said the first method does to an extent adding that unbundled REC limits are not modeled in detail and this is designed to get good market signals.

Marr asked if any operating reserve limits were violated in any runs. Ollis added the comment to the [Slide 12] list, acknowledging that there were some violations in the Southwest. Marr indicated that their model runs were showing similar results.

Jen Kelly, Northern Wasco County PUD, asked if AURORA defines REC as a vanilla term for all environmental attributes and if the model assigns cost per state. Ollis said a benefit of this methodology is it finds an opportunity cost for meeting a constraint.

Thomas Carr, Western Interstate Energy Board, confirmed that the WECC uses the sales forecast to quantify RPS targets. He added that WECC builds for one year, 10 years in the future so they rely on utility plans of expected loads and new build resources and then do an ex-post expansion if short. Carr said they don't explicitly know the REC market but assign resources to utilities when they can and check, in aggregate, if there are enough. Ollis agreed that the Council models differently but does check results.

Black cautioned that the jumps in requirements may be the biggest challenge [Slide 16] and suggested looking into optioning strategies. Ollis said optioning could work but the RPM is an agent-based model that knows the requirements while AURORA is not.

LUNCH

Incorporation Policies and Potential Implications (Part 2: Mostly Implications)
John Ollis, NWPCC, Gillian Charles, NWPCC, Mike Starrett, NWPCC
Nightingale noted that many of the states in the WECC have a 100% requirement that is not represented on [Slide 22.] Ollis stated that 40% of the load is in states without a 100% requirement and the bars represent the difference, adding that this represents following the letter of the law without incorporating goals.

Nightingale felt the slide was incorrect as zero is the wrong representation for energy goals. He suggested including a portion of the goal differentiated by the likelihood of meeting it.

Smith said the possibility of double counting and whether or not to include RECs is a regional tension point. She suggested showing the "spirit of the law" number graphically if it isn't explicitly modeled.

O'Brien asked if it was possible to model both the letter of the law and the spirit of the law to evaluate potential differences in the future build. Ollis said the Council may decide on this and the real question is how interested the GRAC/SAAC is in further exploration. O'Brien asked if the Letter of the Law option takes a state-by-state or WECC-wide look. Ollis said he might consider a state-by-state look with all of the earlier caveats.

Angela Tanghetti, CA Energy Commission, urged sticking to the Letter of the Law as goals are written less clearly and are more difficult to interpret in a simulation model.

Jennifer Gardner, Western Resource Advocates, pointed to a Colorado utility's goal that was eventually codified as a mandate. Ollis said if it is a law then it's on [Slide 22.] Charles added that staff judgement is important too.

Heutte stated that the law is the law and there will always be interpretation. He pointed to 2007's HB3543, which is still not binding. He then said the Council should, of course, reflect the law and perhaps on a state-by-state basis looking at goals as a sensitivity. Doug Larson, Larson Energy, agreed, adding that confidence should increase if a state has a goal that the major utility has agreed to meet or exceed.

Marr said it makes sense to follow the Letter of the Law for consistency and objectively applying standards.

Heutte said WA's 5116 treats the social cost of carbon differently depending on if it's a new resource or in a utility's IRP. Ollis agreed that it's a difficult situation.

Black asked if [Slide 25] fall within existing transmission system configurations. Ollis said yes, but it wasn't run with a nodal model. Ollis said transmission will be considered later in the day.

Big clean energy steps in CO, NV, NM
Doug Larson, DL Energy

Ollis pointed to Arizona IRPs that include gas and a backlash against batteries [Slide 5.] He asked for insight about this. Larson said he thinks batteries paired with renewables are a more attractive choice for utilities, particularly as the price comes down. He added that gas is not a given as there are only two pipelines and no storage options.

Heutte called modeling flexible resources the frontier of resource planning. He said models are not ready for this and the region should watch this issue. Larson agreed that the majority of resources in the CAISO queue are renewables combined with storage.

Ghoshal said as a developer they don't do stand alone storage but always develop a hybrid resource. He then asked if the natural gas moratorium is about utilities building gas plants and not IPP gas. Ollis said the study is pre-moratorium and if the IPP door was open it probably still is. Ollis wondered what prices would keep gas in the money.

Ghoshal added that you can get 30% ITC on a storage investment when paired with wind or solar.

Incorporating Policies and Potential Implications (Part 1: Mostly Modeling)
O'Brien asked about the average capacity factor for the gas illustrated on [Slide 27.] Ollis moved to [Slide 36] to answer saying that resource stacks with a high thermal mix are used less in the Northwest. Heutte asked for a definition of capability. Ollis said it's available fuel, not on maintenance with forced outages de-rated.

Heutte asked about the price of the batteries Ollis used in modeling. Ollis said that they were enough above the line that no batteries were built even after removing coal and gas. Heutte asked how much demand-side flexible resource were considered. Ollis said he didn't include any extra DR into the model.

Douglas Howe , Consultant, said that Arizona's natural gas moratorium expired last week and the commission hasn't yet put it back into place. He said they are leaning toward the Energy Modernization Plan which frowns on new, large-frame gas. He added that APS has been desperate to build rate base through large-frame natural gas. He predicted APS will make a decision in the next four to five months but not to expect any movement on the Energy Modernization rulemaking until after November 2020.

Howe said the New Mexico gas builds looked unrealistically big probably because Ollis only looked at the WECC. Howe stated that PNM has committed to not build new, large-frame gas but will build some small CTs. He called El Paso Electric a different story as they are shifting plans to build in Texas, adding that El Paso Electric is not big enough to shift the game.

Howe addressed new gas transmission, saying that the Permian Basin Transmission Lines are extremely congested and gas is being flared off. Howe called this a political and environmental crisis that is fueling expansion of the lines.

Ollis said [Slide 28] doesn't differentiate between combined cycle and simple cycle CT.

Larson suggested considering a gas death spiral as building for ramp or peaking leads to high MWh costs.

Smith asked how much detail goes into modeling gas and different flexible resources, adding that they are not one-to-one-to-one. Ollis said the answer changes depending on the model, AURORA hasn't hit massive curtailments yet but the RPM has less fidelity around seasonality. He added that the RPM obfuscates daily and hourly attributes.

Smith pointed to overbuilding curtailment as an actual strategy and wondered if any of the models look at that. Ollis said all of the models capture renewable curtailment to some extent.

Black theorized that the addition of wind, solar and batteries might make it harder for BC to recharge at night [Slide 29] which may reduce PowerEx's ability to supply western markets during the day. He asked if the models capture this and suggested checking in with system operators and Susan Cooper at BPA.

Ollis stated that hydro's inherent substantial storage reduces the value of small scale storage and makes it hard to see in the modeling. He said that gas has been the hedge against bad hydro but that might shift to solar with storage. Black clarified that he wasn't talking about new storage but the ability to deploy existing capacity.

Starrett stated that in general our connection to BC is seasonal storage where we export to BC in the spring and they sell us the energy back in the summer, rather than the nightly re-charge previously suggested. Black called this a granularity issue with the model. Ollis said the model has the granularity but not much fidelity about the Peace River System.

Implications for Filing Transmission Capacity Opened up by Coal Retirement
Mike Starrett, NWPCC
Nightingale asked about size threshold to maintain line transfer ratings. Starrett said it would have to be the size of the retiring coal plant or less.

Heutte said that most of the time this is manageable and the costs are not huge. He agreed that it did need some attention as things are moving fast but didn't think it was a showstopper. Starrett agreed saying he was encouraged by the study that showed line capabilities maintained after the retirement of Colstrip 1, 2 and 3 but pointed to the 700MW unit left running.

Regional Energy Market Update
Jennifer Gardner, Western Resource Advocates
Starrett asked about the hole on [Slide 9.] Gardner didn't know. There was some speculation from a committee member that it could be tribal lands.

Ollis said they do not model the EIM and model by the power pools. He asked for Garnder's input. She said beyond current discussions of a combined resource adequacy sharing regime there are no talks about SPP and/or CAISO expanded footprints. She said that's unfortunate as it's important for resource adequacy and transmission rates.

O'Brien asked which Advisory Committee would address the transmission bullet on [Slide 34.] Ollis said it would be best handled by another GRAC/SAAC meeting.

Starrett thanked the participants, asked for feedback and ended the meeting at 3:00.

Attendees

Rob Diffely	BPA
Aaron Bush	PPC
Rebecca Smith	ODOE
Michael O'Brien	Renewable Northwest
Fred Heutte	NW Energy Coalition
John Fazio	NWPCC
Gillian Charles	NWPCC
John Ollis	NWPCC
Mike Starrett	NWPCC
Tomás Morrissey	PNUCC
Almahz Negash	Tacoma Power
Jen Kelly	Northern Wasco County PUD
Garrison Marr	Snohomish PUD
James Vander Bos	BPA
Charlie Black	Consultant for Invenergy
Anika Roberts	NWPCC
Orijit Ghoshal	Invenergy
Bill Henry	DJoule

Attendees via Webinar

Andrea Goodwin	NWPCC
Angela Tanghetti	CA Energy Commission
Ben Brownlee	Energy Stratagies
Bryan Neff	CA Energy Commission
Cindy Wright	SCL
Clint Gerkensmeyer	Energy Northwest
Gregory Cullen	Energy Northwest
Douglas Howe	High Rock NM
David Nightingale	WA UTC
Dan Davis	US Army Corp of Engineers
Deanna Carlson	Cowlitz PUD
Doug Larson	Larson Energy

Elizabeth Osborne	NWPCC
Shamus Gamache	Central Lincoln PUD
Eric Graessley	BPA
Greg Nothstein	WA Dept of Commerce
Elizabeth Hossner	PSE
Ian Bledsoe	Clatskanie PUD
Jeff Kugel	PNGC Power
Jennifer Gardner	Western Resources
John Goroski	Flathead Electric
Lisa Hickey	New Law Group
John Lyons	Avista
Jennifer Magat	PSE
Michael McCoy	Independent
Mike Hoffman	PNNL
Nora Xu	PGE
Will Price	EWEB
Phil DeVol	Idaho Power
Rich Flanigan	Grant PUD
Rick Williams	Portland State University
Kathi Scanlan	WA UTC
Paul Nissley	SCL
Villamor Gamponia	SCL
Shirley Lindstrom	NWPCC
Terry Toland	Clark PUD
Thomas Carr	Western Interstate Energy Board
Thomas Chisholm	US Army Corps of Engineers
Toby Butterfield	EDP Renewables
Torsten Kieper	BPA
Wendy Gerlitz	NW Energy Coalition
Alaine Ginocchio	Western Energy board
Philip Popoff	PSE
Shawna McReynolds	PNUCC