

Northwest Power and Conservation Council
Systems Analysis Advisory Committee Meeting
January 30, 2015

Ben Kujala, NWPCC, opened the meeting, made introductions and reviewed the RPM redevelopment status.

Future Generation in RPM

Jim Litchfield, Consultant to Idaho, asked if there are any checks to see if the scaling is in a reasonable range. Kujala answered that the factors are inputs into the model and if you put in something that is not within the high/low forecast there is nothing to prevent that from going out.

Litchfield asked if you have to look at the ranges you generate to judge if they are within the realm of reason. Kujala said yes or you find some way to derive those parameters which is what we're going to talk about today.

Tom Chisholm, Army Corp of Engineers, stated that the price of electricity is a function of many things and wondered how you reconcile that when entering it into the program. Kujala answered that the price of electricity will come from Aurora.

Fred Huetten, NW Energy Coalition, speculated that in 20 years the price of electricity will not be dominated by the price of gas and wonders what the model will do then. Kujala noted the issue.

Dave LeVee, PwrCast, asked about the how granular the price inputs into Aurora will be. Kujala answered that the input is done in quarterly prices and the model parameters take those prices, get a distribution and the dispatch is based on that. Kujala suggested a future SAAC meeting to dig into this issue. Clint Kalich, Avista, stated he is looking forward to that and wants a deep dive.

Litchfield pointed to slide 7 asking if you can inspect the peak load extremes. Kujala said yes and showed a way to see every game. Thomas Morrissey, PNUCC asked if it was possible to see extreme loads on a daily or hourly basis. Kujala answered no but he wants to create a graphic to show that. He stated that capacity logic will have a peak load forecast with its own set of risks. Morrissey asked what the time scale will be. Kujala stated he believes that it will be peak load hour.

Phillip Popoff, Puget Sound, asked if the distribution of loads reflects both growth and weather. Kujala said the model uses a weather normalized load with distribution around it to make decisions. Popoff stated that his model includes weather variability with other macroeconomic factors. Kujala stated they are not explicitly separated out in this model but right now it adds volatility which could be interpreted as weather. However, the RPM uses a weather normalized load for input.

Sibyl Geiselman, eweb, asked how you know the distribution will be wide enough to catch the “tails.” Kujala proposed we line up with what comes up in the high and low load forecasts which should include parameters that came out of the Demand Forecast Advisory Committee (DFAC).

Huette asked what is to be gained by having the model go to the quadratic form [slide 8]. Kujala answered that it seems to tighten up the at the end of the 20 years a bit.

Kujala explained the concept of jumps [slide 10]. Litchfield asked if it applies to all the parameters. Kujala stated it applies to loads, natural gas price forecast, and electricity price forecast.

Ehud Abadi, BPA, asked if jumping was in the previous model. Kujala responded yes and the Advisory Committees came up with the parameters for jumps. Abadi asked how much the jump tells you. Kujala said it explains volatility in a persistent way. Popoff stated that stochastic analysis is not focused on short term

aberrations so jump factors seem odd. Kujala agreed but stated his opinion it should be looked at as a boom/bust cycle that doesn't take weather into account.

Kujala explained the model DNA [slide 11]. Abadi asked how this model works with the Aurora as they use the same inputs. Kujala answered that there is one Aurora forecast that goes in. Abadi asked if you could have a jump that takes place in the gas forecast that doesn't take place in the power price forecast. Kujala answered yes however there is a factor that applies to the power price forecast based on the natural gas price and pointed to his working draft of the appendix.

Litchfield asked if the time step in slide 16 is quarterly average energy. Kujala answered yes and explained.

Abadi asked if the critical assumption is that the forecast is normal. Kujala said no and had to fit the high and low and take an average of the two to get a parameter.

Mark Dyson, RMI, asked if there was a way beside the historical look back to calculate variance. He pointed to new technology like behind the meter resources. Kujala stated that there will be some representation of that in the future. He said there are also shapes that go with conservation but this is a starting point. Kujala said that there are climate change analysis models that could test variation but the past model had higher summer volatility. Dyson stated that the idea makes sense to him.

Litchfield asked what the lines represent in slide 22. Kujala answered the red is high from the DFAC, blue is low and black is a future in the model. Abadi asked how the parameters are picked. Kujala stated that the parameter for the annual growth model is based on the high and low forecast.

Litchfield asked for clarification on the futures and said that he thought there was random year to year variability. Kujala said even the jumps don't take you away from this and illustrated the concept on the white board.

Kujala pointed the SAAC to future topics and asked for inputs.

Litchfield stated that in the past the outputs of RPM are difficult to interpret. He wanted to know you turn the outputs into a story of what the region is doing in the next 20 years. He stated he wants a discussion on how to interpret the outputs. Abadi agreed and pointed to the GRAC meetings as an example. Kujala stated that after an initial set of runs we will come together and dig in.

Litchfield stated that he is coming from a top down perspective and said the bottom line is the eight decision makers and this model will inform them. He said I'm trying to figure out how this tool can help inform those eight decision makers.

Kujala stated that the model informs the SAAC and we then come up with high level summaries for the Council Members. He then stated that the SAAC might not all agree, so members formally dissent with the SAAC's decision and that dissent will be provided to the Council Members. Kujala hopes that the SAAC will come together to tear apart RPM results in a round table setting and help provide perspective for the Council. Litchfield noted that this is different from the past.

Abadi stated that the only way for the SAAC to do this is to learn how they constructed the futures and how the dispatch goes, etc so when it comes out with an efficient frontier I can be confident taking it to my bosses at BPA. He concluded by saying how we do this is by knowing the ins and outs as best we can.

Litchfield agreed that that would help form some confidence in the outputs but asked the more fundamental question about the efficient frontier with 1000s of dots and each dot is 850 games. So what does that mean for the plan? The Council hasn't chosen a dot. **Kujala admitted that it needs work and we should have a meeting on how to take results out of the efficient frontier and report them to the Council. Litchfield agreed.**

Litchfield then brought up Net Present Value (NPV) and said the model is different than what everyone else does. Kujala said that is a good point and should be paired with optimization. Huette said the rest of the utility does not treat that the same and there is a lot of variation. Kujala said we should be transparent with the entire model.

Chad Madron, NWPPCC, reviewed upcoming events for the Power Committee including scenarios and strategies that RPM will analyze. Madron mentioned the metrics that will be used.

Geiselman asked where you get the final parameters. Kujala answered that there is a method and the parameters are a function of the forecasts provided. He noted that they will change based on information we are given. He summarized stating that the parameters are not as important as the method.

Kujala stated that he got the annual trend based on the forecast, the seasonal variance based on the history and the jump parameters will come from a survey. Geiselman asked if they will be specific inquiries to the other advisory committees. Kujala said yes, to the Natural Gas Advisory Committee and DFAC.

Popoff expressed concern about the consistent risk story that gets told. He wondered if you're talking about mean reversion to long term trends or not. Kujala agreed and stated that the challenge is explaining the art to the advisory committees. Huette added that we are trying to see the future as best we can and that is what scenario analysis does.

Flexibility Assessment Methods

Aidan Tuohy, EPRI

Litchfield stated that Aurora was not refined when it came to hydro dispatch [slide 6] and wondered how you overcame it. Kujala clarified that this is BPA's Aurora run which is different and stated how he tied it to a regulator.

Kalich asked how to account for the discrepancy between committing more thermal resources and then backing them down. Tuohy agreed and said there may be a need to examine different techniques. He stressed that this is more of a method. Kujala added that this is agnostic to the dispatch and can use any of them.

Chisholm asked why there is such a big difference between six and eight hours. Kujala stated that it is inherent to the parameters in Aurora which may not be accurate and there may be data gaps. Litchfield suggested it may be technology like in coal.

Litchfield asked if this analysis used the full NW wind fleet. Tuohy stated they used one minute data that was provided. Kujala stated that Western Wind and Solar provided the intra-hour part. He said the 80 years would have a similar record. Litchfield stated that there is about 8000 MW of wind now and asked again if this data used the full fleet or historical averaged data. Kujala answered full fleet plus a BPA forecast out to 2015-16.

Kujala summed up stating that this is an example of what can be done to come up with duration curves. Kalich asked there is statistical analysis of this data set noting that it looks intuitive. Kujala answered it would be hard to decide what to pull out. Litchfield pointed to 1939 stating that it jumps up and down in flexibility but has a dry shape so the average doesn't describe the shape. Kujala agreed that it's a challenge. Litchfield agreed that it's a challenge and pointed to coming up with LOLP.

Kujala stated that operators are not hitting these numbers and there is extra variance that impacts this but this could be used as a ruler to establish benchmarks and come up with a comfort level.

Kujala asked that people who want to be formal SAAC members please contact him. He explained that a formal member makes a commitment to come to as many meetings as possible and gets to submit a formal dissent to The Council.

Kujala closed the meeting.

Attendees on site

Ben Kujala	NWPCC
John Ollis	NWPCC
Ehud Abadi	BPA
Fred Huette	NW Energy Coalition
Sibyl Geiselman	eweb
Tom Chisholm	Army Corp of Engineers
Jim Litchfield	Consultant to Idaho

Attendees via Go-To-Meeting

Robert Anderson	
Barbara Miller	Army Corps of Engineers
Brian DeKiep	NWPCC
Clint Kalich	Avista
Dave LeVee	PowerCast
Elizabeth Osborne	NWPCC
Jimmy Lindsay	PGE
Cam LeHouiller	
Mark Dyson	RMI
Mark Strokes	Idaho Power
Marty Howard	
Dennis Morgan	
Phillip Popoff	Puget Sound
Robert Petty	BPA
Sandra Hirotsu	
Shirley Lindstrom	NWPCC
Thomas Morrissey	PNUCC
Aidan Tuohy	
Stan Williams	BPA
Zac Yanez	Snohomish PUD