

Northwest Power and Conservation Council
Systems Analysis Advisory Committee
May 21, 2015

Tom Eckman, NPCC, opened the meeting at 9:30. He called for introductions and reviewed the agenda.

Methodology for Calculating Long-Term Peak Forecast with Temperature Sensitive Loads

Presenter: Massoud Jourabchi, NPCC

Slide 3

Sibyl Geiselman, EWEB, asked via chat if there a trend variable that captures changes (winter decline?) in temperature sensitive loads over time? She continued stating that she thinks the temp sensitive portion of loads might change with conservation impacts over time. Jourabchi answered that there is no explicit variable for reflecting conservation but stated that the model is updated every year so structural changes like conservation and climate change are captured. He continued stating that hourly data comes from Balancing Areas.

Slide 4

Tomas Morrissey, PNUCC, asked if the temperature sensitive load multiplier is applied every hour or just at peak. Jourabchi stated that he will clarify how he puts a shape around the data for each hour.

Slide 5

Morrissey asked if the 22.538 is based on the shape built from 1995-2013 data. Eckman answered yes.

Geiselman asked if Jourabchi does any back casting at this phase of the modeling as a check. She gives the example of comparing similar historic days of the week and temperature to more recent actual hourly data? Jourabchi answered that when the model was developed in 2007 and refined in 2009 they went back and captured the actual peak data. He found that the model can pick up the magnitude of a peak but would miss morning peak versus afternoon peak in some months. He stated that in general he did not find a big miss in the model but admitted that if they had data from 1928 and up they could have a more extensive back cast. He stated that the model does a reasonable job of forecasting loads two to three years into the future.

Slide 6 Extreme Weather Events

Morrissey stated that the corrections that lead to higher winter peaks are not in the spirit of his original concern: that the Council's winter peaks are already too high. Eckman asked for Morrissey's analytical concerns. Morrissey explained that winter peak events in Genesys seemed extreme compared to historical events. Eckman said that the record they used is not the same as the 86-year record. Morrissey restated his original comments were not designed to increase the winter peaks as they looked too high to begin with.

Jourabchi stated that the data is then run through stochastic analysis to get to an expected peak. Eckman stated that there are issues in

applying this record to the whole and admitted it could be done differently.

Geiselman stated that from an analytical perspective she is concerned that the once per year update is not adequately capturing trends in load related to conservation acquisition over time. She continued stating that she does not see how this is capturing potential declines in the temperature sensitivity to winter loads over time. Jourabchi answered that the data is hourly/annually. He stated that for reliability he takes future conservation targets into account but the past conservation targets are already netted out of the load. Eckman stated that it's always a limitation of econometric equation fitting. He continued stating that they are using underlying frozen efficiency load shapes going forward. Jourabchi added that weather normalized energy by month is reflective of changes like Federal standards, rooftop solar and others.

Geiselman then asked if it's only to the weather normalized energy- not the portion of the load- that is actually sensitive to weather. Eckman needed clarification. Geiselman could not get through on Go-To-Meeting and would try again later.

Expected Peak Loads in the RPM

John Ollis, NPCC

Slide 4

Geiselman asked if Ollis compared this to any of BPAs peak forecasting models? Do they do any 1 in 10 vs 50-50 peak forecasting that you could use to check your distribution? Ollis answered that he has not.

Slide 5: Distribution of Expected Peak Load Factors.

Morrissey asked if Ollis had an example of revised normal quarter peak loads expected. Ollis stated that he didn't and offered to go into the RPM. Morrissey suggested they do that offline.

Update to the Calculation of the Adequacy Reserve Margin

John Fazio, NPCC

John Ollis, NPCC

Villamore Gamponia, PSE, asked if you're still trying to add capacity to the 5% LOLP. Eckman answered yes if it needs it. Fazio reminded him that in the RPM there are no generic capacity-only or energy-only resources.

Gamponia asked if there is an assumption going into RPM about the capacity contribution of each generic resource. Eckman stated yes, each one has its own capacity and energy value.

Slide: ARMe and ARMc Formulae

Gamponia asked what is assumed about the Southwest Market for 2026-2031. Fazio answered that they don't count any imports in the equation. Morrissey stated that there could be 3400 total in spot market.(hard to hear). Fazio concluded by saying that when the

contracts expire they go away as he doesn't assume they will be re-upped.

Slide: Average ARMc-ARMe of Load Range in RPM

Morrissey asked if you use one ARM per quarter or one ARM for the total study. Ollis answered one ARM total. Fazio emphasized that there is a fundamental relationship between the ARM and load and load shape and resources.

Gamponia asked if Ollis was sure that the ARMc for Q1 is achieving a 5% LOLP. Ollis and Eckman answered yes. Gamponia restated that if you're averaging it for the year... Ollis stated that it is not averaged for the year but for low/medium/high. Morrissey asked if Genesys was rerun with the new loads. Ollis answered yes.

Jim Litchfield, Consultant, stated using 1.8 may create high levels of inadequate plans. Ollis stated that Jourabchi's new numbers haven't been run through the RPM yet. He then said he is open to suggestions on how to use the numbers but 2026, which is the middle of the study, seemed like the best opportunity.

Litchfield stated that he is pointing to a bigger problem: if the model is building to a 1.8 factor and you see high loads then you should have been building to a 3.8 factor. Ollis answered that the model will curtail if it sees something above the ARM so those plans would be kicked off the efficient frontier.

Fazio stated that picking the highest number, 3.8, gives you adequacy but you would be overbuilding in a number of cases. Fazio stated that he is unravelling why these numbers are changing and trying to come up with a robust relationship to put into the RPM.

Litchfield stated this seems like a structural problem in the RPM and it would be better if the RPM could see what load case it's in (low, medium, high) and use an appropriate ARMc. Litchfield admitted that this would require additional logic. Ollis called it a good action item to have the ARMs change over time but he is not sure about risk level.

Gamponia asked if a load could jump from low in one quarter to high in the next. Eckman said it moves annually. Ollis reiterated that he supports exploring having a time series of ARMs in the future.

Geiselman stated that along those same lines, this is applying a more aggressive ARMc to the action period than needed to achieve the 5% LOLP. She asked if this would result in a higher level of adequacy within the first 5 years. Ollis called that a good point. Fazio pointed to the incorporated penalties.

Litchfield asked for clarification of the number 1.8. Eckman stated that it's a percent. Fazio said the RPM doesn't build anything if the capacity is 1.8% higher than peak load.

Fazio stated that they will bring results to the group before the final for feedback and that they are open to better ways. Litchfield approved.

Litchfield stated that the model should be sensitive to major changes in ARM requirements. Fazio reminded him that it is making multiple decisions. Ollis stated that course corrections could be made quickly.

Selected Findings from Scenario's 1A, 1B and 2C Updated to Reflect Revisions in ARM and Peak Load Calculations

Tom Eckman, NPCC

Average cumulative renewable generation winter peak

Scenarios 1a and 1b [slide 9]

Morrissey asked if solar gets less expensive in the planning horizon. Eckman stated yes it beats out wind. Ollis pointed out that the model doesn't option solar and only picks it up for RPS.

Average cumulative thermal generation-winter peak

Scenarios 1a and 1b [slide 10]

Litchfield asked if this is after Boardman and Centralia are out. Eckman stated yes. Litchfield stated that it's way less than replacing them. Eckman agreed and said part of it is winter peak reduction from EE.

Distribution of Net System Cost for Least Cost Resource Strategy in Scenarios 1b and 2c [Slide 17]

Litchfield stated that something looks wrong with this chart. Ollis answered that it is a graphics and smoothing of the distribution problem. Eckman stated that they have bought a new graphics program and will try it out.

Average Cumulative Energy of New Resources- Least Cost Strategy Scenario 2C [Slide 24]

Morrissey stated that this slide tells him that the preferred plan of the region doesn't change much with carbon risk. Eckman agreed stating that carbon is not a near term driver. Ollis mentioned that thermal builds are slightly penalized but it's hard to see.

Average Cumulative Thermal Generation [Slide 25]

Eckman asked if a PDF of this slide would be more helpful. Morrissey and Litchfield agreed that it would. Litchfield felt that it doesn't illustrate the need to replace Boardman and Centralia. Morrissey asked if this is dispatch or energy. Eckman answered dispatch.

Average Winter Peaking Capacity of New Resources- Least Cost Strategy Scenario 2c [Slide 27]

Gamponia asked if there is a range on the assumptions of the peak contribution of conservation. Eckman answered there is a range of effects by load shape. Gamponia called that a big assumption. Eckman agreed and stated that much of the data is from 1990 and called for an update.

Average Cumulative Conservation-Winter Peak Capacity [Slide 28]

Gamponia asked if the peak contribution of conservation is adjusted by the weather draw. Eckman answered no, it's a fixed relationship. Fazio said it's a percentage that changes from winter to summer.

Average Cumulative Demand Response-Winter Peak [Slide 29]

Litchfield stated it would be good to have a PDF of the first 5 years for this. He also asked for a case that didn't have DR. Eckman stated that we will run that as well.

Total Regional Power System CO2 Emissions-2030 [Slide 33]

Morrissey stated that the combined coal and gas [slide 36] looks low and asked if staff tried running the carbon for 2016 and testing it against the last couple of years. Eckman agreed that the timeframe for compliance is important.

Ollis suggested going to the model. Morrissey stated that the group should finish the slide deck first.

CO2 Emissions for In-Region Resources Affected by EPA's Proposed Clean Power Plan 111d Regulation -2030 [Slide 34]

Morrissey asked if the negative tails in this slide come from exporting hydro. Ollis stated that they come from distribution smoothing.

List of Scenarios [Slide 37]

Morrissey asked if there will be a sensitivity where DR is less available. Eckman answered yes along with other sensitivities as well.

There was casual discussion on the closing schedule of North Valmy Generating Station.

John Ollis went to the RPM Model

Morrissey said the historic dispatch for coal and gas for the region hovers closer to 8000 aMW per year and these charts seem smaller. Ollis didn't think he had other dispatch. Morrissey suggested doing this another time.

Morrissey asked what "other must run" is. Eckman stated its cogen, CHP, amalgamated sugar and other things.

Gamponia asked if staff is using the 1.8 ARM and if you have a distribution for ARMc. Eckman stated that we are using a single value. Gamponia stated that the outcome will be different. Eckman answered that no portfolio has been run through Genesys yet.

Gamponia asked if staff was going to use Genesys to calculate ARMc. Fazio stated they did that to begin with. Ollis stated that there is no time dependence on the ARMs and that would have to be an enhancement to the logic.

Fazio stated that the ARMs shown were not adjusted for Jourabchi's revisions. Fazio stated that the ARMs will change and things will be re-run.

Eckman noted other changes: the relationship between average and peak in the summer for EE and the new Analytical platform that will happen as well. He concluded by saying that it looks stable.

Eckman ended the meeting at 11:45

Attendees On Site

Tom Eckman	NPCC
John Ollis	NPCC
John Fazio	NPCC
Tomas Morrissey	PNUCC
Jim Litchfield	Consultant

Attendees via Go-to-Meeting

Ehud Abadi	BPA
Anne Falcon	EES Consulting
Brian Dekiep	NPCC
Daniel Suurkask	Birch Energy Economics
Diane Broad	Oregon Dept of Energy
Fred Huetten	NW Energy Coalition
Kevin Nordt	Grant County PUD
Mark Stokes	Idaho Power
Massoud Jourabchi	NPCC
Michael Deen	Public Power Council
Mike Hoffman	PNNL
Shirley Lindstrom	NPCC
Sibyl Geiselman	EWEB
Villamore Gamponia	PSE