

**Northwest Power and Conservation Council
Conservation Resources Advisory Committee
September 10, 2019**

Massoud Jourabchi, NWPCC, began the meeting at 9:30 with introductions.

**Demand Forecast Advisory Committee Meeting Load Forecast Range Under Climate Uncertainty
Massoud Jourabchi, Steve Simmons, Dan Hua and Adam Rovang**

Tom Potiowsky, NW Economic Research Center/PSU, asked for an explanation for the drop in DSI firm sales in 2000 [Slide 4.] Jourabchi explained that a spike in the cost of energy coupled with a lack of global competitiveness forced the closure of most DSI customers in the region.

Tomás Morrissey, PNUCC, confirmed that the forecast data comes from IHS Markit. Jourabchi said single and multi-family data comes from IHS while commercial comes from employment data plus Council information about square footage/per employee. Jourabchi added that industrial is benchmarked to Global Insights output. Morrissey asked if state-generated population numbers have been compared to this. Jourabchi confirmed that state economists on the DFAC look at these numbers.

Terry Moreland, independent, asked about the maps on [Slide Average Winter Temperature Warming by 2040s] Jourabchi explained that they represent the Columbia Basin and match well with the Council's footprint.

Moreland recalled that coastal areas may be cooler and asked if that means cooler than the rest. Jourabchi answered yes, coastal areas may remain less warm than the interior.

Amber Rider, PGE, asked what number was used for max AC penetration on [Slide 23.] Jourabchi said it was kept to one as per NEEA data.

**Indirect Impacts of Climate Change on Load Forecast in the Northwest
Adam Rovang, intern, NWPCC**

Morrissey asked what year [Slide 27] represents. Rovang answered the slide represents median impacts from 2080-2099 and the work comes from outside the Council. Rovang offered to send Morrissey the paper.

Moreland asked about the studies' assumptions about adaptations and policy changes within these forecasts. Rovang said these studies assume staying at the current rate of emissions adding that these changes will occur slowly over years, making them slightly insidious.

Potiowsky asked if there was any insight into the demographics of the climate-induced migrants represented on [Slide 29.] Rovang answered that poorer counties will be hit harder so migrants will likely bring a decrease in per-capita income.

Potiowsky noted that NW mortality is expected to be less than the rest of the US and asked if that fact was incorporated into the baseline forecast on [Slide 30.] Jourabchi answered that the population baseline comes from Global Insight, which hasn't explicitly included climate change impacts.

Morrissey asked how this changes the annual growth rate assumptions. Rovang said the annual increase in population would be about .2% extra growth, which would less migration the Northwest has seen in the last 30 years.

Moreland pointed to the vast amounts of uncertainty with this work and wondered if it was worth undertaking in the Power Plan. Jourabchi agreed, adding that it's good to explicitly know this information.

Morrissey asked if adjustments on [Slide 32] were applied to the whole sector or just used for the new portion of climate-induced migration. Jourabchi said this is delta was applied to the whole sector.

Morrissey noted that single-family is higher across the board than multi-family on [Slide Impact on residential and commercial sectors] then asked about the discrepancy with single family new additions. Jourabchi pointed to the shift from new single-family to multi-family construction adding that the data on the top of the slide doesn't take climate change into account while the lower section does. Morrissey asked where the 25% number came from. Jourabchi said it was an estimate and upcoming slides will show that the number is inconsequential.

Potiowsky asked if there is any change in household size. Jourabchi said there is a very small shift. Potiowsky said he's trying to wrap his mind around a 1% change in population and a +1% change in single family. Jourabchi said this might be caused by historic over response by builders. Potiowsky cautioned that this runs against the housing shortage narrative. Jourabchi answered that this doesn't talk about a shortage but about a shift from single to multi family. He added that this is a long-term look while shortages tend to be over just a few years.

Moreland called the 7.38 positive change in the paper industry on [Slide 34] surprising. Jourabchi agreed that some figures have been unexpected and individual utilities may see different numbers.

Morrissey asked if the table only looks at population change or if it includes other variables. Jourabchi answered that it only looks at population for simplicity. Morrissey wondered if population assumptions implicitly assume other variables. Jourabchi agreed saying you need a full, macro-economic model to truly understand this.

Morrissey pointed to the decrease in lumber noting that you would have a hard time pinning that decrease to population growth. Jourabchi cautioned against searching for causality.

Rider asked how to interpret the origin of the 2022 number on [Slide 36.] Jourabchi said he will follow up off line.

Moreland asked about the starting case on [Slide 40] wondering if the shape comes from the variability of climate change or modeling. Jourabchi said it isn't modeled and the smooth shape comes from using a constant heating/cooling degree days value.

Morrissey pointed to a typo on [Slide 40.] Jourabchi thanked him saying the label on the graph is correct while the label on the slide is wrong.

BREAK

Crosswalk from Daily to Hourly Temperatures

Dan Hua, NWPCC

Morrissey said the delta between the lines on [Slide 52] seem a bit larger than typical climate change impacts. Hua agreed, saying this is three days in 1950, which was the coldest on record.

Moreland suggested picking a couple of scenarios for the work instead of all. Jourabchi said this is complicated as we need a direct link between hydro generation and loads. He added that river flow and other information will be coming from Bonneville will help.

Potiowsky said there's many ways to make comparisons and some will minimize huge differences. Hua agreed.

Morrissey said it would be interesting to see high-level, yearly summary statistics including max, min and average temp. Hua said he can send that information to any interested parties.

Potiowsky asked if Jan 02 on [the Historical 1987 Hourly Shape.... Slide] is also 1987. Hua said it is the 1987 hourly shape for all three days.

Potiowsky asked about correlation between temperature and shape. Hua moved to [Slide 51,] saying the climate change temperature only has so much information and the shape is not from the coldest or hottest day but one day in a historic year.

Solar Load Forecast

Steve Simmons, NWPCC

Morrissey stated that there is data that shows WA state with higher values than those on [Slide 63.] Simmons thanked him, answering that his slide doesn't have any preliminary data in it.

Jordan Prassinis, Idaho Power asked about residential customer saturation [Slide 63.] Simmons offered to look into the details. Prassinis said Idaho has seen a surge in net metering for agricultural customers over the past year and suggested the Council staff keep an eye on that.

Morrissey stated that [Slide 64] shows a bump not seen in [Slide 63] that could cause an impact due to quadratic growth. Simmons wasn't sure what was causing the bump and didn't think it would have a big impact but offered to examine it further and follow up.

Moreland asked how different the slide would look if it were adjusted for state capacity factors. Simmons said Idaho has the best profile but Oregon and Washington are seeing more installations.

Behind the Meter: Solar + Battery

Steve Simmons, NWPCC

Moreland asked if [Slide 14] takes spring hydro production into account. Simmons answered no, adding that solar + battery is not in the base.

Morrissey said [Slide 15 and 14] look aggressive for residential solar + batteries. Simmons assured him that this will not be the forecast but merely a look at the possible effect.

Moreland confirmed that [Slide 21] is in the base case before asking about uncertainty ranges. Simmons said there will be a high and low. Morrissey asked for an explanation about why these are lower than

the Seventh Power Plan. Simmons said one reason may be because this wasn't done in Energy 2020. Jourabchi added that this represents what customers would do without any mandates or regulatory shifts. Morrissey said the 10% stock share feels low. Simmons said it's taking a while for gas cars to retire in the model.

Moreland noted that WA State Ferry system and busses around the Puget Sound area are looking at electrification [Slide 23.] Simmons said they will be forecasting busses. Rider asked if this includes fleet cars or just personal. Simmons thought that fleet was rolled into this.

Summary

Massoud Jourabchi, NWPPC

Morrissey asked when comments are due. Jourabchi said they can come at any time.

Bud Tracy, independent, said he was encouraged by the rigor and different methodologies used but cautioned that in the past hydro generation and climate trends, but NOT climate change, was used and *(he cut off here but I think he's alluding to a mistake.)* Tracy cautioned against making the same mistakes this time. Jourabchi said this is one small part of a larger analysis and assured him that the final analysis will include at least one small mistake. Tracy thanked him and again approved of the rigor. Jourabchi said the goal is to get to good initial conditions and then try scenarios.

Moreland said after a career of forecasting he's learned that the sector requires a large amount of humility.

Jourabchi thanked the room for their attention and adjourned at 12:30.

Attendees

Massoud Jourabchi	NWPPC
Steven Simmons	NWPPC
Dan Hua	NWPPC
Terry Morland	independent
Tom Potiowsky	NW Economic Research Center/PSU
Adam Rovang	NWPPC
Aaron Bush	PPC
Bud Tracy	independent
Amber Rider	PGE
Tomás Morrissey	PNUCC
Ryan Bracken	NW Natural
Annabel Drayton	NW Energy Coalition
Peter ???	BPA
Glen Boos	BPA

Attendees via Webinar

Brad Forsyth	Avista
Jim McMann	Better Climate
Jordan Prassinis	Idaho Power
Mike Hopkins	Fortis BC
Villamor Gamponia	SCL
Elizabeth Osborn	NWPPC
Stephanie Price	PSE