Northwest Power & Conservation Council
Demand Forecast Advisory Committee
July 14, 2023

Steven Simmons, NWPCC, began the meeting at 9:00 by calling for introductions. Chad Madron, NPWCC, reviewed the best way to interact with the Go-to-Webinar platform.

Simmons announced that Massoud Jourabchi, NWPCC, will be retiring soon. Jourabchi confirmed.

Demand Forecasting at the Council
Steven Simmons, NWPCC

Aliza Seelig, PNUCC, asked if moving to the ITRON model would affect the Council's ability to openly share information [Slide 5]. Simmons answered no, the Council plans to stay open book. Seelig again asked if the proprietary parts of ITRON would impede sharing. Simmons assured the room they can publish results.

Zeecha Van Hoose, Clark PUD, asked if these are the Metrix tools. Simmons answered yes, the LT (long term) and NT (hourly). Van Hoose asked if there will be access to Council data. Simmons said there will be access to input and output data.

Stephanie Price, PSE, pointed to the number of regional utilities that subscribe to ITRON including PSE, saying she would like to participate. Simmons thanked her and said there will be a lot of opportunity for input and participation.

Developing a Short-Term Load Forecast Model
Dan Hua, NWPCC

Price voiced confusion about the annual load shown on [Slide 28] and the regular monthly load the Council usually does. Simmons listed the Council's different forecasting methods including the long-term, econometric, and end use forecast . Price asked why they are not used here. Simmons said they have been intertwined in the past and may be used again, but they are also investigating other methods.

Curtis Dlouhy, OPUC, asked if the feed forward data was used in the time series portion of the model [slide 53]. Hua said it was used in the output. Dlouhy then asked how the projections would look with just the feed forward data. Hua said he has plots of that but inputting the feed forward data into the LSTM improves accuracy.

Price asked if the hourly difference data was isolated to check for particularly well-performing or poor-performing hours. Hua said not but he should. Price pointed to past, hourly modeling work that found issues with the temperature data set when moving from midnight to hour one.

Price wondered how to differentiate between heating and cooling loads and asked if temperature is added as is or modified in some way like splitting into degree days [Final Slide]. Hua moved to [Slide 45] and said the predicted data is the hourly temperatures of the ten previous days while the feed forward data uses four temperatures at the same hour.

Price understood his methods and said her models had trouble distinguishing between heating and cooling in the shoulder months. Hua said he could use the temps as they are without calculating heating or cooling days and the network will figure it out.

Simmons pointed to somewhat larger errors in April. Hua said he did not have April plotted.

Seelig asked what gives staff pause about these new methods. Hua said he was concerned with how far into the future he could look using this method. Seelig asked for more clarity around that. Hua said the model is based on and therefore dependent on historical data which could cause bigger errors the farther out you go.

Grant Forsyth, Avista Corp, said the model looked promising and asked if the correlation of the errors over time has been explored. Hua said he only tested data with one year. Forsyth asked another question. Hua said he has not looked at the correlation and offered to talk more offline. Forsyth added that he sees bigger errors when you get to two years out.

Dan Kirschner, NW Gas Assoc, asked if trends over the last 10 years could be tracked. Hua said he could look into it, adding that the year is not part of the data, but could be useful.

Alison Jacobs, PSE, asked what this will be used for as the temperature is the big driver of hourly models. Hua said he will use the climate change data set. Jacobs asked what the outputs will be used for. Simmons said this will be used for some of the Resource Adequacy work especially for extreme weather. Jacobs thought that approach made sense.

Van Hoose pointed to her past work with a neural nets and thought model robustness was a continual challenge. Simmons also worked on neural nets in the past and noted that this seemed promising. Hua said these are “not your father’s neural network” but a “deep learning network” with many layers that was developed in 2016-17.

Yue Liu, Tacoma Power, approved of the approach for predicting load shape and absolute value. She asked if the models were trained one-by-one. Hua answered yes, he stared with the feed-forward network.

Liu asked if concurrent training was considered to improve accuracy. Hua thought that would be hard to produce enough advance data but said he would consider it.

Liu then asked if data cleaning or engineering was used. Hua said the networks need Order One numbers but temperatures are not Order One. He then explained how he fit the temperature data into the model.

Price noted that the output will be used for Resource Analysis and asked if there plans to layer on additional shapes for emerging loads. Hua said the load ratio could be manually manipulated. Price cautioned that PSE is very concerned with peaks and is seeing the load shape changing significantly ten to15 years out due to EVs. Hua said that makes sense as EVs were not a historic concern.

Dor Hirsh Bar Gai, NWPCC, said they are exploring transportation solutions and will show more information later in the presentation.

Data Center Load Forecast
Massoud Jourabchi, NWPCC

Seelig questioned using the frozen efficiency approach for data centers [Slide 11] as they are not trying to implement efficiency programs for data centers. Jourabchi answered that frozen efficiency has uses beyond energy efficiency like forecasts. Jourabchi said the draft forecast assumes improvements would stay as they are.

Seelig confirmed that the improvements shown would not go beyond Moore's Law and Koomey's Law. Jourabchi confirmed, noting that Moore's Law might not be as useful as it once was.

Forsyth said tax preferences will drive where these data centers locate. Jourabchi agreed.

Simmons confirmed that [Slide 13] illustrates shaping and not an annual profile. Jourabchi confirmed but said it might be more prudent to use BPA's forecast for resource adequacy.

Price wondered if stakeholders would push back against assuming a higher load for Resource Adequacy. Jourabchi said we need good load shape data and the ability to see five years out. He noted that experience shows data centers moves very fast and suggested that it needs its own dedicated forecast to track all the trends.

Price understood the tension between forecasting for load and forecasting for rates and thought utilities needed bigger solutions. She wondered how to reconcile that. Jourabchi called it an interesting question and said a lot depends on where the utility is, access to telecom hubs, and more.

Ben Ulrich, EWEB, wrote, I wonder how common it is today (or will be in the future) for Data Centers to participate in Demand Response programs? As we forecast the peak demand, should we be assuming these customers may have retail contracts that include elements of demand response?, in the question pane.

Jourabchi said demand response has been around for a bit, but it comes down to the value of what DR could offer a data center. Seelig asked if traffic could be partially reduced. Jourabchi said the opportunity to shift load is there, but it comes at a risk.

Blake Weathers, Umatilla, thought that IP traffic trend and BPA's forecast is mainly driven by transmission constraints [Slide 16]. He thought BPA's capacity prediction looked correct. Jourabchi thought BPA's flattening might be a caution against the uncertainty. Weathers agreed there is a lot of uncertainty in the next ten years.

Price noted that PSE energy rates are going to change and that will influence co-locator growth. She wondered if regional price increases might impact customers. Jourabchi agreed and said the total cost of data centers should be looked at as total clicks are what they care about.

BREAK

Transportation & The 2021 Power Plan
Steve Simmons, NWPCC
There was no discussion.

Transportation Sector Modeling
Dor Hirsh Bar Gai, NWPCC

Price pointed to PSE's forecast saying that it's important to consider demand and management scenarios at the same time [Slide 5]. Hirsh Bar Gai asked for a clearer definition of demand. She said demand is what a customer would do without any intervention while EV management would basically be a DR program. She said developing assumptions about DR is important for mitigating peak loads so it's important to do both at the same time.

Hirsh Bar Gai said the hourly shape is the end product, not the annual load. Simmons said EV charging peak coincides with afternoon system peak. Because of this Simmons said they built in assumptions like work-based and retail charging, but not utility programs like TOU rates.

Jourabchi suggested exploring the impact of climate change on EV performance. He also pointed to the quick growth of more efficient batteries that may further influence the profile. Hirsh Bar Gai said they will be exploring climate change and efficiencies are forward looking. Jourabchi clarified that he was talking about the charging profile.

Allison Jacobs, PSE, suggested an intermediate step between vehicle stocks and load consumption. She thought this would help reign in issues like workplace charging where there are only five chargers available. Hirsh Bar Gai thanked her and said he will be reaching out for more help.

Price addressed the volume of trucks entering Oregon [Slide 11] and pointed to studies that examine the electrification of the I-5 corridor. She wondered if that could be helpful. Simmons said the 2021 Power Plan looked at actual consumption and fuel sold in-state.

Jacobs thought states should be siloed because of policy variations. She pointed to policy affecting the price of gas in WA that could then affect fleet management decisions.

Jourabchi asked if the pattens of charging approach is the same for a school bus as an EV car. Hirsh Bar Gai noted that they use look up tables to increase granularity.

Price pointed to increasing electrical rates, asking how rate forecasts impact projected vehicles miles traveled. Hirsh Bar Gai said they have considered what parameters should be endogenous versus exogenous and went with VMT being exogenous. He asked for more discussion and input on the matter.

Jacobs addressed EV charging technology, saying a DC fast charger is a huge, connected load with zero demand until the first car actually charges. She then asked for a survey around the future role of vehicle-to-grid services, wondering if EV owners are interested in paying back to the grid or using their battery to power their own homes during an outage.

Hirsh Bar Gai appreciated the feedback. He said the assumed value in vehicle-to-grid services is in the difference between a short driving distance and what is left in the battery.

Seelig suggested the survey differentiate between allowing the utility to use one, two, or three days of battery. Jourabchi pointed to the great potential of school bus batteries, particularly for summer peaks. He then said increase battery capacity might ease some apprehensions while some luxury EV owners might not be interested in savings.

Kirschner noted that the 2021 Plan modeled end use of natural gas for the region and asked if that will happen again. Simmons did not know yet.

Simmons thanked members for their input and looked forward to more DFAC meetings in the future. He ended the meeting at 12:30.

Attendees in person and Go-to-Webinar

Steve Simmons	NWPCC	Stefanie Price	PSE
Massoud Jourabchi	NWPCC	Lee Eider	PacifiCorp
Dan Hua	NWPCC	Adela Arguello	BPA
Dor Hirsh Bar Gai	NWPCC	Leann Bleakney	NWPCC
Chad Madron	NWPCC	Raymond Baise	PacifiCorp
Curtis Dlouhy	OPUC	Glen Booth	BPA
Ryan Bain	OPUC	Frank Brown	BPA
Aliza Seelig	PNUCC	Dan Catchpole	Newsdata
Dan Kirschner	NW Gas Assoc	Robert Diffely	BPA
Blake Weathers	Umatilla	Grant Forsyth	Avista Corp

Mike Hermanson	Avista Corp	Craig Patterson	independent
Allison Jacobs	PSE	Tom Potiowsky	PSU
Kristen Lambert	Coateskokes	Mike Rogoway	The Oregonian
Jing Liu	Tacoma Power	Blake Scherer	Benton PUD
Yue Liu	Tacoma Power	Ben Ulrich	EWEB
Tara Maynard	GH PUD	Zeecha Man Hoose	Clark PUD
Jim McMahon	Better Climate	Jisong Wu	PSE
Elizabeth Osborne	NWPCC	Brian Dombeck	BPA
Tom Pardee	Avista Corp		
Joel Ainsworth	BPA		
Gillian Charles	Red Kite		
Karma Hara	BPA		
Becky Keating	independent		
Amber Riter	PGE		
Ed Schriever	NWPCC		
Landon Snyder	SnoPUD		
Brian Dekiep	NWPCC		