

Northwest Power and Conservation Council
Fuels Advisory Committee
October 24, 2023

Steve Simmons, NWPCC, began the meeting at 9:00am by reviewing the morning's agenda. He then introduced the Fuels Advisory Committee and Tomás Morrissey, NWPCC, as its new chair. Simmons added that he will be taking over the Demand Forecast Advisory Committee. He then called for introductions.

Chad Madron, NWPCC, reviewed the best way to interact with Go-to-Webinar.

Agenda, Introductions, and Background

Dan Kirschner, NW Gas Association, noted how early the forecast comes in the Power Plan cycle and asked if there will be opportunity to adjust numbers as necessary [Slide 6]. Simmons said there could be some adjustment if conditions change drastically, but encouraged earlier engagement as it is hard to change inputs later in the process.

Kirschner stated that the market for some fuels is changing rapidly and suggested a truth check before publication. Simmons agreed that makes sense, adding that the next Plan has not yet begun, and this forecast is for a limited, in-between-Plan look.

Scott Johnson, NW Natural, pointed to the different types of hydrogen with different prices for each type [Slide 8]. Simmons agreed saying this will be explored later in the presentation and future FACs.

Michelle Detwiler, RenewableH2, advised against forecasting pricing based on colors, saying the DOE is moving towards a carbon intensity metric. Simmons thought the colors would correlate to a block of emission intensities but said this will be explored throughout the process. He then urged FAC members to fill out the natural gas price survey sent earlier.

Natural Gas Prices

Kirschner asked what "move the prices at Henry Hub" means [Slide 11]. Simmons answered that it's a disaggregation. Starting at an annual average that is broken into monthly pieces for each hub. Kirschner confirmed that the Sumas, AECO, and Opal hubs are predicated on the Henry Hub forecast. Simmons answered yes.

Kirschner confirmed that there is a mechanism that translates the Henry Hub forecast into something relevant for the Northwest. Simmons said yes, pointing to bullet point 4 on the slide. Kirschner said the historical correlation could change as the Northwest system is increasingly utilized. Simmons agreed, saying this is where the "art" comes into play.

Johnson asked if Council staff looks at daily spot volatility, monthly, first of month, or a mix. Simmons answered that they typically look at monthly. Johnson noted that there could be a lot

of volatility in the middle of the month and wondered how that data point could impact results. Simmons said that should be considered when developing the next round of stochastics.

Kirschner asked if it's a win if the high-low forecast range incorporates the actuals [Slide 15]. Simmons said he never counts anything in forecasting as a win or a loss, but the goal is to have the actual average annual prices within the bounds. He said they open the bounds to illustrate uncertainty over time, adding that prices for 2022 [Slide 14] were over the bounds.

Kirschner asked about the practical application of widening the bounds or jaws of the forecast. Simmons said scenarios and sensitivities can look at low, medium, or high forecasts as appropriate, admitting that this has been a challenge.

Bill Donahue, PSE/consultant, noted that gas prices are primarily a function of supply and demand, influenced by new loads, capacity, availability, bottlenecks, weather, and more. He said most utilities in the region use Wood Mackenzie or another forecasting service. Donahue noted that the success or failure of LNG in Canada could also influence things. He wondered if the committee should use a forecast service to look at overall supply and demand so they can focus on other important components.

Simmons said that has been considered in the past and might still be appropriate.

Natural Gas Fundamentals

Clay Riding, Clean Hydrogen Works, stated that part of the low natural gas storage levels in 2022 were related to how California utilities reacted to low hydro and high prices [Slide 4]. He hoped the region would learn from that mistake but wasn't sure how to forecast from that.

Jim Robbins, Kootenai Electric, said severe weather and freezing well heads are not a new phenomenon. He agreed they drive prices through the roof but called them short term issues. Robbins then wondered how long the low prices from horizontal drilling/fracking will last.

Someone in the room said this question has been asked since 1962. Robbins agreed but pointed to the limitations of fracking and the lack of built pipeline. Robbins stressed that he was no geologist but said that cheap gas will come to an end.

Kirschner said the highest-level look at the December 2022 price event will incorporate everything on [Slide 4]. He said you can get more granular, but agreed that this is the right, big picture look.

Johnson agreed that dropping Wyoming production is a concern [Slide 7.] Robbins said there are physical constraints at play. He thought the same could be an issue in British Columbia.

Johnson talked about the Sumas pipeline being fully subscribed in the winter but can have deep cuts in the summer [Slide 8]. Morrissey asked about the I5 loop expansion. Johnson explained that that was a lateral and not a mainline expansion.

Riding said there has been no mainline expansion since 2005/2006. Someone in the room said the next expansion (on Westcoast) should be in 2027/2028. Johnson said it's the same amount as Woodfibre but will likely occur after the LNG project is online.

Riding thought the fleet utilization curve on [Slide 10] correlated with declining coal. Simmons agreed saying a low hydro year in the resource adequacy work could also play a role.

Kirschner recalled that 2011 was the year wind producers sued BPA. He then said the 2021 Gas Outlook forecasted a reduction in demand for natural gas as a generation fuel the first time ever. He said this year is different, increasing for five years before tailing off. Kirschner speculated that policy changes may have caused that. Simmons asked when this outlook will be published. Kirschner said Q1 of 2024 but offer to share data before publication.

Robbins asked if California storage on [Slide 11] is all of California or just northern California. Morrissey said it should be all of California. Johnson added that 2022 included a reclassification of storage where they moved a good chunk of working gas to base gas. He asked for a graph on the percent of capacity over time. Morrissey agreed.

Johnson pointed to the year the system had a rupture [Slide 12] saying taking 300,000 out of the Northwest is about a 15% reduction. Johnson then said it's become apparent how connected the Pacific Northwest is connected to California prices. He pointed to an LNG facility in Mexico, Costa Azul, that will be taking supplies from El Paso. Someone in the room noted that infrastructure will have to be built, which will take time. Morrissey confirmed that Woodfibre (In British Columbia) is likely coming online in 2027.

Donahue thought there could be a lag between Woodfibre and a pipeline expansion, and pointed to increased coordination that could facilitate the expansion on Westcoast.

Robbins commented that oil and gas used to track closely, and that an unstable Middle East could impact prices [Slide 13].

Mitsubishi Power Hydrogen Infrastructure and Gas Turbine Overview

John Robbins, Mitsubishi Power

Someone in the room asked about the heat rates for simple cycle equipment [Slide 7]. John Robbins, Mitsubishi Power, answered around 40% efficiency, adding that the larger the unit the higher the efficiency.

Someone in the room confirmed that the storage discussed on [Slide 8] is strictly hydrogen and not ammonia. John Robbins confirmed that it is hydrogen gas.

Morrissey asked if this could be a hydrogen storage hub for the west. John Robbins confirmed.

Jim Robbins noted that hydrogen is the most reactive gas and wondered if and how issues have been solved [Slide 9]. John Robbins said slides about hydrogen in gas turbines are coming up but previewed that they are very comfortable about swapping hydrogen for gas in turbines. He then said that they plan to use hydrogen-dedicated pipelines, calling it a proven technology. John Robbins then pointed to new materials that are being explored.

Riding asked about the power source for the electrolyzer [Slide 10]. John Robbins answered that they are powered with renewable energy.

QUESTIONS

Johnson referenced the step change of burning 30% hydrogen to 100% but wondered about a previous slide that showed 50%. He asked if there is a limit in ramping or not. John Robbins said the 30% is not a hard limitation and future testing may reveal more information about combustors.

Simmons noted that hydrogen blends lower CO2 emissions but asked about the impact on NOx. John Robbins answered that NOx levels didn't change much in the Georgia example; however, they expect NOx to rise when they switch to 100% hydrogen. John Robbins said they do plan to reach the same stack emission levels.

BREAK

Power to Gas in the 2023 IRPs James Gall & Tom Pardee, Avista

Kirschner recalled Simmons prior analysis of hydrogen for transportation that found it would take gobs of generation to meet that demand, adding that this ammonia analysis looks similar [Slide 8]. Simmons said his rough analysis looked at replacing trucking diesel with hydrogen. He said the work assumed that the hydrogen would be produced in-region with renewable resource. Simmons said it did add tremendously to demand for clean electricity, adding that the hydrogen does not have to be produced locally.

Kirschner then asked Gall if he looked at the increased cost and added emissions of transporting the fuel. Gall said that is beyond the scope of this analysis and the prices shown earlier are the points where the model selects the resource. Gall assumed that price included transportation, but the emissions piece is variable depending on the mode of transport. He said [Slide 8] is just a look at what may be needed but Avista could also buy ammonia off of the futures market or from local fertilizer manufacturers.

Morrissey asked if, when thinking about the costs of electricity to produce hydrogen or methane, they are considering new resource builds or buying off the market [Slide 12-13].

Pardee recalled the assumption was for new solar and wind builds but said they could also buy off the market. He felt a combination would be more likely to avoid peak issues and allow the buyers to use a market-based price.

Simmons asked if the synthetic methane would be blended into the gas pipeline. Pardee answered yes, saying it has the same BTU per volume as natural gas. He acknowledged that regional pipeline is currently constrained and spoke about difficulties of using hydrogen.

Simmons then asked if synthetic methane would compete with renewable natural gas. Pardee answered that RNG would have to meet a 980 BTU standard plus a quality level that landfill RNG might not meet.

Jim Robbins added that landfill gas tends to be in the 600 BTU range, while natural gas is in the 1000s so it must be blended. Donahue countered that it doesn't have to be blended and can have the same BTU as gas, but the nitrogen and CO₂ must be removed from the gas to make it work.

Wrap Up

Robbins questioned the safety/flammability of hydrogen. He said it could be done but would present challenges. Simmons recalled that his dad worked on rocket fuel and hydrogen leaks were a big topic around the dinner table. Robbins spoke about the element's volatility.

Simmons asked for input and survey answers, pointing to future meetings.

Robbins mentioned the need to budget for travel and asked for a meeting schedule. Simmons said there should be a couple next year.

Donahue then said the survey requests gas price outlooks, which can only be shared at the averaged-out IRP level. He again suggested engaging a service like Wood Mackenzie. Simmons understood the issue, saying they can dig into the IRP.

Simmons thanked the room, ending the meeting at 11:45.

Attendees in Person and Via Go-to-Webinar

Steve Simmons	NWPCC	Michael Freels	ODOE
Tomás Morrissey	NWPCC	Gerad Freeman	PNNL
Chad Madron	NWPCC	James Gal	Avista
Scott Johnson	NW Natural	Fred Heutte	Energy NW
Clay Riding	Clean Hydrogen Works	Haixiao Huang	NW Natural
Jim Robbins	Kootenai Electric	Kyle Maki	Idaho Wildlife
John Robbins	Mitsubishi	Tom Pardee	Avista
Dan Kirschner	NW Gas Association	Crag Patterson	independent
Michael Cocks	BPA	Steven Polunsky	independent
Aimee Robinson	BPA	Brian Robertson	CNGC
Michael Brutocao	Avista	Ken Ross	Fortis BC
Dylan Dsouza	NWPCC	Marcus Sellers-Vaughn	CNGC
Michelle Detwiler	RenewableH2	Matthew Doyle	NW Natural
Bill Donahue	PSE/consultant	Shannon Pressler	WA Dept of Commerce
Ted Drennan	OR PUC	Daniel Serres	Columbia River Keepers
Sean Ford	PPC		