

Service Date: December 21, 2016

DEPARTMENT OF PUBLIC SERVICE REGULATION
BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MONTANA

IN THE MATTER OF NorthWestern Energy's
Application for Interim and Final Approval of
Revised Tariff No. QF-1, Qualifying Facility
Power Purchase

REGULATORY DIVISION
Docket No. D2016.5.39

**DATA REQUESTS VS-025 to VS-046
OF VOTE SOLAR AND MONTANA ENVIRONMENTAL INFORMATION CENTER**

Vote Solar and Montana Environmental Information Center, by and through their legal counsel, hereby submit their data requests 025 to 046 to NorthWestern Energy.

VS-025 Witness: Hansen Subject: Workpapers

Please provide the complete workpapers for Mr. Hansen's rebuttal testimony, with spreadsheets in Excel format with all formulas intact.

VS-026 Witness: Hansen Subject: Natural Gas Price Forecast

Please provide the workpapers for the 11/17/2016 natural gas price forecast presented in Table 1 at page LPH-4 of Luke P. Hansen's prefiled rebuttal testimony on behalf of NorthWestern Energy (NWE). Please include and show separately in these workpapers: (1) the 11/17/2016 AECO-C Hub forward prices, (2) the assumed Canadian \$ / US \$ exchange rates, (3) all transportation components on the TransCanada Pipeline system, (4) all transportation components in the U.S. on NWE, and (5) the calculation of the levelized natural gas burnertip price.

VS-027 Witness: Hansen Subject: Natural Gas Price Forecast

Please state the annual forecast basis differential for each year from 2017 to 2042, as the difference between (1) the 11/17/2016 forecast in Table 1 at page LPH-4 of Luke P. Hansen's pre-filed rebuttal testimony, and (2) the AECO-C hub forecast prices (in U.S. \$/MMBtu). Also, please explain whether and why these differentials were or were not assumed to escalate over the forecast period.

VS-028

Witness: Hansen

Subject: Long-2 Condition

At page LPH-6, Mr. Hansen states that (1) during “Long-2” hours the market price is below the variable cost of thermal resources and those resources are not economically dispatched, and (2) the energy that is serving load during “Long-2” conditions comes from hydro, must-run thermal, and/or QF must-take resources.

- a. Does NWE sell its excess power at the market price in such “Long-2” circumstances? If not, what is done with the NWE’s excess generation? If NWE does sell into the market, does the market price represent the value NWE obtains from the sale of its excess generation?
- b. Were load to increase by 1 kWh in a particular hour under “Long-2” conditions, would NWE’s sales of its excess generation decrease by 1 kWh? If so, why does not the market price represent NWE’s marginal cost, rather than zero?
- c. In an energy market with multiple suppliers and demanders, does the market clearing price represent the value of energy for each market participant? Or is it NWE’s position that there is a unique market value for each market participant?

VS-029

Witness: Hansen

Subject: REC Pricing

At page LPH-5, Mr. Hansen disagrees that \$5 per REC for 2017, increasing with inflation through 2021, is the value NWE would use for REC purchases. Mr. Hansen notes that NWE assigned a \$0.90 per REC (per MWh?) value for RECs in 2017 in its 2015 Plan, and that 2016/2017 bid/ask prices are \$0.33 to \$0.38.

- a. Please provide the units for these prices – are they per MWh?
- b. Please provide workpapers/data on the REC values from the 2015 Plan in all years covered in the Plan, and describe how those prices were developed.
- c. Please confirm that the overall bid prices were \$0.33 per MWh and the overall ask prices were \$0.38 per MWh for the 2016/2017 RECs from early December 2016. Were these for RECs generated in Montana?

VS-030 Witness: Hansen Subject: REC Pricing

At page LPH-5, Mr. Hansen discusses REC pricing. Please answer the following:

- a. If NWE has enough RECs through 2026 to meet its RPS obligation, and if it monetizes additional RECs (e.g. in South Dakota), does this indicate that NWE sells excess RECs?
- b. Does NWE sell excess RECs produced in Montana? If so, are these sales to entities in Montana, or in what other states has NWE sold RECs from its Montana plants?
- c. If NWE sells or monetizes excess RECs, why are not current REC market prices in the West indicative of the value of RECs to NWE, and why did NWE assign zero value to such near-term RECs in its avoided cost calculations, esp. if NWE assigned a value to 2017 RECs in its 2015 IRP?
- d. Please provide NWE's volumes (in MWh) and revenues in \$, for all REC purchases and sales in each of the last five years (2011-2015) plus in 2016 to date.

VS-031 Witness: Bushnell Subject: Workpapers

Please provide the complete workpapers for Mr. Bushnell's rebuttal testimony, with spreadsheets in Excel format with all formulas intact.

VS-032 Witness: Bushnell Subject: SPP Method

Please provide the SPP NPC calculation tool, in Excel workbook format, that NWE obtained in October 2016, as described on page JBB-11. Also, please provide the complete SPP Planning Criteria description of the NPC tool calculations, which is excerpted in Exhibit JBB-5.

VS-033 Witness: Bushnell Subject: SPP Method

Please provide all workpapers that show the calculation of a ten-year 6.1% capacity credit for solar, based on the SPP method.

Regarding the SPP methodology described in Exhibit JBB-5, please respond to the following questions:

- a. Did the top 3% load hours over a 10-year period result in approximately 220 hourly hours in each month of the year? In other words, using January as an example, if 3% of the 744 hours in January corresponds to the 22 hours in January with the highest NWE system loads, and ten years of data is considered, would that amount to $22 \times 10 = 220$ data points for the month of January?
- b. In applying the SPP method, did you compute the modeled solar output that would be exceeded in 60% of the hours identified in above in part (a) of this question? For example, is the solar exceedance value in January for a ten-year calculation based on the solar production in hour 132 out of 220, when the 220 hours of solar output are sorted from the highest to the lowest value? If not, how did NWE perform this calculation.
- c. Please verify that you combined monthly data for multiple years before calculating the 60% exceedance, as opposed to calculating 60% exceedance values for each month in the ten-year period.
- d. Please identify the 12 monthly 60% exceedance values that were calculated, and that NWE used to develop its 6.1% capacity credit calculation.
- e. What are the average monthly system loads for the top 3% of hours in each month of the ten-year period?

VS-035

Witness: Bushnell Subject: SPP Method

Regarding the SPP methodology calculator shown in Exhibit JBB-6, please respond to the following questions:

- a. Was the 6.1% capacity credit stated at Line 13, page JBB-12 calculated based on the data shown in JBB-6, as the 0.160523 MW value in Cell I10 divided by the 2.612 MW nameplate capacity in Cell E4 equals 6.1%?
- b. Does the 0.160523 MW value shown in the formula bar of Exhibit JBB-6, and displayed as 0.2 MW in cell I10 of JBB-6, represent a single peak hourly value over an annual or ten-year period? If so, what hour and year? If not, exactly what hours does it represent and how is it calculated?
- c. Please describe how the peak hour value in cell I10 relates to the monthly net renewable values shown further below in cells I17:I28 of JBB-6.
- d. Please confirm that, if one averages the monthly net renewable values shown in cells I17:I28 of JBB-6, the monthly SPP capacity credit method results in a value of 0.86, which when divided by a 2.612 MW nameplate rating yields a solar capacity value of 33% of nameplate. Please explain why this is not the correct result of the SPP methodology, which states “the recommended methodology to evaluate the net planning capability established for wind or solar facilities shall be determined on a monthly basis” (see Exhibit JBB-5).
- e. Please confirm that, if one averages the monthly net renewable values for the months of December, January, February, July, and August, as shown in cells I17, I18, I23, I24, and I28 of JBB-6, the monthly SPP capacity credit method results in a value of 0.94, which when divided by a 2.612 MW nameplate rating yields a solar capacity value of 36% of nameplate. Please explain why this is not an appropriate application of the SPP method to the peak load months on the NWE system.

VS-036

Witness: Bushnell Subject: SPP Method

Regarding the SPP methodology calculator shown in Exhibit JBB-6, Please provide the ten years of generation output data that were used to run the SPP tool, as shown in Cells E10 to C20.

VS-037 Witness: Bushnell Subject: Retail Load

Please explain whether it is NWE's position that its costs of serving retail load are completely independent of the peak loads of the entire NWE balancing area, including the peak loads of the rural electric co-ops and retail choice customers on NWE's transmission system? If this is NWE's position, please explain in detail why its retail costs are independent of its costs to serve these other customers on its system.

VS-038 Witness: Bushnell Subject: Retail Load

Is NWE's transmission and distribution planning based on serving the total loads of its balancing area, or only upon serving NWE's retail load? Would the NWE transmission or distribution systems be considered to have adequate capacity if they were only able to serve reliably the peak level of NWE's retail load?

VS-039 Witness: Bushnell Subject: Solar Capacity Contribution

Please provide workpapers showing the calculation of the 3.4% PV capacity contribution under the ten-year 85% exceedance value calculation that you performed (see page JBB-7).

VS-040 Witness: Bushnell Subject: Peak Loads

At page JBB-5, you state that "Northwestern is a winter peaking utility which experiences bimodal seasonal peaks."

- a. Please confirm that the maximum load for the most recent four years shown in Table 1 was a summer peak in two years (2012 and 2015) and a winter peak in two years (2013 and 2014).
- b. For how many hours in the ten-year period from 2006 to 2015 did NWE hourly load exceed 1,200 MW? Please confirm that the only time this occurred during these years was: (1) twice in December 2008, (2) twice in December 2009, (3) four times in December 2013, and (4) once in February 2014.
- c. Please confirm that there were no hourly loads above 1,200 MW in 2006, 2007, 2010, 2011, 2012, 2014, and 2015.
- d. How many hourly loads in 2015 were above 90% of the annual maximum? How many of these occurred during winter months?

VS-041 Witness: Bushnell Subject: Table 3

Please provide the ten years of hourly wind data, and the associated workpapers, that were used to develop Table 3.

VS-042 Witness: Bushnell Subject: Table 3

Please reproduce the results in Table 3, using ten years of combined wind and solar data, scaled so that equal nameplate MW amounts of wind and solar generation are assumed. This request is important to evaluate the synergies of winter-peaking wind and summer-peaking solar, and to evaluate whether the combined wind and solar capacity is greater than the capacity of each resource individually.

VS-043 Witness: Bushnell Subject: AERO

Please provide workpapers or source documents supporting the 25-year levelized capital cost of an AERO generation unit built in 2018 equal to \$109.05 per kW-year

VS-044 Witness: Bushnell Subject: AERO

Please provide workpapers or source documents supporting the O&M costs of an AERO generation unit starting at \$6.42 per kW-year in 2018, and growing by 2% per year.

VS-045 Witness: Bushnell Subject: AERO

You state that your calculations of the 25-levelized capacity costs of an AERO generation unit built in 2018 presented at page JBB-17 supersede the calculations provided in JBB-2 in your pre-filed testimony.

- a. Please explain the why you reduced the levelized capital cost by 22%, from \$139.99 to \$109.05 per kW-year.
- b. Please explain why you reduced the 2018 O&M cost by 23%, from \$11.37 to \$6.42 per kW-year.

VS-046 Witness: Cashell Subject: Workpapers

Please provide the complete workpapers, if any, for Mr. Cashell's rebuttal testimony.

CERTIFICATE OF SERVICE

I hereby certify that on the 21st day of December, 2016, I served the foregoing by first-class mail, postage prepaid, and electronic mail on the following:

Will Rosquist
Administrator
Public Service Commission
1701 Prospect Ave.
Helena, MT 59620-2601
(By *Federal Express*)

Michael J. Uda
Uda Law Firm, P.C.
7 West Sixth Avenue
Power Block West, Suite 4H
Helena, MT 59601
michaeluda@udalaw.com

John Alke
NorthWestern Energy
208 N. Montana, Suite 205
Helena, MT 59601
john.alke@northwestern.com

DarAnne Dunning
Luxan & Murfitt, PLLP
P.O. Box 1144
Helena, MT 59624
ddunning@luxanmurfitt.com

Al Brogan
NorthWestern Energy
208 N. Montana, Suite 205
Helena, MT 59601
al.brogan@northwestern.com

Eric Christensen
Cairncross Hempelmann
524 Second Ave., Suite 500
Seattle, WA 98104
echristensen@cairncross.com

Tracy Killoy
NorthWestern Energy
208 N. Montana, Suite 205
Helena, MT 59601
tracy.killoy@northwestern.com

Jeffrey Wagner
Volkswind USA Inc.
205 SE Spokane Street, Ste 306
Portland, OR 97202
Jeffrey.Wagner@volkswind.com

Joe Schwanzenberger
NorthWestern Energy
40 East Broadway
Butte, MT 59701
joe.schwanzenberger@northwestern.com

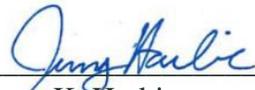
Steven J. Levitas
FLS Energy, Inc.
130 Roberts Street
Asheville, NC 28801
legal@flsenergy.com

Jason Brown
Montana Consumer Council
111 North Last Chance Gulch, Suite 1B
P.O. Box 201703
Helena, MT 59620-1703
jbrown4@mt.gov

Chris Norqual
Cypress Creek Renewables
3250 Ocean Park Blvd.
Suite 355
Santa Monica, CA 90405
norqual@ccrenew.com

Ryan R. Shaffer
MEYER, SHAFFER & STEPHANS, PLLP
305 S. Fourth St. East, Suite 101
Missoula, MT 59801
ryan@mss-lawfirm.com

Ryan N. Meyer
ElGuindy, Meyer & Koegel, PLLP
2990 Lava Ridge Court, Suite 205
Roseville, CA 95661
ryan.meyer@pacificnorthwestsolar.net



Jenny K. Harbine