
COMMERCIALLY SENSITIVE INFORMATION

PUB/DAYMARK-CSI-1 Reference: Daymark Export Revenue Report Page 50

Preamble: "The composite carbon pricing [REDACTED] and are, on average, [REDACTED] of such prices typically considered in market assessments."

3b

Request: Please clarify what is meant by "market assessments", specifically whether this refers to other market assessments viewed by Daymark or whether these refer to the four independent forecasts used by Manitoba Hydro. If the latter, please provide additional explanation of Daymark's concern since the Manitoba Hydro consensus forecast is [REDACTED] independent forecasts.

3b

Response:

Market assessments refers to the four forecasts and other market assessments that Daymark has observed in other consulting engagements.

The carbon pricing assumptions in the four independent market price forecasts are depicted in Figure 18. [REDACTED]

[REDACTED] (values in 2017 US\$).

3b

As an example of other market assessments, the Report describes the Minnesota Public Utilities Commission recent adoption of carbon pricing to be used in resource planning in Minnesota. (See Report footnote 28 on page 22). The Commission adopted low and high range values for 2017 through 2050. The 2040 values adopted are approximately \$14 in the low case and \$62 in the high case (2017 US\$). We observe that [REDACTED]

3b

[REDACTED] The range of values in this analysis is representative of the range of values we have observed in other market assessments.

COMMERCIALLY SENSITIVE INFORMATION

PUB/DAYMARK-CSI-2 Reference: Daymark Export Revenue Report Page 50

Preamble: [REDACTED]
[REDACTED]
[REDACTED]"

3b

Request: Please explain how this forecaster's forecast [REDACTED]
[REDACTED]

3b

Response:

MH uses only the energy component of the four forecasts, as it assumes no capacity revenue. However, the energy and capacity forecasts are prepared by each forecaster on a set of assumptions. [REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

3b

PUB/DAYMARK - 1 Reference: Daymark Export Revenue Report Page 13 Figure 4

Please confirm whether the unit types set the locational market price at the Minn Hub or MHEB pricing node in the same proportion shown in Figure 4. If not confirmed, please identify the share of intervals set by each unit type for Minn Hub or MHEB hub. If this information is not available, please explain the factors that would result in a different mix of unit types setting the price at the Minn Hub or MHEB hub.

Response:

Not confirmed.

The data depicted in Figure 4 is information contained in the 2016 State of the Market Report for the MISO Electricity Market (2016 SOMR) (See footnote 18 of the Daymark report). This information is not specific to the Minn Hub and the 2016 SOMR does not contain this information specific to the Minn Hub.

The locational market prices and the resources that set those prices will differ from the MISO market, in the aggregate, when congestion exists between Minnesota and other portions of the MISO market or when loss factors cause local resources to be economic relative to sources on the margin in other regions.

PUB/DAYMARK - 2 Reference: Daymark Export Revenue Report Page 22

- a) Please explain whether Minnesota Power identified the generation sources that it intends to add to its generation portfolio in order to meet its 44% renewable generation target by 2025.
- b) Please show the current mix of Minnesota Power's generation sources by unit or fuel type in order to show how much additional renewable generation is needed to meet the 44% target.
- c) Considering Manitoba Hydro's existing 250MW power sale agreement with Minnesota Power along with its existing mix of non-dispatchable renewable generation, please give Daymark's view whether Minnesota Power is in a position to add more non-dispatchable renewable generation or whether it is approaching the limit of non-dispatchable generation in its system.

Response:

- a) Minnesota Power's June 7, 2017 news release cited in the Daymark report states:

In an upcoming filing with the Minnesota Public Utilities Commission (MPUC), Minnesota Power will request the addition of 250 megawatts of wind power capacity, an additional 10 megawatts of solar power and 250 megawatts of combined-cycle natural gas generation to meet customer demand for power, which is projected to grow throughout the region. The new resources will increase the company's already robust wind portfolio of 620 megawatts and double its solar generation.

and:

With approval of the proposed resource package by the MPUC, renewable energy resources— including wind, Canadian hydro, solar and biomass—will account for 44 percent of the utility's energy supply portfolio, exceeding the initial EnergyForward goal of one-third renewable power. Minnesota Power's long-term

goal is an energy mix of two-thirds renewable energy and flexible, renewable-enabling natural gas and one-third environmentally compliant baseload coal.

- b) Please refer to response to part a.
- c) Minnesota Power's 2015 Integrated Resource Plan (September 1, 2015, page 32) offers the following statement regarding renewable resource integration:

The regional market allows the Company to maximize its generation and transactions. In particular, the market provides timely and cost-effective flexibility to help support the integration of additional renewable energy into Minnesota Power's system. The maturity and flexibility within the regional energy market allows the Company to buy and sell electricity to manage supply and demand for the topmost portion of its load at the lowest possible cost.

PUB/DAYMARK - 3 Reference: Daymark Export Revenue Report Page 23

- a) To the extent that the information is provided in Northern States Power's Integrated Resource Plan (IRP), please indicate whether Northern States Power is in a position to replace its 375MW/325MW contract with Manitoba Hydro with dispatchable generation (such as combustion turbines) and still meet its Renewable Portfolio Standard obligations. Please cite the IRP if possible.
- b) To the extent that the information is provided in Northern States Power's Integrated Resource Plan (IRP), please indicate whether Northern States Power is in a position to add more non-dispatchable renewable generation or whether it is approaching the limit of non-dispatchable generation in its system. Please cite the IRP if possible.

Response:

- a) On Page 23, Daymark reports certain information obtained from the most recently public documents regarding Northern States Power's (NSP) integrated resource plan. NSP's indicates that it is already on track to meet its Renewable Energy Standard requirements through the planning period and plans to add significantly more renewable energy than is required to meet the RES requirements. (See PUB/Daymark-3 Attachment 1 at page 12). NSP's five-year action plan includes the following statement (See PUB/Daymark-3 Attachment 2 at page 59):

Hydro. We will continue to evaluate the potential and value of hydro resource options including the potential for hydro resources from Manitoba Hydro beyond the current contracts that expire in the mid-2020s.

The Minnesota Public Utilities Commission (MPUC) includes the following modification in its January 2017 order approving the NSP IRP (See PUB/Daymark-3 Attachment 3 at page 11):

Xcel's resource plan is modified ... to change Xcel's planned CT additions in the 2025-2030 timeframe to provide instead for adding the most cost-effective combination of resources consistent with state energy policies, including but not limited to the following resource options: large hydropower, short-term life extensions of Xcel-owned peaking units, natural gas combustion turbines, demand response, utility-scale solar generation, energy storage, and combined heat and power.

Based on the foregoing public statements of NSP and the MPUC, Daymark understands that NSP could, at the conclusion of the current contracts with MH, secure replacement power from dispatchable generation such as combustion turbines and comply with RES requirements.

- b) NSP's IRP included a wind integration study to conclude that the system could support the wind energy additions proposed in the IRP (See PUB/Daymark-3 Attachment 1 at page 91). It also indicates that the integration of increased renewable energy and DG on its system will require significant investments in its transmission system (Id. at page 37).

PUB/DAYMARK - 4 Reference: Daymark Export Revenue Report Pages 22 to 24

Please confirm whether Manitoba Hydro's exports meet the requirements of Minnesota's and Wisconsin's Renewable Portfolio Standards, or whether there are limitations or exclusions on these exports such that they are not counted towards meeting the RPS.

Response:

Not confirmed. The renewable energy policies in Minnesota (Renewable Energy Standard) and Wisconsin (Renewable Portfolio Standard) regarding the eligibility of hydropower includes size limits (100 MW and 60 MW, respectively).

PUB/DAYMARK - 5 Reference: Daymark Export Revenue Report Page 27

Does MISO have a forward capacity market that extends beyond the next year? If so, please explain how this market operates

Response:

No. Forward transactions in years after the current forward year are exclusively bilateral transactions among market participants. Bilateral transactions are subject to state and federal regulations, however, MISO does not administer any market for such transactions.

PUB/DAYMARK - 6 Reference: Daymark Export Revenue Report Pages 23 and 29;
2015/16 GRA May 28, 2015 Transcript Page 1072

Please identify whether any nuclear plants in Minnesota are scheduled to be shut down within the period to 2030. If no shut downs are publicly identified, please provide Daymark's views of whether shut downs are likely in this timeframe.

Response:

Xcel Energy (NSP) owns 1,600 MW of nuclear capacity in Minnesota, Prairie Island (2 units) and Monticello. In its recent IRP, the Company notes that its plan is to operate these units through their existing licenses (through 2034 and 2030, respectively) and include an assumption in its planning that those units retire at that time. (See PUB/Daymark-3 Attachment 1 at page 75). In a recent rate case, the review of capital cost requirements associated with future operations of Prairie Island has led to examination of the cost-effectiveness of earlier retirements. The Company included an assessment of early retirement issues and options in its IRP Supplement. (See PUB/Daymark-3 Attachment 2 at pages 46-58). The MPUC has required that the Company include plans and scenarios for retirements of Prairie Island and Monticello in its next IRP (February 1, 2019). (See PUB/Daymark-3 Attachment 3 at page 12).

Based on the foregoing public information, the issue of early retirements of these units is point of consideration in Minnesota and a possibility. Daymark has no further information on which to assess whether early retirements are likely.

PUB/DAYMARK - 7 Reference: Daymark Export Revenue Report Page 33

Please explain whether Figure 13 depicts the on-peak variance between the actual forecast prices and the short term forecast prices, or between the actual prices and the short term forecast prices. If the variance is between the actual forecast and the short term forecast, please explain what the source of the actual forecast is.

Response:

The figure compares forecasts to actual prices.

PUB/DAYMARK - 8 Reference: Daymark Export Revenue Report Page 34 and 35

- a) Please explain whether Figures 14 and 15 depict the actual forecast prices or the actual prices. If the actual forecast prices are shown, please explain what the source of the actual forecast is.
- b) If Manitoba Hydro has available to it three independent forecasts as well as ICE forward prices, please explain why it relies on one independently produced forecast for the short term forecast of prices.

Response:

- a) All values are forecasts, not actual prices. As noted in the sentence preceding Figure 14, the “actual forecast” is the one actually used by MH in its modelling.
- b) Daymark does not have documentation of MH’s rationale. Our recollection of our discussion of this topic with MH relates to the frequency of updated projections from the one vendor relative to the others. The analysis depicted in Figures 14 and 15 is a one-time benchmarking of the one forecast to the others.

PUB/DAYMARK - 9 Reference: Daymark Export Revenue Report Page 39

- a) Please confirm whether the four natural gas forecasts are all referenced to the same market hub or whether adjustments were required. If adjustments were required, please provide Daymark's views as to whether those adjustments were appropriate and justified.
- b) Please identify whether the prices in Figure 16 are real or nominal dollars, the currency, and the units.

Response:

- a) All four forecasts are referenced to Henry Hub. The only adjustments made by MH to these values was to put all values in the same year dollars. That adjustment is appropriate. The chart source is a Confidential workpaper provided by MH to Daymark (Spreadsheet name: 2017 Energy Price Forecast V3.xlsx)
- b) The values are real, 2017 US dollars/MMBtu.

PUB/DAYMARK - 10 Reference: Daymark Export Revenue Report Pages 42 and 44

Please confirm whether the prices in Figures 19 and 22 are for different pricing locations. If not confirmed, please reconcile the discrepancy in pricing.

Response:

Confirmed. The prices in Figure 19 are MHEB prices. The prices in Figure 22 are Minnesota Hub prices.

COMMERCIALLY SENSITIVE INFORMATION

PUB/DAYMARK - 11 Reference: Daymark Export Revenue Report Page 47

Please explain whether Daymark finds Manitoba Hydro's adjustment of the forecasters' Minn Hub prices to the MHEB hub to be appropriate.

Response:

MH's methods in the 2016 Electricity Export Price Forecast (2016 EEPF) (Appendix D, page 40) uses [REDACTED]

3a

[REDACTED] We find this to be a reasonable approach for planning, given that is a complex process to forecast the dynamics of congestion and losses in a forecasting model. The resulting adjustments are not significantly different from and [REDACTED] than the assumptions used in prior EEPFs.

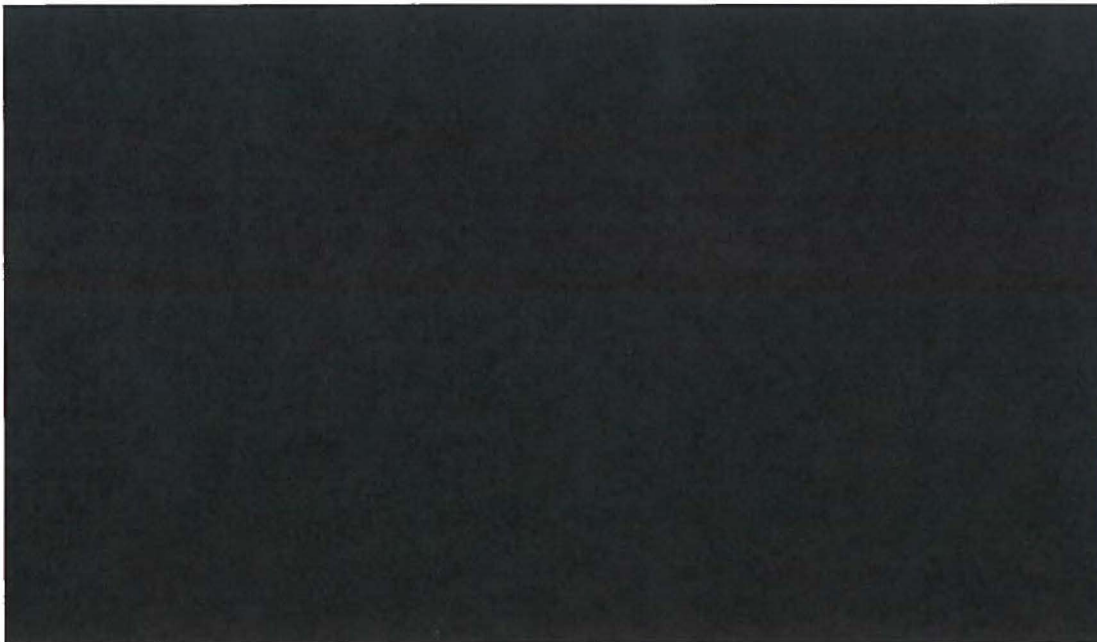
3b

PUB/DAYMARK - 12 Reference: Daymark Export Revenue Report Page 55

Please re-plot Figure 27 with all three series in stacked columns, with firm (contract) sales as the "bottom" series of the graph, followed by surplus dependable energy and then opportunity energy at the top of each column.

Response:

See CONFIDENTIAL graph below:



5b, 5c

PUB/DAYMARK - 13 Reference: Daymark Export Revenue Report Pages 60 and 61; PUB/MH I-50a

Preamble: Daymark states: “Based on our review of the information on the longer-term trends in MISO (as documented in Sections II and III), the near-term market conditions that are adversely affecting the ability to sell firm power at a premium are not expected to persist for more than a few years. Our observation that the 20-year plus long-term outlook prepared by MH, assuming no premium at any point in time, is inconsistent with the rationale for instituting the premium in the first instance for years 6 to 20 of the forecast.”

- a) Please confirm whether Daymark’s use of “premium” refers to both the premium for surplus dependable energy as well as the value of capacity.
- b) If not confirmed, please indicate for which component in (a) is it inconsistent to exclude from years 6 to 20 of Manitoba Hydro’s forecast of export revenues.
- c) Please provide Daymark’s views on an appropriate portion of surplus uncontracted sales to which Manitoba Hydro should add a dependable energy premium.
- d) Please provide Daymark’s views on an appropriate portion of surplus uncontracted sales to which Manitoba Hydro should add a capacity value.

Response:

- a) Not confirmed. Our use of “premium” in this context excludes the capacity value. That section of the report was addressing the portion of our Scope of Work that was specific to the premium assumption. Refer to the depiction of energy, capacity and premium in Figure 28.
- b) Please refer to pages 70 and 71 of the Daymark Report, specifically the discussion of “No Forecasted Capacity Revenue”. In this section of the report, we discuss our observation that MH’s assumption of no capacity revenues for the

surplus dependable energy and opportunity sales beyond the near term is not supported and our observation is similar to that for the premium in the cited passage from page 50.

- c) MH's assumption that none of the surplus dependable energy or opportunity energy obtains capacity revenue or premiums is the lowest possible value, as discussed in the "No Firm Energy Sales" and "No Assumed Replacements for Expiring Firm Sales" sections on page 72 and 73 of the Daymark Report. In the NFAT analysis, all surplus dependable energy was assumed to receive capacity and premium values, as well as some of the surplus opportunity sales. Those two approaches, either all or nothing, bound the range of values that could be assumed for this forecast. We believe it would be helpful to the Board to understand the changes in the export revenues for at least two or three alternative assumptions, such as 1) all as in the NFAT analysis, 2) 50 % of that value, and 3) assume all existing firm commitments are renewed for the 20 year period.
- d) In response to part c, we suggest scenarios to consider including both capacity and premium values. Given the requirements for capacity are more explicit in the MISO market (all entities must have capacity resources to meet resource adequacy obligations), and the projected needs for new, as yet unidentified capacity resources is large relative to MH's surplus, the Board may find it helpful to understand the changes in export revenues that would result from an assumption that all surplus dependable energy receives capacity value based on MH's consensus capacity price forecast for years 2025 and later.

PUB/DAYMARK - 14 Reference: Daymark Export Revenue Report Page 76

Please confirm whether Figure 35 incorporates the high and low natural gas price forecasts and the corresponding impacts on Fuel & Power Purchased.

Response:

Confirmed. The light blue range depicted in Figure 35 is derived using the high and low export prices derived from the use of the high and low gas price assumptions described on pages 47 to 49 of the Daymark Report.

PUB/DAYMARK - 15 Reference: Daymark Export Revenue Report Pages 66 and
67

Preamble: As part of its Report in Section VI Firm Contracts Analysis and Detailed Findings which begins on Page 64 Daymark has provided a discussion of how its calculations of revenues from export contract compare to values determined by Manitoba Hydro.

Request:

- a) Please provide all notes, analysis, workpapers, and spreadsheets in working electronic form used to support the paragraph on page 66: “Through the review of documentation provided by MH, discussions with MH staff, and independent analysis of the contracts, the Daymark IEC Team has concluded that the revenue forecasts assumed by MH for carryover contracts are reasonable.”
- b) Please provide all notes, workpapers, and spreadsheets in working electronic form used to support the paragraph on page 67: “For the capacity-only contracts, the calculations performed by the Daymark IEC Team matched the revenue forecasts provided by MH in MFR 84.”

Response:

- a) See CONFIDENTIAL Attachment 1.
- b) See CONFIDENTIAL Attachment 2.