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PREAMBLE

Furthermore, the assumptions behind these forecasts are not available. Thus, it is not possible to speak definitively about the reasonability of the export price forecast and assumptions. Manitoba Hydro did include supporting information in its Business Case that raises concerns about the assumptions behind its export price forecast and thus, about the export price forecast itself.

QUESTION

What, if any, further conclusions has Dr. Gotham reached as a result of the publicly posted reports by the Independent Expert Consultants, including Potomac Economic?

RESPONSE

The relevant sections of the public version of the IEC report from Potomac Economics have been redacted due to the same concerns over the release of commercially sensitive information. This includes information on the MH consensus export price forecast and the consultant forecasts (excepting Brattle).

Thus, it is not possible to draw conclusions as to the appropriateness of the MH consensus forecast, the consultant forecasts (excepting Brattle), or the assumptions that were made in the preparation of those forecasts.

Similarly, specifics of La Capra critique of MH's export forecast (specifically, Technical Appendix 6, Section IV) are heavily redacted. La Capra does indicate that MH did adjust for forecast congestion (Page 6-49).

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PREAMBLE

Manitoba Hydro indicates that there are no significant transmission congestion issues between the Minnesota/Wisconsin region and the rest of the Mid-continent Independent System Operator (MISO). This contradicts determinations by the MISO Independent Market Monitor and the U.S. Federal Energy Regulatory Commission (FERC), as well as evidence based on wholesale electricity prices....Thus, one would expect lower market prices when Manitoba Hydro is selling into the market (and lower revenues for Manitoba Hydro) and higher market prices when Manitoba Hydro is purchasing from the market (and higher costs for Manitoba Hydro).

QUESTION

Is Dr. Gotham able to quantify (in terms of dollars or percentages) the impacts of transmission congestion on the economic analyses performed by MH?

RESPONSE

Without knowing the specifics of the actual MH export price forecast, it is not possible to authoritatively quantify the impacts of transmission congestion. Instead, a suppositional estimate is provided (as in, if MH does not include the impact of transmission congestion costs, these are the impacts that can be inferred from the information that is available).

MISO provides locational marginal price estimates, with separate transmission loss and transmission congestion components, for the years 2017, 2022, and 2027 as part of its 2012 planning process (MTEP12). During those years, the transmission congestion component results in a Minnesota Hub price that is 3 % (in 2017), 4.2 % (in 2022) and 5.6 % (in 2027) lower than the MISO system-wide marginal price in the Business As Usual scenario (BAU). The congestion component is higher in all three alternate scenarios than in the BAU. The three scenarios are a Combined Policy scenario (COMBO) with high CO2 costs and a national renewable standard, a Historical Growth scenario (HG) with more robust load growth, and a Limited Growth scenario (LG) with low load growth. The impact for the alternate scenarios range from 5.9 % (2017 in COMBO) to 12.1 % (2027 in HG). The congestion component grows as a percentage of the system-wide price over time for all scenarios.

Based on the MISO MTEP12 results, a low estimate of the impact of congestion on the export prices would be in the 4 to 6 % range (based on the BAU), with a high estimate in the 9 to 12 % range (based on the other scenarios). Based on the available data, one could reasonably speculate that the percentage impact of congestion would increase beyond 2027, but it is also likely that that increase would tail off at some point.

A similar exercise using the IEC report by Potomac Economics indicates that the impact of ignoring congestion could be greater. Potomac Economics provided charts of energy prices that included both the MISO system-wide marginal price and the Minnesota Hub price after accounting for transmission congestion. These charts were provided for four cases: a reference case, a no carbon cost case, a high resource (low fossil fuel price) cases, and a high load growth case. Using values estimated from the graphs for the years 2017, 2022, and 2027, the impact of transmission congestion was estimated. Unlike the MISO MTEP12 results, Potomac does not indicate congestion growing over time. However, congestion does result in a significantly greater impact on market prices. For the reference case, congestion reduces the price by 13 to 14 %. A similar range was seen in the high resource case. The no carbon case ranged from 14 to 16 % and the high growth ranged from 13 to 15 %.

The Brattle Group export price forecast does not provide separate congestion costs.

The expected present value of export revenues in Manitoba Hydro's preferred development plan is $9.3 billion. However, a portion of this is based on existing and pending long-term contracts of which the details are unavailable. Therefore, while transmission congestion will have a direct impact on the export prices associated with short-term (i.e., opportunity) export sales, it is unknown how the price determination in these long-term contracts would be affected and thus, what the overall effect will be. Finally, a material change in exports prices would likely lead to changes in Manitoba Hydro's forecasts regarding system dispatch. As a result, without access to additional information, it is not possible to determine the impact these percentage changes in export price would have on the economic analysis performed by Manitoba Hydro.

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PREAMBLE

The supporting information from Manitoba Hydro includes projected load growth in the export region that may be too robust. A more appropriate load growth would be for the two census divisions that represent the states comprising the area into which they would be selling energy. The growth rates for these regions are lower than the U.S. average in EIA's analysis...Based on these forecasts, load growth of 0.5-0.6 % would be more appropriate than the U.S. projection of 0.9 %.

QUESTION

Is Dr. Gotham able to quantify (in terms of dollars or percentages) the impacts of the lower load forecasts on the economic analyses performed by MH?

RESPONSE

Without knowing the specifics of the load growth assumed in the actual MH export price forecast, it is not possible to authoritatively quantify the impacts of transmission congestion. Instead, a comparison between the results stemming from alternative load growth assumptions from MISO, Potomac Economics, and The Brattle Group are provided.

MISO provides locational marginal price estimates for the years 2017, 2022, and 2027 as part of its 2012 planning process (MTEP12). MTEP12 had three scenarios that may shed some light on the impact of load growth in the export market on prices in that market; a Business As Usual scenario (BAU), a Historical Growth scenario (HG) with more robust load growth, and a Limited Growth scenario (LG) with low load growth. MISO used an energy and demand growth rate plus a reduction for energy efficiency and demand response programs. While MISO published the initial energy and demand growth rates, they did not publish the reductions so the exact load growth rates for these scenarios are unknown. However, since the energy efficiency and demand response adjustments were the same for all scenarios, it is possible to determine the difference between the load growth assumptions between two scenarios. The LG energy growth was 0.83% less than the BAU and the HG was 0.84% higher than the BAU. Note that these differences are slightly more than double the differences in the Preamble (0.3-0.4 %) to this question. Thus, one would expect the price impacts in MTEP12 to be larger than what would be expected with a smaller change in load growth.

The average LMPs for the Minnesota Hub were provided in the evidence (Table 1). On a percentage basis, the LMPs for the LG scenario were 15.9 % (in 2017), 25 % (in 2022), and 29.7% (in 2027) lower than in the BAU scenario. The LMPs for the HG scenario were 11.8 % (in 2017), 25.3 % (in 2022), and 35.6 % (in 2027) higher than in the BAU. If one assumes that the relationship between a change in load growth

and a change in price is linear (from the numbers above, it is not linear but is close enough for an estimate), a reduction in load growth of 0.3-0.4 % would result in a decrease in market price of 10-15 %.

The IEC report from Potomac Economics has two cases that vary by load growth: a Reference case that is based on EIA's reference case from the 2013 Annual Energy Outlook, and a High Growth case that is based on EIA's high growth case. Potomac adjusted the load growth downward from EIA's results in both cases to account for the inclusion of carbon costs. Estimating the values from the charts in the Potomac report shows that prices in the High Growth case are about 3-4 % higher than in the Reference case.

Of the various scenarios in the study by The Brattle Group, the two that allow for a direct comparison of the impact of the load growth assumption are the Base Case and Scenario 9 (Energy Efficiency/Conservation). It should be noted that there is a fairly large difference in the load levels between these two. Scenario 9 also has no contribution from capacity prices through the late 2020s. An estimation of the all hours energy price indicates that prices in Scenario 9 are 4-7 % lower than in the Base Case. It should be noted that The Brattle Group indicates that the effect of load on market prices is typically modest (slide 52 of Appendix 3.1).

Overall, this would suggest that the impact on export prices of using a load growth assumption that is too high would be from 3 % on the low end (using the Potomac and Brattle results) to over 10 % (using the MTEP12 results).

The expected present value of export revenues in Manitoba Hydro's preferred development plan is $9.3 billion. However, a portion of this is based on existing and pending long-term contracts of which the details are unavailable. Therefore, while transmission congestion will have a direct impact on the export prices associated with short-term (i.e., opportunity) export sales, it is unknown how the price determination in these long-term contracts would be affected and thus, what the overall effect will be. Finally, a material change in exports prices would likely lead to changes in Manitoba Hydro's forecasts regarding system dispatch. As a result, without access to additional information, it is not possible to determine the impact these percentage changes in export price would have on the economic analysis performed by Manitoba Hydro.

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PREAMBLE

The imposition of CO2 restrictions in the Midwestern U.S. is not a foregone conclusion...Alternatively, if the CO2 costs do not materialize, the price of (and corresponding revenue from) exports would be about 20-25% lower. With an expected present value revenue of $9.3 billion from exports, this would result in a shortfall of $1.8-2.3 billion, assuming that the export price forecast from The Brattle Group is representative of Manitoba Hydro's forecast.

QUESTION

Please provide a summary and references to the literature that provide the most current (and authoritative) views on CO2 restrictions in the Midwestern USA.

RESPONSE

There is very little literature to be found on CO2 restrictions on a regional scale in the Midwestern USA. The MISO region is largely composed of industrial states that rely on low electricity prices (in part due to using coal) for their economic competitiveness. They tend to oppose any federal environmental restrictions that threaten those prices. One example is an op-ed in the Wall Street Journal by the then governor of Indiana in which he referred to cap-and-trade of CO2 as "imperialism" with "wealthy but faltering powers – California, Massachusetts, and New York – seeking to exploit politically weaker colonies in order to prop up their own decaying economies."[1]

In 2007, the governors of 6 states (plus Manitoba) signed on to the Midwest Regional Greenhouse Gas Reduction Accord, which was a commitment to reduce greenhouse gases. The governors of 3 other states (plus Ontario) did not sign but agreed to participate as observers. While the accord is technically still in place, nobody is abiding by it and none of the governors that signed it are still in office.[2]

Since the Midwest states are unlikely to act on their own, the real question is what will happen at the federal level. The answer to that is largely political. The Republican Party generally opposes carbon restrictions while the Democratic Party is split (many support carbon restrictions but those from industrial and coal states oppose them). President Obama has directed the Environmental Protection Agency to develop performance standards for existing generators. The form and stringency of those regulations are unknown at this time and the regulations undoubtedly will face legal challenges. The House of Representatives responded by introducing a bill (H.R. 3826) to limit EPA's authority to do that.[3] The bill recently passed out of committee, but has little chance of passing the Democrat-controlled Senate and almost certainly would be vetoed by the President.

[1] M. Daniels, "Indiana Says 'No Thanks' to Cap and Trade," Wall Street Journal, May 15, 2009.

[2] http://www.c2es.org/us-states-regions/regional-climate-initiatives/mggra

[3] http://beta.congress.gov/bill/113th/house-bill/3826

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PREAMBLE

The Brattle Base Case includes CO2 prices, which are a huge uncertainty. Potomac used a lower CO2 price in two of their four scenarios and only gave a 50 % probability to a CO2 price occurring at all. MISO had one scenario out of 4 with CO2 prices. It was a combined policy scenario with a national renewable standard and a very high CO2 price (a very low probability, very high cost bookend).

QUESTION

Is Dr. Gotham able to quantify (in terms of dollars or percentages) the impacts of the MISO MTEP12 and Potomac forecasts on the economic analyses performed by MH?

RESPONSE

Without knowing the specifics of the actual MH export price forecast, it is not possible to authoritatively quantify the impacts. Instead, a suppositional estimate is provided (as in, if the MH export price forecast is identical to the forecast from The Brattle Group, these are the impacts that can be inferred from the information that is available).

A comparison of the MISO MTEP12 Business As Usual, Brattle's Base, and Potomac's Reference cases was provided in Table 5 of the evidence. It should be noted that the assumptions for the MISO BAU are significantly different from those in the other two studies, particularly in terms of load growth (MISO is higher) and CO2 costs (MISO has none). However, since these cases represent the "base" scenarios of what the future may hold from the perspectives of the organizations that performed the studies, a comparison of the prices is informative.

The MTEP12 export prices are essentially the same as the Brattle prices in 2017 (when there is no CO2 costs in the Brattle forecast). The MTEP12 prices are 26 % (in 2027) to 29 % (in 2022) lower than the Brattle prices once CO2 costs are factored into the Brattle forecast. The Potomac reference case is 15-17 % lower than the Brattle base case.

The expected present value of export revenues in Manitoba Hydro's preferred development plan is $9.3 billion. However, a portion of this is based on existing and pending long-term contracts of which the details are unavailable. Therefore, while transmission congestion will have a direct impact on the export prices associated with short-term (i.e., opportunity) export sales, it is unknown how the price determination in these long-term contracts would be affected and thus, what the overall effect will be. Finally, a material change in exports prices would likely lead to changes in Manitoba Hydro's forecasts regarding system dispatch. As a result, without access to additional information, it is not possible to determine the impact

these percentage changes in export price would have on the economic analysis performed by Manitoba Hydro.