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**Sent:** Tuesday, May 31, 2011 9:25 AM  
**To:** Buechler, John; d.a.whiteley@att.net  
**Subject:** Responses to questions

1. Why do the carbon prices need to rise so high to achieve the targeted reduction goals?

*As noted in the CRA presentation, the 2030 carbon price is close to that suggested by stakeholders.  Without earlier year banking, the CO2 price must be high enough to eliminate 80% of U.S. CO2 emissions in 2050  which requires a significant increase in carbon prices to move the general economy and the electric sector to non-carbon alternatives and/or reduce economic activity and electricity demand.  Banking of allowances would have allowed for a reduced out-year price but would not precisely meet the desired stakeholder emission levels in 2030 or in 2050.*

1. It is noted that the S2 and S3 results are nearly identical
   1. Is the primary reason for that because the intermittency limits are binding in both cases

*The F2S1 and F2S1 capacity builds are similar in aggregate (although not necessarily by NEEM region) indicating that intermittency limits for solar/wind are beginning to bind as noted in the CRA presentation.  Other renewable/nuclear capacity build limits in Exhibit 12 may also be contributing.*

1. The shadow prices between Ontario and the US Regions are very high, but there is no significant increase in the flows out of Ontario in the soft constraint cases
   1. Does the soft constraint methodology create a disincentive for increasing such flows due to the high shadow prices?

*The soft constraint methodology relaxes constraints in a similar fashion across the footprint.  The shadow prices are an indication of the value of the next MW of transfer path expansion, not necessarily for a significant amount of MW expansion.  With simultaneous transfer path changes throughout the footprint in F2S1 and F2S3, it is not possible to determine why Ontario flows do not increase significantly without isolating the change in a separate sensitivity.  It is likely that significant generation capacity expansion in Ontario would be required to materially increase the flow across the Ontario paths, and such expansion may not be economic relative to capacity expansion in other parts of the system.*

1. Stan Hadley has performed a “Net Present Value” calculation from the NEEM Future 2 results, in which he has included the following: fuel, emissions, FO&M, VO&M, and Capital Costs, using a PV factor of 5% per year
   1. The Transmission sub team is considering using this NPV figure for comparison between the Base Case and the Soft Constraint Cases
   2. Question whether this NPV calculation is representative of the objective function of the NEEM model?
   3. Is such an NPV calculation appropriate for application to costs that are given in constant dollars?
   4. Does the CRA MRN-NEEM optimization minimize the present value of all costs in the above list for each model year?
   5. Is the above method compatible with the CRA MRN-NEEM optimization to help inform the capacity expansion value difference between OL25 and OL75 sensitivities and baseline?
   6. Should the NEEM results be interpolated between NEEM model years as described above?

*The stakeholder NPV calculation using each model year’s costs is similar to that used in the NEEM model.  The NEEM model minimizes the present value of costs across all model years using all costs, including transmission hurdles.  Applying a real discount rate to real constant dollars is a standard practice.  NEEM does not apply an interpolation process to obtain intermediate year values.*

1. To what extent are the higher hurdle rates between regions in the Southeast blocking flows through that area?

*Hurdle rates are an important input into the NEEM model, and will limit transfers between regions.  Targeted sensitivity analyses with alternative hurdle rates would have to be conducted to determine the exact impact in any particular region.*