



Eastern Interconnection Planning Collaborative



SSC Webinar/Conference Call February 11, 2011 Draft Summary

SSC Members in Attendance (by sector)

Canada: Rob Sinclair (alt. for Jon Norman)

End Users: Alice Jackson, Ryan Kind, Sonny Popowsky

Generation Owners: Steve Gaw, Michael Goggin

NGOs: Wil Burns (alt. for Mark Brownstein), Andy Oliver, Beth Soholt

Other Suppliers: Herb Healy, Chris Lyons, Dennis Sobieski

Public Power/TDUs: Paul Malone, Tim Noeldner, Maryam Sharif

States: Lauren Azar, Denis Bergeron (alt. for Jim Volz), Lib Fleming, Ed Finley, Kevin Gunn, Valerie Lemmie, Jon McKinney, Doug Nazarian, Marya White (alt. for Paul Suskie)

Transmission Owners: Will Kaul, Tamara Linde, Stuart Nachmias

1.1 Summary of Consensus Decisions on BAU from SSC Feb. 7-8 Meeting

- A. SSC Consensus Decisions made at Feb. 7-8, 2011 Meeting:
- PTC and ITC sunsets (extended through model period)
 - State RPS targets (voluntary – modeling determined by state)
 - Wind penetration rates (25% on regional basis)
- B. MWG consensus items accepted without objection by SSC including:
- NEEM Regions
 - MRN Economic Assumptions
 - RGGI and EPA non-carbon regulations modeling
 - Oil prices & SOx/NOx Prices
 - Demand Response, EERS
 - Load Forecasts (base, high & low) net of DR & EERS
 - PHEV & BEV levels
 - Existing Generation data
 - Class 4 Wind Shapes (Exhibit 4)
 - Increased Generation Costs

No outstanding issues were raised by SSC members regarding these decisions made at the Feb. 7-8th meeting.

1.2 Outstanding Decisions on BAU

A. Capital Costs

- MWG reviewed alternative data sources for generation capital costs
 - EPA is based on AEO 2009; was rejected by MWG as outdated
 - **Option A:** New Build Capital Costs and Characteristics for all generation: AEO 2011

- **Option B:** New Build Capital Costs and Characteristics for wind AEO 2010; all other generation AEO 2011

CONSENSUS DECISION OF SSC: OPTION A – AEO 2011 for all generation capital costs.

B. Capital Cost Learning Assumptions

- Generation other than wind: where available AEO 2011, otherwise AEO 2010 learning rates
- Wind: Total Learning Through 2030 (percent total cost reduction 2010-2030)
 - Option A: 1% (AEO 2010/CRA default)
 - Option B: 5% (similar to coal, gas)
 - Option C: 10% (similar to nuclear, geothermal)
 - Option D: 15% (in between 10% and 20% for solar/biomass)[1]

CONSENSUS DECISION OF SSC: OPTION C - 10% learning over the study period; Further clarification sought on how learning "rates" are used by EIA in AEO generation cost forecasts and how this compares with CRA's approach.

C. Transmission Cost Adder

- Current CRA Data:
 - \$0/kW for offshore wind
 - \$172.98/kW for wind/solar/geothermal
 - \$21.92/kW all other new generation
- **MWG Recommendation:** Use \$21.92/kW for all technologies.

Intent is to reflect differential transmission costs in PA's high level transmission cost estimate for each future rather than embedded in capital costs.

SSC CONSENSUS DECISION: MWG Recommendation: \$21.92 Transmission Adder for all Technologies; with the understanding that further clarification is needed on the relationship between transmission costs included in AEO 2011 capital costs estimates and transmission adders. The appropriate value of transmission adders will be open for discussion in subsequent Futures and Sensitivities. EISPC asked that consideration be given to how the transmission costs of more remote generation can be integrated in the MRN-NEEMS model as well.

D. Regional Multipliers for Capital Costs

- CRA selected one city from AEO 2011 cost data as multiplier for each NEEM region
- **MWG Recommendation:**
 - For NEISO, use 3-city (Burlington, Portland, Concord) on-shore wind
 - For NEISO, use a 6-city average for all other technologies (Exhibit 10)

SSC CONSENSUS DECISION: MWG Recommendation Adopted; A request for further opportunity to evaluate CRA's single-city approach in other NEEM regions, with the possibility that adjustments to regional multipliers may be needed for other Futures.

E. Natural gas price forecast for BAU Base case

- **Option A:** Composite of AEO 2010 and AEO 2011 forecast
 - Starts with the AEO 2011 forecast in year 2011, ramping up to the AEO 2010 forecast by year 2025 and staying on the AEO 2010 forecast for years after 2025.

- **Option B:** AEO 2011 forecast

Note: For either Option A or B, AEO 2011 regional prices by NERC sub-regions to be used to develop the natural gas basis mapping (Consensus of SSC).

SSC CONSENSUS DECISION: OPTION B - AEO 2011.

F. High Natural Gas Price Forecast – Sensitivity #5

- **MWG Recommendation:** Use the ratio of the AEO 2010 high natural gas price case to the AEO 2010 reference case and apply that ratio to the agreed natural gas price base forecast from Item E above.
- Two other options were also discussed at the last SSC meeting:
 - AEO 10 High – the high natural gas case from AEO 2010 (EISPC Proposal)
 - AEO 10 High Adjusted – AEO 2010 high gas case adjusted by difference between AEO 2010 reference and AEO 2011 reference cases (This proposal was withdrawn during discussion in acknowledgement that it was the same as the AEO 11 reference case adjusted according to the MWG’s recommendation)

SSC CONSENSUS DECISION: AEO 2010/2011 Composite High Case, which recognizes the need for greater spread between base case and high case Sensitivity.

1.3 Report on Completion of outstanding modeling data inputs for BAU Base case ('Holes')

A. Reserve Margins, hurdle rates and wheeling charges

- **MWG recommendation:** PA-provided reserve margins, hurdle rates and wheeling charges adjusted to reflect the new NEEM regions (Table 15, Exhibit 18)

SSC CONSENSUS DECISION – MWG recommendation adopted.

B. Intermittent Resources Contribution to Reserve Requirements

- **MWG recommendation:** Based primarily on PA guidance and current planning practice. Individual values with rationale provided, including revisions for NYISO (15%), IESO (11%) and offshore wind (30%) in Table 5

SSC CONSENSUS DECISION: MWG recommendation adopted.

C. Class 3 Wind Capacity & Shapes

- CRA wind capacity data included only Class 4 and above
- Class 4 wind shapes based on CRA analysis of EWITS site data
- NREL ReEDS provided data for Class 3-7
- **MWG recommends** creating Class 3 wind shapes by applying ratio of NREL C3 to C4+ capacity factors to CRA C4+ wind shapes:
 - CRA Class 4 data disaggregated by state in ISO-NE only
 - NREL Class 3 data not available by state
- To consolidate to NEISO region, MWG recommends:
 - State by State weighting by Class 4 capacities

SSC CONSENSUS DECISION: MWG recommendation adopted.

D. HQ & Maritimes hydro and wind

- MRN-NEEM does not model HQ and Maritimes as NEEM regions
- MWG developed a proxy method to include HQ & Maritimes hydro and wind
- Existing resources modeled as BI fixed flows into neighboring regions
- New resources modeled as pseudo-generators
 - Cost characteristics from AEO 2011
 - Resource limits based on regional studies
 - Hurdle/wheeling rates based on Ontario charges
- Model can allow import of capacity under increased transfer limit Sensitivities
- High-level costs of transmission will be estimated by PAs

SSC CONSENSUS DECISION: MWG proxy method adopted.

Characteristic	Value	Source
<u>Resource Potential</u> Available (MW) by 2020 Available (MW) by 2025 Available (MW) by 2030	695 MW + 1485 (total = 2,180) + 2470 (total = 4,650)	MHEB (Keeyask) MHEB (Conawapa) MHEB (Other Sites)
Capital Cost (in 2010 U.S. \$/kW)	\$ 3,076	AEO 2011 Data (consistent with modeling of HQ)
Energy Production	Proportional to load shape in MISO_W	Consistent with the modeling assumptions used for HQ and the Maritime provinces.
Reserve Margin Contribution	100%	Dispatchable hydro generation with large reservoir storage. (consistent with the modeling assumptions used for HQ and the Maritime provinces)

E. MAPP CA and Ontario hydroelectric potential

- The MAPP_CA (includes Manitoba Hydro and Saskatchewan Power Corporation) and Ontario NEEM regions contain significant hydroelectric potential
 - A 200 MW new hydroelectric generating station (Wuskwatim on the Burntwood River) in the MAPP_CA NEEM region is currently under construction and has been forced into the base model.
 - Manitoba Hydro has identified approximately 4,650 MW of additional new hydroelectric generating capability which can be developed on the Nelson and Burntwood Rivers.

- Ontario has identified approximately 250 MW of additional new hydroelectric generating capability which can be developed within the current Ontario transmission system.
- MWG recommends that the model make this new hydroelectric generating capacity available to be selected by the NEEM model as a future resource using the following assumptions:

Characteristic	Value	Source
<u>Resource Potential Available (MW) by 2020</u>	250 MW	Ontario Power Authority
Capital Cost (in 2010 Can \$/kW)	\$ 3,800	Ontario Power Authority
Energy Production	Proportional to load shape in Ontario	Consistent with the modeling assumptions used for HQ and the Maritime provinces.
Reserve Margin Contribution	100%	Dispatchable hydro generation with large reservoir storage. (consistent with the modeling assumptions used for HQ and the Maritime provinces)

SSE CONSENSUS DECISION: MWG recommendation adopted, with the comment registered that the Canadian data analysis had been finalized only in the past week, and the request that the SSC members have more time in the future to review in advance of decisions.

F. Environmental retrofits to existing generation

- Issues related to the implementation of the EPA Cooling Water Intake Structures rule have been resolved as the subteam was able to secure the necessary information on capital costs and facilities with closed-loop cooling.
- CRA's default data for Exhibit 13 and Tables 8, 9, 10, 11 on environmental retrofits reference material and cost data are accepted by the Existing Generation sub team.

SSC CONSENSUS DECISION: MWG recommendation adopted.

2.1 Summary of Consensus Decision on BAU Sensitivities

- **Sensitivity #1:** Transfer limits adjusted through soft constraint approach using 75% of overload charges from the reference case; wheeling & hurdle rates remain the same. CRA agreed to alert the SSC if there were "red flags" after reviewing the results.
- **Sensitivity #2:** Transfer limits adjusted through soft constraint approach using 25% of overload charges from reference case; wheeling & hurdle rates remain the same.

Review Sensitivity #1 results to determine if how to proceed for the remaining Sensitivities.

- **Sensitivity #3: High Load Growth:** 1% per year increase over reference case load forecast.
- **Sensitivity #4: Low Load Growth:** 1% per year reduction over reference case load forecast.
- **Sensitivity #6: Increased EERS/RPS/DR targets**
 - EERS targets increased by 5 percentage points over the study period
 - State RPS increased by 5 percentage points by target date
 - For states with a solar carve-out, the solar carve out will be increased 1 percentage point and the non-solar RPS will be increased by 4 percentage points
 - DR modeled as 5 percentage points increase over FERC BAU Study Scenario
- **Sensitivity #7: Higher PHEV levels**

Exhibit 19: BAU PHEV & BEV numbers (not %) increased by:

 - 2x BAU in 2015
 - 4x BAU in 2020
 - 7x BAU in 2025
 - 10x BAU in 2030
 - Assumes 37% of charging is during peak hours
- **Sensitivity #8: Increased Generation Costs**
 - Apply a uniform 25% increase to all 2011 base overnight capital costs and existing generation retrofit costs

SSC CONSENSUS DECISION: Sensitivity 8 will be redefined by MWG as Low Cost Renewable capital cost Sensitivity.

3.1 Future 5 – Nuclear Resurgence, Sensitivity #8: Restriction on Canadian hydro, heavy variable resource penetration

- EISPC clarified that this Sensitivity has been withdraw and could be used to model the Clean Energy Standard.