Summary of Modeling WG Webinar
Wednesday, June 20, 3 PM ET

Official/designated WG members in attendance: Erin Hogan (Chair), Allan Myers, Bob Pauley, Craig Taborsky, Doug Gotham, Ezra Hausman, Hisham Choueiki, Michael Goggin, Ryan Kind, Tyler Ruthven, Wil Burns, and Ralph Luciani, Bruce Tsuchida, Youngsun Baek and Alex Smith (CRA); Dave Whiteley, Flora Flygt and John Buechler and (EIPC). Facilitator: Catherine Morris (Keystone).

NOTE: To facilitate the rapid pace of the MWG meetings during June 2012, these summaries will focus on the action steps taken during the meeting and next steps resulting from the meeting. Details of modeling discussed will be captured in the matrix of inputs (see below) and the output framework drafts, to be updated regularly on the Phase II – MWG page online. Recordings of the webinars will also be posted.

1. **Input Data**

- **DR curves**
  - ORNL has made progress and will touch base with MWG members early next week. On next Wednesday's MWG call, the group will cover the DR supply curve to be included in the MAPS model.
- **Wind shape diversity**
  - CRA has received, but not reviewed, information from NREL on the correlation of EWITS wind sites and wind shapes with balancing areas within NEEM regions. If possible, this would be the first choice for recognizing the diversity in wind shapes across a region.
  - Where that is not possible, MWG members are considering other options to bring more diversity in wind shapes, so that all of the wind doesn't peak at the same time and potentially result in transmission constraints.
  - CRA had originally proposed an option for stratifying the EWITS wind shape data statistically by randomly grouping sites into 20 groups, and taking averages across each hour to define the region's wind shape diversity.
  - CRA also evaluated two alternatives proposed by MWG members. One is to sort the wind data by annual capacity factor from low to high, and divide it into 20 groups along that spectrum, then use hourly averages. The second option proposed would involve determining the hour of maximum inputs across sites and sorting them by hour, then grouping them and finding the averages. CRA suggested that the capacity factor option would provide the greatest diversity.
  - There was some discussion of a third alternative that reflected the geographical differences of all of the wind sites, for instance, through sorting the sites by latitude, or breaking the region into latitude and longitudinal groupings. CRA expressed concern that this might involve more time and effort than can be afforded given the tight timeline, and may not yield better results than using the balancing authorities, or one of the other options suggested. The group determined that they needed more information from NREL and CRA in order to make this decision.
  - The group decided to add a MWG call on Monday, June 25, to the schedule, and will try to resolve this issue at that point.
- **DC line imports/commitments**
  - The MWG agreed that there should be a rule that defines the amount o committed capacity for import between commitment pools, such as the power carried by the HVDC lines from the Midwest to PJM.

- CRA stated that providing a range rather than an exact number as the commitment amount, would allow the model to solve faster and more easily. CRA suggested using the average flows between NEEM regions during three different seasons (summer, winter, other), with a range of +/- 20%.
- Some MWG members proposed using the average as the max and constructing a range to - 20% of the max., or a range of 80-100% of that max.
- After some discussion, the group agreed that the range should be 80-100% of the average seasonal flow, or in other words, the average as the maximum capacity and as much as 20% less than the average, based on what MAPS "wants" to do.

2. Output Framework Details

- **Commitment data** – CRA clarified that the specific commitment data will not be available. The model will automatically move from commitment to dispatch, and the hourly data report will show total flows after BOTH commitment and dispatch.

3. Sensitivities

- **Transmission sensitivities**
  - Some stakeholders discussed an interest in transmission-related sensitivities, such as changing flow gate limits, changing the size of the DC lines, or possibly removing one of them.
  - Others were concerned that removing or adjusting transmission facilities or flow gates would fail to account for necessary related changes in the subsystem, and would mean a starting point that didn't represent a reliable transmission system,
  - There was also concern that adjusting the flow gates wouldn't yield much useful information since it would not include what transmission facilities might be needed or changed to support the reliability of the system.
- **Other sensitivities**
  - The group was reminded that sensitivities related to fuel costs, carbon prices, DR variations, etc., were the kinds mentioned in earlier documents related to project objectives.
  - The group may want to consider consistent sensitivities across all three scenarios; because there are six sensitivities, that would mean two sensitivities per scenario.

4. **Next steps:**

- ORNL: Continue refining DR supply curve
- NREL & CRA: More information about how to diversify wind curve on a geographic basis
- GE-MAPS sensitivities discussion
- Additional call scheduled: **Monday, June 25, 1-2 p.m. ET**

Summary of Modeling WG Webinar
Wednesday, June 20, 3 PM ET

EIPC MWG GE-MAPS Data Review, Draft June 20, 2012			
Input	**Phase 1 Assumptions**	**Phase 2 Recommendations**	**Comments**
Load Characteristics			
Hourly Load Profile	Load duration curve developed from 2006 Load Shape	Chronological hourly load based on 2006 Load Shape	
Peak Load	Each NEEM Region peak adjusted for coincidence factor	Peak load based on hourly load for MAPS area	NEEM adjustment necessary to capture variation in peak loads across time zones (Phase 1, excludes Phase 2)
Total Energy by Area	2030 Energy Aggregated by NEEM Region	2030 Energy Disaggregated proportionate to MAPS area	Follows similar methodology to exhibit phase 1
Generation Characteristics			
Generating Capacity	NEEM used single capacity rating (Summer capacity rating for gas units)	generation in-service in 2030 consistent with power flow cases for each Scenario;	unit list posted on EIPC website
Capacity ratings		seasonal differences used for gas (CTs & CCs) ; 8% additional capacity for winter rating	CRA to confirm NEEM values
Full load heat rates	full-load HR of units in aggregate	Generation in-service in 2030 consistent with power flow cases for each Scenario; apply technology specific graduated HR assumptions provided by CRA	MWG members compared NREL and CRA assumptions and found little difference.
Forced outage rates		NEEM	New units - AEO projections; existing units - CRA to check
Planned outage rates		NEEM	
Up & Down Time		CRA Assumptions	
Emission rates for existing units		NEEM	
Post-retrofit emissions rates		NEEM	
Variable O&M costs		NEEM	
Nuclear capacity ratings		NEEM	

Summary of Modeling WG Webinar
Wednesday, June 20, 3 PM ET

Nuclear forced outage rates		NEEM	
Hydro Existing			MAPS model: Monthly energy target w/ Max Limit, Min Limit; Minimize Total Production Cost
Hydro, New			
Renewable Resource Plant Capacity		NEEM	
Renewable Resource Plant available energy		NEEM	
Wind generation capacity factors	Modeled Output: 8760 Curve Shape by NEEM Region <1000 MW [5 Shapes] >5000 MW< [20 Shapes]		Fixed Output 8760/unit; from NREL 2006 data (capacity factors)
Profile of hourly wind generation		NREL tasked with translating EWITS wind data to balancing areas used in MAPS. 6/18 - CRA is able to tie wind shape by balancing area for certain units. Where that is not possible, CRA's approach for 20 stratified wind shapes provides adequate diversity of wind shapes.	6/20-CRA provided an example of the distribution of wind in MISO with varying load shapes. Sorting the wind by capacity factor first leads to greater diversity. Developed 20 groups of wind shapes within MISO_W; NREL data available at more granular level to allow distribution of wind load shapes to MAPS regions based on measured wind resources;
Export of generation outside commitment pool	NA	Scenario 1 - Set a range for each season to specify amount available for export from MISO to PJM/ SPP to MISO	6/20 -Scenario 1 - Based on NEEM intertie transfers provided by CRA, there is consensus to allow interchange commitments. Ave. MW by season crossing the intertie should be committed as the maximum commitment for import and the range should be -20%. Hurdle rates on DC lines would be the same as Ph I hurdle rates between those regions. No hurdle rates between commitment pools for imported capacity in commitment phase.

Summary of Modeling WG Webinar
Wednesday, June 20, 3 PM ET

Demand Resource Variable Cost	$750/MWH	Will treat DR as pseudo-generator in commitment process based on supply curve; use the same step function on price to define both commitment and dispatch; dispatch step will determine whether it actually runs on hourly basis; no prescribed limits to DR dispatch other than price	DR acts during real-time dispatch; load-weighted distribution to busses; price step function should be carefully designed to ensure that DR is not over-dispatched; can create seasonal price curves; could be a factor to consider as a sensitivity; SH working on price responsiveness of DR to develop price step curves for testing 6/18 discussed creation of 2 price curves - one for active and one for passive DR -- based on ratio of peak to ave. LMBP. ORNL would like a way to benchmark the results to insure they are reasonable. CRA recommends referencing Ph I prices. DR prices will in most cases be below $750 avg so it is competitive with CTs; extremely high price DR case will balance the cost DR.
Demand Resources in peak			
Spinning Reserves	NA	Section A-10 of input assumptions lists regional requirements; also made assumptions of thermal units' and hydro plants' spinning reserve provided by type (p. 6)	based on hourly load or MW levels and approved by PAs; does not include spinning reserves from nuclear or CTs
Standby Reserves		Not included directly in MAPS	
Transmission Characteristics			
Transmission		Transmission build for EIPC power flow model	200 kV and above
DC tie with WECC		NEEM	
DC tie with ERCOT		NEEM	
Tie with HQ		NEEM	
Tie with Maritimes		NEEM	

Summary of Modeling WG Webinar
Wednesday, June 20, 3 PM ET

Hurdle Rates		NEEM hurdle rates between regions in dispatch step in MAPS; commitment step - divide model into 10 commitment pools; inside pool set $10 hurdle rate between NEEM regions	Note: Each commitment pool commits units to meet load within the pool. Wind is based on specified schedule unless RTP drops below $1; would $0 LMP be appropriate?
Fuel Prices			
Seasonal natural gas price	Summer/winter Shoulder	NEEM	Delivered gas prices as Phase 1
Distillate oil price	Annual	NEEM	
Coal price	Output from NEEM	NEEM	Assumed 2010 Dollars
Emission Prices			
NOx price		NEEM	
SO2 price		NEEM	
CO2 price		NEEM in Scenario 1	None in Scenario 3 or 2; CO2 = $0