

Summary of Modeling WG Webinar
Monday, June 18, 1 PM ET

Official/designated WG members in attendance: Erin Hogan (Chair), Allan Myers, Brenda Harris, Doug Gotham, Ezra Hausman, Hisham Choueiki, Michael Goggin, Ryan Kind, Tyler Ruthven, Wil Burns, and Michael Wegner and Marya White (EISPC), Ralph Luciani, Bruce Tsuchida, Youngsun Baek and Alex Smith (CRA); John Buechler and Flora Flygt (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.***

Outstanding Questions from last MWG Webinar on Input Data

- **DR curves to average supply costs**
 - ORNL proposes to calculate both passive and active demand response (DR) based on National Demand Response (NADR) Assessment data. Also, non-price options will be incorporated in more price blocks to reflect reality more closely. For the base cases, average must equal NEEM assumption of \$750/MWh; for sensitivities there might be flexibility to change average based on more realistic pricing information.
 - CRA will assume DR to be treated as committable resource. DR likely to be run more often this way.
 - DR will be dispatched on an hourly basis, without a maximum run time
 - NGOs: doesn't make sense to shackle DR to average NEEM price assumption when GE-MAPS has more realistic pricing. ORNL confirmed that DR supply curve will have 4 or 5 options below \$750/MW price, and one extremely high price to achieve that average.
- **Wind shape diversification method:**
 - If NREL is able to identify wind units by balancing area, then CRA will be able to use EWITS data to calculate load shapes by balancing area. MISO-W and SPP (N and S) only regions to be treated like this. Possibly MAPP-US, MISO-MO, MISO-MI.
 - Where this approach is not possible, CRA proposes the default method of distributing the NEEM region single wind shape randomly into 20 groups to create some diversity in wind shapes on hourly basis.
 - Wind unit performance characteristics will not include detail such as cut-ins and cut-outs
 - Can't assign wind unit at wind location (1427 locations), just at bus locations.
 - Suggestion was made to sort wind shape data by highest annual capacity factor, instead of a random assignment. CRA will draft an example with MISO-W.
- **Seasonal Interregional flows committed as exports** (see CRA memo)
 - Table 2: CRA sorted interregional flow in 2030 in summer, shoulder, winter periods by NEEM regions and 10 commitment pools.
 - HQ Maritimes and Ontario are scheduled, but others may need adjustments in their commitment schedule for export. CRA proposes to focus on the regions with the greatest inter-regional flows such as Midwest to PJM and Southwest to Midwest. Questions for further discussion are which regions should be considered for unit commitment for export, how many MW should be committed, and how should the

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range of values be established (e.g. +/- 20% of listed flows). This is a critical step for Scenario 1.

Output Framework Details

- Providing hourly data is difficult but doable. CRA needs a list of which data are most needed hourly, and needs to know who finds the information valuable in order to prioritize information needs.
- CRA will discuss with EIPC before proceeding
- Easier to produce hourly loads and generation by NEEM region. Hourly fuel would be very difficult due to heat rate specification.
- Hourly generation by generator type (including DR as generator) (1b) and hourly flows on NEEM interfaces, including flows on DC ties (3a are highest priority for NGOs.
- CRA will provide data on curtailment of wind by NEEM region
- CRA needs decision on priorities for any additional information needed this week: send suggestions to Erin, Ralph and cmorris@Keystone.org

Tagged for discussion at next meeting: What types of transmission sensitivities are possible?

ACTION ITEMS:

- ORNL: Refining DR supply curve
- NREL: Report on EWITS wind unit locations by balancing area
- CRA: Example for stratifying wind load shapes within regions
- Additional granularity of outputs
- GE-MAPS sensitivities discussion
- Additional call scheduled: next **Wed. June 27, 3-430 EDT**
- Next MWG call: **Wednesday, June 20, 3-4:30 PM EDT**

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EIPC MWG GE-MAPS Data Review, Draft June 18, 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	
Nuclear forced		NEEM	

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outage rates			
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.	CRA to provide an example of the distribution of wind in MISO with varying load shapes. 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; Flora requested consideration of sorting wind shape data by highest annual capacity factor or peak hour rather than distributing randomly to achieve more diversity. CRA to evaluate and example.
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	Discussion to continue: Based on NEEM intertie transfers provided by CRA, is there consensus to allow interchange commitments? If so, how many MW should be committed for import and what range should be applied?

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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 avg. 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	

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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