

Interregional Economic Studies

IPSAC Meeting
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Background JIPC Economic Studies

- Year 2013 interregional analysis
 - Conducted by the Joint ISO/RTO Planning Committee (JIPC)
 - Analyzing the effects of increasing the transfer capability between New York and New England
- Identify potential physical barriers to more efficient economic operation of the interregional system
- Quantify changes to economic and environmental metrics resulting from relaxing transmission constraints
- First cut analysis is a “high level” model of the three Northeast ISO/RTOs using IREMM
 - PJM
 - NYISO
 - ISO New England

Background JIPC Economic Studies, *cont.*

- Not intended to advocate for IREMM over other models, such as PROMOD, GridView, MAPS, etc.
 - Each model has its own place
 - Experience and comfort with an existing model is valuable
- Preliminary economic analyses to be followed by a more detailed analysis
- Transmission planning
 - Identification of conceptual solutions
- Detailed production cost analysis
 - Affirmation of economic analysis results
 - Including effects of conceptual solutions

Model Validation Framework

Modeling Validation Concepts

- Preliminary assessment of the data to be used
 - Is it “all-in” there?
 - What simplifying factors are included?
 - Bubble representation vs. detailed system representation
- Reasonableness of the results that are ultimately obtained through simulation
 - Meets expectations for direction of results for changes in input parameters
 - Magnitude of changes “feel right” to the analyst and reviewers
 - Absolute magnitude criterion are difficult to ascertain in advance
- Unexpected results can be investigated further
 - Data or modeling improvements can be suggested
 - Theory and understanding of interrelationships can be quantified

Modeling Validation Concepts, *cont.*

- The theoretical foundation of the model
 - The models that are used (including IREMM, PROMOD, MAPS and GridView) have a solid theoretical basis
 - Economic dispatch
 - Unit commitment
 - Representation of transmission constraints
 - Quantification of transmission congestion
- Statistical significance and economic significance
 - How often the model suggests that congestion occurs
 - The economic significance of that congestion

Modeling Validation Concepts, *cont.*

- Robustness of results
 - Will trends and observations be different if some data are changed?
 - What does it take to change a trend or observation?
- Explanation
 - Can the model be used to explain the general characteristics of the power system?
 - Does this resemble a similar historic time period?
 - If specific events exist in the historical record, does incorporating those events provide the changes that were actually seen?
- Forecast
 - Does the model suggest a reasonable outcome?

Validation Metrics

- Data verification
 - Generation
 - Load
 - Transmission
- Simulation verification (historical vs. simulated)
 - Average energy prices
 - Zonal average energy prices
 - Differences in average energy prices between zones
 - Interface flows
 - Time at limit (percent of time)
 - Volatility of flows (direction)
 - Congestion
 - Economic consequences of congestion
 - FTR / ARR approach used in other (New England) economic studies

Performance Acceptability

- Review results
 - Percent differences
 - Priority of metrics to consider in determining “acceptability”
 - Tradeoffs between
 - Better fit for one metric vs. better fit for another metric

Input Data Verification

- Highest level
 - Capacity and loads are located in appropriate areas or zones
 - Transmission interfaces are located appropriately
 - Average heat rates by class
 - Interface flow sensitivities
- Identify expectations around model simplifications and differences with other models
 - Resulting direction of differences
 - Expected amount of differences
 - Compare results of simulations **between models**
 - Interface flows
 - Fuel consumption estimates produced by other models
 - Estimated average energy prices

Interface Representations

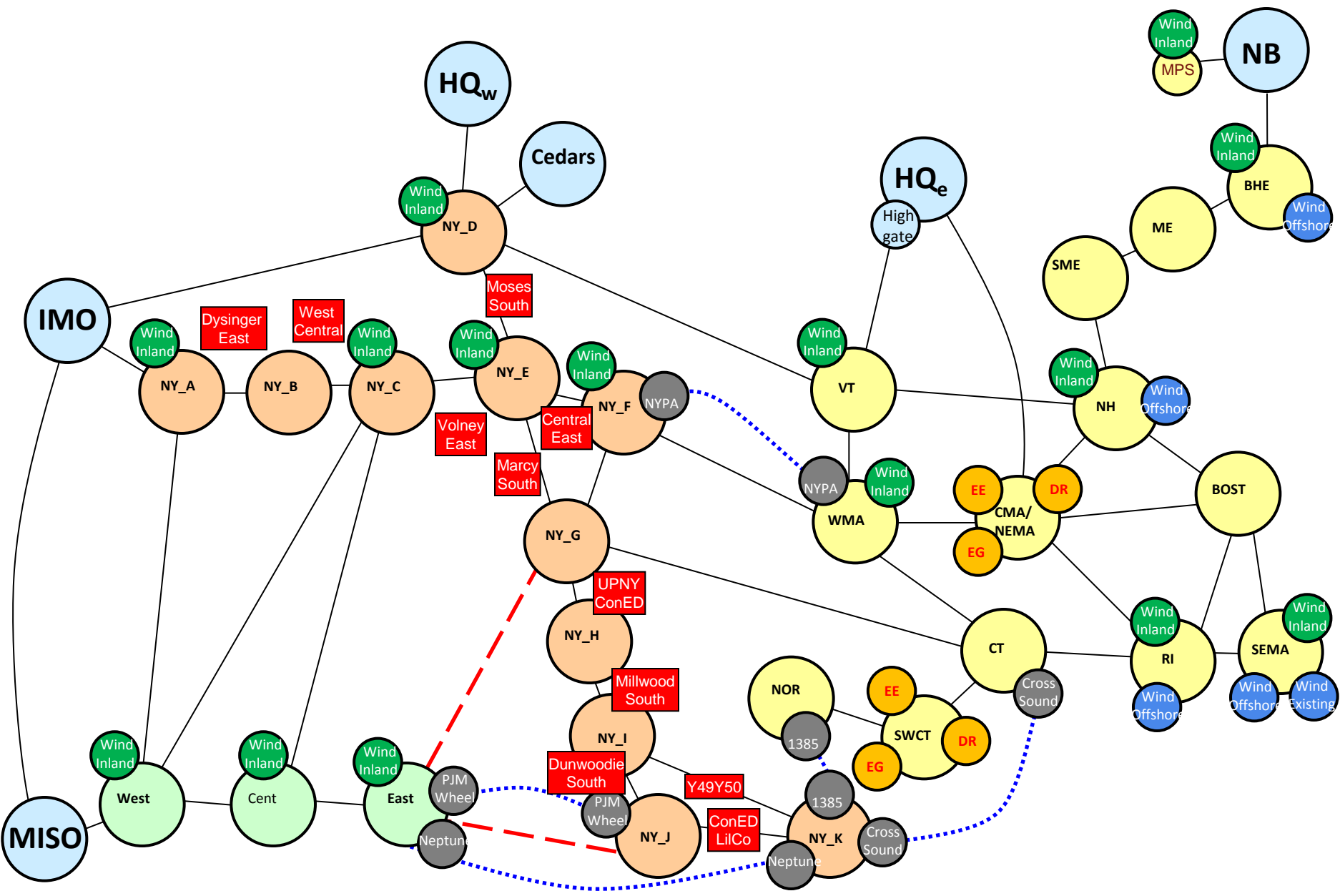
Interface Limits

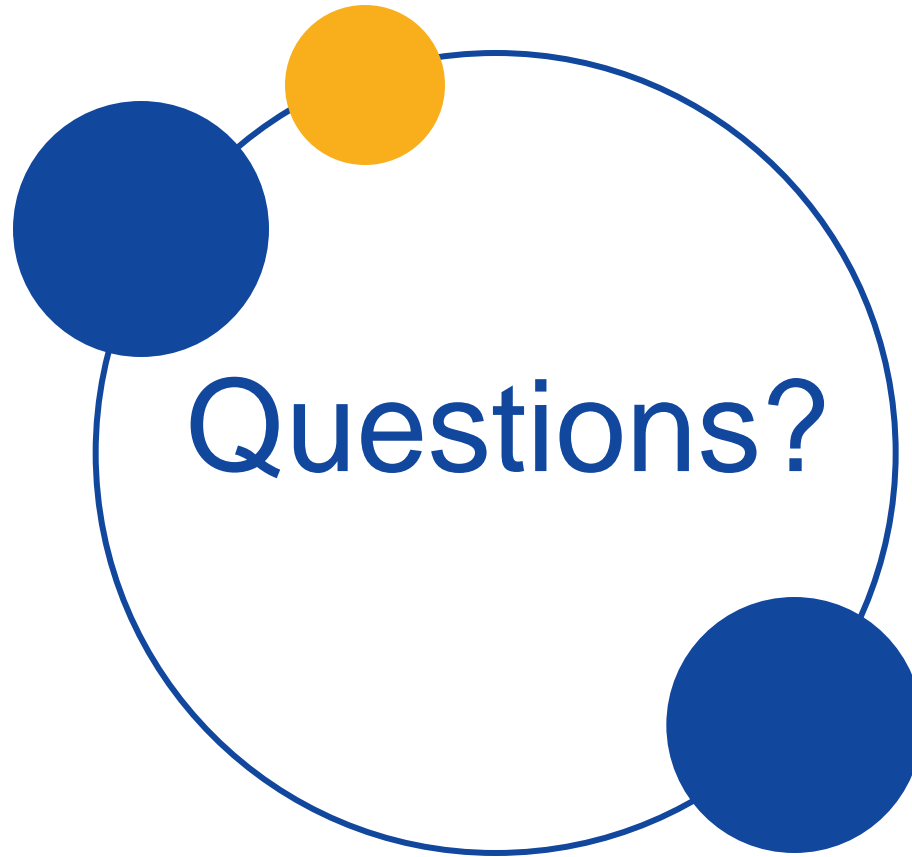
Number	Interface Name	Forward	Reverse	Forward Direction
1	CE GRP	4550	3400	To the southeast
2	TOTAL-ES	6425	1999	From West to East
3	DSY49Y50	99999	99999	To NY City
4	EAST-WEST	2800	9999	Boston toward New York
5	NY-NE	1250	1250	New York to New England
6	N TO S	2700	9999	New Hampshire to Massachusetts
7	CT-IMPEX	2500	9999	Into Connecticut
8	PJM WEST-CENTRAL	4250	4250	From the west into central PJM
9	PJM CENTRAL-EAST	6450	6450	From the central into eastern PJM
10	DYSINGER	2850	1999	From Buffalo to the east
11	NB-BHE	1000	550	From New Brunswick
12	SUROWIEC SOUTH	1200	9999	From central Maine to southern Maine
13	ORRINGTON SOUTH	1150	9999	From Bangor Maine to central Maine
14	MAINE-NEW HAMPSHIRE	1525	9999	From southern Maine to New Ha
15	BOSTON IMPORT	4900	9999	Into Boston
16	ONTARIO TO NEW YORK	3000	3000	From Ontario into New York
17	G-SENY	6000	2499	From NY G toward NY City
18	J-IMPORT	99999	99999	Import into NY City
19	PJ_G&PJ_J	1500	2000	Eastern PJM toward NY City
20	LI SUM	1190	300	Into Long Island from New York

Note: 1000 MW "PJM Wheel" uses part of the 1500 MW in Interface 19 ("PJ_G&PJ_J")

Color Codes

Value	Same as MARS Data
0	Economic Transfer Limit
99999	Unlimited





Questions?