

# Interregional Economic Studies

IPSAC Meeting  
February 2, 2010

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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")

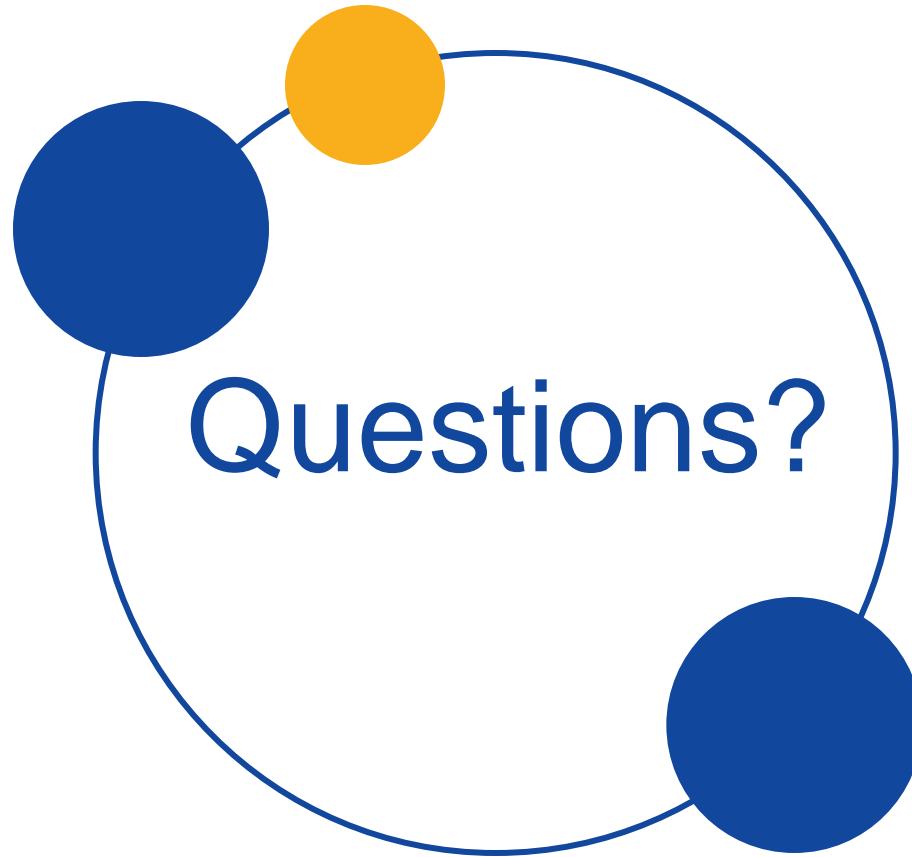
## Color Codes

Value	Same as MARS Data
0	Economic Transfer Limit
99999	Unlimited









Questions?