Mark-to-Model Approach to Collateralizing FTR Market

FTR CWG

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Generalized Approaches for Valuing FTRs

- Technical approach
  - Relies upon statistical analysis of historical data to forecast potential returns
  - Basis for every ISO's FTR credit policy
  - Foundation of traditional commodities margining methodologies (e.g., initial margin, variance margin (mark-to-market), settlement margin, historical & implied volatilities, etc.)
- Fundamental Approach
  - Simulation of system operations to predict future values given set(s) of input assumptions
  - Basis for most long-term planning decisions
    - Generation
    - Transmission
    - Outage coordination
    - Reliability

Generalized Approaches for Valuing FTRs (cont'd)

	Technical	Fundamental

Advantages	• Transparent
	• Relatively straightforward methodology
	• Easily replicated by Participants
	• Reflective of actual observed congestion patterns
		• Commonly used in planning decisions
		• Explicitly considers the impact of changes to system conditions
		  • planned/unplanned outages
		  • additions/retirements
		  • interface limits
		  • fuel prices / load , etc.)
		• Can be used to identify concentration risk
		• Feasible to identify pending exposures

Disadvantages	• Does not account for known/unknown changes to system conditions
	• Impossible to predict the impact of a new generator or transmission line
	• Results less robust without extensive historical dataset
	• Doesn't account for regulatory changes (e.g. changes to market rules, dispatch procedures, system topology, etc.)
	• Doesn't identify concentration risk
		• Complex
		  • Many parameters and assumptions
		  • Requires use of simulation modeling software
		• Requires definition & evaluation of large number of scenarios

Select Model Input Parameters

- Generators
  - Operational Parameters
    - Variable Heat Rates
    - Fuel type – dual fuel consideration
    - Start-up, min-run, min-load, seasonal claimed capability, emission constraints, unit availability, fuel contracts, …
  - Fuel Prices
    - Contract pricing
    - Spot price forecast
      - Natural Gas
      - #2 Fuel Oil
      - Coal
  - Variable O&M
- Asset Additions / Retirements
  - Generation & Transmission
- Outages
  - Scheduled & Unscheduled

Select Model Input Parameters (cont'd)

- Load Levels
  - Seasonal
  - Peak / Off-Peak
  - Locational
  - Dispatchable demand
  - Reserves / Contingencies
- Imports/Exports
- Virtual Transactions
- Transmission System
  - Line ratings
  - Interface limits
  - Contingencies

Sensitivities

- Should assess FTR sensitivities to changes to input assumptions
  - May be necessary to determine appropriate scenarios
- Numerous iterations is necessary for sensitivity analysis
  - Monte Carlo
  - Tornado measure of relative sensitivities
- Determine metric for sensitivity analysis
  - Total FTR returns?
  - Total system congestion?
- Inputs evaluated in isolation / combination?

Sample Questions When Determining Scenarios

- What is appropriate basis for selecting scenarios?
  - Most likely?
  - Largest sensitivities?
  - Customized to fit FTR portfolios?
- How many scenarios are enough?
- Should scenarios include changes to multiple inputs?
  - Correlation matrix
- How frequently should scenarios be updated?
- How frequently should simulations be run throughout the month?
  - At least twice – before auction, after auction
  - Possibly re-run when major new events occur, e.g., outages
  - Scheduled runs
- How much detail should be shared regarding model input assumptions?

How to Create M-t-Model Margin Requirement

- How to use scenarios in establishing margin requirement?
  - FTR portfolio margin based upon 95%?, 99%?, 99.9%? confidence interval?
  - Margin based upon blend of all scenarios – risk adjusted?
- Continue to utilize historic volatility perspective?
  - Base potential future exposure on blend of historic and modeled scenario exposure?
  - Utilize the max/blend of historic and scenario exposure?
- Possible to use M-t-Model prior to FTR award?
  - Optimize the bid portfolio to assess largest possible award exposure
- Other Questions…?