Commitment Process & Uplift Drivers

Joe Ciabattoni
Manager, Markets Coordination
MIC Special Session: Price Transparency
February 24, 2017
3-7 Days Prior
Reliability Engineer Studies 3-7 days

1 Day Prior
Day-Ahead Process Runs
Reliability Engineer Studies Next Day
Reliability Assessment Commitment (RAC)

Real-Time Commitments
Combustion Turbine Optimizer (CTO)
IT SCED RT SCED

10:00
Day-Ahead Market Close

10:30
Day-Ahead Results Posted

13:30
Re-bid Close

14:15
RAC Commitments Communicated

15:00
RAC Commitments Communicated
Reliability Engineer Studies Next day & 3-7 days

• Power flow studies (full contingency list) are preformed for scheduled transmission outages
  – Thermal constraints
  – Reactive constraints (real time or post contingency voltage)
  – Units are identified based on distribution factors (dfax)
  – For voltage - proximity to the problem, thermal surrogate
  – Extreme weather Hot, Cold, Hurricane, etc.

• If required Long Lead units are called or run through
• Unit with >32 hours total time to start cannot be committed in the DA
• Before the Day-Ahead Market is run, next day commitments are given to the Day-Ahead Market operators
• **Objective** - minimize total production cost with bid-in generation and demand

• Balances generation and bid-in demand
  – Generation = generators and increment bids
  – Demand = fixed, price sensitive and decrement bids

• Up to Congestion transactions are also cleared

• Reliability units either picked up economically or committed manually
Reliability Assessment Commitment

- **Objective** – utilize PJM forecast to schedule additional long lead units for reliability concerns at minimum cost

  - Load is based on PJM forecast
  - Interchange is based on PJM forecast
  - Energy and Reserve co-optimization
  - Focuses on Steam & Combined Cycle Commitments
• **Objective** – utilize updated forecasts and system conditions to schedule additional long lead Combustion Turbines (CT) at minimum total production cost

• Typically run 03:00-07:00 and throughout day if needed
• Same inputs as RAC but updated closer to the peak
  – Updated load forecast
  – Updated unit information
• Focus on CT commitment
• Used to commit > 2 hour time to start and long minimum run time units
Real-Time Commitments - SCED

• Objectives
  – Enforce security constraints
  – Minimize total production cost
  – Energy and reserve co-optimization

• Inputs – Current system conditions
  – Very Short Term Load Forecast
  – Topology
  – Generation
  – Load
  – Interchange
  – EMS constraints, operator selected
Intermediate Term SCED
• 2-hour look ahead
• Focus on CT commitment
  – Gives CT recommendations
  – Dispatchers have operational discretion
  – Enforces Reserve Requirements (synchronized and primary)

Real-Time SCED
• 15-minute look ahead
• Dispatches online units
  – Sends unit base points or dispatch signal
  – Respects the Reserve Requirements (synchronized and primary)
  – Dispatches economic Demand Side Response
• Day-Ahead Market
  – Minimize bid production cost
  – Does not guarantee the unit is economic for its entire commitment
  – Some hours LMP above or below units cost/price
  – Cannot recoup start cost through LMP
• Long lead time units
  – Steam / Combined Cycle unit(s) needed for Monday’s constraints
  – Release on Friday after peak…
  – Minimum Down Time + Start Time place unit out of time horizon unit is needed
  – Unit must be run thought the weekend
• Resources committed for load and reserves
  – Unit Parameters
    • Minimum run
    • Starts per day
    • Economic minimum
  – Load under or over forecast
  – Interchange swings (20 minutes notice)
  – Self-scheduled units (20 minutes notice)
  – Emergency outages
• Reactive constraints
  – Energy Management System does not generate dfax for voltage constraints
  – May or may not be viable thermal surrogate
  – Bringing a unit on overwhelms voltage problem
    • Needed a portion of the unit
    • Flows are too low to model constraint