Commitment Decision Making

Energy Market Uplift Senior Task Force
August 20, 2013
Reliability Engineer Studies 3-7 days

- Power flow studies (full contingency list) are performed for scheduled transmission outages
  - Thermal constraints
  - Reactive constraints (real time or post contingency voltage)
  - Units are identified based on distribution factors (dfax) or for voltage - proximity to the problem, thermal surrogate
• Other reasons
  – Black Start / Automatic Load Rejection
  – Extreme weather Hot, Cold, Hurricane, etc.
    • Geography
• Long Lead units are called
• Unit with >32 hours time to start cannot be committed in the DA
• Power flow studies (EMS) same as 3-7 day
• Before the Day Ahead is run next day commitments are given to the DA operators
• Objective - minimize total production cost
• 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
Day Ahead Tools

- **RSC** – Resource Scheduling and Commitment
  - Initial unit commit
  - Limited Contingency list
- **SPD** – Scheduling Pricing and Dispatch
  - Dispatches committed units and calculates LMPs
• SFT - Simultaneous Feasibility Test
  – Contingency Analysis

• SPD
  – Second SPD iteration uses results from SFT

• Probe –
  – Full contingency list
  – Fine tunes the commitment
• Start with a Reactive and Blackstart unit from RE analysis, committed as must run but dispatched according to their offer curve

• DA is run with a limited to contingency set identified by RE studies, Reactive Interfaces, M2M flowgates and common constraints

• DA Scheduling Reserves are optimized
Reliability Assessment Commitment

- Load is based on PJM forecast
- Interchange is based on transaction schedules at 18:00
- RAC minimizes cost to bring units on line
- Energy and Reserve co-optimization
- Focuses on Steam Commitments
• Same constraint set as Day Ahead
• Same topology as Day Ahead
• Combustion Turbine Optimizer (CTO)
  – Typically run 03:00-07:00
  – Same inputs as RAC but updated closer to the peak
  – Objective, Minimize total production cost
  – Focus on CT commitment
  – Used to commit > 2 hour time to start and long minimum run time units
• Co-optimizes Energy and Reserves
  – 2 hour look ahead, hourly assignments
  – Regulation assignments
    • Steam or CTs
  – Synchronize Reserve assignments
    • Inflexible Resources (Condensers and DSR)
    • Double checking
• Security Constrained Economic Dispatch
  – Enforce Security Constraints
  – Minimize total production cost
  – Energy and reserve co-optimization
• Inputs – Current system conditions
  – Very Short Term Load Forecast (VSTLF)
  – Topology
  – Generation
  – Load
  – Interchange
  – EMS Constraints, operator selected
• 2 hour look ahead

• Focus on CT commitment
  – Gives CT recommendations
  – Dispatchers have operational discretion
  – Enforces Reserve Requirements (Synchronized and Primary)
• 15 minutes look ahead

• Dispatches on line units
  – Sends unit base points or dispatch signal
  – Respects the reserve requirements (synchronized and primary)
  – Dispatches economic Demand Side Response
• Differences between Day Ahead and Real Time
  – Load, bid in vs. forecast
  – Interchange, historical model vs. actual interchange
  – Financial Instrument DA only
    • Up to transactions
    • Inc & Dec
    • Creates flow not present in RT
Reliability Engineer Studies 3-7 days

Reliability Engineer Studies Next Day

Day Ahead and Second Pass

Reliability Assessment Commitment (RAC)

Real Time Commitments

10:00 12:00 16:00 18:00