Tier 1 Estimate Changes

October 2013
9/10 Synchronized Reserve Event

15:48 - 16:50 Spinning in RFC

800 MW from NPCC

RTOACE (1-min)
Spinning Reserves
NPCC Reserves
RTO Load
Tier 1 Estimate is the lesser of

\[
\begin{align*}
\{ & \\
\quad & \text{Greater of (SpinMax, EcoMax) – Energy Dispatch MW} \\
\quad & \text{OR} \\
\quad & (\text{Spin Ramp Rate, else Ramp rate}) \times 10\text{minutes} \\
\}
\end{align*}
\]

- No units are excluded
- Example: Unit A is a combined cycle that bids
  - Eco Max=Emergency Max=Spin max = 525MWs.
  - Ramp rate = 5MWs/min.
  - Energy Dispatched MW = 490MWs.
  - Tier 1 = lesser of [(525-490),(5MW*10min)] => 35MW.
• Emergency Max analysis:
  – Analyzed the last 42 Spin events. Less than 4% of units outperform their EcoMax (not Emergency Max).
    • Change #1:
      ➢ Cap Tier 1 estimates to reference the least of \{EcoMax, SpinMax, EmergMax\}.
      ➢ To be implemented by end of year 2013
• Unit Response:
  – Reviewing Hydro and Combined Cycle units for historic Tier 1 response. Most do not respond to Spin events when Tier1 MW is estimated on them because they are not designed for this (duct burners, fuel guns, etc are required).

• **Change #2:**
  - Remove Hydro and CC units from Tier 1 estimates based on past performance.
  - To be implemented by end of year.

**NOTE:** With this change, Hydro and CC units are still eligible for Tier 2 assignments. To avoid penalties, GOs should validate that their SpinMax values are correct and potentially lower than EcoMax.

- Please see “Communication Process for Consideration of Resources Physical Limitation” on the link below for process that allows SpinMax to be lesser than EcoMax:
• Regulation:
  – Analysis is on-going. Member feedback?
    • **Potential Change #3:**
      ➢ If analysis warrants, units assigned regulation would be excluded from Tier1 estimate.
      ➢ To Be Determined

• Constraint control:
  – Units being backed down for constraint control should not respond.
    • **Change #4:**
      ➢ Remove these units from the Tier 1 estimates.
      ➢ To be implemented by end of year.
• Ramp response:
  – Analysis from September indicates the DGP* modifier to the spin ramp rate or ramp rate gave a better predictor of unit response.
    • DGP gives a measure of units that are responding to PJM signals and estimates future response based on recent history.

• Change #5:
  ➢ Apply DPG modifier to cap resource’s Tier1 estimate.
  ➢ Additional analysis is on-going to determine if this should be implemented 24x7 or just during peak load periods/emergency procedures.
Initial estimates were 1435MW for the RTO less DOM (RFC region). After each change is applied, the following estimates result:

- Change #1 => 1134MW Tier 1
- Change #2 => 785MW Tier 1
- Change #3 => 785MW Tier 1, No impact this interval
- Change #4 => 531MW Tier 1
- Change #5 => 301MW Tier 1

Actual response was ~200MW