Tier 1 Estimate Changes

October 2013
• Reviewed all Synchronous Reserve Events since 1/1/2012 (42 events)

• Performance metrics:
  – Tier 1 actual response vs. estimate Tier 1 reserve
    • Avg response = 71%, which is bias up by two over-performance events. Removing those two, the Avg Response drops to 62%.
      – 9/10 response was 12%
  – Percent of Units outperforming eco max = ~4%

• GO/OC discussions
  – Combined Cycles and Hydro capability reviewed:
    • Hydro doesn’t respond automatically to synch reserve event
    • Most CC units max out below eco max for spin reserve
• Regulation:
  – No changes to units assigned reg. They are currently assumed to be able to respond with the MWs outside their regulation band and will remain in the Tier 1 estimate.

• Constraint Control:
  – No changes. These units are expected to respond to a Synch reserve event and will remain in the Tier 1 estimate.
• Change #1 (implemented by end of year):
  – All Units used in the Tier 1 estimate will be capped to the lesser of Eco Max or Spin max.

• Change #2: (implemented):
  – All Hydro Units will be removed from the Tier 1 estimates.
    • Reviewing Dominion Hydro
  – All Combined Cycles units will be removed from the Tier 1 estimate with the exception of units that have submitted a Spin Max < Eco Max.
    • **NOTE**: PJM does have the ability to add or remove units on a case by case basis and may do so based on actual performance from the Tier 1 calc.

• Change #3 (implemented by end of year):
  – Remove units from the Tier 1 estimate with a Manual Dispatch instruction.

**NOTE**: No changes are being made to the Tier 2 calculations!
• Change #4 (available by end of year):
  – During Hot or Cold Weather Alerts, the Degree of Generator Performance (DPG) modifier will be used to adjust the Tier 1 response estimate
  • See the attached presentation (slide 55) for more explanation of DGP:
    http://www.pjm.com/sitecore%20modules/web/~/media/traini
    ng/core-curriculum/ip-gen-101/how-pjm-oper-and-dispatch.ashx
Future changes

- Manual/public posting/training to be created that will include:
  - Tier 1 Information
    - The unit types are included in the Tier 1 Calculation
    - The Tier 1 calculation used during ‘normal’ operating days
    - The Tier 1 calculations implemented during when in emergency procedures
  - Expected response to a Synchronizer Reserve event for non-Tier 2 resources
- Investigate how to provide GOs the DPG value in use.
Current Tier 1 Estimate is the lesser of
{Greater of (SpinMax, EcoMax) – Energy Dispatch MW
OR
(Spin Ramp Rate, else Ramp rate) * 10minutes}

– 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.