Tier 1 Estimate Calculation

Tier 1 Compensation (MIC)

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- ❑ Realistic Tier 1 MW estimation
  - ➢ Unit's Tier 1 MW estimation relies on Participant's data
    - ❖ Synchronized Reserve Ramp Rate
    - ❖ Synchronized Reserve Maximum (SpinMax)

  - ➢ Tier 1 MW estimated will be approximately equal to unit's capability if unit is closely following PJM dispatch signal

  - ➢ The measures currently in place provide PJM with an accurate estimate of Tier 1 capability

❑ Synchronized Reserve Ramp Rate (MW/Minute)

  ➢ Participant submits data via eMKT to reflect capability of the unit

  ➢ Used mainly for Tier 1 MW estimate on a unit

    ❖ Separate from default or economic ramp rate

  ➢ Can be submitted for multiple segments of unit's MW range

  ➢ If no data submitted, energy ramp rate will be used

❑ Unit's Tier 1 MW estimate is capped at

$$10 \; minutes \; * NVL \begin{pmatrix} Synchronized \; Reserve \; Ramp \; Rate, \\ Economic \; Ramp \; Rate, \\ Default \; Ramp \; rate \end{pmatrix}$$

❑ Synchronized Reserve Maximum (MW)

- ➤ Participant submits data in eMKT to represent the maximum MW output a unit can achieve in response to a Synchronized Reserve event

- ➤ Value is used for unit's Tier1 estimation ONLY

- ➤ It is the reference MW point relative to which Tier 1 MW is estimated, else the Economic Maximum value is used

- ➤ The value cannot be less than Economic Maximum of the unit
  - ❖ Exception exists for units with physical limitation

❑ Exception that allows Synchronized Reserve Maximum value to be less than Economic Maximum of a unit

➢ There exists a communication process for consideration of a unit's physical limitation like 'Duct Burner range'

➢ With the exception flag and correct data submitted, a unit will not be considered for Tier 1 or Tier 2 when operating in the duct burner range

➢ Exception process is described in http://www.pjm.com/markets-and-operations/ancillary-services.aspx   (see section 4.2.1 of Manual 11)

- ❑ Degree of Generation Performance (DGP) score is used to adjust a unit's ramp rate for the purpose of Tier 1 MW estimation

  - ➢ It is the responsiveness of a unit to PJM dispatch instruction in terms of its actual MW output

  - ➢ Assumed to reflect the realistic capability of the unit

- ❑ Tier 1 MW Estimate =

$$Higher\ of\ \left\{ 0, Lesser\ of\ \left[\begin{array}{c} NVL(SpinMax, EcoMax) - Dispatch\ MW \\ or \\ NVL(Spin\ Ramp\ Rate, Economic\ Ramp\ Rate) * \textbf{\textit{DGP}} * 10\ minutes \end{array} \right] \right\}$$

❑ Tier 1 Deselect is a feature that is unit specific, and setting is internal to PJM

- ➢ It is used to set Tier 1 MW estimate to zero during market clearing process for any unit or unit type identified as a non reliable synchronized reserve resource

- ➢ Resource type Battery, Hydro, Nuclear, Solar, Wind and some combined cycle units are Tier 1 deselected

- ➢ Exception process exists to take a unit out of the Tier 1 Deselect list http://www.pjm.com/markets-and-operations/ancillary-services.aspx (see section 4.2.1 of Manual 11)