## **KP7 - Change in GREDP Formulation - Associated with LFC Changes**

* Currently a Generation Resource Energy Deployment Performance (GREDP) is calculated for each Generation Resource that is On-Line and released to SCED Base Point Dispatch Instructions.
* This GREDP is based on the resource’s Base Point and Regulation Service instruction.

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| 8.1.1.4.1 Regulation Service and Generation Resource/Controllable Load Resource Energy Deployment Performance\*  The GDREP is calculated for each five-minute clock interval as a percentage and in MWs for a Resources with as follows:  **GREDP (%) = ABS[((ATG – AEPFR)/(ABP + ARI)) – 1.0] \* 100**  **GREDP (MW) = ABS(ATG – AEPFR – ABP - ARI)**  Where:  ATG = Average Telemetered Generation = the amount of regulation that the Generation Resource or IRR Group should have produced based on the LFC deployment signals, calculated by LFC, during each five-minute clock interval  ARI = Average Regulation Instruction = ….  ∆frequency is actual frequency minus 60 Hz  EPFR = Estimated Primary Frequency Response (MW) = ….  AEPFR = Average Estimated Primary Frequency Response = …  ABP = Average Base Point = the time-weighted average of a linearly ramped Base Point or sum of Base Points for IRR Groups, for the five-minute clock interval. The linearly ramped Base Point is calculated every four seconds such that it ramps from its initial value to the SCED Base Point over a five-minute period. The initial value of the linearly ramped Base Point will be the four-second value of the previous linearly ramped Base Point at the time the new SCED Base Point is received into the ERCOT Energy Management System (EMS). In the event that the SCED Base Point is received after the five-minute ramp period, the linearly ramped Base Point will continue at a constant value equal to the ending four-second value of the five-minute ramp.  *\* This is a summary of the current protocol and it not expected to be a perfect match.* |

* Per Key Principle 1.5 (5), LFC will send an Updated Desired Set Point (UDSP) for all Resources receiving a Base Point from RTC. UDSP will be a single value that is the sum of two components: Base Ramp and Resource-specific Regulation Service instruction.
  + Base Ramp will be a four minute ramp similar to UDBP, except that the starting point of the Base Ramp will be the expected output of the Resource using the previous Base Point and the last Resource-specific Regulation instruction from LFC before new Base Points were input to LFC (i.e., the expected output based on these two components).
  + For Resources that are not providing Regulation Service, the Regulation instruction component will be zero.
  + LFC will then determine the Resource-specific instruction and add it to the Base Ramp.
  + LFC will send UDSP every four seconds for all Resources receiving a Base Point from RTC and will continue to do so as new RTC results become available.
  + The UDSP ramp may be temporarily halted for Resources that have Base Points directionally opposite a significant frequency deviation.
* Consequently in RTC, GREDP will be modified to include UDSP.

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| **GREDP (%) = ABS[((ATG – AEPFR)/(ASP)) – 1.0] \* 100**  **GREDP (MW) = ABS(ATG – AEPFR – ASP)**  Where:  ATG = Average Telemetered Generation = …  ∆frequency is actual frequency minus 60 Hz  EPFR = Estimated Primary Frequency Response (MW) = ….  AEPFR = Average Estimated Primary Frequency Response = …  ASP = Average Set Point = the time-weighted average of the sum of a linearly ramped Base Point (Base Ramp) and Regulation Service instruction that a Generation Resource or IRR Group should have produced, for the five-minute clock interval. The linearly ramped Base Point (Base Ramp) is calculated every four seconds such that it ramps from its initial value to the SCED Base Point over a four-minute period. The initial value of the linearly ramped Base Point (Base Ramp) will be the expected output of the Resource using the previous Base Point and the last Resource-specific Regulation instruction from LFC before new Base Points were input to LFC (i.e., the expected output based on these two components). |

* The performance criteria framework for GREDP tracked using parameters X%, Y MW and Z% in current protocols will be carried over as is to RTC.

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| 8.1.1.4.1 Regulation Service and Generation Resource/Controllable Load Resource Energy Deployment Performance\*  (7) All Generation Resources, excluding IRRs shall meet the following GREDP criteria for each month.  (a) A Generation Resource, excluding an IRR, must have a GREDP less than the greater of X% or Y MW for 85% of the five-minute clock intervals in the month during which GREDP was calculated.  (8) All IRRs and IRR Groups shall meet the following GREDP criteria for each month. :  (a) An IRR or IRR Group must have a GREDP less than Z% or the ATG must be less than the expected MW output for 95% of the five-minute clock intervals in the month when the Resource or a member IRR of an IRR Group received a Base Point Dispatch Instruction in which the Base Point was two MW or more below the IRR’s HSL used by SCED. The expected MW output includes the Resource’s Base Point, Regulation Service instructions, and any expected Primary Frequency Response.  *\* This is a summary of the current protocol and it not expected to be a perfect match.* |