



Real-Time Reserve Requirement Tool (R3T)

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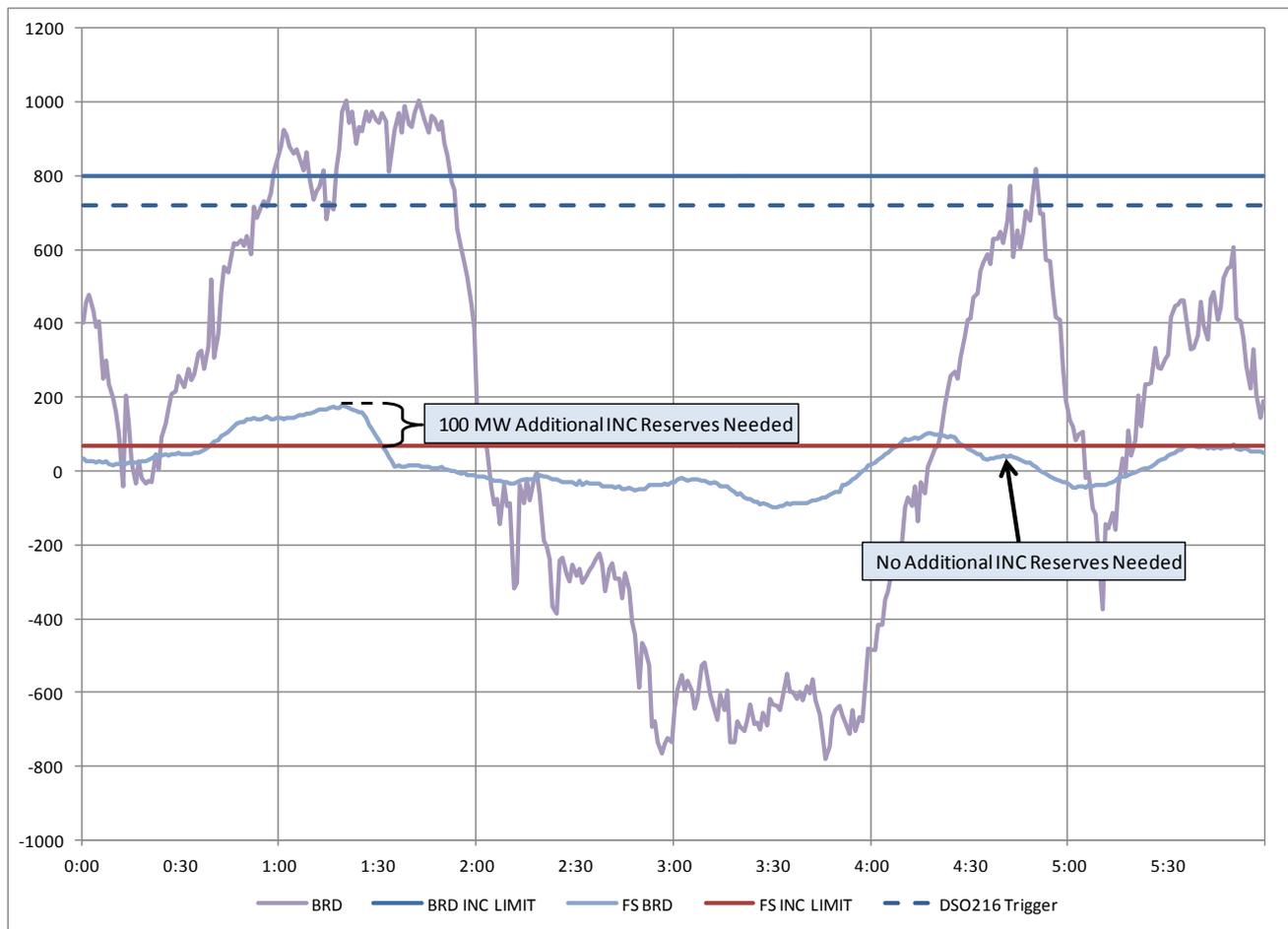
PRELIMINARY

PRE-DECISIONAL

Real-Time Reserve Requirement Tool

1. R3T Objectives
2. Input Data
3. Time Horizons
4. Desired Outputs
5. Options

Real-Time Reserve Requirement Tool



R3T Objectives

- The R3T will be developed for three purposes:
 1. Inform BPA of the additional reserves to purchase for Full Service Participants
 2. Confirm additional reserves purchased for Full Service participants is sufficient **X** hours ahead of the delivery hour
 3. Predict the likelihood of a DSO 216 event occurring during any given hour at **Y** hours ahead of time

R3T Input Data

- The following have been identified as possible inputs to the R3T:
 - Wind Forecast
 - Delta in Wind Forecast from Previous to Next Hour
 - Hour of Day
 - Load Forecast
 - Deltas in Load Forecast from Previous to Next Hour

R3T Time Horizons

- Time Horizons
 - With worst case holiday pre-scheduling occurring 6 days out, R3T must predict out 168 hours to accommodate.
 - R3T will run hourly to accommodate multiple uses.

R3T Desired Outputs

- **Output Data Formats**
 - The primary output will need to be the additional reserves needed to cover Full Service participants (only) by hour for the time period forecast. This will cover objectives 1 and 2 of the tool.
 - For objective 3, the tool will need to categorize the likelihood of a DSO 216 occurring for the BPA BAA by hour for the time period of the forecast.

R3T Options

- Option 1 - Static 99.96% coverage of Full Service Participants
 - Static 24/7 Coverage
 - This is would be an analysis of the Full Service Participants' netted SCE from the Rate Case Dataset cut off at the 99.96% with their Base Service allocation removed.

R3T Options

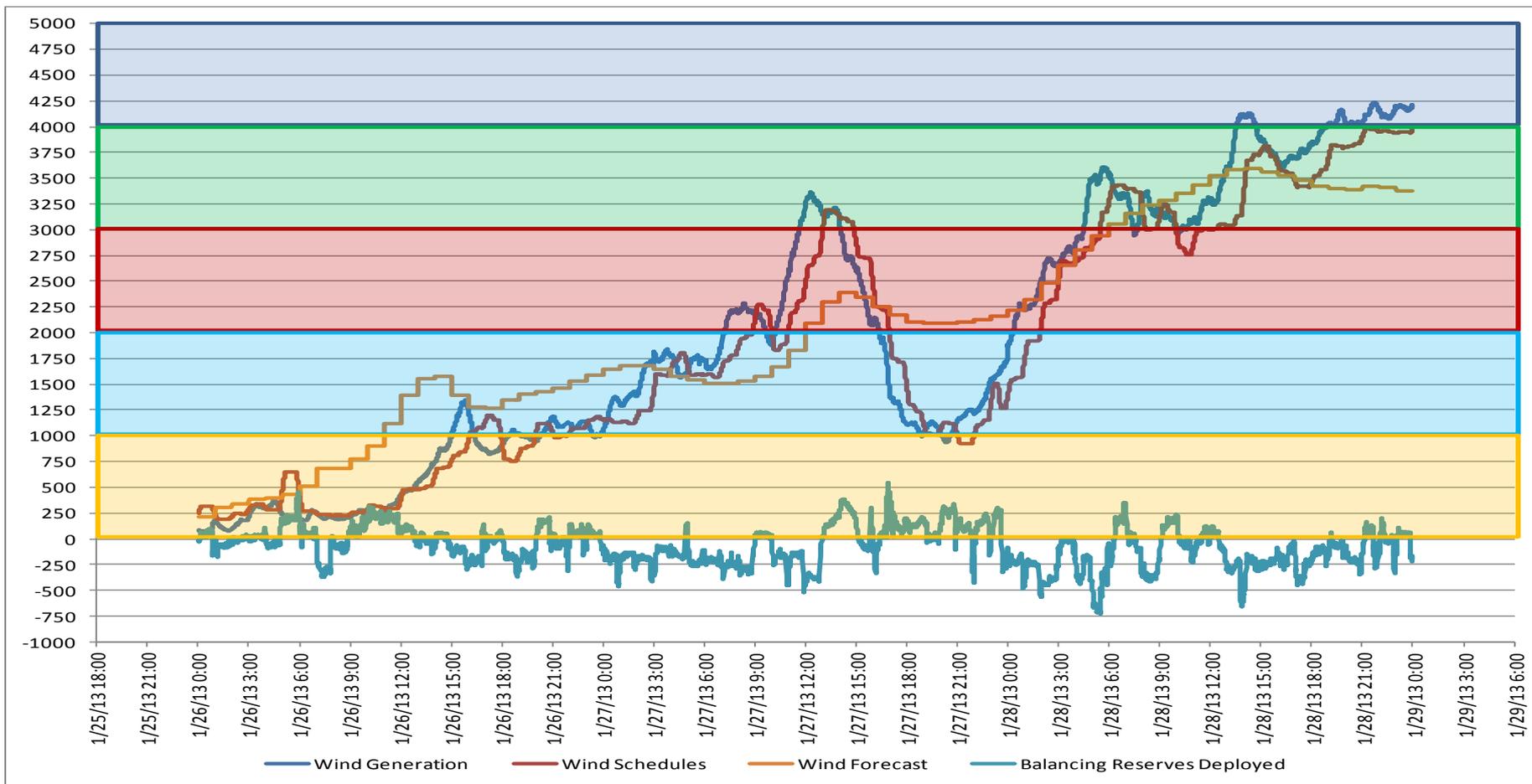
- Option 2 - Group DSO 216 Analysis Method of Full Service Participants
 - Static 24/7 Coverage
 - This would be an analysis of the Rate Case Dataset to separate out DSO 216 INC times and identify the Full Service Participants' needs above their Base Service allocation.
 - 100% of the identified amount.

R3T Options

- Option 3 - Matrix Approach
 - Create bins of historical data for Balancing Reserves Deployed and Full Service Participants SCE(s) based on selected Input Data
 - Determine percentile coverage needed within each bin and forecast accordingly
 - This Option would need to be recalibrated often at first

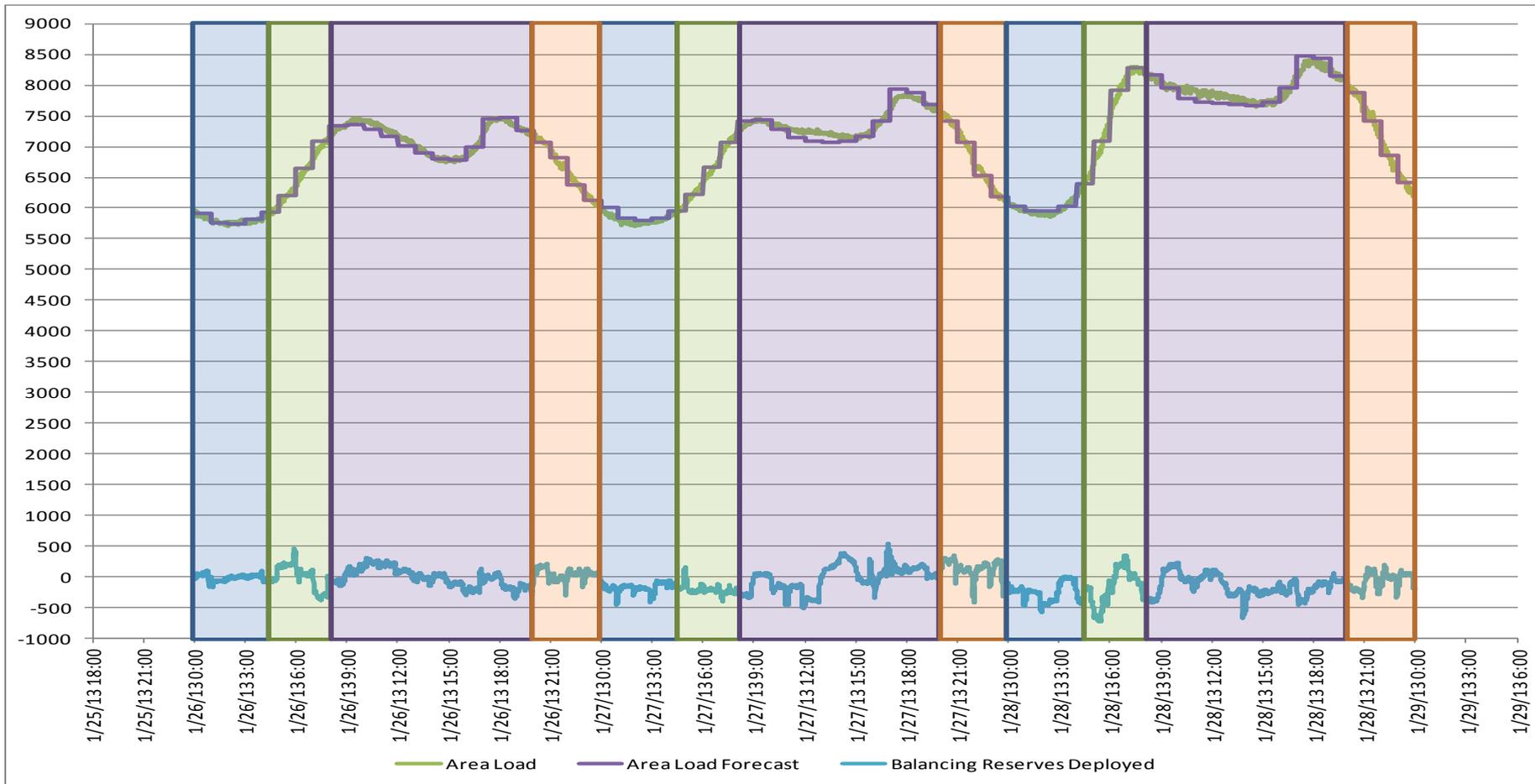
R3T Options

- Option 3 - Matrix Approach [Wind Forecast Bins]



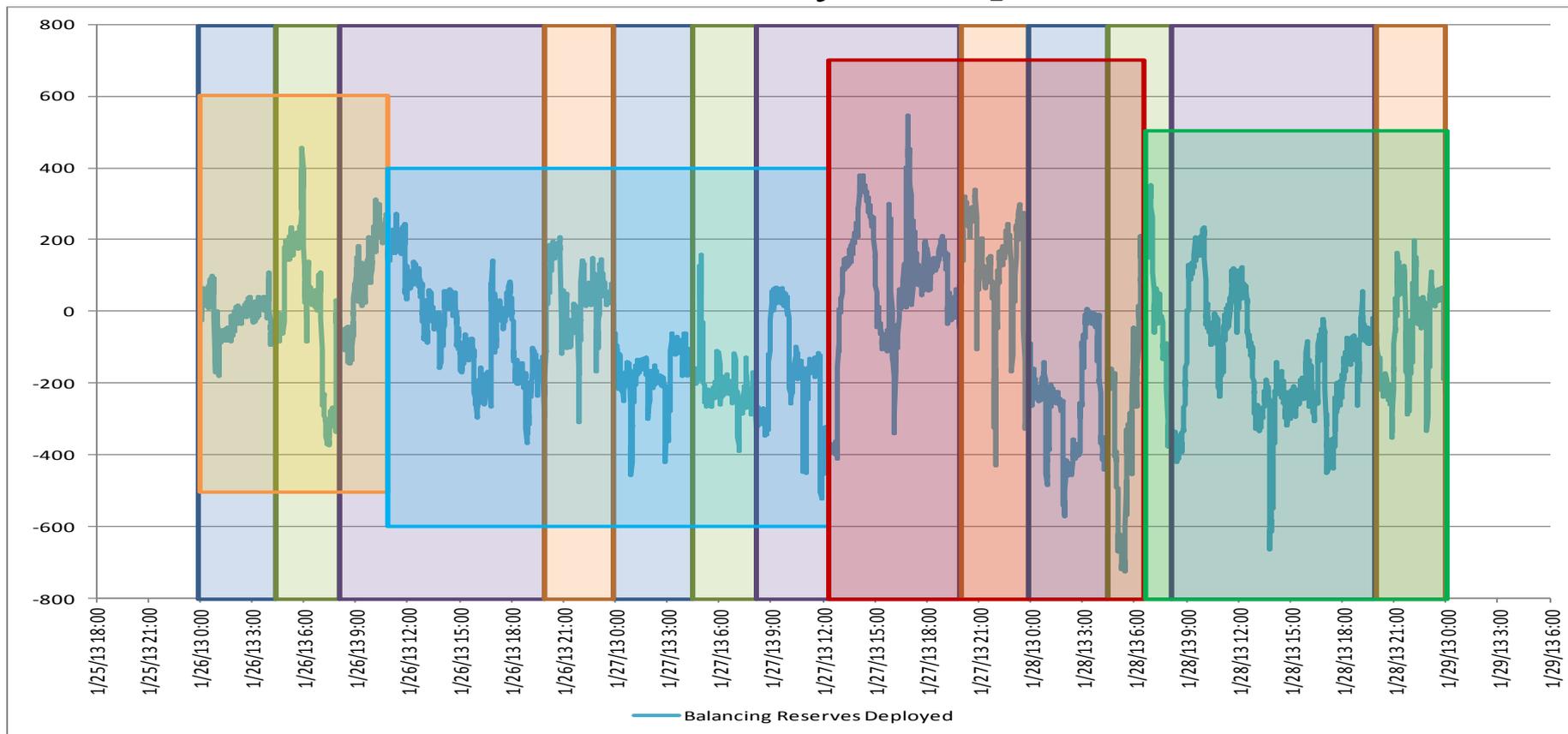
R3T Options

■ Option 3 - Matrix Approach [Time of Day Bins]



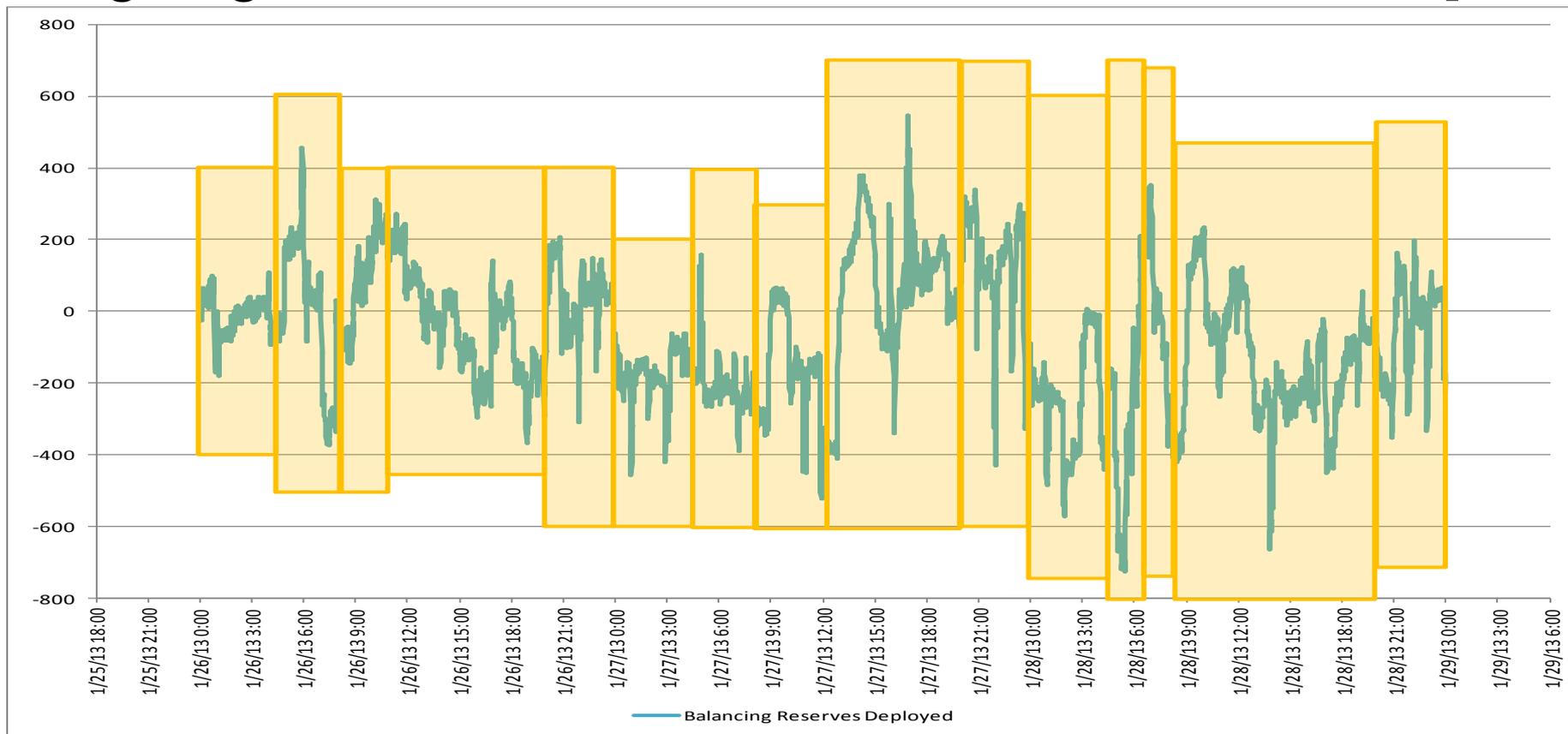
R3T Options

- Option 3 - Matrix Approach [Combination of Wind Forecast and Time of Day Bins]



R3T Options

- Option 3 - Matrix Approach [Reserve Forecast going out 72 hrs based on Combination of Bins]



R3T Options

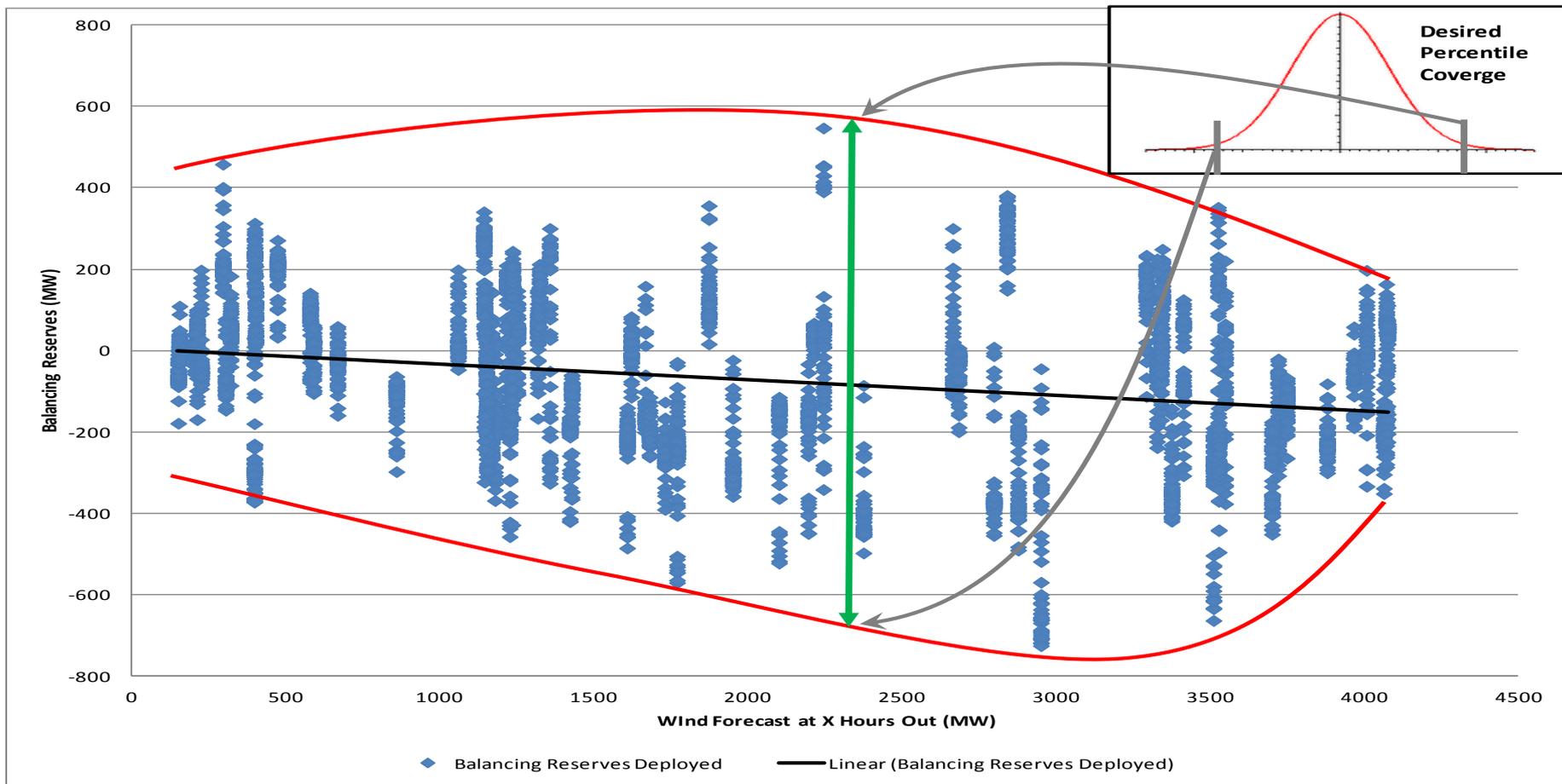
- Option 4 – Linear Regression Approach
 - Create linear regression functions to predict Balancing Reserves Deployed and Full Service Participants SCE(s) based on based on selected Input Data
 - This Option would needed to be recalibrated often at first

R3T Options

- Option 4 – Linear Regression Approach
 - Linear Equation is created to predict reserve need based on Input Data.
 - Historical data is analyzed to identify distributions of error around the Linear Equation.
 - Percentile coverage of distribution of errors determines the Reserve Requirement.

R3T Options

Option 4 – Linear Regression Example



Real-Time Reserve Requirement Tool

Questions?