determined based on the 97.5th percentile. FRD uncertainty histograms are determined based on the 2.5th percentile.

- 97.5 and 2.5 Quadratic quantile regressions are constructed for each hour to estimate uncertainty separately for Demand, Solar, and Wind as a function of the forecast:

$$uncertainty_{\text{solar}} = A + B * \text{forecast}_{\text{solar}} + C * \text{forecast}_{\text{solar}}^2$$

$$uncertainty_{\text{wind}} = A + B * \text{forecast}_{\text{wind}} + C * \text{forecast}_{\text{wind}}^2$$

$$uncertainty_{\text{demand}} = A + B * \text{forecast}_{\text{demand}} + C * \text{forecast}_{\text{demand}}^2$$

- The histograms and quadratic quantile regressions are combined together into the mosaic variable to capture the complex interactions between demand, solar, and wind:

$$mosaic = \text{NetDemand}_h + (\text{Demand}_q - \text{Demand}_h) - (\text{Wind}_q - \text{Wind}_h) - (\text{Solar}_q - \text{Solar}_h)$$

- The Mosaic variable is then used as an input to the final regression. The Mosaic Quantile Regression used to estimate Net Demand uncertainty is constructed in the form of

$$\text{uncertainty}_{\text{net demand}} = A + B * mosaic + C * mosaic^2$$

Each hour shall have a separate Mosaic Quantile Regression. Histograms and Regression coefficients for each component shall be updated daily and determined based on ~~respective daytype in the dataset of 180 rolling days.~~ historical data and configurable amount of sample days, initially set at 180.~~Daytypes are separated by weekday and weekend/holidays.~~

In addition to each BAA individually, regression coefficients will be calculated dynamically for the passing group. When dynamic regression is not available the coefficients will be based on the entire EIM area and may result in a higher or lower requirement.

Calculation of Thresholds

Because the requirements are based on historical information, the requirements determined through this process may be representative of future forecast uncertainty and may at times also produce extreme outlier values. To ensure the CAISO does not set extreme requirements, the CAISO enforces 2 layers of thresholds to bound the FRU/FRD requirements. The first threshold is updated daily and based on the 99th percentile and 1st percentile of Net Demand uncertainty for each hour based on historical data. ~~hour and daytype in the rolling dataset of 180 days~~. The second threshold is calculated to ensure reasonable operational requirements, and determine Max and Min values for FRU/FRD