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Witness: Amparo Nieto
Request from: Office of Consumer Counsel

Question:

(MCOSS) Refer to Exh. CLP-MCOS-1, at 17-18. In a live, unlocked Excel format with all links and formulas intact, please provide the Company's probability of peak analysis and all underlying workpapers and data.

Response:

The Company's probability of peak analysis was performed with Python and therefore a workpaper is not available for computation of the probability of peak (PoP) analysis. However, the input data used in the Python code is included in OCC-733, Attachment 1.

Additionally, an explanation of the main steps followed in calculating the PoP in Python is provided below.

1. The sum of historical hourly Substation Loads from January 2022, to December 2025 across all the distribution substations provided by the Company were grouped by hour type, where each hour defined by month, hour beginning, and weekday vs. weekend/holiday.

2. For each historical year, each hourly load was divided by the average hourly load in that same year. This allows filtering out year-to-year customer growth impacts on load for comparable analyses across years. A delimiter based on the average of the four historical year ratios (for 2022-2025) of the maximum hourly load in the year to the same year's average hourly load was calculated. This ratio is used later in the analysis to determine a simulated hour's weight in the PoP calculation.

3. For each hour by day type and month, a Kernel Density Estimation was used to create representative distributions of future gross hourly distribution substation loads, which back into the PV impacts. In particular, the model simulated hourly load distributions 500 times using a truncated version of Gaussian Kernel density estimation (KDE). KDE with a gaussian kernel is a non-parametric method that forms a small probability density function (PDF). The final distribution for a given hour is obtained from adding the sum of these point-based PDFs.

4. To factor in the expected impact of BTM PV generation on near-term load profiles, the analysis considers the cumulative forecasted additions of BTM PV capacity in

Eversource's CT service area (based on ISO-NE projections through the mid-point of the period 2026 through 2031). Capacity factors from NREL's National Solar Radiation Database (NSRD) are then applied to annual BTM PV capacity forecasts to yield hourly PV generation projections. The hourly PV data for each hour type is then subtracted from the simulated hourly gross loads to yield hourly distribution net loads.

5. For a given hour and day type, any hour in the simulation with a load > delimeter calculated in step 2 is given a weight of 1 for PoP; other hours are given a weight of zero. The percent of hours of a given type with loads at or above the delimiter across the simulations provides a vector of hourly probabilities for each month. These hourly probabilities are divided by the sum of the probabilities across all hours such that they add up to 1. The resulting PoPs are stated by hour, day type and month.