# results

*Exponential Smoothing Model*

After evaluating several candidate models on the validation data, we determined that the Holt/Winters model with additive seasonality minimized the mean absolute percentage error (MAPE), with a measure of 15.98%. Consolidating the training and validation data, the same ESM was then refit on this combined data set and used with the test data to assess model accuracy, where the calculated MAPE was approximately 12.54%.

*Visualizations*

Initial investigation and visualization of the training data revealed a noticeable seasonality with a magnitude of variation that appeared to remain *roughly* constant, indicating an additive seasonality (displayed in Figure 1). Using an STL decomposition, we extracted the trend, seasonality, and error components from the training data set.

Graphical user interface

Description automatically generated

**Figure 1:** Generated energyover time in training data set.

Actual *electricity* values overlaid with the trend/cycle component are displayed in Figure 2. An analogous plot of actual *electricity* values overlaid with seasonally adjusted electricity values (seasonality component removed) is shown in Figure 3.

Graphical user interface, chart

Description automatically generated

**Figure 2:** Overlay of actual energy values and trend component of training data set.

Graphical user interface

Description automatically generated with medium confidence

**Figure 3:** Overlay of actual energy values and seasonally adjusted energy values of training data set.

*Predicted Values*