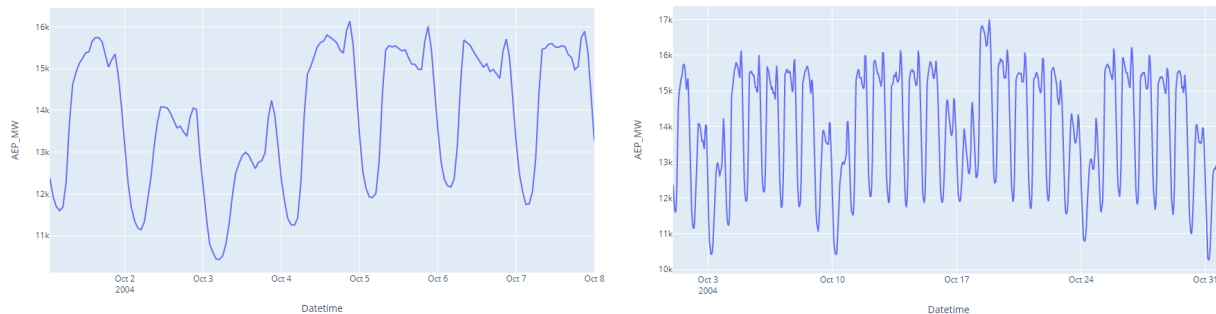


Energy Usage Modeling Analysis

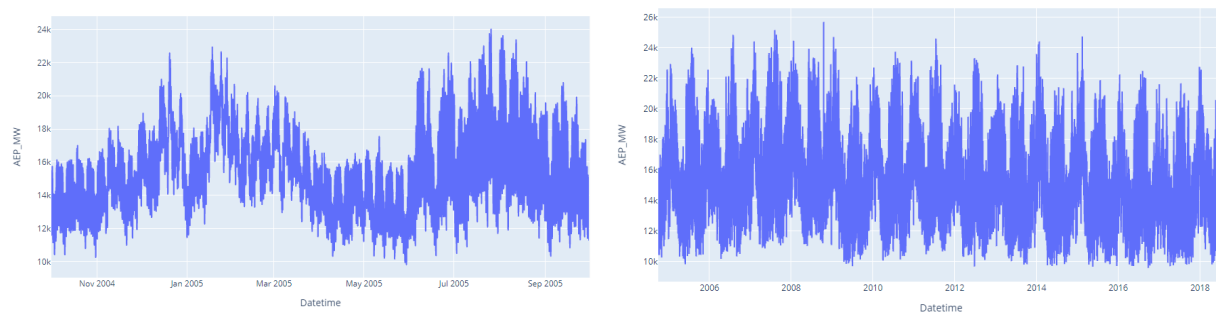
RV energy is considering an investment in a new energy company. To make the investment, the company wants to be confident that the demand for energy in the area and revenue collected for its purchase supports the investment they intend to make.

We will determine whether the investment is worthwhile by using an algorithm to predict future energy consumption based on historical data. RV energy provided nearly 14 years of hourly energy usage data, which we can use as the basis for our prediction.

The time series model we will train will use the prior 7 days of data to predict the next hour of energy usage. This period was selected because of the daily and weekly fluctuations in energy usage, which we discovered by visualizing the data in charts. As you can see below, energy usage drops during the nighttime and on the weekends.



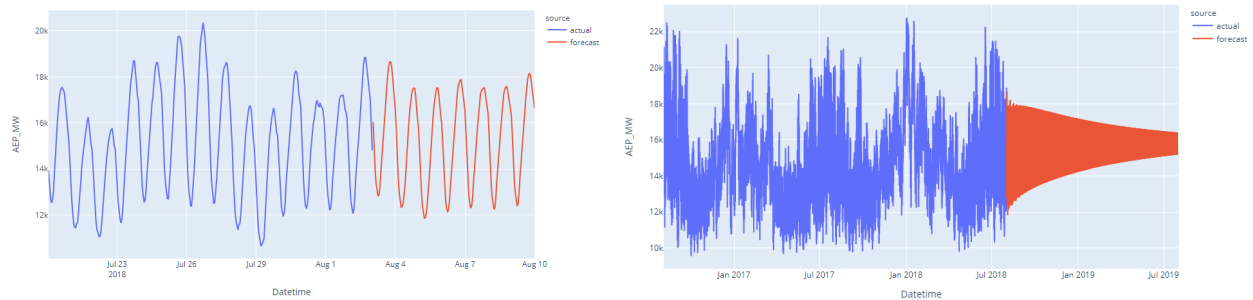
Additionally, we observed that energy usage is higher in the summer and fall than the winter and spring, most likely due to the use of heating and cooling. Across the entire 14 year period, average energy usage does not appear to have changed substantially.



The model we used for prediction is a penalized linear regression, which will give more weight to the periods in the data that are more highly correlated to the period to be predicted. This algorithm is designed to balance the limitations in machine learning models of bias and variance. The model selected reported very high performance metrics, with a correlation coefficient of 0.997 reported on the test dataset.

This model can be used to predict the energy usage for future periods. When we make predictions for one week in the future, the results look quite good. However, the limitations of

modeling based on such a short period of time are that they break down when you look at a longer period into the future, such as a full year.



RV energy could use this model to predict energy usage in the near future with a reasonable level of precision. In order to clearly address the objective of whether to invest in the energy company, we would need further information about the projected rates to be charged and other potential costs to be incurred. At a high-level, based on the past 14 years of data, it appears that energy usage is quite stable. To perform an analysis many years into the future, it may make sense to consider modeling at the annual level rather than the weekly level as we have done.