

# DISAGGREGATE FORECASTING MODELS: APPLICATION TO AMEREN UE'S TRANSFORMER USAGE

Matthew Roman  
Dr. Wooseung Jang, Thesis Supervisor

## ABSTRACT

Maintaining appropriate inventory levels is essential when attempting to maximize potential revenue and customer satisfaction. Within the utilities industry the significance of customer satisfaction is of utmost importance and the ability to predict when and where certain materials will be needed is highly valued. This research was motivated by these requirements and was focused on creating a customized forecasting model which could address the specific needs and demand patterns identified within Ameren's transformer usage. Historical transformer usage was attributed to three primary causes: new construction, storm and emergency, and general maintenance. Each of these displayed a distinctive demand pattern, thus a specific forecast was made for each disaggregate segment. Creating an individual forecasting model for each type of demand provided the ability to address the uniqueness within each demand pattern. More specifically, this approach allowed for the input of a forward-looking trend, generated from external factors, during the new construction forecast, the use of a model which followed historical trends within the general maintenance data, and a long-term averaging model which limited outliers found in the storm and emergency demand pattern. These disaggregate forecasts were then added together to create a final aggregate level forecast for the item or group of items being investigated. This model showed up to a 20% improvement of accuracy over more traditional methods when compared using median absolute percent error.