# AMI Meter Data and Analytics can help to Optimize Grid Operation

**Invited Paper I B**

**Date: Friday, Dec 17, 2021** **Time: 01:30 PM-01:50 PM**

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**Abstract:**

The Advanced Metering Infrastructure (AMI) meters provide easy access to not only the consumption data but also to many other quality measurements that will help System operators to optimize the Grid operations. Data analytics then does the rest of the magic to bring the meaningful and actionable insights. This paper presents how Utilities are using data analytics methods to optimize the grid operations to save costs in several areas. These savings offset the costs incurred in implementing AMI meters and associated IT technologies.

Analytics by using measurement and event data collected from AMI meters' IoT capabilities can be divided into three areas. First, the bi-directional energy flow measurements from AMI meters will allow to detect any distributed energy generation assets such as Solar panels. The measurement data when aggregated at transformer level can tell which transformers are overloaded. Event data from the meters can be used to detect outages and power restoration. This data when extrapolated can be used to assess the extent of outage and the restoration times required. Secondly, the energy measurements taken by AMI meters at 15 minutes or hourly intervals can be used to predict the peak load and its contribution by each of the consumers. This when coupled with behavioral economics by giving Peak Time Rebate (PTR) to encourage customers to reduce the consumption during peak hours will reduce the peak load on the system. Third, advanced analytics techniques including machine learning algorithms can be used to forecast the generation of each of the distributed generation assets. This forecasted capacity is used by the Utility to decide how much additional electricity will need to be purchased from outside of the grid and fed into the Grid for forecasted weather conditions a day in advance.