The Ohio State University
HackOhio 2019

American Electric Power Challenge: Battery Systems: Can they Reduce Costs and Emissions?

Battery technology has the potential to radically change the electric utility industry by providing cost-effective "warehousing" of electricity. With batteries, energy produced by the most efficient and environmentally-friendly generating plants can be stored and used when older, more expensive plants would otherwise be deployed. Such cost-effective storage systems are indispensable for large-scale incorporation of renewables (wind & solar) onto the grid. Batteries can also help customers by improving reliability and reducing the amount of electricity needed from the grid during peak (i.e. most expensive) hours.

Challenge: Demonstrate how batteries can benefit customers and the environment. Specifically, using records of historical energy consumption, approximate cost structure, and details of different battery systems, identify customers who are the best candidates for installing a battery system and build a business case to show them the benefits. Additionally, investigate how such battery systems can reduce the impact on the environment without reducing total energy consumption. As a bonus challenge, recommend changes to the cost structure that would incentivize increased battery deployments.

Challenge Details: AEP will provide information about 100 Ohio commercial customers. This will include zip code, and a classification of the type of company, along with 21 months of historical energy consumption for about 21 months, in 15-minute increments. We will also include an approximate specification of the billing structure and rates for these customers. Finally, we will provide operating and cost specifications for 4 different hypothetical, but realistic battery systems. AEP experts will be available at the start of the HackOhio event to provide more information and answer questions.

The challenge will be to identify the customers that would be the best candidates for each of the 4 battery specifications, and make a business case describing the benefits for each. The business case may include an estimate of the annual savings that would be achieved by deploying the battery, the estimated length of time it would take to pay off the investment, benefits to the environment, and an explanation of why they are particularly strong candidates for the technology.