Electricity Flexibility and Forecasting Systems Tool

Client	National Grid Electricity Distribution	national**grid**
Country	UK	
Year	2017	

The UK is working toward a target of net zero carbon emissions by 2050. To achieve this there is significant investment in the electricity industry to accommodate increased levels of renewable generation, electrification of heat/transport and growth in low carbon technologies (LCTs). This Electricity Flexibility and Forecasting Systems (EFFS) project developed a solution to enable National Grid Electricity Distribution to actively forecast, select and manage the flexibility services in their network instead of traditional network reinforcement.

Challenge

National Grid had a system to forecast the demand on their system based on weather and historic profiles. They also had developed a market system to interact with aggregators to provide Distributed Energy Resources (DER) services in the form of demand/generation reduction and increases. The challenge National Grid faced was the ability to bring this together to identify the following on a week-ahead time scale:

- The location where the network constraints would be experienced on the system
- The specific customer(s) that would be able to resolve the constraints
- The optimum customer(s) to dispatch to resolve those constraints
- Any further risks that may occur during contingency configurations

Project solution

PSC as experts in power system analysis and study automation were able to support National Grid in the core of this project. PSC worked with all the parties in the project to develop a tool to integrate demand forecasting, flexibility service providers and system network models.

PSC developed a tool utilising PSSE and Python to carry out the following studies:

- Time series and contingency power system analysis for the week ahead to identify potential network constraints
- Analysis of available flexibility service providers capability to resolve those constraints
- Processing market offers to identify the optimum services
- Optimum service selection and validation of constraints required, and the system studies a vendor must produce to prove the mitigation.

PSC advantage

The EFFS tool allowed National Grid to investigate the potential benefits of utilising customers on their network to provide flexibility rather than traditional reinforcement for resolving potential network constraints. The tool is undergoing a trial on a region of their network to analyse its potential benefit before it is rolled out across the wider footprint.

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