The Alan Turing Institute

nationalgridESO

Impact story
Towards a greener grid

Turing researchers and doctoral students contributed to a new solar forecasting system for National Grid, which is 33% more accurate at day-ahead forecasts, aiding in more efficient balancing of supply and demand and lowering consumer costs.

– The National Grid Electricity System Operator (ESO) balances the electricity system in real time, ensuring the nation's supply always meets demand.

– This balancing act becomes more challenging as wind and solar power become a larger part of the overall energy mix, as their generation output is hard to predict.

– At a Turing Data Study Group, ESO challenged the UK's brightest talent in data science to investigate how a data-driven approach could help.

– This led to three Turing PhD interns – with expertise in engineering, maths and statistics – working with ESO.

– The Turing interns developed innovative methods and new code. For wind, they used a 'Gaussian process' method, and for solar power a mix of machine learning and computational statistics.

– Focusing on solar power, the team's models provided slightly better next-day predictions than ESO's forecasts, and were 10% better at forecasting one week ahead.

– ESO subsequently built on this work, using additional further machine learning techniques to produce a multi-model forecast. The result was a solar forecasting system 33% more accurate at day-ahead forecasts.

Impact

– Big improvement in forecast accuracy is helping ESO run the grid more economically and more securely.

– This means lower bills for all electricity consumers.

– ESO is now running a strategic project aimed at delivering machine learning and other advanced technologies into its forecasting operations.

"The project brought ideas into ESO that we hadn't considered before and might not have considered otherwise."

Kevin Tilley, Senior Energy Forecaster at National Grid Electricity System Operator (ESO)
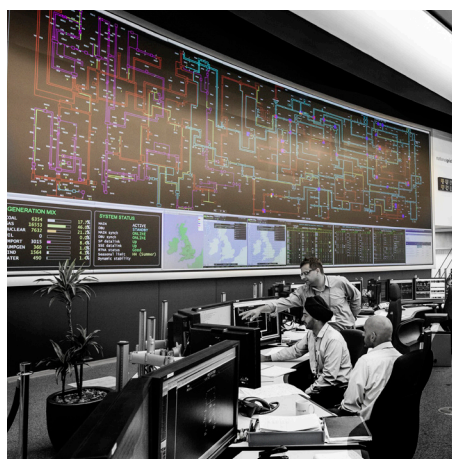
Bottom image: National Grid

Turing researchers made weekly visits to the Electricity National Control Centre in Wokingham to aid the project.