

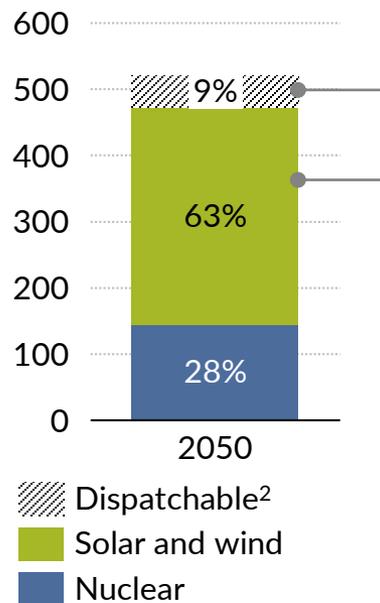


Statera – The role of gas peakers in a net-zero 2050 system

October 2019

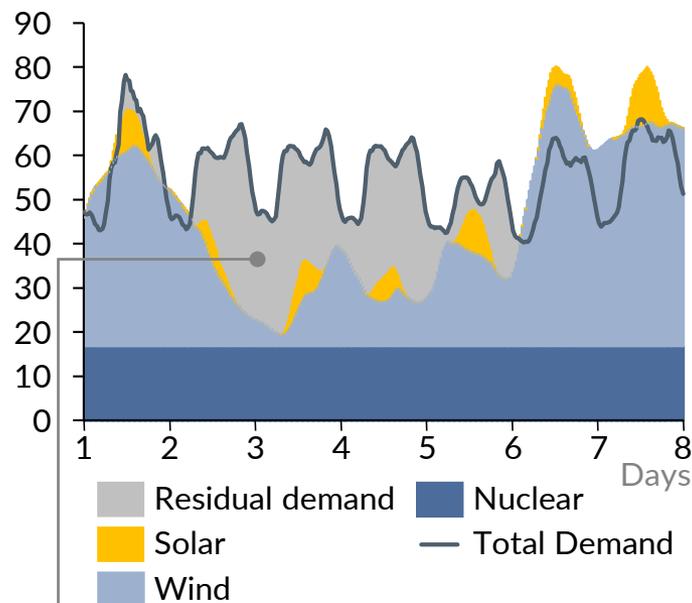
Dispatchable generation is needed to backup renewables during long periods of low output in a net zero 2050 system

GB generation mix in a net-zero 2050 system¹, TWh



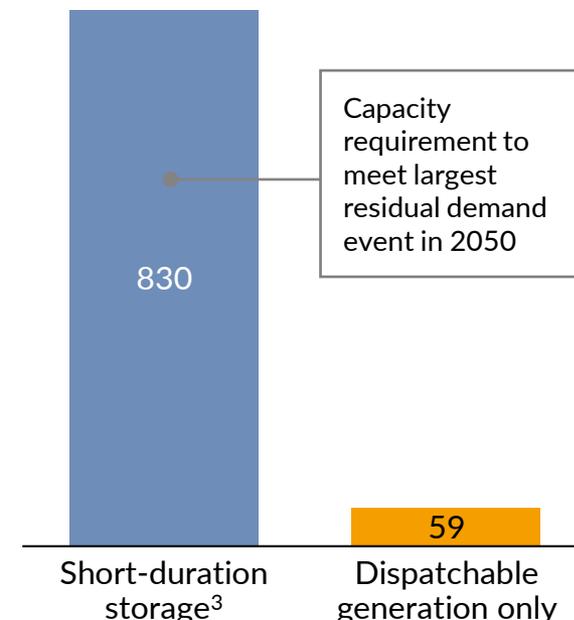
- In a net zero emissions system, c.50TWh of dispatchable generation are required at any point in time to back up renewables

Example power demand in a typical week, GW



- Dispatchable generation is needed to meet demand during periods of sustained low output from renewables

Theoretical ways of meeting dispatchable requirement, GW

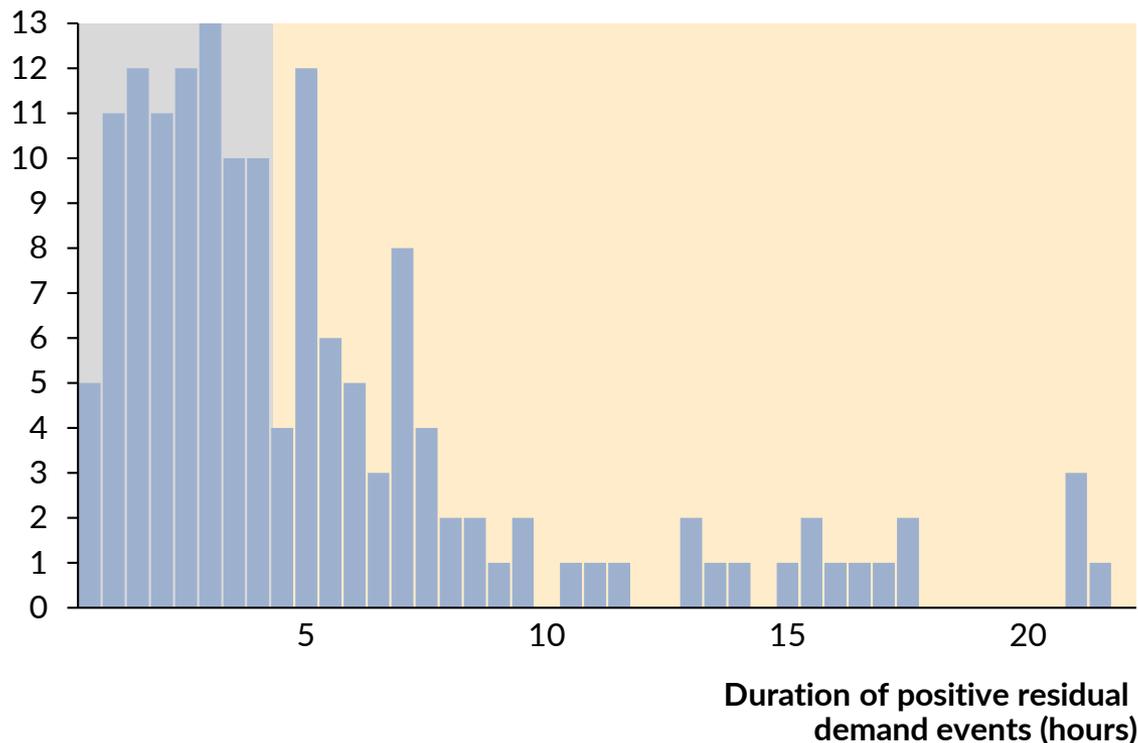


- An impractically high capacity of short-duration storage would be required to meet residual demand on its own
- Using peaking generation would require less capacity because it is not duration-limited

1. Carbon intensity of <math><5\text{gCO}_2/\text{kWh}</math> in 2050 compared to current levels of c.155 $\text{gCO}_2/\text{kWh}</math> 2. Refers to generation technologies that can ramp their output up and down to match demand. 3. Assuming battery storage capacity with an average duration of 10 hours.$

Backup will be mainly required for short-term dispatch; peaking gas engines will be cheaper to run over these timeframes

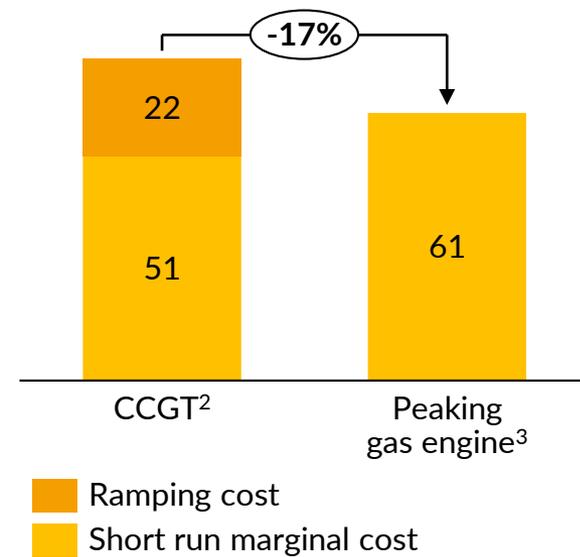
Frequency of positive residual demand events in 2050



54% of dispatch events in 2050 have a duration of up to 4 hours. 85% are less than 10 hours

Short-term demand fluctuations during longer duration residual demand events could be met by fast-ramping modular peaking capacity

Average operational cost¹ for up to 4-hour operation, £/MWh



Despite their lower efficiency compared to CCGT plants, high efficiency gas peakers are cheaper to operate for less than 4 hours due to no ramping costs

1. Based on 2020 operational cost assumptions. 2. Assuming a typical efficiency of a CCGT in Great Britain. 2. Based on Statera's operational cost and efficiency assumptions for a MAN engine.

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