

Will Britain keep the lights on?



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Each winter, there are warnings of potential blackouts in the UK. Several power stations have recently closed, and several more are due to close by the end of next year; yet more have had unexpected interruptions.

However, the National Grid has a suite of measures to make up for shortfalls, and the UK Capacity Market is about to open. The next two winters could be tricky, but overall the lights are expected to stay on.



Dark times lie ahead, according to some commentators. Image: Simon Swales, Creative Commons licence

Supply shortages: myth or reality?

Early this year there were warnings of '[potential blackouts](#)' and '[capacity shortfall](#)' in the UK, attributed to the closure of power stations in the UK and elsewhere in Europe. More recently, Owen Paterson MP [has also claimed](#) that UK energy and climate policy will lead to power cuts in future.

However, the regulator, Ofgem, suggests the situation is improving, concluding in [June 2014](#): 'The risk of disruption to customer supplies in the coming winters has reduced compared with last year's report'. Ofgem calculates that the amount by which peak supply exceeds peak demand - the 'de-rated margin' - could fall to 2-8% in the 2015-16 winter, but will rise thereafter.

Short-term issues could require 'controlled disconnections' to customers - in other words, power cuts. But Ofgem calculates that if the National Grid procures all of the balancing services that it anticipates, the odds of this occurring in 2015-16 are at worst one in 31.

Those predictions were made before the recent fire at Didcot B gas-fired power station, but the Grid says that will [cause no disruption](#) to supplies.

How does the National Grid balance supply and demand?

Balancing supply and demand is crucial, otherwise the grid's frequency - 50Hz - will change, affecting operation of equipment. The National Grid always keeps some power stations in 'spinning reserve', able to start delivering power if another major generator fails unexpectedly.

In addition, the Grid has numerous contracts with companies allowing them to turn off non-essential equipment or start diesel generators at times of peak demand. Two new balancing services were introduced during 2013, [Demand](#)

[Side Balancing Reserve \(DSBR\)](#) and Supplemental Balancing Reserve (SBR).

Under the DSBR, large energy users can choose to be paid to reduce their demand for short periods [between 4-8pm on winter weekday evenings](#). The SBR aims to keep power stations in reserve that would otherwise be mothballed or closed.

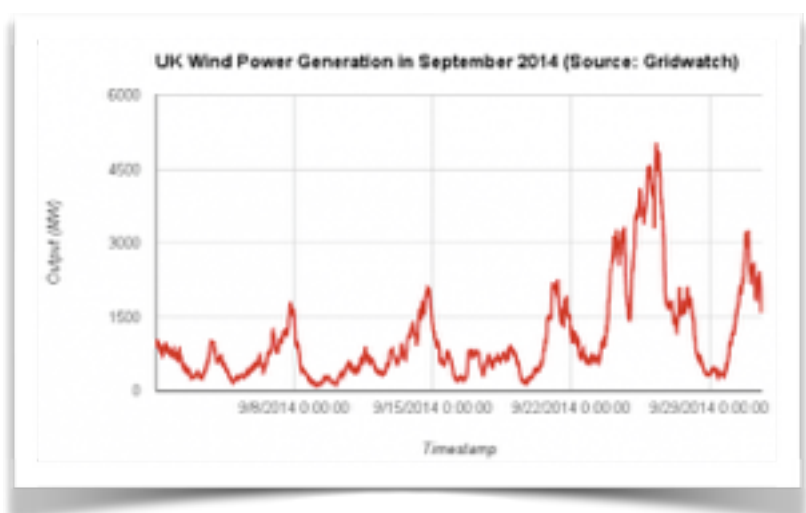
In Germany, which is more dependent on renewables, [industrial customers find](#) that contracts for turning equipment off at periods of high demand can be attractive.

The UK also has four operational [interconnectors](#) that import electricity from overseas when demand is high, or the price of imports low. Three connect the UK with France, the Netherlands, and Ireland, while one links Scotland with Northern Ireland. The total capacity is 4 Gigawatts (GW). [Ofgem shortlisted](#) five more proposed interconnectors in October 2014.

More high-tech approaches to demand management are being developed - for example, smart systems that switch non-essential domestic appliances off for short periods when demand and price are high. These systems can potentially save customers money, as well as reducing the overall need for capacity.

Why is the Capacity Mechanism needed?

As the UK installs more renewable energy, there is a growing need to manage the [peaks and troughs](#), because wind and solar output can vary with the weather and time of day.



According to the [National Grid](#), the capacity market aims to 'ensure adequate capacity within an electricity system that in future will rely increasingly on intermittent wind and inflexible nuclear generation'. Essentially, the market pays for power stations to exist, whether or not they are generating.

What is the capacity market and how is it set up?

The first Capacity Auction takes place in [December 2014](#), to deliver capacity in winter 2018. The auction is supposed to ensure that capacity is provided to the lowest bidders. Companies choose whether or not to participate. Successful bidders will sign capacity agreements, obliging them to deliver electricity when called upon; failure incurs penalties.

The government will secure [50.8GW](#) in the first auction - equivalent to more than 80% of peak electricity use. The auction's outcome, in January 2014, will be a [key driver of decisions](#) to build, mothball (temporarily close) or retire gas- and coal-fired capacity. A further 'top-up' auction in 2017 will add 2.7GW.

According to analysts Sandbag, the total amount of de-rated capacity available for this winter's capacity market auction is 69.4GW – [37% over the target of 50.8GW](#).

The market has been criticised for failing to prioritise demand-side response (DSR), even though this offers savings for consumers. As the [Energy and Climate Change Committee](#) recently pointed out, DSR providers were not allowed to take part in the capacity market on an equal footing to existing generators.

Under the capacity market, DSR providers can only obtain one year contracts, while companies investing in refurbishing or building coal- or gas-fired [plant can obtain longer agreements of three to 15](#) years. According to

economics consultancy [NERA](#), limited contracts "may discourage DSR from providing capacity at all". Changing the rules and enhancing the role of DSR could [save consumers up to £359 million annually](#).

Interconnectors were also barred from the first auction (in 2014), despite the fact they [could reduce costs by tapping into cheaper European markets](#).

In December 2014, it was announced that interconnectors will be able to take part in the [second auction](#) in 2015.

The capacity market [could encourage](#) construction of new power stations that are not needed. It could also [enable coal plants to remain open](#) that would otherwise have closed, being uneconomic. [Eight coal power stations](#) are eligible to bid in the auction.

Closures, mothballs and constraints

Two nuclear power plants, Heysham 1 and Hartlepool, were closed for a prolonged period in 2014 due to safety checks, and will re-open at about 80% power. [It is not clear](#) how long Didcot B Power Station will remain on half power. Several coal, oil and nuclear power stations are [expected to close before 2025](#). About 6.1GW of UK coal capacity is expected to shut by 2015 under the EU's [Large Combustion Plant Directive \(LCPD\)](#), which reduces air pollution.

However, there are [several large, 'mothballed' gas power stations](#) in the UK that became uncompetitive due to higher gas prices, totalling roughly [7%](#) of UK capacity. 'Mothballing' means they are left in a condition in which they could be used again in future, so these could come back online if needed.