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# The Capacity Market - reinforcing the past or securing the future?

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## Introduction

The Capacity Market is one of the pillars of the Government's Electricity Market Reform package and has been introduced to ensure that there is enough electricity supply to meet demand at all times. There are two main issues which the Capacity Market is trying to address:

- Expected future revenues from the electricity market may be insufficient to bring forward enough investment to replace old power stations that are reaching the end of their lives.
- A concern that some power stations, particularly older gas plants, are not currently profitable and may close prematurely.

The Capacity Market will be successful in addressing security of supply concerns but is likely to be detrimental to meeting the other Government policy objectives of decarbonising the power sector and ensuring best value for consumers.

## Key concerns

1. Most Capacity Market payments will go to existing generators many of which are already profitable and have no need of an extra revenue stream.
2. Capacity payments to coal plants could prolong, perhaps significantly, the life of the UK's aging coal plants. This is a major threat to the UK's decarbonisation goals.
3. The Capacity Market gives conventional generators an advantage over innovative low carbon flexible capacity, notably demand side response, which can reduce bills.

## Background - Why have security of supply concerns arisen now?

At the height of the economic recession, there was a surplus of electricity supply as demand for electricity reached lower levels than anticipated. This surplus has now fallen, due to the closure of a number of power stations. However, warnings about 'the lights going out' have been overblown and the chance of a shortfall in electricity supply is still extremely low with 2015/16 and subsequent margins expected to fall within government reliability standards<sup>i</sup>.

All of the UK's coal and nuclear electricity generation capacity was built prior to privatisation in 1990, the majority during the 1960s and 70s. Much of this capacity is reaching the end of its life and needs replacing. However, concerns have been raised that there is too much uncertainty about future profitability to commit to building new power stations. There are a number of reasons for this:

1. UK electricity demand has fallen by 10% since 2008<sup>ii</sup>
2. Decarbonisation of the electricity sector will mean huge changes to the UK electricity generation mix which inevitably brings uncertainty to any potential investor.



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- Due to low coal prices relative to gas, coal power stations averaged 51% load factor in 2014 crowding out gas which ran on average 29% of potential hours. Without certainty as to when coal plants will shut, investing in new gas power stations is unattractive.
- Current market rules mean that wholesale prices do not rise as high as they might be expected to at times of high demand although this issue is currently being addressed<sup>iii</sup>.

## How does the capacity market work?

Every year the Government estimates how much electricity capacity will be needed in four years' time to ensure sufficient supply to meet demand. An auction is then held to establish who can provide capacity and at what price. The price at which the auction clears is the price that all successful capacity will receive for providing electricity at times of peak demand.

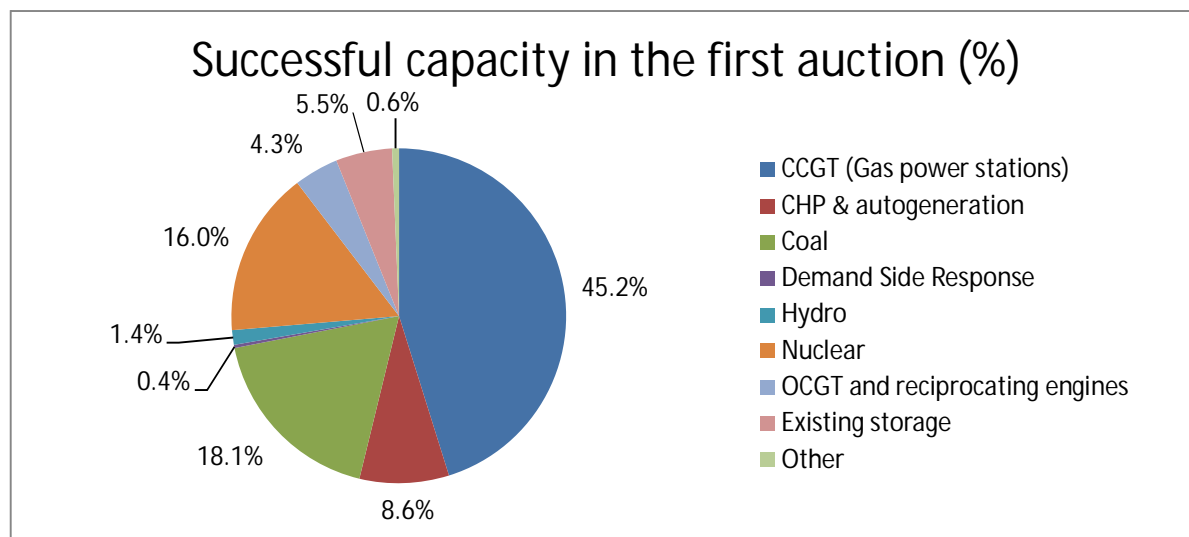
For example: A 2GW existing power station is willing to provide capacity at £20/kW. The auction clears at £30/kW. As this is above the minimum price they were willing to accept, the power station receives a capacity contract. That they were willing to provide capacity at a lower price is irrelevant. All capacity receives the auction clearing price. The 2GW power station receives an annual payment of £60 million on top of the revenues they earn from selling electricity on the wholesale market.

## What capacity is eligible for a payment?

Electricity capacity providers (except those already in receipt of subsidies) are eligible for capacity payments. Capacity payments will go to fossil fuel generators, existing nuclear power stations, existing pumped storage, existing hydro, interconnectors and demand side response.

## What happened in the first capacity auction?

The first auction was held in December 2014 for the delivery year 2018/19 and cleared at £19.40/kW. The total value of the capacity contracts awarded was £1 billion. 49GW of capacity was procured<sup>iv</sup>. Only 5% of this capacity is new build. The cost of capacity payments will be funded through consumer bills, which breaks down to £11 per household<sup>v</sup>. DECC estimate, although some disagree, that a reduction in wholesale market price spikes will reduce the cost to £2/household.



## What if nearer the time more or less capacity is needed than originally estimated?

The bulk of the capacity required is auctioned four years ahead to allow time for building new power stations. However, there is also an auction held one year ahead of each delivery year. The amount of capacity which Government currently anticipates procuring in this auction is 2.5GW. However, given the risks of trying to accurately forecast four years ahead, this figure is likely to change and the auction could even be cancelled altogether.

## Does all capacity get contracts with the same duration?

No: A key area of controversy is the differing length of contracts available to different types of capacity:

- New build power stations can access up to fifteen year contracts,

- Refurbishing generators can access up to three year contracts
- Existing generators and demand side response can only access one year contracts.

The stated reason for offering fifteen year contracts is that the higher the capital cost, the longer the contractual certainty required in order to invest. However, other successful capacity markets, for example most of those in the United States, offer only one year contracts. The maximum contract length offered by any US capacity market is seven years and is available to all new capacity not just generators<sup>vi</sup>.

### **What is the impact of different contract lengths?**

If a participant has revenue certainty for multiple years, they are subject to far lower levels of future risk which in turn reduces finance costs. The level of capacity payment they need and therefore goes down and places them at an advantage when bidding against new capacity such as demand side response, which can only access a one year contract.

The more long term contracts are issued, the greater the potential for distortion and inefficiency in the energy market. For example different types of capacity will be receiving totally different capacity payments for delivering the same service depending on what length of contract they have secured and the clearing price in the year the contract was issued. Even if the capacity market is no longer needed and scrapped, capacity payments will still be due.

## **The problems with the capacity market**

### **1. Windfalls to existing plant**

94% of the capacity which obtained a contract in the first auction was existing capacity. Therefore, capacity payments are mainly going to old capacity not new. While there are undoubtedly some existing power stations which are struggling to make a profit and genuinely at risk of closure, there are plenty which are making money and have no need of a capacity payment. Old nuclear plants, existing pumped storage, hydroelectric and a significant proportion of the UK's coal fired power stations are likely to fall into this category. WWF believes that providing lump payments to already profitable capacity is an inappropriate use of consumer bill payments.

### **2. A lifeline to old coal**

The UK's coal power stations average around 45 years old and are very inefficient<sup>vii</sup>. These coal plants emit around 900gCO<sub>2</sub>/kWh compared to a decarbonisation target by 2030 of 50gCO<sub>2</sub>/kWh<sup>viii</sup>. They are therefore no longer a desirable source of electricity. Due to their age and low efficiency they are also not suitable for retrofitting carbon capture and storage. Despite this, in the first auction, held in December 2014, nearly 20% of the capacity went to coal plants.

By the end of 2015 coal plant owners must make decisions about whether to invest in equipment to comply with a new air pollution law called the Industrial Emissions Directive. Coal plants which do not meet the pollution standards must close by 2023. Capacity contracts, particularly those lasting three years, will cover a significant proportion of the substantial cost of complying with the new standards<sup>ix</sup>. They therefore throw a lifeline to owners of polluting plant who might otherwise have judged the costs prohibitive and closed.

The capacity market payments run counter to another government policy, the carbon price support, which puts a price on emitting carbon, making coal plants more expensive to run than other sources of power. Allowing coal plants to receive capacity payments to recoup some of the carbon price cost is at odds with government affordability and decarbonisation objectives.

### **3. Discriminating against demand side response**

Ensuring a reliable supply of electricity when it is needed means having enough electricity generation capacity and transmission capacity to meet the highest demand experienced all year plus spare capacity in case of any failures. Most of the time demand is well below this peak level. Therefore building a new power station which will sit idle almost permanently is unlikely to be the most cost effective solution.

Instead, it is likely to be more cost effective to reduce peak demand by engaging with electricity users who are willing and able to occasionally shift their demand away from peak times in return for a revenue stream. This mechanism is called demand side response (DSR) and while it can participate in the capacity market, in practice the rules, like only being able to access one year contracts, place it at a disadvantage compared to generators. In the US PJM capacity market 9% of the capacity for delivery year 2015/16 is DSR<sup>x</sup> compared to only 0.35% of the successful capacity in the UK's first auction.

### **The benefits of demand side response:**

#### **DSR can reduce the cost of electricity for consumers**

Electricity is at its most expensive and carbon intensive at times of peak demand as low efficiency, high marginal cost gas or diesel plants come online. Moving some demand away from peaks allows suppliers to buy electricity more cheaply, reduces the use of some of the UK's dirtiest power stations and can reduce the need for new power stations or expensive upgrades to electricity transmission capacity. Building flexibility into the demand for electricity provides the opportunity to make better use of off peak power which is often cheaper and might otherwise go to waste. A recent study by NERA consulting estimated that changing the rules of the UK capacity market to make it more suited to DSR could save consumers up to £359 million a year<sup>xi</sup>.

#### **DSR reduces the need for new fossil fuel power stations and saves carbon**

Some new capacity, particularly gas plant, is inevitably required over the next decade to replace older plant as it closes. However DSR can reduce the amount of new generation capacity required by reducing peak demand. This allows more efficient use of existing resources and will reduce the risk that an excessive reliance on gas for electricity will jeopardise 2030 decarbonisation goals.

### **Policy Recommendations**

The Government has designed a capacity market which provides payments regardless of need, carbon emissions or compatibility with a future low carbon power system. Our preferred response to security of supply concerns would have been a targeted security of supply policy such as a strategic reserve, which would pay old, unprofitable plant no longer active in the market to be available if needed at time of peak demand. This could be combined if required, with auctions designed to procure new flexible capacity to ensure security of electricity supply.

Given that there is currently little immediate prospect of wholesale Capacity Market reform, we recommend the following amendments to improve value for money and compatibility with decarbonisation objectives:

#### **Phase out all subsidies to coal**

Providing consumer funded payments to coal plants is directly in conflict with affordability and decarbonisation objectives. Given evidence that a rapid phase out of coal could be managed by using system balancing tools available to National Grid, coal capacity payments should be phased out now<sup>xii</sup>. Government should also introduce a policy such as an Emissions Performance Standard which ensures coal that closes by the early-mid 2020s. Recent modelling suggests this would deliver an unabated coal phase out at lower cost to the consumer than relying on the carbon price<sup>xiii</sup>.

#### **Reduce maximum contract lengths and offer a level playing field**

Maximum contract lengths should be reduced to 3-5 years and be available to all new capacity including DSR to correct the current bias towards generators.

#### **Do not restrict Demand Side Response participation in capacity auctions**

Capacity market rules prevent DSR which accesses pilot funding in 2016 and 2017 from participating in the main auctions for delivery in 2018/19 and 2019/20. DSR wishing to continue to attract support during these delivery years is therefore restricted to the one year ahead auctions which may not happen at all. This unnecessary restriction should be removed in the next auction.

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<sup>i</sup> <https://www.ofgem.gov.uk/ofgem-publications/88523/electricitycapacityassessment2014-fullreportfinalforpublication.pdf> see p6

<sup>ii</sup> See DECC Energy Trends 5.5 <https://www.gov.uk/government/statistics/electricity-section-5-energy-trends>

<sup>iii</sup> <https://www.ofgem.gov.uk/electricity/wholesale-market/market-efficiency-review-and-reform/electricity-balancing-significant-code-review>

<sup>iv</sup> [https://emrdeliverybody.com/Shared%20Documents/Final%20Auction%20Results%20Report\\_v3.pdf](https://emrdeliverybody.com/Shared%20Documents/Final%20Auction%20Results%20Report_v3.pdf)

<sup>v</sup> <https://www.gov.uk/government/news/first-capacity-market-auction-guarantees-security-of-supply-at-low-cost>

<sup>vi</sup> [http://www.iso-ne.com/static-assets/documents/2014/11/02\\_fcm101\\_oct\\_2014\\_fcm\\_overview.pdf](http://www.iso-ne.com/static-assets/documents/2014/11/02_fcm101_oct_2014_fcm_overview.pdf)

<sup>vii</sup> <http://www.timera-energy.com/uk-power/carbon-price-floor-impact-on-the-uk-power-market/>

<sup>viii</sup> [http://www.theccc.org.uk/wp-content/uploads/2013/12/1785a-CCC\\_AdviceRep\\_Chap3.pdf](http://www.theccc.org.uk/wp-content/uploads/2013/12/1785a-CCC_AdviceRep_Chap3.pdf)

<sup>ix</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/315717/coal\\_and\\_gas\\_assumptions.PDF](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/315717/coal_and_gas_assumptions.PDF)

<sup>x</sup> [http://www.nera.com/content/dam/nera/publications/2014/PUB\\_Anstey\\_DSR\\_0814.pdf](http://www.nera.com/content/dam/nera/publications/2014/PUB_Anstey_DSR_0814.pdf)

<sup>xi</sup> [http://www.nera.com/content/dam/nera/publications/2014/PUB\\_Anstey\\_DSR\\_0814.pdf](http://www.nera.com/content/dam/nera/publications/2014/PUB_Anstey_DSR_0814.pdf)

<sup>xii</sup> <http://www.e3g.org/news/media-room/security-of-supply-is-no-excuse-uk-needs-a-coal-phase-out-policy>

<sup>xiii</sup> <http://www.ippr.org/publications/scuttling-coal-ending-unabated-coal-generation>