



Department  
of Energy &  
Climate Change

# Electricity Market Reform: Capacity Market – Detailed Design Proposals

June 2013





**ELECTRICITY MARKET REFORM: CAPACITY MARKET – DETAILED DESIGN  
PROPOSALS**

Presented to Parliament  
by the Secretary of State for Energy and Climate Change  
by Command of Her Majesty

June 2013

© Crown copyright 2013

You may re-use this information (excluding logos) free of charge in any format or medium, under the terms of the Open Government Licence. To view this licence, visit <http://www.nationalarchives.gov.uk/doc/open-government-licence/> or e-mail: [psi@nationalarchives.gsi.gov.uk](mailto:psi@nationalarchives.gsi.gov.uk).

Where we have identified any third party copyright information you will need to obtain permission from the copyright holders concerned.

Any enquiries regarding this publication should be sent to us at [emr.pmo@decc.gsi.gov.uk](mailto:emr.pmo@decc.gsi.gov.uk)

You can download this publication from <https://www.gov.uk/government/publications/electricity-market-reform-capacity-market-proposals>.

ISBN: 9780101863728

Printed in the UK by The Stationery Office Limited  
on behalf of the Controller of Her Majesty's Stationery Office

ID P002568345      06/13

Printed on paper containing 75% recycled fibre content minimum.

## Contents

<b>Executive Summary .....</b>	<b>7</b>
<b>Introduction .....</b>	<b>10</b>
<b>Capacity Market Design.....</b>	<b>12</b>
Overview.....	12
Amount of capacity .....	14
Reliability Standard .....	14
Demand curve.....	15
Security of supply analysis.....	16
Eligibility and auction .....	16
Eligibility .....	18
Auction format and frequency .....	24
Capacity agreement durations .....	28
Secondary market.....	29
Physical trading.....	29
Financial trading.....	30
Delivery.....	31
The capacity agreement obligation .....	32
Penalties .....	33
Over delivery .....	34
Spot testing .....	34
Payment.....	35
Review and exit .....	36
<b>Institutional Arrangements.....</b>	<b>37</b>

Devolved Administrations..... 38

**Next Steps ..... 39**

EMR Delivery Plan ..... 39

Developing Legislation ..... 39

Auction timeline..... 40

**Appendix: Summary of Capacity Market Design Proposals..... 43**

# Executive Summary

1. Government is legislating for a Capacity Market to ensure security of electricity supply in an energy system where many older power plants are closing and the investment case for reliable capacity is increasingly uncertain.
2. Government will run the first Capacity Market auction in 2014 for delivery of capacity from the winter of 2018/19.<sup>1</sup>
3. The Capacity Market is designed to cost effectively bring forward the amount of capacity needed to ensure security of electricity supply. It will do this by correcting market failures and providing a predictable revenue stream to capacity providers. The level of revenue will be set through a competitive auction process and in return for payment successful providers must commit to deliver energy when needed or they will face penalties. The Capacity Market can be described in five operational stages:
  - a. Amount of capacity:
    - Ministers decide the amount of capacity for which capacity agreements are to be auctioned based on analysis from the System Operator on the amount needed to meet an enduring reliability standard.
    - A draft reliability standard will be published for consultation as part of the first draft Electricity Market Reform (EMR) delivery plan in July 2013.
  - b. Eligibility and auction:
    - The Capacity Market will be technology neutral and all existing and new forms of capacity will be eligible to participate, except for capacity supported by Contracts for Difference, small scale Feed in Tariffs or the Renewables Obligation, and interconnected capacity.<sup>2</sup>
    - Demand side response (DSR) capacity will be eligible, and will be supported by transitional arrangements to develop the capability of the sector.
    - Government has amended the Energy Bill so that projects that deliver permanent reductions in electricity demand (EDR) could also participate in the Capacity Market.<sup>3</sup>
    - Eligible capacity providers will offer capacity in a pre-qualification process run by the System Operator.
    - Pre-qualified capacity will enter competitive central pay as clear auctions also run by the System Operator. There will be an initial auction four years ahead of delivery, and a further year-ahead auction.

---

<sup>1</sup> The introduction of the Capacity Market is subject to legislation and state aid clearance.

<sup>2</sup> However, we will continue work to seek a solution that might enable the participation of interconnected capacity in future.

<sup>3</sup> Government has proposed a pilot to test the feasibility of EDR participation, and will take final decisions on EDR implementation on the basis of evidence from the pilot.

- Successful bidders will be awarded ‘capacity agreements’, which provide a steady payment for capacity in return for a commitment to deliver energy when required in the delivery year, or face a penalty linked to the value of lost load.
  - Existing plants will by default have access to a one year capacity agreement. Existing plants requiring major refurbishment may have access to agreements with a term of up to three years, and longer agreements are expected to be available for new plants.<sup>4</sup>
- c. Secondary market:
- Between auction and delivery and in the delivery year, participants will be able to hedge their position through secondary trading.
- d. Delivery:
- Capacity providers will receive payment for capacity in the delivery year.
  - In return, they will be obliged to deliver energy in periods of system stress and will be financially penalised (following the publication of a Capacity Market warning) if they do not deliver in stress periods.
- e. Payment:
- The costs of capacity agreements will be met by suppliers based on their market share.
  - Payments will flow from suppliers, via a settlement body, to providers of capacity.
  - Where penalties are applied to capacity providers, the funds will flow from them, via the settlement body, to suppliers.
  - The upfront costs of capacity are expected to be offset by reductions in the wholesale electricity price.
4. A full summary of the design is available in the appendix.
5. The Capacity Market has been designed to enable exit from the mechanism should this prove necessary in future – though we do not anticipate that the underlying market will develop to the point where this is possible for at least 10 years and potentially longer. It may be right to exit the Capacity Market if the underlying electricity market develops sufficiently, particularly through development of greater market liquidity, an active demand side, and more interconnection. The need for a Capacity Market will also be reviewed every five years.
6. The System Operator will undertake several roles including providing advice on the level of capacity to auction, administering the auction and issuing capacity agreements. A Panel of Technical Experts will provide independent scrutiny of the System Operator’s advice on the level of capacity to auction. Ofgem will be responsible for governance of technical Capacity Market rules after the first auction has taken place and will continue to regulate the System Operator and enforce the rules and competition law within the Capacity Market. We have

---

<sup>4</sup> We are still considering the term limits for refurbishing and new plants, and the eligibility criteria for existing plants to access different agreement lengths and will consult on these questions later this year.

also announced our intention to designate Elexon Ltd. as the Capacity Market settlement agent.

7. The Capacity Market will cover England, Wales and Scotland, but will not apply in Northern Ireland.
8. These design proposals will form the basis for the development of detailed implementing legislation. We intend to consult in October on these proposals and draft legislation to implement them, so that legislation can be further refined in time to enter into force in July 2014.

# Introduction

9. Government has three objectives for energy policy - to keep the lights on, to keep energy bills affordable, and to decarbonise our energy system – and it aims to deliver these in a way that supports our economic objectives. The Energy Bill, introduced to Parliament in November 2012, includes legislation to enable the market reforms that will deliver these three objectives.
10. A core element of EMR, the Capacity Market is intended to incentivise sufficient reliable capacity (both supply and demand side) to ensure a secure electricity supply even at times of peak demand.
11. The Energy Bill includes legislation enabling the implementation of the Capacity Market. Alongside this, we have been working with expert stakeholders to develop more detailed proposals for how the Capacity Market should work.
12. This document sets out those proposals, along with the rationale for some of the more significant design choices. The accompanying ‘blueprint’ sets out the proposals with more technical detail, but omits the rationale.<sup>5</sup> These design proposals will form the basis for the secondary legislation and operating rules for the scheme, all of which will be the subject of a public consultation in October.
13. Alongside this document, Ofgem has published its latest assessment of the risks to security of supply in GB over the forthcoming six winters. Ofgem’s report presents the loss of load expectation (LOLE, the expected number of hours per year in which supply is expected to be lower than demand in the absence of intervention by the System Operator) and the expected energy unserved (EEU, the amount of electricity demand in MWh that may not be served in a given year). It also presents de-rated capacity margins (the average excess of available generation capacity over peak demand, expressed in percentage terms). To ensure that risks to security of supply in the middle of the decade are managed, Ofgem and the System Operator are also consulting on possible measures to ensure security of supply in the years before the Capacity Market can be introduced. Government supports this consultation.
14. Government will run the first auction in 2014 for delivery of capacity from the winter of 2018/19, subject to state aid clearance.

---

<sup>5</sup> The ‘blueprint’ is a working document, intended to provide a technical description of how the proposed GB Capacity Market might work in practice. It is not a description of agreed Government policy and proposals may change before implementation. It is available at <https://www.gov.uk/government/publications/electricity-market-reform-capacity-market-proposals>.

15. For a description of the market failures leading to insufficient capacity margins, and the rationale for a Capacity Market, please see Electricity Market Reform: Policy Overview.<sup>6</sup>

---

<sup>6</sup> DECC, November 2012: <https://www.gov.uk/government/publications/electricity-market-reform-policy-overview--2>

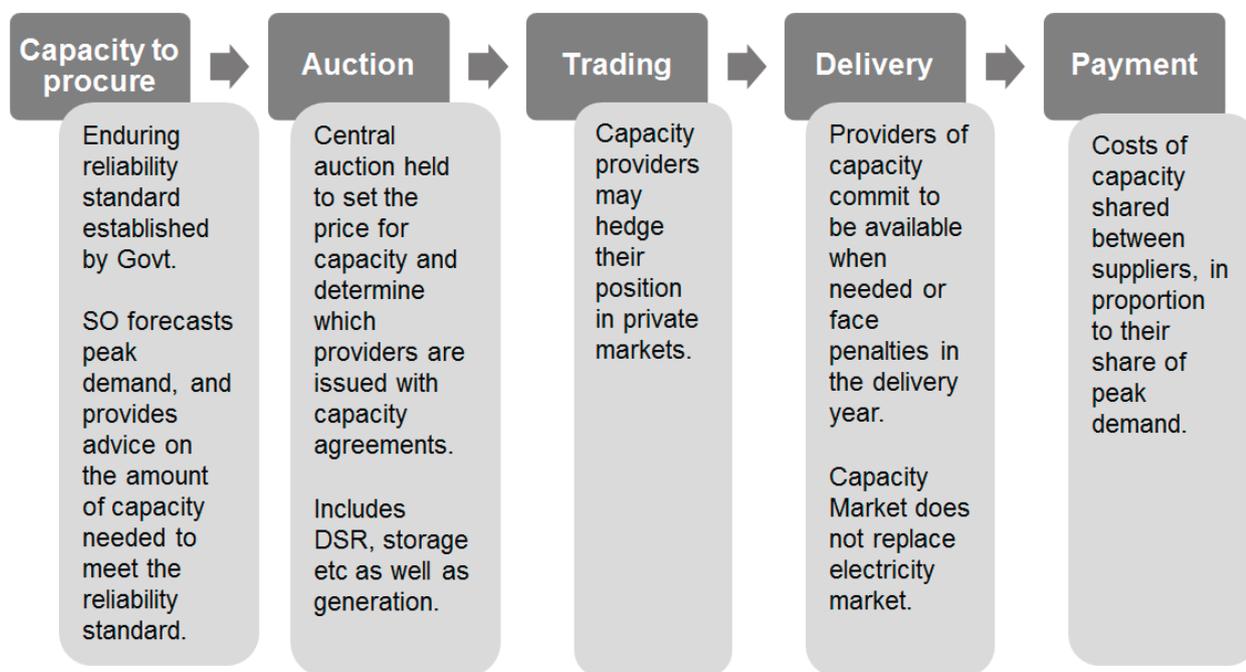
# Capacity Market Design

## Overview

16. The GB market has historically delivered high levels of security of supply. But the market is changing, and risks to security of supply are increasing in the medium-term.
17. The Capacity Market is designed to ensure sufficient investment in the reliable capacity needed to ensure security of supply during prolonged periods. It does this by providing certain, regular payments to capacity providers, in return for which they must be available and producing energy (or reducing demand) when the system is tight, or face penalties.
18. The Capacity Market will operate alongside the electricity market – which is where most participants will continue to earn the majority of their revenues. There will also remain a need for the System Operator to contract short term balancing services to ensure the moment to moment balancing of the system. The Capacity Market described here is in many respects similar to those existing in certain regions of the USA, and to the mechanism that France is establishing.
19. The Capacity Market can be described in five operational stages:
  - a) Amount of capacity: where ministers decide the amount of capacity for which capacity agreements are to be auctioned. This will be the total amount of capacity needed, with some deductions for capacity which will be on the system but which does not participate in the Capacity Market.
  - b) Eligibility and auction: where participants ('capacity providers') eligible to offer capacity participate in a pre-qualification process run by the System Operator, and, following this, enter a competitive central auction also run by the System Operator, four years ahead of delivery. Successful bidders are awarded 'capacity agreements', which provide a steady payment for capacity in return for a commitment to deliver energy when required in the delivery year/s, or face a penalty.
  - c) Secondary market: where, between auction and delivery and in the delivery year/s, participants hedge their position through secondary trading, e.g. to take on a greater or lesser obligation, or to avoid an obligation due to delayed construction or maintenance.
  - d) Delivery: capacity providers receive payment for capacity in the delivery year. In return, they are obliged to deliver energy in periods of system stress and are financially penalised (following notice) if they do not deliver the amount of energy set out in their capacity agreement.
  - e) Payment: the costs of capacity agreements will be met by suppliers. The payments will flow from suppliers, via a settlement body, to providers of capacity. Where penalties are applied to capacity providers, the funds will flow from them, via the settlement body, to suppliers.

20. These stages are summarised in Figure 1. The following sections set out proposals for each of these operational stages in more detail.

**Figure 1: Stages of Capacity Market operation**



21. We have been through a detailed process to develop this design, including:
- fortnightly meetings of a stakeholder expert group (which includes representatives from vertically integrated companies, independent generators, consumer groups, the demand side, Ofgem and the System Operator);<sup>7</sup>
  - engagement with other stakeholders including industry representatives;
  - discussions with various financial institutions and potential investors; and
  - advice from expert consultants who have been involved in Capacity Market design in other markets.
22. These proposals will be the basis for developing detailed implementing legislation and other documentation, and for the procurement of auction IT systems by the System Operator.
23. However, we intend to continue to test the design over the months ahead, including by:
- continuing to meet regularly with stakeholders as the design is finalised;
  - undertaking a specific consultancy project to provide further quality assurance of the proposals and to test gaming opportunities within the design; and
  - consulting formally on the detailed rules in October 2013.

<sup>7</sup> For more information on the Capacity Market Expert Group please visit: <https://www.gov.uk/government/policy-advisory-groups/capacity-market-emr-expert-group>

24. So although these design proposals should provide a good indication of the design we propose, it may change before implementation.

## Amount of capacity

### Summary:

- The enduring reliability standard will be established in December 2013 in the first EMR delivery plan following consultation in July 2013.
- Annual security of supply analysis on the amount of capacity required to meet the reliability standard will be carried out by the System Operator and scrutinised by the Panel of Technical Experts.<sup>8</sup>
- A capacity demand curve will be determined annually by DECC, in advance of capacity auctions, to enable the trade-off between cost and reliability to be automatically determined at auction.
- The contribution to security of supply of any ineligible capacity (including interconnected capacity), and plants that opt out of the auction, will be taken into account when setting the total amount of capacity for which capacity agreements are to be issued.

## Reliability Standard

25. To increase long term investor certainty, the Secretary of State will establish and publish an enduring reliability standard. A reliability standard will provide an indication of the acceptable level of security of supply for the GB system – bearing in mind the likely costs of providing that level of security.
26. We anticipate that this will be expressed as a loss of load expectation (LOLE).<sup>9</sup>
27. Setting the standard on an enduring basis is intended to minimise the risk of over procurement of GB capacity, and avoid large swings in the amount auctioned from one year to the next – which would increase uncertainty for investors, and therefore the risk premium applied in their bids. As a result bids would be higher, unnecessarily increasing costs for consumers.

---

<sup>8</sup> Following royal assent of the 2012 Energy Bill, the EMR Panel of Technical Experts will be appointed by Government as an ad-hoc advisory group. Further detail on their role can be found in Annex E of the November 2012 EMR Policy Overview: <https://www.gov.uk/government/publications/electricity-market-reform-policy-overview--2>. An interim panel has been appointed to scrutinise the analysis being done for the first EMR delivery plan. Further detail on the interim panel is available at <https://www.gov.uk/government/policy-advisory-groups/141>

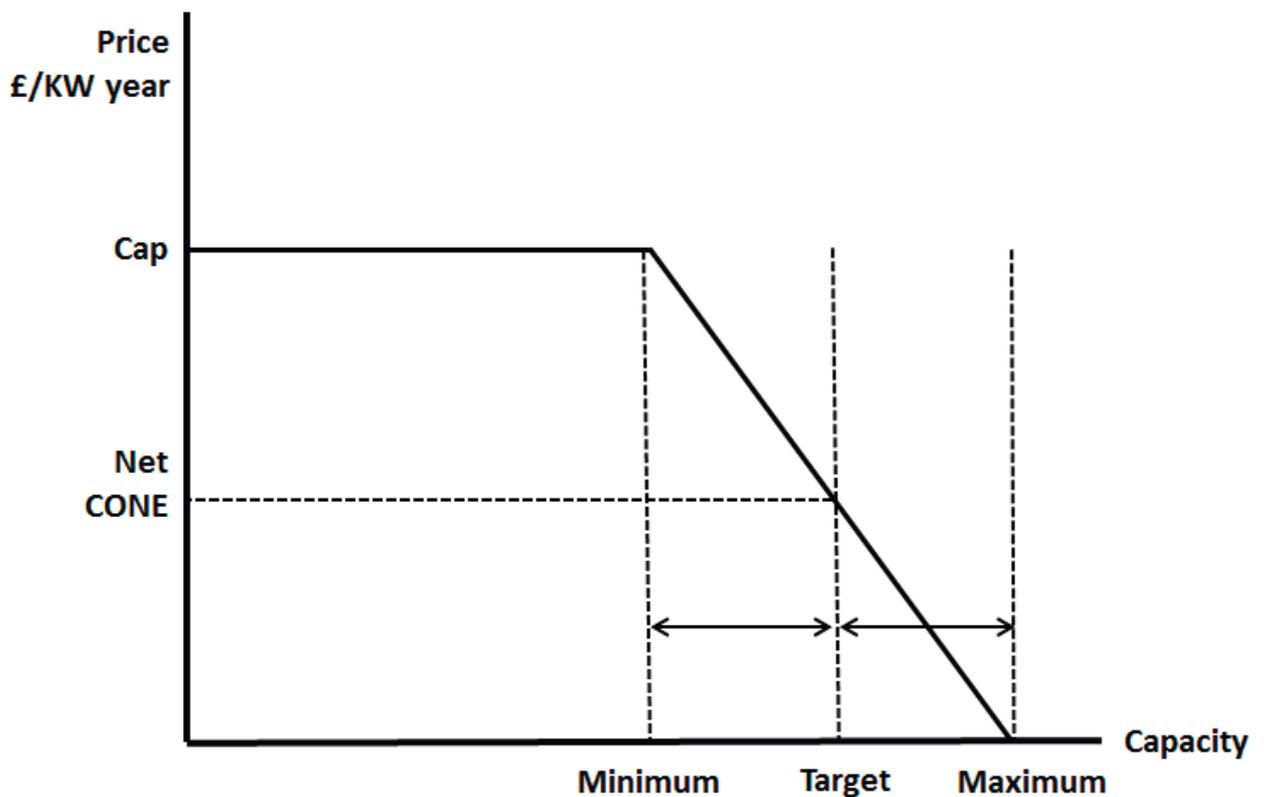
<sup>9</sup> i.e. the number of hours/periods per annum in which, over the long-term, it is statistically expected that supply will not meet demand, and which reflects the economically efficient level of capacity. This does not mean that we would have this level of blackouts in a particular year; in the vast majority of cases, loss of load would be managed without significant impacts on consumers.

28. We will consult on a draft reliability standard in the draft EMR delivery plan (due to be published for consultation in July 2013). We intend to finalise the reliability standard in the first EMR delivery plan to be published in December 2013, subject to royal assent.

**Demand curve**

29. The Secretary of State will also, in advance of the first auction, set out an enduring methodology for calculating a demand curve for capacity auctions. A demand curve is important since it allows a trade-off to be made between reliability and cost (e.g. we might ideally want 45 gigawatts (GW) but if the 45th GW is very expensive, entering into capacity agreements for only 44GW might be better value). A demand curve also helps mitigate gaming because it provides an auction price cap, and flexibility to procure less capacity if the price is high – both of which reduce opportunities for participants to push up prices by exercising market power.

30. **Figure 2: Illustrative capacity demand curve**



31. The two important parameters to the demand curve are the target capacity level and the net cost of new entry (net-CONE). The target sets the estimate of the optimal level of capacity to obtain to deliver the reliability standard, and the net-CONE is the estimate of the reasonable cost of new capacity. Net-CONE sets the price at which the target level of capacity would be auctioned and the price cap in the auction will be set at multiple of net-CONE. Net-CONE will be determined from the cost of a new build open cycle gas turbine

(OCGT) plant (i.e. gross-CONE) minus expected electricity market revenue, and will be revised if necessary for each auction.<sup>10</sup>

32. DECC will set out how much capacity will be required 4.5 years ahead of the delivery year, informed by the analysis from the System Operator taking into account how capacity is expected to be available outside of the Capacity Market (e.g. capacity supported by Contracts for Difference (CfDs), and expected imports via interconnectors) and therefore how much should be auctioned through the Capacity Market. The level of capacity to be auctioned may be published as a demand curve (as shown in Figure 2).
33. Once the auction has commenced, there will be no ministerial discretion in relation to the outcome of the auction process. Ministerial discretion is restricted to the decision to hold the auction and the construction of the demand curve prior to the auction being held. This is to minimise uncertainty (which could drive up bids and therefore costs).
34. Naturally, unforeseen issues may arise once an auction starts and it is prudent to put in place checkpoints (and contingency plans) which would call for cancellation or suspension of the auction e.g. if so few bidders pre-qualify that the auction will not be competitive or if there were irregularities that compromised a fair and competitive auction. Government will clarify the circumstances under which an auction could be cancelled over the next phase of work.

### Security of supply analysis

35. Annually, the System Operator will provide an assessment of the amount of capacity that is needed for a delivery year (running from 1 October to 30 September) to meet the reliability standard based on an assessment of different possible scenarios.

### Eligibility and auction

#### Summary:

- Eligibility:
  - The following will be eligible to participate in the Capacity Market:
    - New and existing generation capacity (including combined heat and power (CHP)).
    - Demand Side Response (DSR), including embedded generation.
    - Storage.
    - Permanent reductions in electricity demand (EDR) could also participate. Government has amended the Energy Bill to enable this and is considering whether to pilot the approach before final decisions on EDR are made.

<sup>10</sup> The cost of OCGT capacity is used to set CONE is because this is the marginal plant – the one that most needs a capacity payment (because it runs least) and should therefore be setting the price in the auction.

- The following forms of capacity will not be eligible to participate in the Capacity Market:
  - Capacity receiving support through the Renewables Obligation (RO), Contracts for Difference (CfDs), or small scale Feed in Tariffs (FIT).
  - Interconnected non-GB capacity, and the interconnectors themselves (though we will continue work to explore potential solutions that might enable the participation of interconnected capacity in future auctions).
- Capacity below a 2 megawatt (MW) de-minimis threshold will only be able to participate when combined with other capacity through an aggregation service.
- Two stages of transitional arrangements will better enable DSR and smaller scale storage participation.
- All eligible capacity will be free to participate in both the Capacity Market and Balancing Services markets.
- Though participation in capacity auctions will be voluntary, a pre-qualification stage will be mandatory for all generators (including those who do not wish to bid in the Capacity Market), and for other capacity providers who intend to bid (e.g. DSR providers). This stage is to confirm the eligibility and bidding status of potential capacity providers.
- The amount of capacity each participant can bid into the auction will be determined by the System Operator (subject to rules on the de-rating factor to be applied, which we will finalise over the coming months).<sup>11</sup> There will be a dispute process for participants unhappy with their de-rated eligibility.
- Auction:
  - For each delivery year, an auction will be held four years ahead of delivery, supplemented by a further auction one year ahead of delivery to enable the participation of DSR and provide an opportunity to refine the level of capacity for which capacity agreements are issued.
  - The System Operator will have the capability to run zonal auctions if necessary to manage constraints but no such zones will be created unless approved by Ofgem.
  - The auction will be ‘pay as clear’ – that is, all participants will receive the clearing price set by the marginal bidder.
  - To mitigate market power, bidders will be classified as either ‘price takers’ (who cannot set the price) or ‘price makers’ (who can). We expect most bidders will default to being price takers meaning they can freely bid up to a predetermined threshold. New entrants and DSR resources will be classified as price makers, and will be free to bid up to the overall auction price cap (set at a multiple of the cost of new entry).
  - Existing plants will default to one year capacity agreements unless they require major refurbishment, in which case they may be eligible to access a capacity

<sup>11</sup> De-rating refers to the process by which we will determine the amount of reliable capacity that can be ascribed to each potential Capacity Market resource. The details of the process are yet to be established but we expect to build on well understood power engineering practice, which de-rates a resource from its ‘nameplate’ rating by taking account of forced outage probabilities, scheduled outage durations, and fuel (e.g. gas, wind) availability.

agreement with a term of up to three years in each round of the auction.

- New entrants will have access to a longer term agreement for a term they nominate up to a maximum term limit.
- We are still considering the term limits for refurbishing and new plants, and the eligibility criteria for existing plants to access different agreement lengths and will consult on these questions later this year.

## Eligibility

36. The Capacity Market has been designed to be technology neutral – that is, we are not seeking to procure specific volumes of different types of capacity, and all types of capacity are able to participate, with some limited exceptions.
37. Generation, including combined heat and power (CHP) capacity, will be able to participate, as will storage and demand side response (DSR).
38. Existing and new plants will both be eligible to participate in the Capacity Market. Existing plants should receive a capacity payment because we want to keep existing plants on the system where it's efficient to do so. Capacity payments to existing plants will also ensure they have the right incentives to make efficient decisions about longer term operation (e.g. when to mothball / close, or when to reopen after mothballing), and when to make significant investments in refurbishment.
39. Finally, we want existing plants in the market to have strong incentives to deliver when needed. Capacity payments to existing plants will ensure they have the right incentives to produce electricity at times of system stress – for example by scheduling maintenance, keeping warm as needed, employing the right number of staff to maximise reliability, and sourcing reliable fuel contracts.
40. Plants will only be compared on the basis of their auction bids – there will be no requirement for particular plant characteristics.
41. Small scale capacity below a 2MW de-minimis threshold will not be eligible unless combined with other capacity through an aggregation service.
42. Any eligible capacity that opts out of the capacity auction will not be exposed to Capacity Market penalties for non-delivery, nor will they be eligible for any payment for over delivery. Such capacity will be able to opt back into subsequent auctions and can participate in the secondary market. As with ineligible plants, the amount auctioned will be reduced by the capacity of plants opting out.

## Demand side response (DSR)

43. To ensure DSR (including embedded generation and smaller storage) can participate, we propose to:

- Run one year ahead auctions, as well as four year ahead auctions, because DSR finds it difficult to commit to providing capacity four years ahead of delivery (though year ahead auctions are in any case valuable for fine tuning the amount of capacity holding capacity agreements to reflect changes in demand projections between the four year ahead auction and the delivery year).
- Put in place transitional arrangements for DSR in advance of the first full delivery year. These will help to increase the total volume of DSR on the system and ensure that we fully exploit DSR capabilities (see Box 1).

### **Storage**

44. Smaller storage (i.e. storage connected to the distribution rather than the transmission network) will benefit from the transitional DSR arrangements mentioned above and will be able to aggregate with other resources to bid into capacity auctions.
45. Larger storage will be able to participate in the Capacity Market in the same way as generation.

### **Electricity Demand Reduction**

46. Action on the demand side is a key part of the Government's reforms – both for DSR and permanent reductions in demand. DECC launched a consultation in November 2012 on whether and how to incentivise permanent electricity demand reduction (EDR), including whether EDR should participate within the Capacity Market. The response was published on 22 May 2013 confirmed the Capacity Market as the Government's preferred route to deliver a financial incentive for EDR and explained the rationale for this decision.<sup>12</sup>
47. However, before proceeding, Government is exploring whether to test the proposed approach via a pilot. An update on this will follow as soon as possible. This could help to develop our knowledge and understanding of the potential benefits of a financial incentive, the market appetite for such an approach, and detailed design questions such as monitoring and verification, before proceeding to final decisions. When EDR would participate in a Capacity Market will depend on a range of factors which could be tested through the proposed pilot.

### **Low carbon capacity**

48. The Capacity Market is intended to be a technology-neutral mechanism in which all types of capacity are able to participate. However, to avoid overcompensation, there will be restrictions on the participation of low carbon capacity where it is already in receipt of other forms of support.

---

<sup>12</sup> Consultation available at: <https://www.gov.uk/government/consultations/options-to-encourage-permanent-reductions-in-electricity-use-electricity-demand-reduction>

49. Plants receiving CfDs will not be eligible to participate in the Capacity Market, at least while levels of support for Contracts for Difference (CfDs) are set administratively.
50. Consistent with this principle, capacity that is fitted with Carbon Capture and Storage (CCS) and in receipt of a CfD will not be eligible to participate in the Capacity Market (regardless of whether the capacity runs in unabated mode at certain times during a delivery year). This will include circumstances where capacity is increased temporarily to respond to peaks in demand. CCS capacity not in receipt of a CfD, or unabated units within a partly abated power station, will be eligible to participate in the Capacity Market.
51. Similarly, capacity receiving support through either the Renewables Obligation (RO) or small scale Feed in Tariffs (FIT) will be ineligible to participate in the Capacity Market. Such capacity will be eligible to enter the Capacity Market once their RO or FIT support has expired provided they meet all other eligibility criteria (such as minimum size). However, with the exception of biomass co-firing plants, RO-accredited plants will not be eligible to terminate their 20-year term of RO support early in order to bid in to the Capacity Market.
52. Excluding CfD, FIT and RO plants avoids any risk of double payment, and will have a minimal impact on future low carbon investment as the levels of support offered for low carbon investment should be robust to the introduction of a Capacity Market.
53. We will continue to work to explore whether renewable CHP capacity receiving support through the Renewable Heat Incentive (RHI) should be eligible to participate in the Capacity Market.

### **Balancing services**

54. Balancing services are the short term response services that the System Operator contracts to ensure moment to moment balancing of the system. Even if a Capacity Market is introduced, there will still be a need for these balancing services. If a provider believes it can offer both capacity and balancing services then it can participate in the Capacity Market and Balancing Services markets, and if successful in both could receive revenue from both. However, a provider will have to meet the requirements of both, and will face penalties under their balancing services contracts and under the Capacity Market if failing to act as instructed for balancing services at a time of scarcity when Capacity Market penalties also apply.

### **Box 1: Transitional arrangements for demand side response (DSR) and participation in the Capacity Market**

Note: The System Operator is exploring the development and procurement of two new balancing services, referred to as ‘Demand Side Balancing Reserve’ (DSBR) and ‘Supplemental Balancing Reserve’ (SBR). These would provide additional reserves to help the System Operator balance the system against tightening margins mid-decade. The System Operator would require Ofgem’s approval before it could procure these reserves.

For the DSBR product, the System Operator would procure a quantity of demand reduction capability at peak times on non-holiday weekdays in the months of November to February inclusive. The intention is to stimulate the development of new demand-side resources by providing a simple, low cost solution, allowing consumers or their agents to offer demand reduction services directly to the System Operator. The learning from these arrangements should help support DSR participation in the subsequent Stage 1: Preparatory auctions.

#### *Stage 1: Preparatory auctions*

- Specific auctions for DSR (including embedded generation and smaller storage) will run until the first year ahead auction for the Capacity Market (scheduled for late 2017). This means DSR auctions will be run in 2015 and 2016, each for delivery one year later. The timing of these will be reviewed in light of Ofgem’s decisions on additional balancing services. In 2017, the first year-ahead auction for the Capacity Market would be run and DSR support would move to Stage 2 (see below).
- The preparatory auctions will be for time-banded products (e.g. between 4pm and 8pm) that are easier for DSR to provide, transitioning over time to a more standard load-following obligation product.
- DSR holding capacity agreements will need to respond within four hours of a DSR dispatch instruction being issued or face penalties. Penalties for non-delivery (or for failing spot checks by the System Operator) will be lower than in the enduring regime and the penalties will be capped at a provider’s total annual capacity payment.
- Payment flows would be the same as for the main Capacity Market, and costs would be recovered in the same way. A demand curve would be set for each preparatory auction to control costs.

#### *Stage 2: Transitional arrangements in the Capacity Market*

- These arrangements will be in place from the first year-ahead capacity auction, for a few years (e.g. three years). The specific terms of stage 2 will be determined by the review of stage 1 and the continued needs that it identifies. We anticipate that this will

include a lower penalty level per event and a lower annual cap. If the review deems it necessary, some of the capacity reserved for the main year-ahead auction could be ring-fenced for DSR. The emphasis will be on DSR moving to full integration.

- Under this phase there will be no time banded products so DSR providers are likely to aggregate with other pre-qualified capacity providers (e.g. generation), either before they bid into the auction, or using the secondary market, to meet their obligations.

#### *Enduring DSR arrangements in the Capacity Market*

- A proportion of capacity will be held back from the four year ahead auction. To ensure a liquid auction, this will be slightly less than the amount of DSR expected to be available in the year ahead auction, held the year before the delivery year. Before the year ahead auction, the analysis will be updated to reflect new demand and supply forecasts and the amount to procure in the year ahead auction will set.
- If revised analysis indicates that no new capacity is needed, a minimum amount will still be auctioned (to ensure opportunities for DSR). But to ensure competition no capacity will be ring-fenced for any particular capacity type.
- DSR will have two routes to pre-qualify and can choose which to pre-qualify under:
  - Demonstration that capacity can be despatched in a test or through evidence from previous successful despatch.
  - Provision of a credible business plan (and associated meter identification numbers) and posting of a bid bond, which will be returned following a successful test after the auction or if the provider fails to win a capacity agreement.
- De-rating of DSR in the enduring scheme will be based on DSR's performance in balancing services and earlier stages of these transitional arrangements.
- DSR provided by load reducing or shifting (as opposed to some embedded generation or storage which can export onto the distribution network and can be metered in the conventional way) will be baselined using the 'X of Y' method. This involves taking an average of demand during the same settlement period on a number of previous days (X) from a potential range of days (Y) to determine what the unit is usually demanding, and comparing that to their reduced demand when the unit responded to the stress event. There may be a gaming risk that providers inflate their baseline so the option to review the baselining approach will be retained.

Figure 4 (page 42) shows an indicative schedule for DSR transitional arrangements.

## **Interconnected capacity**

55. Government is keen to find a way for interconnected capacity to be able to participate in the Capacity Market. Participation of interconnected capacity would increase efficiency by increasing competition in the auction, and provide appropriate incentives for additional investment in interconnection. Any solution must preserve the integrity of the Capacity Market itself, and be compatible with European internal energy market rules since completion of the single market in energy is an important Government priority.
56. This is a complex area and we have worked closely with expert stakeholders, other EU Member States and the European Commission to explore possible solutions. Given the potential benefits of the single market and of facilitating additional investment in interconnection this work will continue. In the meantime, it will not be possible for interconnected capacity to participate in the first capacity auction in 2014, but we are committed to completing this work as quickly as possible to determine whether there is a solution which would allow interconnected capacity to participate in future auctions.
57. We consider that interconnected capacity should be able to compete where:
- the penalties imposed upon any provider of interconnected capacity for non-delivery at times of GB system stress are consistent with those imposed on GB capacity; and
  - there is an appropriate level of assurance of physical delivery of capacity offered into the Capacity Market across an interconnector (similar to the pre-qualification process for GB capacity).
58. The target model being introduced across Europe to promote efficient operation of the internal energy market means that interconnector flows will be determined largely by energy price differentials between interconnected markets. Depending on the circumstances in the interconnected market, prospective providers of interconnected capacity will need to consider the liabilities implied by participating in the GB capacity market. Where prospective providers of interconnected capacity are prepared to face exposure to Capacity Market penalties, we will need to assess the level of certainty in physical delivery at times of system stress. Further work on this issue will be pursued over the coming months.
59. In the absence of participation by interconnected capacity, the expected contribution from interconnection at times of GB system stress will be reflected in the amount of capacity auctioned. For example, if 2GW of imports are expected to be available at times of GB system stress we will reduce the amount of capacity auctioned in the Capacity Market by 2GW.

## **Pre-qualification**

60. A pre-qualification stage will take place around seven months ahead of the auction and is designed to confirm the eligibility and bidding status of all potential capacity. Pre-qualification requirements will vary for different types of capacity (e.g. for generation and DSR). The purpose of pre-qualification is to ensure that participants in the Capacity Market

auction can deliver the capacity they offer, and to ensure the System Operator can, if necessary, mechanistically adjust the amount to auction in the Capacity Market. Rules for this mechanistic adjustment will be determined in the coming months.

61. Participation in the pre-qualification stage will be mandatory for all eligible generation even if it does not intend to bid. The pre-qualification criteria will vary depending on whether the plant is an existing plant, an existing plant seeking support for refurbishment or a potential new plant. The amount of capacity which can be ascribed to each capacity provider must accurately reflect the amount of capacity they can offer. This is known as de-rating and seeks to establish the amount of capacity each plant can be relied upon to deliver.
62. The question of who carries out de-rating is important. Ostensibly, plant owners have the best information and are in the best position to establish their own de-rating. However, this risks the exercise of market power/gaming – on the one hand, by providers who overstate their reliable capacity because they assess the risk of penalties as low; and on the other, of providers withholding capacity (i.e. bidding below their reliable level, or not participating in the auction at all) in order to force the over-procurement of capacity.
63. Our proposal therefore involves the central de-rating of capacity by the System Operator, though to minimise the possibility of any disputes this will be carried out using a pre-determined methodology (which is yet to be determined). There will be an opportunity in that process for the capacity provider to submit information and suggest a suitable de-rating. There will be a dispute process for participants unhappy with their de-rated eligibility, or who fail the pre-qualification stage.
64. Initially, any disputes will be notified informally to the System Operator, after which they can be escalated to a third party, possibly Ofgem, if necessary.

### **Auction format and frequency**

65. A main auction for physically backed capacity will be held every year, for delivery in four years' time (e.g. an auction in 2020 would be for delivery in 2024/25, with the delivery year running from 1 October 2024 to 30 September 2025).
66. A further year-ahead auction will be held in the year immediately prior to the delivery year of the main auction. The process for setting the demand curve for this auction is the same as that for the main (four-year ahead) auction – the System Operator will provide analysis on the amount of capacity needed to meet the reliability standard, with the final decision taken by ministers. This auction will also be important for enabling DSR capacity (which finds it difficult to participate in an auction four years before delivery) to actively participate in the mechanism.
67. Each auction will be run on a pay as clear basis, which means all successful auction participants will be paid the same price per unit of capacity, and the price will be set by the most expensive successful bidder.

68. Pay as clear auctions should prove more cost effective than pay as bid (where participants receive the amount they bid) for a number of reasons. First, pay as clear provides the right investment signals:
- In the existing energy market, capacity is rewarded with a single price – the electricity price. A Capacity Market will dampen wholesale electricity prices, so it is right that existing generators are compensated through capacity payments on the same terms as new plants. Treating existing and new plants differently would create regulatory risk that will increase the cost of bringing forward new plants.
  - A pay as clear auction provides incentives for the market as a whole to become more efficient, since the most efficient providers of capacity effectively earn a premium by being paid the clearing price.
69. Second, theory and evidence suggest pay as bid would be more costly for consumers:
- This is because existing plants can ‘game’ a pay as bid auction by bidding in at the clearing price rather than bidding their true costs. A pay as bid auction can in fact lead to perverse outcomes if parties guess the clearing price incorrectly and then bid too high. This could mean that economically inefficient decisions are made e.g. to build new plants rather than pay cheaper existing plants to stay open.
  - A pay as bid approach can also harm competition as big portfolio players are much better placed than independents to correctly guess the clearing price and so are better able to game the system.
70. Government has carefully considered a range of auction design options as part of our design process, and have engaged international experts on auction design to advise on this given its centrality to the effectiveness of the mechanism. Analysis suggests the longer term advantages of a pay-as-clear approach outweigh any short term benefits of pay-as-bid auctions. All similar international mechanisms take a pay as clear approach.
71. We intend to run the auction in a descending clock format. This involves providers confirming they will offer capacity at a particular price, and then further rounds being held at a lower price until the auction discovers the minimum price at which there is sufficient capacity.
72. We consider that this is more suitable for buying capacity than a sealed bid format in which providers state the minimum price they need and the auction is completed in a single round. The advantage of a descending clock auction over a sealed bid auction is that it allows greater price discovery for capacity providers:
- Providers (in particular, new entrants) face considerable uncertainty when estimating capacity costs.
  - Estimates of capacity costs involve ‘common values’: many aspects of costs will be similar across projects (e.g. how much energy revenue they will receive); however, each provider will each have their own estimates of these costs.

- Where common values are significant, sealed bid auctions have a tendency to lead to the ‘winner’s curse’ – the successful participant(s) are often those who have overestimated revenue/underestimated costs, not the most efficient providers.
- The ability to observe the behaviour of participants in previous rounds in a descending clock auction, and adapt bidding behaviour on this basis, mitigates this risk, and should increase the likelihood that the most efficient providers win capacity agreements.

73. We recognise that there is an increased risk of collusion under a descending-clock approach, as providers are better able to observe the bidding strategies of other providers. However we consider that this risk can be effectively mitigated through measures to enforce competition – such as through the use of a demand curve and the requirement for existing plant to enter the Capacity Market as price takers (see below).
74. The use of a descending clock format is consistent with the design used internationally in similar capacity auctions.

### **Locational constraints**

75. The GB electricity market operates as a single market with locational signals for the provision of electricity being provided through transmission charging arrangements. Government considers it inappropriate to introduce additional location signals through EMR while the energy market remains a single zone. We do not anticipate there to be any need for locational pricing in the near future since it is unlikely that there will be transmission constraints at times of system stress. The 2012 Ofgem capacity assessment indicated that the Cheviot boundary (between England and Scotland) should not have a significant impact on electricity security of supply for GB due to the planned investment in upgrading its capacity.
76. However, if in the future Ofgem decides the implementation of the EU Target Model requires market splitting, or if in future capacity from outside Great Britain is able to participate in the Capacity Market and there are capacity constraints across interconnectors, it would be possible to run zonal auctions.
77. In this case the System Operator would publish the zones and related constraints in advance of the auction. In the event that capacity bids within these zones exceed the constraint, then the zone shall be considered a ‘constrained zone’ and a zonal auction will ensue – i.e. bids from participants in this zone will only be accepted up to the level of the constraint.

### **Price takers and price makers**

78. Although participation in the pre-qualification process will be mandatory, participation in the auctions will be voluntary (i.e. we do not propose to force generators to participate in the auctions, or to close if they choose not to participate).

79. To mitigate market power, in particular of existing plants seeking to force up the capacity price, at the pre-qualification stage all participants must register whether they wish to participate in the auction as price makers or price takers.
80. Existing participants will default to being a price taker (and only be able to bid up to a relatively low threshold). If successful in the auction they will be offered a one year price and capacity agreement at the auction clearing price. The threshold will be set on a technology-neutral basis. The threshold is not intended to be a perfect reflection of the costs faced by existing plants – rather it will be set at a level that ensures that the majority of existing plants should be willing to participate in the Capacity Market without being price makers.
81. New plants and DSR capacity will be able to participate as a price maker (and can bid any price into the auction up to the auction price cap, which will be compared against other bids to establish the clearing price).
82. Any existing plants wishing to set the price would have to provide sufficient information to justify that their bid reflects the price at which the unit needs a capacity agreement to remain operational (for example a board certificate and business plan presented to the provider's board) – which may be open to investigation / enforcement. The information will be submitted directly to Ofgem, and must be provided prior to the auction.
83. Any existing providers that bid a price above the 'price maker' threshold and do not receive a capacity agreement in the auction, but continue to operate in the delivery year, are likely to be investigated by Ofgem, which may use information provided alongside the price setting auction bid.
84. New entrants will be able to set a price without justifying their bid, though if it were perceived that they were seeking to exercise market power this could be subject to investigation by Ofgem as part of its normal enforcement role. The level of bid would also be capped by the price cap set in the demand curve provided in advance of the auction.
85. To ensure there is no disincentive to investment before the Capacity Market is implemented, Government has already decided that plants that begin construction between May 2012 and the first capacity auction will have the option of being treated as new in the auction (allowed to be a price setter and take a longer-term agreement).
86. Including the threshold below which bidders can submit bids with no supporting evidence will reduce the administrative burden on participants. Allowing even existing plants that have sunk all their investment costs but have material net go-forward costs to bid up to a threshold level is also appropriate because participants may be exposed to a risk of paying penalties greater than the total capacity payments they will receive.

## Capacity agreement durations

87. If successful at auction an existing plant will be awarded a one year capacity agreement at the clearing price.
88. However, existing plants that can demonstrate that they require major refurbishment (as distinct from cyclical or routine maintenance) may be eligible to access a capacity agreement with a term limit of up to three years in each round of the auction. Refurbishing plants will also be entitled to act as price makers in the auction without having to provide a board-approved justification. We are continuing work to develop eligibility criteria and to finalise the agreement lengths offered.
89. New entrants will have access to a longer term agreement. Our work to date has suggested that a contract of around 10 years would be appropriate. However, we will consult formally on the length of contract available and also on whether it would be feasible and desirable to run an auction process which would require new entrants to bid on the basis of a contract of around 10 years and one that is significantly longer. This would enable the System Operator to choose the length of contract based on price comparison.
90. Agreements longer than one year are appropriate for new entrants because they should help to reduce barriers to entry and increase competition. In particular, a longer agreement should enable a new entrant to secure cheaper project finance, allowing a lower capacity auction bid and potentially reducing the overall costs of the Capacity Market. However, we also recognise that longer contracts for new plant would lock in a certain capacity price for a significant period and have the potential to skew the balance between new and existing capacity in capacity auctions – potentially leading to higher total costs. We will therefore consider carefully these factors as part of the consultation on the optimal contract length for new plant.

### **Box 2: Additional rules for new plants**

- It is important to ensure plants under construction holding capacity agreements have strong incentives to build on time (since if they are late there will be additional security of supply risks, and other participants will (unfairly) bear a higher risk of facing penalties).
- To ensure they will be ready for the delivery year, new plants will be required to demonstrate that they have made a significant financial commitment to their project within a year of being awarded the capacity agreement.
- Failure to provide sufficient evidence will result in the termination of the capacity agreement and the application of a termination fee (TBC).
- Capacity payments will be suspended for new plants until they become operational (though their agreement term will begin at the beginning of the delivery year). Such

plants would not be liable for performance penalties until they had started to receive capacity payments.

- The capacity payments they will be eligible for once operational will be gradually reduced for each month plants are delayed. This reduced payment will apply for the first 12 months after the delayed plant becomes operational.
- Any new capacity failing to have at least 50% of the amount specified in its capacity agreement operational by 18 months after its scheduled commissioning date will have its capacity obligation terminated, and be liable for a termination fee. Such capacity would be eligible to participate in subsequent auctions as a price taker. We expect plants with 50-90% of their capacity operational by this stage would have an additional six months to commission the outstanding amount.

## Secondary market

Summary:

- Providers can physically trade their obligations from a year ahead of the start of the delivery year where there is additional unencumbered pre-qualified capacity that can take their place.
- The System Operator will maintain a registry of capacity obligations and the System Operator's consent will be required for any physical trading.
- Providers can also manage their risk at any point through private financial hedging.

91. Secondary trading is an important tool for parties to manage their risk of exposure to Capacity Market penalties. Secondary trading can be physical or financial.

### Physical trading

92. Capacity that didn't obtain a capacity agreement (but was pre-qualified) in the previous auction may look to pick up a capacity agreement in the secondary market, for instance an existing plant that had intended to retire at the time of the auction but in current circumstances can remain open if it takes on a capacity agreement.
93. Providers may physically trade obligations at any point from a year ahead of the start of the delivery year and throughout delivery year/s – provided the party taking on the obligation is eligible and doesn't already hold obligations. Plants that opted out of the auction (hence are not pre-qualified) will not be able to take on physical obligations in the secondary market. Physical trades can only take place with the consent of the System Operator and that

consent will not be unreasonably withheld and will involve for example checking whether the assignee is pre-qualified and unencumbered by pre-existing obligations.

94. Additional stipulations will exist for physical trading with a party that has not previously demonstrated its eligibility through a prequalification process.
95. Participants that wish to trade out of their physical obligation will also be prevented from doing so if the System Operator has already procured additional capacity in the year-ahead auction to replace that participant's capacity. The purpose of this restriction, and the limited time window for physical trading, is to prevent parties that fail to build new plants on time from profiting from higher prices in the year-ahead auction.
96. The System Operator will be required to maintain a registry of parties' pre-qualification status and the details of any capacity agreements awarded. This registry will be consulted by the System Operator to determine the eligibility of parties wishing to enter into bilateral physical trades, before providing their consent to any individual physical trade. Access to this registry will also be needed for the purpose of settling payments and/or to apply penalties.

### Financial trading

97. At any time, parties can hedge their position financially through private markets – for instance to avoid exposure to penalties while undertaking maintenance. Parties will be incentivised to trade on this market as they will have load-following obligations and will be paid for 'over delivery' in a stress event (see 'Delivery' section). This means that generators intending to run outside times of peak demand will be able to offer 'spare' capacity to those not choosing to run. Financial players will also be able to trade in this market, enabling greater market liquidity.
98. Providers trading financially will nonetheless remain liable for any penalties and will have to settle as normal but they would recoup any costs from their financial trading partner. We will continue to explore whether there is a role for Government in establishing a trading platform.

## Delivery

### Summary:

- Capacity agreements oblige participants to deliver a specified quantity of electricity in system stress periods.
- Providers' obligations will be 'load following' (i.e. if a stress event occurs when total demand is at 70% of anticipated peak, they are only required to deliver 70% of their obligation).
- The System Operator will issue a 'Capacity Market warning' at least 4 hours in advance of any anticipated stress event.
- Once a warning has been issued, providers that do not deliver sufficient energy at the relevant time/s of stress to meet their profiled obligation will be required to pay a financial penalty. No penalties will be applicable for stress periods where no advance warning was provided by the System Operator.
- Penalties will be based on the value of lost load to reflect the value to consumers of preventing blackouts.
- Providers' total penalty exposure in a delivery year will be capped at a multiple of the cost of new entry multiplied by their MW of capacity agreements held. Rules to create a 'soft cap' will ensure providers always have an incentive to deliver in times of system stress.
- Providers that deliver more than their load following obligation at times of stress will be paid for their excess delivery at the inverse of the penalty rate. Payments for over delivery will be made in stress events from the moment the warning is issued.
- The System Operator will have the ability to spot test providers where they have failed to demonstrate their ability to deliver the level of capacity specified in their capacity agreement. Capacity payments will be withheld from any plant which fails a spot test until the plant passes a subsequent test.

## The capacity agreement obligation

99. System stress events are defined as any settlement periods in which either voltage control or controlled load shedding are experienced at any point on the system for 15 minutes or longer.<sup>13</sup>
100. We have previously decided that the decision on whether a capacity provider has met its obligation during a period of system stress will be based on the delivery of energy (by generating or reducing demand), or provision of a balancing service, during that period. Providers will be required to determine their own response at such times, and avoid breaching any existing code or licence conditions.
101. To ensure participants are able to adequately manage the risk of exposure to penalties, e.g. the risk that a number of plants simultaneously trip, the System Operator will provide (based on a pre-determined methodology) at least four hours' notice of system stress via a 'Capacity Market warning'. Unless this warning has been issued, a scarcity event will not trigger Capacity Market penalties or overdelivery payments.
102. Because this may reduce the longer term efficiency of mechanism (e.g. by reducing the incentives for participants to invest in the right mix of reliable and flexible capacity that can respond to scarcity situations as they develop) we will review this approach once participants are used to the way the mechanism works and investors more comfortable investing on the basis of capacity agreements.

## Level of obligation in system stress events

103. Capacity agreements oblige participants to deliver a specified quantity of electricity. A provider's obligation at the time of stress events is calculated from their obligations acquired in the four-year and year-ahead auctions, plus any secondary traded obligations acquired for the specific settlement periods in which a stress event occurs.
104. However, in stress periods, providers' obligations will be 'load following'. That means they will only be required to be generating electricity or reducing demand up to the total level of their obligation if all capacity with capacity agreements is required to meet demand. In a stress event where only 70% of the total capacity with capacity agreements is required to meet demand, each provider will only be required to be generating electricity or reducing demand up to 70% of their raw capacity obligation.

---

<sup>13</sup> A stress event will be considered to start when the System Operator issues demand control instructions to relevant Distribution Network Operators (DNOs), or where demand is automatically disconnected by low frequency relays. A stress event will be considered to have finished when the System Operator instructs the last relevant DNO to reconnect demand. The link to instructions, rather than their implementation, will provide clearly auditable timestamps for any stress periods.

105. Load following obligations are appropriate to ensure generators have incentives to operate efficiently in the market, and are proportionate to the harm caused to consumers by any lost load. If every participant risked being penalised for their full raw capacity obligation whenever there was system stress, the Capacity Market would create signals for plant to run warm even when it is economically inefficient for them to do so – increasing both emissions and consumer bills.
106. Providers' performance will be assessed at portfolio level. This is to enable portfolio operators to make efficient decisions about which plants to run. It also helps them to manage risks related to plant maintenance. However, the penalty cap will also apply to a portfolio, which means the cap provides less protection to portfolio participants since they are unlikely ever to reach their portfolio cap.
107. There are not expected to be any exceptions, e.g. for force majeure or gas supply emergencies. However, where there is unmet demand or voltage reductions because of failures or deficiencies in the transmission or distribution systems, Capacity Market penalties will not apply.

## Penalties

108. Providers that do not deliver sufficient energy at notified times of stress to meet their profiled obligation will be required to repay a proportion of their up-front capacity payments.
109. Penalties will be linked to the value of lost load (VoLL) minus the prevailing 'System Buy Price' (i.e. 'cash out') imbalance price for each half hourly settlement period in which there was system stress. VoLL is the theoretical value to consumers of preventing blackouts. In other words, it is the price at which a consumer is indifferent between paying for electricity and not having any. Since the purpose of the Capacity Market is to prevent blackouts, using VoLL (the value to consumers of preventing blackouts) as a basis for Capacity Market penalties will help ensure capacity providers have the correct economic incentive to provide capacity.
110. In a perfect energy market, cash out prices would rise to VoLL at times of scarcity, and should eventually provide the long term certainty investors need to build sufficient capacity to provide security of supply. However, current cash out prices do provide some incentive for delivery at times of scarcity, and if the cash out price was not subtracted from VoLL then capacity providers would face more than the economically optimal penalty for failing to deliver capacity when required.<sup>14</sup> The same penalties will apply to both existing generators and new capacity providers that have achieved operational status.

---

<sup>14</sup> If they are not delivering but had notified the System Operator that they *would* deliver they would have to pay the cash out price on top of VoLL. If they are not delivering and have notified the System Operator that they would not deliver then they miss out on the high energy prices driven by the stress event.

111. The interaction between the proposed penalty regime and Ofgem’s Electricity Balancing Significant Code Review (EBSCR) will be kept under review over upcoming months. Ofgem is planning to take final policy decisions on the EBSCR in early 2014, with implementation of any changes from early 2015.
112. A joint DECC/Ofgem study is presently underway to establish the appropriate level to use for VoLL. Once this study is complete Government will set a VoLL in the penalty regime to ensure that the mechanism strikes an appropriate balance between providing strong performance incentives and reducing investment risk for new capacity. To achieve this balance, it may not be appropriate to use the full level of VoLL in the penalty calculation.

### **Penalty capping**

113. To avoid unquantifiable risk (which would tend to drive up the cost of capacity for consumers), providers’ total penalty exposure in a delivery year will be capped at a multiple of the expected annual capacity payment (‘net-CONE’) multiplied by their MW of capacity agreements held. However providers that have incurred sufficient penalties to reach their cap will be able to reduce their total exposure to penalties if they deliver in future events. This ensures that providers continue to have incentives to deliver at future times of system stress even once they have reached their cap.

### **Over delivery**

114. Since at times of stress it is beneficial to have all available capacity on the system (until demand is met), providers that deliver more than their load following obligation at times of stress, preceded by a Capacity Market warning, will be paid for their over delivery at the penalty rate. Only providers holding capacity agreements, who notify the amount they will deliver to the System Operator before gate closure or react to specific System Operator instructions, will qualify for this payment.

### **Spot testing**

115. The System Operator will be given a right to spot test providers in circumstances where they have failed to demonstrate their capacity volumes to the System Operator’s satisfaction over the previous delivery year. This is because we do not expect there to be regular stress events and therefore we need a means to check participants are able to perform.
116. Designated providers will be required to deliver the amount of their capacity agreements at a date and time specified by the System Operator, with penalties being applied for providers not able to demonstrate when tested. Plants would receive advance notification of the test periods. The System Operator would be limited to testing any specific plant on a maximum number of occasions (number TBC) within a particular delivery year.
117. Capacity payments will be withheld from any plant which fails a spot test until the plant passes a subsequent test. The provider could request a retest at any time after their initial

unsuccessful test. We are considering whether further penalties should apply to plants that have failed a spot test, including the potential for testing performance to affect a participant's future de-rated capacity.

118. No specific funding for testing would be provided, with providers pricing in the risk of such tests into their auction bids.

## Payment

### Summary:

- Payment flows between suppliers and capacity providers will be the responsibility of a government-owned settlement body with a number of its functions designated to a settlement agent (Elexon).
- The cost of capacity will be recovered from suppliers according to their share of peak demand.
- Penalties will be returned from capacity providers to suppliers according to their share of peak demand.

119. Payment flows between suppliers and capacity providers will be managed by a settlement body assisted by a settlement agent. We propose to designate this role of settlement agent to Elexon, and this decision was announced in February 2013. The settlement body's costs (including that of its agent) will be added to the capacity tariff funded by suppliers.
120. The cost of capacity (including capacity payments, over-delivery payments and settlement body costs) will be recovered from suppliers according to their forecast total peak demand. Charges will later be reconciled based on actual demand when meter data is available.
121. Suppliers will be required to lodge collateral with the settlement body so that they are in a position to cover their payment obligations for one month in the event of default. Any payment defaults remaining once a supplier's collateral was exhausted would be mutualised across the remaining supplier base (i.e. other suppliers would have to cover this default) to ensure the settlement body is always in a position to pay capacity providers.
122. Penalties will be returned from capacity providers to suppliers – with any revenues being split between suppliers pro-rata according to their forecast total peak demand. Charges will again be reconciled based on actual demand when meter data is available.
123. Capacity providers will not be required to lodge any collateral against potential penalty payments. Any initial default by providers will be covered by withholding future capacity revenues. Any defaulted penalty amounts outstanding at the end of the delivery year will be mutualised across suppliers. Ofgem will enforce this regime.

124. Net charges and/or payments to suppliers and capacity providers will be made monthly.

## **Review and exit**

125. The Capacity Market addresses fundamental failures in the electricity market, and is therefore expected to be required for at least ten years once implemented.
126. However, it may be right to exit the Capacity Market if the underlying electricity market develops sufficiently, particularly through development of greater market liquidity, an active demand side, and more interconnection.
127. Ongoing work to improve the functioning of the electricity market, such as the rollout of Smart Meters, Ofgem's work on cash out reform, and work in Europe to complete the internal energy market, are all important complements to the Capacity Market. By supporting the development of the demand side, the Capacity Market itself will also contribute to the market developments that could render it unnecessary in the longer term.
128. Given this, the Capacity Market has been designed so that it can be exited from in future. For example:
- The establishment of a reliability standard and annual decisions on how much capacity to auction will reduce the risk of over procurement, and mean 'stranded assets' are not created.
  - Participants will not be eligible for multi-year agreements unless they are new plants or undertaking significant refurbishment.
  - The rules of the Capacity Market will principally be written into a 'rule book' governed by Ofgem – allowing for adaptation.
129. The need for a Capacity Market will also be reviewed every five years.

# Institutional Arrangements

130. The Capacity Market will be put in place by the Secretary of State under the powers conferred by the Energy Bill. The Capacity Market will be implemented by a combination of Government, Ofgem, the System Operator and Elexon.
131. The detail of the Capacity Market will be set out in a combination of regulations and rules. The regulations, which will be made and overseen by the Secretary of State, will include aspects covering the amount of capacity to auction, eligibility criteria and settlement of payments. The Capacity Market rules, which will be first made by the Secretary of State with subsequent amendments being made by Ofgem, will include technical rules and procedures such as pre-qualification and capacity auctions, and provision about the contents of capacity agreements and the obligations of capacity agreement holders.
132. An individual capacity agreement will be an instrument setting out the particulars specific to each resource, including a description of the unit to which capacity obligations apply, the capacity of that unit, the period in which obligations apply, and the price determined in the capacity auction.
133. This approach will enable Government to retain accountability for key aspects of the Capacity Market, while Ofgem will be responsible for consulting on and implementing future changes to the rules to ensure they remain in line with the developing electricity market.
134. The primary and secondary legislation, capacity agreements, and any changes to existing codes and licences, will create a system of regulated rights and obligations which will be overseen and, where appropriate, enforced by Ofgem.
135. The System Operator will undertake the delivery role for the Capacity Market, including providing advice to ministers on the security of supply outlook and recommended amount of capacity to auction to meet the reliability standard; pre-qualifying auction participants, administering the auction and issuing capacity agreements; and developing and administering new supporting procedures e.g. to provide Capacity Market warnings.
136. A Panel of Technical Experts will provide independent scrutiny of the System Operator's advice on the level of capacity to auction.
137. Ofgem will be responsible for governance of technical Capacity Market rules after the first auction has taken place and will continue to regulate the System Operator and enforce the rules and competition law within the Capacity Market.
138. The overall responsibility for the efficient settlement of the Capacity Market will rest with a settlement body which may delegate a number of operational activities associated with Capacity Market settlement to a settlement agent.

139. Government has also announced its intention to designate Elexon Ltd. as the Capacity Market settlement agent. This role will likely include the calculation of all amounts that become owed or due under the Capacity Market arrangements, the collection and handling of data required for such calculations, invoicing, undertaking regular reconciliations of payments and charges as more accurate data becomes available and the monitoring and enforcement of parties credit obligations under the Capacity Market arrangements.
140. The potential for conflicts of interest between National Grid's role in EMR and its existing interests in the energy market was recently subject to a joint assessment by Government and Ofgem.<sup>15</sup>
141. The joint analysis conducted by DECC and Ofgem has concluded that, on the basis of existing System Operator activities, current market arrangements, and the current design of EMR, conflicts of interest are manageable subject to the implementation of various mitigation measures. The proposed mitigations include the continued design of EMR in a way that minimises the risks of conflicts of interest arising, through transparency, scrutiny and limits on the System Operator's discretion and the proportionate ring-fencing of some of the EMR functions within National Grid. The ring-fencing will include staff that will carry out the capacity auction. The measures are intended to protect confidential information that the System Operator may have access to and minimise the risk of conflicts of interest arising.

## **Devolved Administrations**

142. The Capacity Market will cover England, Wales and Scotland, but will not apply in Northern Ireland. Northern Ireland is part of the Single Electricity Market that extends across both Ireland and Northern Ireland, which has operated a separate capacity mechanism since 2007.
143. To ensure the most suitable design for GB as a whole, and to ensure any relevant devolved powers and responsibilities are respected, we will continue engagement with the Devolved Administrations as the detail is finalised and implementing legislation developed.

---

<sup>15</sup> Available at: <https://www.gov.uk/government/consultations/synergies-and-conflicts-of-interest-arising-from-the-system-operator-delivering-electricity-market-reform-emr>

# Next Steps

## EMR Delivery Plan

144. The first EMR delivery plan will be published in final form by the end of 2013, subject to royal assent of the 2012 Energy Bill. To inform that publication, we will publish a draft for public consultation in July 2013. The first delivery plan will cover the period 2014/15 – 2018/19 with an outlook to 2030. It will contain Government's decisions on the strike prices for renewable technologies eligible for a Contract for Difference and the reliability standard for the Capacity Market. It will also contain the evidence, analysis and methodologies used to inform those decisions, including the analytical report from the System Operator and scrutiny report from the EMR Panel of Technical Experts.
145. We will therefore publicly consult on the reliability standard for the Capacity Market through the consultation on the EMR delivery plan when it is published in July 2013. The final reliability standard will be published in the final EMR delivery plan when it is published by the end of 2013, subject to royal assent.

## Developing Legislation

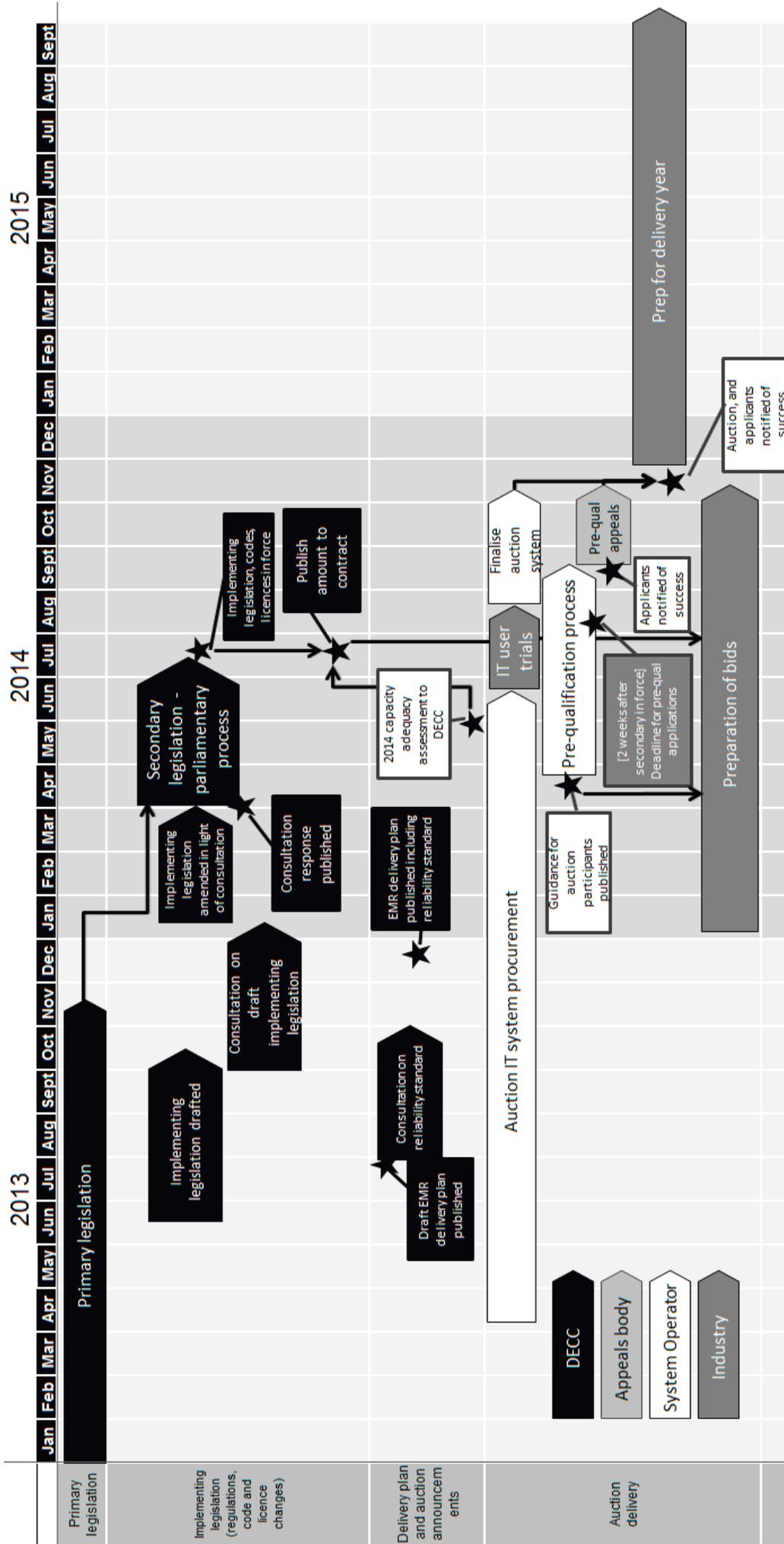
146. The Energy Bill provides the high level framework for the introduction of the Capacity Market. It is proceeding through parliament and should receive royal assent around the end of the year.
147. These design proposals will form the basis for the development of detailed implementing legislation, which will be split between regulations and rules. We are working to consider the appropriate split to ensure appropriate levels of ministerial oversight while also maximising longer-term certainty for industry.
148. In addition, the Capacity Market is likely to give rise to necessary and consequential amendments to certain existing industry codes and licences.
149. We intend to consult in October on these proposals and draft legislation to implement them, so that legislation can be further refined in time to enter into force in July 2014.

150. Over the next few months we intend to continue working with our stakeholder expert group to further refine these proposals, address outstanding design questions, and address any further questions resulting from the legal drafting process.
151. We also expect to pursue a collaborative development process through open meetings with all affected stakeholders, which would further develop the processes and systems required to operate the scheme and the various roles and responsibilities involved. Further information will be made available on the DECC website in the next few weeks.

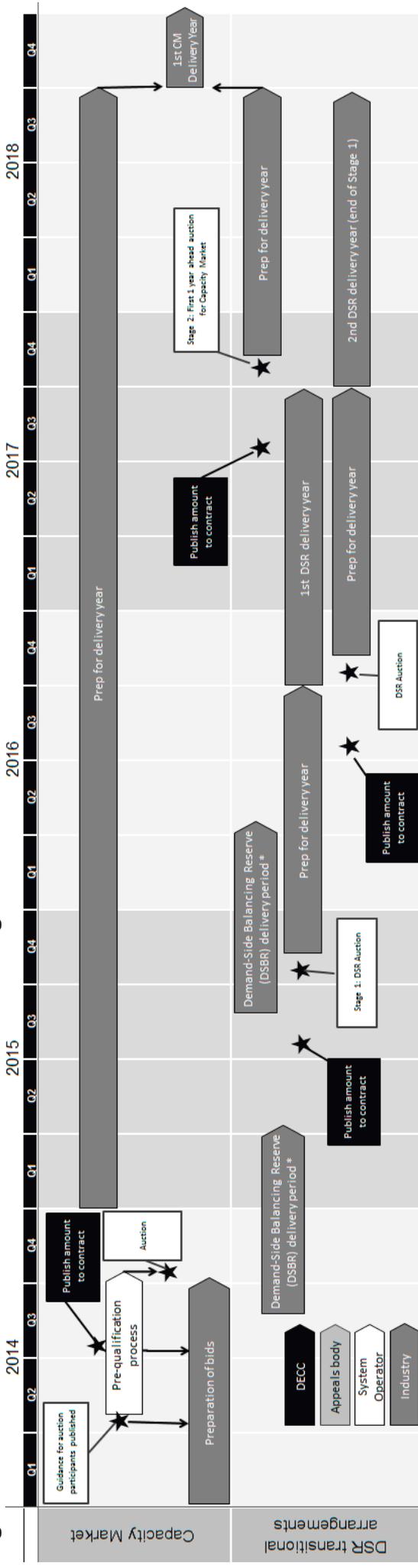
## **Auction timeline**

152. Government will run an auction in 2014 for delivery in 2018/19, subject to state aid clearance. The timeline for running this auction is set out in Figure 3.

Figure 3: Indicative timeline for 2014 auction



**Figure 4: Indicative schedule of DSR transitional arrangements**



\*Note: The System Operator will only look to procure these services if they are approved by Ofgem and are considered necessary to balance the system. See Ofgem's separate consultation for more detail.

# Appendix: Summary of Capacity Market Design Proposals

Operational phase	Design area	Proposal	Further work
<p><b>A – Amount of capacity</b></p>	<p>When will the first auction and delivery year be?</p> <p>How will we decide the volume of capacity to auction?</p>	<ul style="list-style-type: none"> <li>The first auction will be run in late 2014 for delivery of capacity from 1 October 2018 – 30 September 2019.</li> <li>Annual security of supply analysis on the amount of capacity required to meet the reliability standard will be carried out by the System Operator and scrutinised by the Panel of Technical Experts.</li> <li>Capacity demand curve will be determined annually by DECC, in advance of capacity auctions to enable the trade-off between cost and reliability to be automatically determined at auction.</li> <li>The contribution to security of supply of any ineligible capacity (including interconnected capacity), and plants that opt out of the auction, will be taken into account when setting the total amount to auction.</li> </ul>	<ul style="list-style-type: none"> <li>State aid discussions with the European Commission.</li> <li>Consultation on reliability standard, gross CONE and VoLL will be part of the consultation on the draft EMR delivery plan in July.</li> <li>Further parameters for setting the demand curve including net-CONE, the auction price cap and the demand curve gradient will be developed for consultation in October.</li> </ul>
<p><b>B – Eligibility</b></p>	<p>Which forms of capacity will be eligible to participate in the Capacity Market?</p>	<ul style="list-style-type: none"> <li>New and existing generation capacity (including combined heat and power (CHP)).</li> <li>Demand Side Response (DSR), including embedded generation (and with additional transitional support).</li> <li>Storage.</li> <li>Capacity below a 2 megawatt (MW) de-minimis threshold will only be able to participate when combined with other capacity through an aggregation service.</li> <li>All eligible capacity will be free to participate in both the</li> </ul>	<ul style="list-style-type: none"> <li>Permanent reductions in electricity demand (EDR) could also participate. Government has amended the Energy Bill to enable this and is considering whether to pilot the approach before final decisions on EDR are made.</li> </ul>

		<p>Capacity Market and Balancing Services markets.</p> <ul style="list-style-type: none"> <li>Capacity receiving support through the Renewables Obligation (RO), Contracts for Difference (CFDs), or small scale Feed in Tariffs (FIT).</li> <li>Interconnected non-GB capacity, and interconnectors themselves, though we will continue work to explore potential solutions that might enable the participation of interconnected capacity in future auctions.</li> </ul>	<ul style="list-style-type: none"> <li>Explore options (compatible with the internal energy market) for interconnection and/or non GB capacity to participate in future.</li> <li>Explore whether renewable CHP plant receiving support through the Renewable Heat Incentive (RHI) should be eligible to participate in the Capacity Market.</li> </ul>
	<p>Which forms of capacity will be ineligible to participate in the Capacity Market?</p>	<ul style="list-style-type: none"> <li>Pre-qualification will be mandatory for generators, to confirm eligibility and bidding status.</li> <li>The amount of capacity each participant can bid into the auction will be determined by the System Operator.</li> <li>There will be a dispute process for participants unhappy with their de-rated eligibility.</li> </ul>	<ul style="list-style-type: none"> <li>Determine full rules for pre-qualification, including the de-rating factor to be applied.</li> <li>Identify any particular pre-qualification criteria for DSR capacity</li> <li>Identify appeals body.</li> </ul>
<p><b>B – Auction</b></p>	<p>When will auctions take place?</p>	<ul style="list-style-type: none"> <li>For each delivery year, an auction will be held four years ahead of delivery, supplemented by a further auction one year ahead of delivery.</li> </ul>	
	<p>How will auctions work?</p>	<ul style="list-style-type: none"> <li>The auction will be ‘pay as clear’ – that is, all participants will receive the clearing price set by the marginal bidder.</li> <li>To mitigate market power, bidders will be classified as either ‘price takers’ (who cannot set the price) or price makers (who can). Most bidders will default to being price takers meaning they can freely bid up to a predetermined threshold. New entrants and DSR resources will be classified as price makers, and will be free to bid up to the overall auction price cap (set at a multiple of the cost of new entry).</li> </ul>	<ul style="list-style-type: none"> <li>Determine the price taker threshold and the auction price cap.</li> </ul>
	<p>What length of capacity</p>	<ul style="list-style-type: none"> <li>Existing plants will default to one year capacity</li> </ul>	<ul style="list-style-type: none"> <li>Further work and consultation on</li> </ul>

	agreements will be offered?	<p>agreements unless they require major refurbishment, in which case they may be eligible to access a capacity agreement with a term of up to three years in each round of the auction.</p> <ul style="list-style-type: none"> <li>• New entrants will have access to a longer term agreement for a term they nominate up to a maximum term limit.</li> <li>• We are still considering the term limits for refurbishing and new plants, and the eligibility criteria for existing plants to access different agreement lengths and will consult on these questions later this year.</li> </ul>	capacity agreement lengths, and eligibility criteria for accessing longer agreements.
<b>C – Secondary trading</b>	How will secondary trading work?	<ul style="list-style-type: none"> <li>• Providers can physically trade their obligations from a year ahead of the start of the delivery year where there is additional unencumbered pre-qualified capacity that can take their place.</li> <li>• The System Operator will maintain a registry of capacity obligations and the System Operator’s consent will be required for any physical trading.</li> </ul>	<ul style="list-style-type: none"> <li>• Develop rules for System Operator assessing applications for physical trading.</li> </ul>
<b>D - Delivery</b>	What will holders of capacity agreements be obliged to do?	<ul style="list-style-type: none"> <li>• Capacity agreements oblige participants to deliver a specified quantity of electricity in system stress periods.</li> <li>• Providers’ obligations will be ‘load following’ (i.e. if a stress event occurs when total demand is at 70% of anticipated peak, they are only required to deliver 70% of their obligation).</li> <li>• The System Operator will issue a ‘Capacity Market warning’ at least 4 hours in advance of any anticipated stress event.</li> <li>• Once a warning has been issued, providers that do not deliver sufficient energy at the relevant time/s of stress to meet their profiled obligation will be required to pay a</li> </ul>	<ul style="list-style-type: none"> <li>• Determine the procedure and circumstances for the System Operator issuing a Capacity Market warning, and undertaking spot testing.</li> </ul>

		<p>financial penalty. Penalties will not be applied if a warning has not been issued.</p> <ul style="list-style-type: none"> <li>The System Operator will have the ability to spot test providers where they have failed to demonstrate their ability to deliver the level of capacity specified in their capacity agreement. Capacity payments will be withheld from any plant which fails a spot test until the plant passes a subsequent test.</li> </ul>	
	What penalties will apply for failure to meet this obligation?	<ul style="list-style-type: none"> <li>Penalties will be based on the value of lost load to reflect the value to consumers of preventing blackouts.</li> <li>Providers' total penalty exposure in a delivery year will be capped at a multiple of the cost of new entry multiplied by their MW of capacity agreements held. Rules to create a 'soft cap' will ensure providers always have an incentive to deliver in times of system stress.</li> <li>Providers that deliver more than their load following obligation at times of stress will be paid for their excess delivery at the inverse of the penalty rate.</li> </ul>	<ul style="list-style-type: none"> <li>Determine the appropriate multiple of CONE for penalty capping.</li> <li>Determine net-CONE.</li> </ul>
<b>E - Payment</b>	How will capacity payments be covered?	<ul style="list-style-type: none"> <li>The cost of capacity will be recovered from suppliers according to their share of peak demand.</li> <li>Penalties will be returned from capacity providers to suppliers according to their share of peak demand.</li> </ul>	<ul style="list-style-type: none"> <li>Determine the precise definition of 'peak'.</li> </ul>
<b>Review and exit</b>	Will the Capacity Market be an enduring feature of the electricity market?	<ul style="list-style-type: none"> <li>It may be right to exit the Capacity Market if the underlying electricity market develops sufficiently, particularly through development of greater market liquidity, an active demand side, and more interconnection.</li> </ul>	<ul style="list-style-type: none"> <li>Work to improve the functioning of the electricity market, such as the rollout of Smart Meters, Ofgem's Electricity Balancing Significant Code Review, and work in Europe to complete the internal energy market.</li> <li>Additional support for the demand side provided by the electricity</li> </ul>

			market.
	When will the Capacity Market be reviewed?	<ul style="list-style-type: none"> <li>The need for a Capacity Market will be reviewed every five years.</li> </ul>	
<b>Institutional arrangements</b>	Which organisations will implement and oversee the Capacity Market?	<ul style="list-style-type: none"> <li>The Capacity Market will be put in place by the Secretary of State under the powers conferred by the Energy Bill. The Capacity Market will be implemented by a combination of Government, Ofgem, the System Operator and Elexon.</li> </ul>	
<b>Geographic scope</b>	What will be the geographic scope of the Capacity Market?	<ul style="list-style-type: none"> <li>The Capacity Market will cover England, Wales and Scotland, but will not apply in Northern Ireland.</li> </ul>	









Department of Energy & Climate Change  
3 Whitehall Place  
London SW1A 2AW  
[www.decc.gov.uk](http://www.decc.gov.uk)  
**URN 13D/149**



information & publishing solutions

Published by TSO (The Stationery Office) and available from:

**Online**

[www.tsoshop.co.uk](http://www.tsoshop.co.uk)

**Mail, Telephone, Fax & E-mail**

TSO

PO Box 29, Norwich, NR3 1GN

Telephone orders/General enquiries: 0870 600 5522

Order through the Parliamentary Hotline Lo-Call 0845 7 023474

Fax orders: 0870 600 5533

E-mail: [customer.services@tso.co.uk](mailto:customer.services@tso.co.uk)

Textphone: 0870 240 3701

**The Parliamentary Bookshop**

12 Bridge Street, Parliament Square

London SW1A 2JX

Telephone orders/General enquiries: 020 7219 3890

Fax orders: 020 7219 3866

Email: [bookshop@parliament.uk](mailto:bookshop@parliament.uk)

Internet: <http://www.bookshop.parliament.uk>

**TSO@Blackwell and other Accredited Agents**

ISBN 978-0-10-186372-8



9 780101 863728