The development of the Capacity Market for electricity in Great Britain

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Abstract:
A Capacity Market (CM) for electricity was introduced in Great Britain in the early 2010s, with the first auctions being held in 2014. The CM has been controversial in its design and effects. In particular it has been seen as benefiting existing, often high-carbon, capacity and large incumbent generators, rather than new entrants and technologies, such as demand side response. More broadly, it is seen by some as working against, rather than for, the development of a low-carbon flexible future energy system. This paper traces the development of the Capacity Market as a policy process, with a particular focus on the influence of incumbents in that development. It is based on interviews with participants in and close observers of that process, and on a close reading of the policy process documentation, such as consultation submissions. The study of corporate influence in this case is complicated by the confluence of incumbent interests and political incentives facing government actors to keep the lights on. In the main decisions regarding the CM, including the decision to adopt a mechanism in the first place, and in deciding to have a market-wide approach, the incumbent lobby was split. However, in both these cases, the government’s decisions were in line with the wishes of, and used the arguments of the majority of incumbents. There is also evidence that incumbents lobbied effectively against a more supportive design of the CM for demand side response providers. The paper concludes with some reflections on what can be learned from this case about how to minimise the role of corporate influence in energy policy making.

Keywords: incumbents, Capacity Market, governance, electricity, policy process, demand side
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<tbody>
<tr>
<td>BCSE</td>
<td>Business Council for Sustainable Energy</td>
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<td>CBI</td>
<td>Confederation of British Industry</td>
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<td>CCGT</td>
<td>combined-cycle gas turbine</td>
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<td>CD</td>
<td>Collaborative Development (process)</td>
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<td>CEGB</td>
<td>Central Electricity Generating Board</td>
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<td>CfD</td>
<td>Contract for Difference</td>
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<td>CM</td>
<td>Capacity Market</td>
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<tr>
<td>DECC</td>
<td>Department for Energy and Climate Change</td>
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<td>DSR</td>
<td>Demand side response</td>
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<td>ECCC</td>
<td>Energy and Climate Change Committee</td>
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<td>EMA</td>
<td>Electricity Market Assessment</td>
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<td>EMO</td>
<td>Energy Market Outlook</td>
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<td>EMR</td>
<td>Electricity Market Reform</td>
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<td>FTE</td>
<td>Full time equivalent</td>
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<td>GB</td>
<td>Great Britain</td>
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<td>GW</td>
<td>gigawatt</td>
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<td>HMT</td>
<td>Her Majesty’s Treasury</td>
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<td>IA</td>
<td>Impact Assessment</td>
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<td>IEA</td>
<td>International Energy Agency</td>
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<td>IED</td>
<td>Industrial Emissions Directive</td>
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<td>IGG</td>
<td>Independent Generators Group</td>
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<td>LoLE</td>
<td>Loss of load expectation</td>
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<td>LCPD</td>
<td>Large Combustion Plant Directive</td>
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<td>LRMC</td>
<td>long-run marginal cost</td>
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<tr>
<td>MW</td>
<td>megawatt</td>
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<td>MWh</td>
<td>megawatt-hour</td>
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<td>NOx</td>
<td>Nitrogen oxides</td>
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<td>NPV</td>
<td>Net Present Value</td>
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<td>OCGT</td>
<td>open-cycle gas turbine</td>
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<td>PTE</td>
<td>Panel of Technical Experts</td>
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<td>RAP</td>
<td>Regulatory Assistance Project</td>
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<td>SBR</td>
<td>Supplementary Balancing Reserve</td>
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<td>SR</td>
<td>Strategic Reserve</td>
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<td>SRMC</td>
<td>short-run marginal cost</td>
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<td>SSE</td>
<td>Scottish and Southern Energy plc</td>
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<td>STOR</td>
<td>Short Term Operating Reserve</td>
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<td>VoLL</td>
<td>Value of lost load</td>
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Executive Summary

This paper investigates the evolution of the Capacity Market for electricity in Great Britain, and in particular the influence of large energy corporations in that evolution. The Capacity Market (CM) was introduced in 2014 as part of the wider Electricity Market Reform, which was aimed at supporting new nuclear power and the expansion of intermittent renewables (especially wind) (Section 3). The theoretical case for a capacity mechanism rests partly on the argument that the growth of such low-carbon generation will suppress prices in the wholesale electricity market, and reduce the frequency and predictability of peak prices where flexible generation (historically gas-fired) earned the bulk of its revenue, and as a result there will be no investment in the flexible generation that will be needed when low-carbon generation is not available. However, there is no consensus that this argument is correct, and there is also no convergence to either capacity mechanisms or energy-only markets around the world in different electricity markets (Section 2).

Both in the course of its development and since, the CM has been criticised on a number of grounds (Section 3.2), including that it does not represent good value for money, that it undermines the decarbonisation of the power sector, that it has done little to support the development of demand side response (DSR) as a flexible resource, that it has failed to bring forth investment in new combined-cycle gas turbines (CCGTs) (which was one of its avowed aims), that interconnectors were not allowed to participate in the first auction, that an overly conservative reliability standard has meant that too much capacity has been auctioned for and that the auction has not helped open up the wholesale market as most contracts have gone to existing large generators. More generally, the CM has been criticised for being a backward-looking policy in which opportunities for supporting the emergence of a new energy system (for example in DSR, storage) have been missed. A major reason put forward for this outcome is that the process was influenced by incumbents who were seeking to protect their assets in the face of a changing energy system (Section 4.1). The paper seeks to assess such this view.

The paper identifies the relevant incumbents as including the ‘Big Six’ suppliers, but also a group of six second-tier generators. It argues that these companies cannot be viewed simply as one set of actors within the wider universe of stakeholders in Britain (Section 4.2). This is because the government has powerful political incentives to keep the lights on, while at the same time it is dependent on these companies to do that. However, it was also argued that while this means that the government has a form of structural dependency on these incumbents, it does not automatically follow that they can simply dictate policy to the
government. Rather, their structural power has to be deployed in concrete ways. Based on this approach, the paper seeks to address a number of research questions:

- How were corporate interests in relation to the Capacity Market constructed?
- How were corporate actors organised with respect to the state?
- How were opportunities to exercise structural power institutionally mediated?
- How was the structural power of incumbents deployed through ideas in communication with policy makers?
- What was the role of these ideas in the thinking and decisions of policy makers?

A process-tracing methodology was adopted for the research, in which causal chains involving entities and activities are established, drawing on evidence from interviews with participants and close observers of the CM policy process and on related documentation, especially consultation documents and submissions. However, it is also recognised that in an area with a degree of political sensitivity such as corporate influence, both interviews and publicly available documentation have limits.

The first area addressed in the paper concerns incumbent interests (Section 6). In general, any scheme for payment of generating capacity would potentially benefit companies owning such capacity, which in the case of the GB mechanism meant any thermal capacity including existing (but not new) nuclear. However, there is also some evidence that companies that had made large investment in new CCGT plants at the time of the initial policy proposals would be less inclined to be supportive. There is also some evidence that perceptions of interests by incumbents were shaped by the ideas of senior managers, especially regarding the efficacy of markets. It was also argued that incumbents could be expected to favour a market-wide approach to capacity market design over a targeted mechanism, as the former would provide more opportunities for payment. Companies could also be expected to argue for design features that matched their portfolios – i.e. those owning coal would resist differentiation of capacity payment by carbon intensity, those with CCGTs might push for differentiation by flexibility etc.

As a result of these factors, there was no single united incumbent generator lobby on the Capacity Market. A majority of incumbents, with older thermal assets, were in favour of a capacity mechanism with market-wide approach. A minority, with investments in new gas and with more of a commitment to the energy-only market, were far more sceptical about the need for an intervention, and especially the major step of a market-wide mechanism.

The other important corporate actor here is National Grid, which owns the system operator (which came to play an important role in CM policy development) as well as the electricity transmission grid in England and Wales, as well as interconnection businesses. National Grid’s
portfolio in theory gives it a range of different interests, but its transmission business dominates financially, and would potentially benefit from a CM that led to a bigger network than would otherwise be the case without a CM, or with a CM heavily weighted towards the demand side.

If the incumbent lobby was somewhat split, the institutional context for influence (Section 7) was supportive. Decisions on a capacity mechanism were to be taken by government, directly exposed to political incentives on system security, rather than a more politically insulated regulator. While energy costs had high political salience, the details of policy did not, and where public attention was turned on the EMR process, it was much more about the CfD process, and especially the evolving nuclear deal, rather than the CM. The Big Six and National Grid also benefitted from the existence of the UK Business Council for Sustainable Energy, which had emerged over the 2000s to become a key forum for informal contact with government at the most senior levels. At a less senior level, incumbents also had the opportunity to play a major role in the joint industry-government mechanisms set up later in the CM design process, including the Expert Groups and the Collaborative Development process. The scale and complexity of the EMR process meant expanding resources within DECC, which in turn meant a small number of secondments from industry. There are divided views on the significance of such secondments for influence, but the appointment of a secondee from a generation background as CM team leader in 2012 did raise eyebrows at the time.

It is important to recognise that the Capacity Market was not the outcome of a one-off decision, but rather a series of decisions taken over several years. The first of these was the commitment to have some form of capacity mechanism (Section 8). Between early 2010 and the end of that year there was a clear shift in policy with respect to a capacity mechanism, from a view that it might be needed at some point in the future to a proposal to develop a mechanism which then became a decision at the end of 2011.

Four of the Big Six vertically integrated generators and four of the six second tier generators were in favour in some form of mechanism, and there is ample evidence that they lobbied for the introduction of a capacity market. The key argument these actors put forward, through consultation submissions and meetings with Ministers and officials, was that the growth of renewable electricity arising from the measures in the EMR would exacerbate the missing money problem. All these actors also argued that fairly urgent action was needed to avoid the capacity problems that they anticipated in the second half of the decade. However, there was also a significant minority view opposed to a capacity mechanism amongst the incumbent companies themselves and other organisations making submissions to the 2010 EMR Consultation, as well as scepticism from other politically important actors, such as National Grid,
the CBI and the House of Commons Energy and Climate Change Committee. Many of these actors argued that the energy-only market would continue to be sufficient to bring forward investment, and that a set of reforms to strengthen liquidity and balancing pricing signals should tried before a decision on a capacity mechanism was made.

However, there is also evidence that there were other factors bearing on the government’s position that also worked in favour of the introduction of a capacity mechanism. First, there was a change of government in May 2010, and the new Coalition administration was determined to be a government that ‘grasped the nettle of delivery’. Secondly, all governments have strong political incentive to take a conservative view on electricity resource adequacy, and there is evidence that this was at work in the case of the new Coalition government. Concern about future resource margins may have been influenced by modelling commissioned in the autumn of 2010, but there is also some evidence that such modelling played a supportive role to a decision made more on grounds of a high level of caution in the face of uncertainty.

Overall, then, while pro-intervention incumbents were pushing for a capacity mechanism, they were pushing at an open door to a great extent. It is entirely plausible that the Coalition government might have proceeded with the development of a capacity mechanism even in the absence of majority support from the incumbents (although had there been strong opposition from the majority of incumbents this is less clear).

The second decision, which also came at the end of 2011, was that to adopt a market-wide design for a capacity mechanism rather than a targeted ‘Strategic Reserve’ model (Section 9). This is perhaps where there is the clearest case for corporate influence. Throughout 2010 and most of 2011, the government’s preferred option was for a targeted mechanism, which was the more cost effective according to its own Impact Assessments. However, following a strong push-back from the majority of incumbent generators over the course of two rounds of consultation (plus various meetings with ministers and officials), the government changed course and adopted the incumbents preferred market-wide option.

A number of arguments were put forward on either side, with proponents of SR arguing that it was cheaper, more flexible, a better fit with the existing market and would distort prices less, while advocates of the market-wide approach argued that the SR would suffer from the ‘slippery slope’ problem and would not be adequate for periods of low wind and high demand in the 2020s. However, as the government’s concern about a possible capacity crunch grew through the year, it appeared that decision makers wanted a design option that would incentivise a large volume of capacity.
A third decision of interest was the setting of a reliability standard (Section 10), which then determined the amount of capacity to be auctioned. The standard was set at the end of 2013. The policy involved a number of judgements, both in the choice of definition and level of the standard itself, and in the methodology for converting it to a required capacity (including scenario weighting and assumptions about future demand and plant availability). The decisions about these judgements, which were ultimately endorsed by the Secretary of State, were made jointly by the government and National Grid, but with the latter taking the more active role. At the same time, over a period of two years leading up to the decision on the setting of the reliability standard many of the incumbent generators were signalling to the government that they expected an increasingly serious capacity crunch.

However, just as with the decision to adopt a capacity mechanism in the first place, the commercial interests of generators and National Grid, in a conservative reliability standard which would mean an over-generous capacity margin and excessive auctions coincided with political incentives for government. Certainly, there is some evidence that within the parameters of the modelling available to them, officials and Ministers were drawn to the conservative end because of a desire to drive the risk of blackouts to a minimum. It is likely that if the setting of the standard and methodology had been undertaken by other, more independent actors, they would have been less conservative. This is suggested by the fact that what limited independent oversight that there was, in the form of the Panel of Technical Experts, was critical of some aspects of the approach, and continued to be so throughout the process.

A fourth decision point was the treatment of DSR within the CM (Section 11). There is considerable evidence that despite general rhetorical support for DSR in the CM, the large incumbent generators also presented arguments against it having a major role, and then in the course of detailed rule-setting, lobbied heavily against measures that would have given the development of DSR greater support. In the event the government appears to have been more open to the arguments of the incumbent generators than those of the DSR industry and other actors who were enthusiastic about the potential of DSR.

Despite the fact that it was nominally talked about as a new, emerging technological option that needed development, DSR in the end was treated in the main auctions on the same terms as existing generation, on less favourable terms than new-build generation. The openness of government to generator arguments about DSR appears to have been underpinned by a paradigm (also shared by incumbents) which defaulted to supply-side solutions, with a general sense in which the CM was really always about generation capacity, with DSR as an add-on. Such a paradigm, of course, also fitted well with the material interests of generators. It also
appears to be the case that while Ministers made bold statements about DSR in the early stages of the development of the CM, they did not follow through with attention to the detail of policy design, leaving this not only to relatively junior officials, but indeed to joint industry-government processes in which incumbents had some advantage.

Finally, largely implicit decisions were taken within the process of developing the CM not to differentiate rewards for or treatment of capacity, by carbon intensity or by flexibility (Section 12). In the case of carbon intensity (or simply the ruling out of high carbon coal or diesel), it seems that a decision was made by default. Corporate actors mostly seemed to have assumed that there would be no differentiation, and such an option was only briefly considered by decision makers before being abandoned as too complex and on the grounds that carbon intensity would be handled by other policies. At the same time, the lobbying efforts of the majority of environmental organisations were focused elsewhere, on the Emissions Performance Standard. In the case of differentiation of capacity by flexibility, there was more of a split within the incumbent generator group, with many of the second–tier generators (which had a lot of gas in their portfolios) making the case for rewarding flexibility in particular. However, by the middle of 2011, the government had clarified that they saw a capacity mechanism as being more about volume of capacity (which fitted with its shift towards a market-wide approach – see Section 9 above) rather than flexibility. This also fitted with a desire to avoid further complexity.

Overall, not all incumbents got everything that they wanted from the CM, but the majority – essentially those with an older portfolios – did get most of what they wanted. There is certainly plenty of evidence that incumbents lobbied and that decision makers used the ideas put forward by the majority group in several aspects of the CM design. The hypothesis of incumbent influence cannot be rejected, and there is considerable evidence to support it and increase our confidence in it. However, it is harder to say that most incumbents got what they that wanted solely because of their lobbying, as there is considerable evidence that political incentives on the government produced an approach that erred strongly on the side of caution in the CM decisions, in ways that aligned with the interests of incumbents with older assets.

Even in the absence of incumbent lobbying, it is still plausible that the government would have adopted a capacity mechanism, and adopted a conservative reliability standard. The main area where we come closest to ‘smoking gun’ evidence is the move from a targeted approach to a market-wide approach, where it is far more plausible that the government might have stuck with its original preferred choice had there not been such a strong push back from a majority of incumbents.
Beyond the specifics of the CM itself, this study suggests some conclusions for the wider study of the role of incumbent influence in energy policy. First, it points to the importance of a nuanced understanding of incumbents; such actors do not have homogenous interests and positions. Second, corporate actors are perhaps less likely to focus their efforts in areas where they have fairly clear structural power with respect to government, rather they are likely to give special attention to shape policy where governments appear to have a more open mind (such as with the issue of targeted vs market-wide approaches to the CM). Third, while energy sector incumbents sometimes do get what they want, this is not always the case. Fourth, incumbents are able to exercise influence with less scrutiny in policy areas and on decisions that receive less attention from the public and from Ministers, i.e. in what might be called ‘orphan’ issues.

This study is not been a straightforward policy assessment of the CM itself, and does not lead to proposals for reforming the CM. Rather, it leads to consideration of the implications of the CM as a case study for the process of policy making in the energy sector in Britain. It is argued that there are actions that could be taken first in terms of changing processes internal to the decision making process, and second, changes to the external landscape aimed at levelling the playing field.

In terms of changes to internal processes, an initial step would simply be greater explicit self-awareness amongst decision makers both about industry lobbying and their own political incentives. This further implies the capacity to develop such an analysis, and the value to government of officials who have a deep knowledge not only of the economics of the energy industry but also its political economy. The importance of this agenda increases the less that a policy area gets high-level public and political attention, because such ‘orphan’ issues are the ones that are most likely to vulnerable to external influence.

At the same time, the policy process would be less vulnerable to being distorted by the structural dependency of government on industry if policy makers acknowledged and took steps to counter their own political incentives, in the case of the CM to keep the lights on. An obvious way of doing that is involving others who do not have those incentives – such as independent experts – in the decision making process. While it is true that major energy policy decisions should ultimately be taken by elected politicians, as they have democratic legitimacy, a greater role for independent oversight and deliberation would help reduce distortion. There is also a case for rethinking the role of IAs, and being clearer about how exactly they are supposed to relate to decisions, if their credibility is not to be undermined.
A second area is how government sets the terms of engagement for external actors. One of the issues emerging from this analysis the use by incumbents of reports commissioned from energy consultancy firms that involved a mix of modelling and evidence to support the arguments of incumbents. The issue here is one of resources; typically incumbents can access resources for commissioned analysis in a timely manner, whereas other actors often cannot match such resources, or take so long in accessing them that the moment for influencing has passed. Incumbent corporate actors also generally have the resource to produce longer and more detailed submissions to consultations than do other actors.

One way in which the government could produce a more level playing field and a wider range of arguments would therefore be to provide resources to a range of actors, including new entrants, NGOs and expert independents, to commission (or possibly undertake) analysis and evidence gathering as part of the policy development process. This would have the effect of increasing the amount of evidence, in ways that the government might itself not think of, and provide a useful testing of arguments.
1. Introduction

The ability of large powerful incumbent corporations to influence policy, and in particularly to resist technological or institutional changes that threaten their vested interests, is a core part of the literature on sustainable energy transitions. Unruh’s pioneering work on ‘carbon lock-in’, for example, noted the ways in which: ‘constituencies can draw law makers in by lobbying officials for support and preferential treatment of an existing technological system.’ (Unruh 2000: 825).

Within the socio-technical systems literature, which uses the concept of a socio-technical ‘regime’, the influence of energy sector incumbents in seeking to slow or prevent low-carbon energy transitions is framed as ‘regime resistance’ (Geels 2014). Mitchell (2008) also emphasises the power of incumbents to determine the pace and nature of transition change.

The issue of incumbent influence used to slow change is also of particular interest within the context of the IGov project, since it relates to the relationship between the way the energy system is governed and the degree to which it is open to innovation.

The view that UK energy policy in particular is heavily influenced by a small number of large, powerful corporations, especially the ‘Big Six’ utilities, is widely held. This view of energy sector incumbent resistance to change is highly plausible, yet it is much more often asserted in general than tested in specific cases. This paper focuses in detail on one example: the introduction and design of a Capacity Market (CM) for electricity in Great Britain (GB).

The CM effectively pays owners of power stations, providers of demand side response, electrical storage and interconnectors to be available for generation over particular periods of time. It is part of a larger set of changes to the electricity system called Electricity Market Reform (EMR), which were developed and brought in over the period from the late 2000s and legislated for in the 2013 Energy Act. The EMR was driven by a desire by government and major energy companies to see investment in new nuclear power stations, and also a change in the basis for investment in renewables.

1 IGov, or Innovation and Governance for an Affordable, Secure and Sustainable Economy, is a multi-year EPSRC-funded project at the Energy Policy Group, University of Exeter. For more information see: http://projects.exeter.ac.uk/igov/about/about-igov/

2 The ‘Big Six’ are: Centrica/British Gas, EDF, E.On, RWE npower, Scottish and Southern Energy (SSE) and Scottish Power.

3 In this paper we use the term ‘Capacity Market’, with capital letters, to denote the GB Capacity Market in its final form as legislated for in the 2013 Energy Act. The term ‘capacity market’ without capitals is used to denote the idea of a capacity market in general or capacity markets elsewhere. We also use the term ‘capacity mechanism’, especially in sections 8 to 12 below, to denote early proposals used in the development of the final Capacity Market. This is because in the early stages it was not clear that the final choice of intervention would in fact be a capacity market.

4 Northern Ireland is part of the Irish Single Electricity Market, which already has its own separate capacity GB has a CM which is a retrenchment, not a reform, of the electricity market; which is great for the incumbents and their plant; which is bad for the environment, because it will keep old coal going and is very conservative on the demand side; which is unnecessarily expensive; and which is bad for GB innovation mechanism.
Within these changes, a capacity mechanism can be seen as a response to the expectation that electricity generation from nuclear and renewables would expand in future. Such a response could be viewed in two different ways. One is that a future increase in intermittent and inflexible power requires an accompanying increase in flexible resources to balance the system. On this view a capacity mechanism could be an integral part of helping the transition to a low-carbon, flexible future energy system. At the time of the development of the CM, especially in the early phase of 2010-2012, both government and the incumbent energy industry thought about flexibility primarily in terms of a specific technology, i.e. large scale generation by combined-cycle gas turbine (CCGT) power plants, and inducing investment in new CCGTs became the avowed objective of the CM. In reality, by the time the CM was beginning to be implemented in practice, it was becoming clear that flexibility in the future energy system was increasingly going to lie elsewhere, in a range of decentralised technologies which included demand flexibility, storage and small-scale distributed generation.

The other view of what the CM was really about is that a future increase in new nuclear and renewables would threaten the financial viability of existing coal and gas-fired power stations and prevent companies from building new ones. On this view, because it has the effect of reducing revenue risk for owners of existing power stations that use conventional technologies the CM is a defensive move that benefits both incumbent companies and incumbent technologies and will slow a sustainable energy transition.

These two views are not necessarily mutually exclusive; the point is that which one of these visions a real capacity market actually serves will depend very much on its design. The view of critics is that the design of the CM in Britain in practice makes it serve the second vision rather than the first (and within the first a preference for new CCGTs over decentralised solutions). For example, Mitchell (2014) argues that Britain now has a CM

‘which is a retrenchment, not a reform, of the electricity market; which is great for the incumbents and their plant; which is bad for the environment, because it will keep old coal going and is very conservative on the demand side; which is unnecessarily expensive; and which is bad for GB innovation.’
Similar criticism are made by the environmental advocacy group E3G:

‘E3G believes that the current UK Capacity Market proposals…present barriers to the deployment of demand side response, demand reduction, and interconnection solutions to the challenge of securing appropriate resource adequacy in a changing market. The current proposals are suited for incumbents, not innovators. This is a massive missed opportunity that risks spiralling into a politically unsustainable process that undermines investment in low-carbon generation.’ (Littlecott 2014: 3)

The focus of this paper is therefore on the evolution of the design of the CM, and in particular the influence of large energy corporations in that evolution. This focus should not be interpreted as implying that interests, of incumbents or other actors, were the only factor driving decision making, or that there was no attempt at all by officials to develop a rational policy. Rather, what is explored here is what available evidence there is for the view that interests did play a role in the development of the CM, and how they did so at various points along the way.

We argue that the influence of large incumbent energy corporations needs to be seen within a framework which acknowledges that such companies have a degree of structural power in relation to the government, due to their direct control over the delivery of a critical basic service within the economy, i.e. electricity. In other words, keeping the lights on is a political priority for governments, and they are to a large degree dependent on energy companies to do so. However, it does not automatically follow that governments simply do what energy companies want. In practice, structural power has to be deployed, for example through lobbying, and is to a degree recognised and resisted by governments. Its actual effects in any one case is contingent on how the interests of companies themselves are constructed, on institutional arrangements and on the efficacy of the ideas used by companies to pursue their interests (Bell and Hindmoor 2017, Bell 2012). These considerations guide the approach taken here.

The rest of the paper is organised as follows. As a preliminary to the discussion of the politics of the GB Capacity Market in particular, it is useful to introduce the concept of capacity markets in general which emerges from the economic literature on market failures (Section 2). This is particularly important because some of the ideas from that literature, such as ‘missing money’, were widely deployed in the GB case. Section 3 then reviews the debates about the GB case to date, focusing first on the criticisms of the CM that relate to suspicions of corporate influence, and then identifying the key points in the policy process at which decisions were made.
In section 4 we consider the theoretical framing of corporate influence over policy making, and as described above, argue that this framing cannot be a simple pluralist one, in which corporations are seen as just another lobby amongst others, but rather as having a degree of structural power. This section also defines the specific research questions we seek to address here. In section 5 we discuss the methodological approach taken. Given that it involves a single case study of a policy process unfolding over time, a methodology of process-tracing, which seeks to establish a plausible causal explanation for an outcome, through detailed evidence on activities undertaken by specific actors, is appropriate. The key sources of evidence used in the study are of three types: (i) interviews with some of the participants in, and close observers of the evolution of the adoption and design of the Capacity Market; (ii) documentation from the policy process, especially consultation documents and responses, impact assessments and other reports, and (iii) secondary sources offering contemporaneous commentary on and analysis of the decisions taken. The interviews, carried out over the period July 2016 to March 2017, are described in Annex 1.

In section 6 we analyse the interests of both corporate and government actors. The interests of corporate actors are often taken for granted, but as Béland (2010) notes they are in fact socially constructed and, even within the fairly narrow conception of ‘material interest’ that may be particularly relevant for corporate actors, there are specificities that are important. Given the interest of the main actors, in section 7 we turn to the institutional factors that shaped the ability of corporate actors to deploy their resources in pursuing those interests.

Sections 6 and 7 essentially provide the context for understanding corporate influence on the CM policy process. This influence, and in particular the deployment of ideas by corporate actors, and the use of ideas by government actors, is then traced through sections 8 to 12. These different sections correspond to the key decision points in the policy process identified in Section 3. They concern:

- the decision to have a capacity mechanism at all (Section 8);
- the decision to abandon a targeted mechanism in favour of a market-wide mechanism (Section 9);
- the setting of the reliability standard (which determines how much capacity to procure) (Section 10);
- the decisions about the treatment of demand side response in the CM design (Section 11), and
- the decision to procure a standard capacity product, rather than one differentiated by carbon intensity of flexibility (Section 12).
In each of these sections, which make up the substantive part of the paper, we focus first on the mechanics of the decision, i.e. what happened in the formal government decision making process, second on the ideas put forward by corporate actors to try to influence these decisions, third on alternative ideas put forward by other stakeholders, and finally we make an assessment of how far decision makers appear to have actually been influenced by corporate actors.

Section 13 provides overall conclusions about the degree to which and the ways in which corporate actors influenced the CM process, and explores some implications for the wider study of incumbency in energy policy.

Finally, it is important to note that this paper does not present a comprehensive study of the CM. Some aspects, for example, the treatment of interconnection and the design of the auction process, are not covered. Rather, the focus has been on some areas where corporate influence might have been expected to play a major role, and where the protection of the existing system appears to have been a higher priority than the development of a new, more flexible and demand-side focused system.
2. The economic theory of capacity markets

As a background to the analysis of the Capacity Market in Great Britain, it is useful to have a brief discussion of the economic theory behind capacity mechanisms in general, partly because some of the ideas deployed in the policy debate drew on concepts form this theory, such as ‘missing money’.

Electricity markets as they exist now do not function in the standard economic textbook fashion, for a number of reasons (Cramton et al 2013, Joskow 2008). First, consumers do not see and respond to real-time prices, making demand inelastic. At the same time, storage of electricity is costly and difficult, so in situations where generating capacity becomes scarce, supply (i.e. generation) also becomes inelastic. Thus in electricity systems where demand is at or around the level that existing capacity can supply, it might be possible for demand to exceed supply regardless of prices in wholesale markets, the market not be able to clear and demand would then have to be rationed in the form of a rolling blackout.⁵

To avoid the possibility that wholesale electricity market prices might rise without limit in a scarcity situation, regulators set caps on the maximum price.⁶ In theory, to provide as efficient an outcome as possible, this maximum should be set at the average value of lost load (VoLL), i.e. what consumers would be willing to pay to avoid loss of electricity supply (Joskow and Tirole 2007). This price should, in theory again, provide a signal to investors that they should build capacity up to the point where a unit of capacity costs just as much as it earns from being paid the VoLL during what would otherwise be a blackout (Cramton et al 2013: 31). Such an arrangement is known as an ‘energy-only’ market. In practice, there can be a number of problems in energy-only markets, including the difficulty of estimating what the average VoLL actually is. However, the main issues are either that the price cap is in practice frequently set lower than the average VoLL, or that investors believe that if prices spiked very high, the regulator or government would intervene and not allow them to reach the VoLL. In such circumstances, investors may not be able to recover sufficient revenue to cover their long-run costs, leading to what is known as the ‘missing money’ problem (Joskow 2008). In any event, levels of risk for investors in energy-only markets are high.⁷

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⁵ Note that this problem, which is a long-term problem of having adequate capacity to meet demand, is distinct from the need for balancing in the short-term to maintain system stability (IEA 2016). However, system operators do also typically take out-of-market actions, such as procuring short term reserves and frequency control, which add to the capacity problem.

⁶ For example, EU markets are capped at €3,000/MWh

⁷ In the words of a partner in a large energy sector law-firm, “It is difficult for a generator to base a major capital investment on the premise of charging super-high prices in certain periods of supply scarcity – however much justified by the economics. Apart from the operational risks, in the current political climate the reputational risks are significant.” (Jeremy Gewirtz, Partner, Linklaters, quoted in Linklaters (2014: 7)).
The alternative is to take a quantity-based approach, where regulators administratively set an amount of capacity that targets a particular (low) probability of lost load, which again in theory should be calculated by setting the cost of providing that capacity against a VoLL. Some form of capacity mechanism is used to contract for that amount of capacity to be available. There are then a number of options, which include: setting a payment for all providers of capacity administratively; requiring suppliers to secure enough capacity to meet anticipated loads, plus a security margin (capacity obligation); holding periodic auctions for capacity in a capacity market, and a ‘reliability market’ in which generators are paid for an option which requires them to supply at a fixed price whenever the spot price exceeds that fixed price (e.g. Battle and Rodilla 2010).

The issues and options outlined so far constitute the ‘classic’ economic case for a capacity mechanism. However, in recent years, a new dimension has been introduced by the growth of renewable sources of power, i.e. wind and solar, that generate intermittently. With near-zero marginal costs, renewables displace conventional thermal generation, reducing their running hours and revenues (IEA 2016, Cramton et al 2013). Renewables also increase price volatility as there is more uncertainty about their output and therefore need for back-up or demand side flexibility.

The capacity problem related to renewables growth differs in a number of ways from the classic capacity problem. It involves increased uncertainty, arising in part from the difficulty of predicting intermittent generation but also from increased political and regulatory risks, which creates a problem not so much of ‘missing money’ but rather one of ‘missing markets’ (Newbery and Grubb 2015: 66), and is thus more challenging. It also implies the need not so much for capacity in general, but rather for flexible capacity in particular, which can ramp up and down at low cost to offset the variability in renewables output.

Within these conventional analyses of the role of capacity mechanisms in electricity markets, while the issues involved in capacity adequacy are well-understood, there is no clear consensus amongst economists on the best solution. The International Energy Agency (2016: 97) notes the ‘intense academic debate’ between advocates of energy-only markets and capacity markets. Equally, there is no model that dominates in real-world electricity markets, with some jurisdictions having energy-only markets (e.g. ERCOT in Texas, Alberta, the NEM in Australia, and Nordpool in Scandinavia), some having capacity payments (Spain, South America), and

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8 For example, in the UK, the running hours for combined-cycle gas turbine plants fell from almost 6000 hours a year in 2009 to under 2500 hours in 2013 (Linklaters 2014). This was partly in response to shifts in relative prices for coal and gas, but it is also due to the rise of wind power. The effects in France and Germany have been even more pronounced, with a consequent collapse in revenue for those plants.
some using capacity markets (PJM, NYISO and ISO-NE in the US, Brazil, Italy, and Russia) (Spees et al 2013, Battle and Rodilla 2010). The GB market itself has moved from a capacity payment system under the Pool (1989-2001) to an energy-only market under NETA and BETTA (2001-2014) and now to a capacity market. Even within the UK electricity industry, attempts to develop a common position have historically been unsuccessful (Porter 2014: 297).

Within both policy and incumbent industry circles at the end of the 2000s, this kind of thinking about capacity markets, based on the economic theory of decision making about large-scale investments in power plants, dominated the debate. Flexible capacity was seen by default as new CCGT plants, and capacity markets were about the need to (re-)create conditions that would induce investment in these. However, even by the early 2010s it was becoming clear that technology options for flexible capacity in electricity systems around the world were changing rapidly, with the emergence of distributed generation, storage and demand-side options in particular. Since then these changes have accelerated exponentially (Mitchell 2016). Developing these options requires new approaches to policy and regulation, and it is not clear that a capacity market is necessarily the best instrument for this task (Keay-Bright 2013). Certainly, having an energy-only market does not seem to be a barrier in practice to increasing amounts of intermittent renewable energy (Wynn and Schlissel 2017). These developments show the limits to conventional economic theories of capacity markets. Moreover, since they also imply potential changes in scales and types of ownership of assets, and roles for consumers, these developments and accompanying policy choices have explicit political dimensions.

The decision to adopt a Capacity Market in GB cannot therefore simply be ascribed to a well-established theoretical consensus and a convergence in policy practice around the world. Indeed, the government changed its position several times over the course of adopting, designing and implementing the CM, a process that took around five years from beginning to the first auction. The issues are thus sufficiently contested that an interest in the policy process is justified, and a concern that vested interests may have distorted that process is credible.

However, before turning to our analysis of the policy process, we first have to describe what it consisted of, i.e. what the CM in GB actual is, and the formal process by which it was developed.

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For example Germany, with higher levels of intermittent renewables than GB, has rejected the adoption of a capacity mechanism.
3. The Capacity Market in GB: identifying the issues

3.1 How does the GB Capacity Market work?

The capacity market (CM) for electricity in Great Britain was adopted as part of a wider set of policies known as the Electricity Market Reform (EMR),\(^{10}\) which was introduced in an Energy Act\(^ {11}\) in 2013. The EMR involved four new elements: a new form of support for 'low carbon' electricity (renewables but also new nuclear power); a plant-level Emissions Performance Standard for greenhouse gas emissions; a Carbon Price Support for allowances in the EU Emissions Trading Scheme, and a Capacity Market. While the focus of this paper is firmly on the development of the CM it is important to understand that the latter was always seen by the key actors within the context of the wider EMR. For example, the development of the Carbon Price Support gave an advantage to existing nuclear (and to a smaller extent hydro) generators, relative to gas and coal-fired generators, and would have influenced the views of the latter on the design of the CM. Throughout, positions were taken partly in response to these wider EMR elements.

The GB Capacity Market works through a central buyer (nominally the government but administered through an EMR Delivery Body hosted at National Grid) producing future capacity through a set of reverse auctions. It is a market-wide approach, meaning that all capacity (power plants, DSR, storage, interconnectors etc.) can bid into the auction (as long as it has successfully pre-qualified), and that this capacity is not taken out of the ordinary wholesale market but can continue to sell power (or DSR services) as normal. It is thus not a strategic reserve market, where a smaller amount of capacity is taken out of the market. It is also not a fixed capacity payment for all capacity (since not all capacity clears the auctions), or a reliability market design, which works through an obligation on suppliers.

The amount of capacity that the central buyer auctions for is determined by a process with several steps. First, a reliability standard is set (this was done on an enduring basis in 2013), expressed in the loss of load expectancy (LoLE). Second, given assumptions about expected demand in any one year, this is converted into a target capacity for that year (which will exceed the demand by a capacity margin). Third, using a methodology that models investment and retirement decisions, estimates are made of what expected capacity would be available in that year without a capacity auction. The different between this and the target capacity then gives the amount to be auctioned for.


There are a number of different types of auction. The primary auction is held 4 years ahead of the delivery year, so is known as a T-4 auction. Nearer the time, a year ahead, a T-1 auction can also be held, to ‘fine-tune’ the amount of capacity auctioned for. In 2015 and 2016 two smaller ‘transitional arrangements’ (TA) auctions were also held for DSR and some other small scale technologies only, with the avowed aim of developing these so that they could participate better in the main auctions. Successful bidders receive payment for capacity availability, and are paid-as-cleared, not aid-as-bid, meaning that the price received by all bidders is set by the marginal (i.e. most expensive) bidder.

In the main auctions, existing plant, DSR and other technologies such as storage and interconnection receive capacity contracts for one year. New plant can receive contracts for up to 15 years, and plants that are being refurbished with a cost above a particular threshold can receive 3 year contracts. The product procured through the auctions is purely for capacity to be available at any time throughout the delivery period. It is not differentiated, say by flexibility or carbon-intensity.

DSR and storage are treated the same as existing plant. They can bid into the TA auctions in 2015 and 2016, but if they do this they cannot then bid into the primary T-4 or T-1 auctions in the preceding years. Interconnectors were not allowed to bid in the 2014 T-4 auction, but have subsequently allowed to bid in.

The results from the first two main T-4 auctions, the first T-1 auction and the 2015 and 2016 transitional arrangements (TA) auctions are shown in Table 1. These auctions will lead to total capacity payments of the order of £3.4 billion, which will ultimately be paid for from electricity bills. Inenco (2016) estimated that the direct costs of the CM to the average household would be around £14/year by 2020. The government expected the overall long-term cost to be much lower, of the order of £2/year, because wholesale prices are expected to fall as a result of the CM (DECC 2015).

\[12\] Inenco (2016) estimates direct costs at 0.35p/kWh. With average household electricity consumption of 3,940 kWh/year, this equates to £13.79/year.
Table 1: GB Capacity auctions as of June 2017

<table>
<thead>
<tr>
<th>Auction date</th>
<th>Type</th>
<th>Delivery</th>
<th>Capacity contracted</th>
<th>Clearing price</th>
<th>Expected capacity payments</th>
</tr>
</thead>
<tbody>
<tr>
<td>December 2014</td>
<td>T-4</td>
<td>From 2018/19</td>
<td>49.3 GW</td>
<td>£19.40/kW</td>
<td>£956.4m</td>
</tr>
<tr>
<td>December 2015</td>
<td>T-4</td>
<td>From 2019/20</td>
<td>46.354 GW</td>
<td>£18/kW</td>
<td>£834.4m</td>
</tr>
<tr>
<td>January 2016</td>
<td>TA</td>
<td>From 2016/17</td>
<td>803 MW</td>
<td>£27.50/kW</td>
<td>£22.1m</td>
</tr>
<tr>
<td>December 2016</td>
<td>T-4</td>
<td>From 2020/21</td>
<td>52.425 GW</td>
<td>£22.5/kW</td>
<td>£1,179.6m</td>
</tr>
<tr>
<td>February 2017</td>
<td>T-1</td>
<td>From 2017/18</td>
<td>53.6 GW</td>
<td>£6.95/kW</td>
<td>£372.5m</td>
</tr>
<tr>
<td>March 2017</td>
<td>TA</td>
<td>From 2017/18</td>
<td>312 MW</td>
<td>£45.00/kW</td>
<td>£14.0m</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>£3,379m</td>
</tr>
</tbody>
</table>

Source: EMR Delivery Body

3.2 Criticisms of the GB Capacity Market

The capacity market results were hailed by the government as a success. The then Secretary of State for Energy and Climate Change, Ed Davey described the first auction results as ‘fantastic news for bill-payers and businesses’, going on to say that the government was ‘guaranteeing security at the lowest cost’. (DECC 2015a). Launching the December 2015 auction later that year, the then Energy Minister Andrea Leadsom said that: ‘the competition helps drive down costs, while ensuring we have enough generation to power the nation. It also gets the best out of our existing power stations as we increase the amount of electricity we get from low-carbon technologies’ (quoted in Cornwall Energy 2016: 2).

However, the CM has been controversial, and has been criticised by a wide range of observers on a number of grounds:

- The first is that despite the government’s emphasis on cost-effectiveness, *the CM is not good value for money* because it is providing rents to owners of existing amortised plants which have bid in at low prices (Whitehead 2015a, 2016a, Guardian 2015, IPPR 2016). While the first auction cleared at £19.40/kW, the vast majority of bids came in at around £5/kW. This criticism is related to an argument that a broad capacity market (one which Whitehead (2016a) describes as ‘a capacity auction [that] sprays around money to all-
comers’) is costly relative to a more targeted mechanism that could be implemented through strategic reserve by the system operator (Whitehead 2014). IPPR (2016: 18) argues that the CM creates a significant deadweight cost, since much of the existing fleet, including nuclear plants which will receive £153m in capacity payments, would be running in the absence of the CM. They also note that nearly a third of existing plants entering the 2014 auction did not place an exit bid (i.e. the price at which they would drop out of the auction).

- A second criticism is that, because of an indiscriminate approach to securing capacity, the CM undermines the decarbonisation of the power sector. The decision not exclude coal-fired plants from participation auctions was widely criticised, including by environmental groups (Carter 2014, WWF 2013, Sandbag 2014, Littlecott 2014) and some industry participants (e.g. Laidlaw quoted in Godsen 2014) and observers (New Power 77, July 2015, pp 5-6; Gottstein and Skillings 2012), as were the resulting auction results (Cornwall Energy 2015, ECIU 2016, IPPR 2016). In the 2014 auction, 9.2 GW of coal-fired power capacity won contracts, worth £173m, and 4.4 GW won contracts in the 2015 auction, worth £79m. The winning of contracts worth £176m by high-emitting small-scale diesel generators in the second auction was also criticised (Whitehead 2016b, ECIU 2016), with Ofgem responding by removing the embedded benefits earned by all distribution-connected capacity as a way of stamping down on this development.13 IPPR (2016) argues that capacity payments for fossil-fuel plants work at cross purposes to carbon pricing through the EU emissions trading scheme and the UK’s own Carbon Price Support (CPS) policy, effectively penalising and subsidising the same generation units. This ‘provides a lifeline to operators that face penalties elsewhere in the market, and which might otherwise reduce their running hours or go offline completely.’ (ibid: 19). Baroness Worthington, quoted in Macalister (2015), described the CM as ‘a complete shambles’, going on to say ‘We’re spending money on all the wrong things and as a result the right things are not happening.’14

- A third argument is that, despite it being a central aim of the CM, it has to date played little role in bringing forward investment in new combined cycle gas turbine plants (Whitehead 2015a, 2016a, ECIU 2016, Durwall 2015, IPPR 2016, Martin 2017). 2.6GW of new gas plant

14 It should here be noted that despite the fact that coals plants won capacity contracts, the amount of coal-fired power generation has declined sharply since the combination of the CPS and an increase in the coal price. Thus far, capacity payments are payments for staying open rather than for generating (although those could be made once the contract period starts). The point here, however, is as much about the possibility that those coal-fired plants that have won capacity contracts might start generating again if relative gas and coal prices shift, whereas they might otherwise have closed permanently. In addition, some have argued that the effects of CM on coal are seen as more important than they actually are, on the basis that some coal plants (notably Rugeley and Fiddlers Ferry) failed to win contracts – see https://www.carbonbrief.org/old-coal-and-gas-plants-won-largest-share-of-capacity-market-final-results-confirm
was accepted in the 2014 auction, just a little over 5% of total capacity contracted. However, this figure comprised one plant at Carrington that was already near completion which obtained a 1 year contract only, and a proposed plant to be built by Carlton Power in Trafford which did obtain a long-term 15 year contract, but which struggled to secure financing (Whitehead 2016b) leading ultimately to the withdrawal of the capacity contract in July 2016. In the 2015 auction, only 4% was new build. Whitehead (2016a) concludes that ‘auctions have succeeded in procuring precisely no viable 15-year capacity contracts to ensure the building of new gas-fired power stations.’ The poor results on new investment prompted a review of the CM in 2016.

Fourth, many observers were critical of the fact that very little was achieved in the main auctions by demand side response (DSR), which comprised 0.35% of capacity contracted in the 2014 auction, and 1.3% in the 2015 auction (Littlecott 2014; Cornwall Energy 2015; Whitehead 2015a; ECIU 2016, IPPR 2016). Durwall (2015) describes the CM as a ‘damp squib’ for DSR, and the former Chair of the Energy and Climate Change Select Committee, Tim Yeo, argued that DSR ‘has been disadvantaged in the auctions…meaning costs and emissions could be higher than necessary’ (quoted in the Guardian 2015). The energy services firm Tempus has brought a legal challenge against the terms on which DSR was allowed to participate in the first auction.

A fifth area of criticism was that the CM did not specifically differentiate between more and less flexible generation capacity (see Keay-Bright 2013 for a general analysis), and in practice may have ‘reduced flexibility in the generation mix by ensuring old coal stays on at the expense of new gas’ (Cornwall Energy 2015: 4). Gottstein and Skillings (2012: 7) argue that this aspect of design suggests that the CM is unlikely to represent a cost-effective approach as the proportions of variable renewables on the system continue to increase.’

A sixth criticism is that the reliability standard in the CM, which effectively determines the amount of capacity to be auctioned for in any particular period, was set at too stringent a level, implying that too much capacity would in practice be procured (IET 2014, Newbery and Grubb 2015, Baker and Hogan 2014).

15 http://www.reuters.com/article/britain-power-carlton-power-idUSL8N19R3XB
There have also been other criticisms of aspects of the results of the first auctions, including that they have not helped competition in generation, with 74% of capacity payments in 2018 set to go to the Big Six vertically integrated utilities (e.g. Cornwall Energy 2015) and that interconnectors were not made eligible (e.g. Newbery and Grubb 2015).

A number of evaluations of the CM are now appearing, which focus on its design and effects, and make recommendations for its reform (e.g. Newbery and Grubb 2015, IPPR 2016, Cornwall Energy 2016). However, while this paper draws on these analyses, its focus and purpose are somewhat different; it is to provide an explanation of the policy and political processes that resulted in the design of the GB Capacity Market. In particular, we examine the question of whether the outcomes that have been widely criticised are the result of decisions in which the large incumbent energy corporate actors had a significant influence.

3.3 The evolution of the Capacity Market policy process

As a first step, it is important to emphasise that the CM was not the outcome of a single decision, but rather it was a process which evolved over a period of approximately five years, through a series of steps and decision points. Table 2 gives a timeline for the evolution of the Capacity Market, from the late 2000s when the issues behind the policy first began to be discussed, through to the first auction in 2014. The detailed design of the CM has in fact continued to be refined after this date, but the key decisions we are interested in fall within the period covered in Table 2.
### Table 2: GB Capacity Market evolution timeline

<table>
<thead>
<tr>
<th>Date</th>
<th>Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Late 2000s</td>
<td>Growing concern about need to rethink framework for low-carbon generation, but also about knock-on effects on security of supply</td>
</tr>
<tr>
<td>Autumn 2009</td>
<td>Energy Market Assessment starts in DECC, with HMT input</td>
</tr>
<tr>
<td>March 2010</td>
<td>EMA report published at time of 2010 Budget. Suggests no measures needed before 2020 but capacity mechanism may be needed in 2020s</td>
</tr>
<tr>
<td>May 2010</td>
<td>General election; Labour replaced by Coalition government, and Ed Miliband by Chris Huhne</td>
</tr>
<tr>
<td>December 2010</td>
<td>EMR consultation launched; runs until March 2011. Measures to sharpen price signals in current market, proposed, but case also made for further mechanism. Proposes a targeted strategic reserve approach. Impact Assessment published, with negative NPV central values for both targeted and market-wide mechanisms.</td>
</tr>
<tr>
<td>May 2011</td>
<td>Energy and Climate Change Select Committee published inquiry into the EMR.</td>
</tr>
<tr>
<td>July 2011</td>
<td>EMR White Paper published, with specific consultation (Annex C) on models for a Capacity Mechanism. Consultation runs until 4 October 2011. Two models consulted on: Strategic Reserve (a development of the lead option from the EMR) and a Capacity Market. Second Impact Assessment published.</td>
</tr>
<tr>
<td>December 2011</td>
<td>EMR Technical Update document published, along with third Impact Assessment. Decision to adopt a market-wide Capacity Market approach announced.</td>
</tr>
<tr>
<td>February 2012</td>
<td>Chris Huhne resigns, replaced by Ed Davey</td>
</tr>
<tr>
<td>November 2012</td>
<td>Energy Bill introduced to Parliament. EMR Policy Overview document published, along with detailed proposals for CM design, and fourth Impact Assessment</td>
</tr>
<tr>
<td>February 2013</td>
<td>CM Expert Group established</td>
</tr>
<tr>
<td>June 2013</td>
<td>Detailed design proposals for Capacity Market published</td>
</tr>
<tr>
<td>July 2013</td>
<td>Draft EMR delivery plan consultation published, with consultation on reliability standard (Annex C)</td>
</tr>
<tr>
<td>August 2013</td>
<td>CM Collaborative Development process starts</td>
</tr>
<tr>
<td>October 2013</td>
<td>Consultation on implementation plan for EMR. Further IA for CM design options is published</td>
</tr>
<tr>
<td>December 2013</td>
<td>Energy Act passed. EMR Delivery plan published</td>
</tr>
<tr>
<td>June 2014</td>
<td>Response to 2013 EMR implementation consultation is published, along with final decisions on implementation and further CM impact assessment</td>
</tr>
<tr>
<td>July 2014</td>
<td>State Aid clearance received</td>
</tr>
<tr>
<td>September 2014</td>
<td>Consultation on supplementary design and transitional arrangements, including for EDR is published, along with further impact assessment of CM design option</td>
</tr>
<tr>
<td>December 2014</td>
<td>First CM auction</td>
</tr>
</tbody>
</table>

More detail on the process is given in Sections 8 to 12 below. Here we simply identify certain key moments in the evolution of the policy. Identifying these turning points is particularly important for the task of attempting to identify why these decisions were made.
The first of these was the decision to develop any type of capacity intervention for use before 2020 at all (see Section 8 below). While the EMA report suggested that such a mechanism would not be needed, by the end of 2011 DECC had made a commitment to implement a Capacity Market by the mid-2010s. The main shift appeared to happen between the publication of the Energy Market Assessment report in March 2010, in which a capacity intervention was not on the immediate agenda, and the publication of the EMR December 2010 consultation document, which proposed that such an intervention was needed, leading to its further development in the July 2011 White Paper and confirmed as policy in the December 2011 Technical Update.

A second key point was the move from a preference for a targeted strategic reserve (SR) mechanism to a market-wide administrative capacity market (CM) (see Section 9 below). Throughout 2010 and most of 2011 the lead option was the SR, but in the December 2011 Technical Update this was abandoned in favour of a market-wide approach. At this point a reliability market was also rejected in favour of a centrally-coordinated administrative CM.

The Technical Update was thus a crucial turning point in the development of the CM. It also saw some outline proposals on the more detailed design of the CM. These included the decision to include all capacity as eligible and to have a single product, undifferentiated by carbon intensity and flexibility (see Section 12 below). These were not finally decided on formally, however, until the autumn of 2013, following the July 2013 consultation on the detailed design. This was also true of the arrangements for the treatment of demand-side response (DSR) and storage (see section 11 below).

A final key decision was the setting of a reliability standard (see Section 10 below), which effectively determines the amount of capacity to be auctioned for. The standard (a Loss of Load Expectation of 3 hours a year) and its methodology were consulted on in summer 2013 as part of the Draft EMR Delivery Plan, and finally set at the end of 2013.

It is also worth noting that a point of interest, and some bemusement amongst observers, is the approach to cost-benefit analysis for the capacity market. At least seven Impact Assessments were carried out by DECC between 2010 and 2014, for various versions of a capacity mechanism. From 2010 up to mid-2013, the ‘best estimates’ of the net present value of the benefit of a capacity market were negative. Early IAs also suggested that the Strategic Reserve approach would be preferable to a CM on cost grounds. However, from mid-2013 onwards, IAs started showing the best estimate of the NPV benefit of an administrative CM was positive. These shifts, and the assumptions and methodologies behind them, are also discussed below.
4. The Capacity Market policy process and theories of corporate influence

4.1 Two views of the Capacity Market policy process

One view of the development of the CM, and the wider Electricity Market Reform that it was part of, is that it was evidence-based policy making, seeking to respond to a set of problems in electricity markets that were emerging in the late 2000s, as it became clear that a major step-change in investment in renewables was needed, and that this would itself then have effects on system security. This is certainly (and unsurprisingly) how successive governments have presented the EMR and its constituent parts, including the CM, and how industry actors have portrayed it (e.g. Porter 2014: 221). Such an interpretation can also be found in the academic literature, for example in Bolton et al’s (2016) argument that the EMR can be seen as an attempt by policymakers to help induce investment (especially in low carbon technologies) by reducing what was effectively Knightian uncertainty16 facing investors to manageable market risk.

A second view, held by many critical observers of the energy industry, is that the formulation and design of the CM was heavily influenced by lobbying. Van der Burg and Whitley (2016: 35), for example, argue that:

‘A number of EU member states are moving ahead with the design and implementation of domestic CMs, a process that has been driven in part by lobbying from incumbents in the power markets (who primarily own and operate conventional, often fossil fuel-based thermal assets).’

For the GB CM in particular, Mitchell (2014) argues that a ‘primary goal’ is to ‘assuage the incumbents who have been irritated by the pro-nuclear EMR process and who kept threatening to shut down their plants.’ Aldridge (2014) write that:

‘The inclusion of coal generation with the capacity market is the result of a massive lobbying effort by the big utilities that operate these plant….they have pushed extremely hard, and because the design of the market is so complicated their expertise has been drawn on at multiple points by the poor civil servants who have to make this thing work.’

16 ‘Knightian uncertainty’ refers to uncertainty that cannot be parameterised, i.e. uncertainty about events to which quantitative levels of risk cannot be ascribed by actors. It is conventionally contrasted with ‘risk’, which refers to uncertainty which can be parameterised.
Baker and Hogan (2014) focus on the shift in the government’s preferred option from a Strategic Reserve approach to a market-wide Capacity Market, saying that ‘the decision to change course followed extensive lobbying by industry.’ (p 6). Helm (2014: 10) also argues more widely that rules for CM eligibility will inevitably be subject to extensive lobbying. This argument has also been made implicitly by Cornwall Energy (2015) in drawing attention to the fact that the Big Six have captured a large share of the expected revenue from the first auction.

These specific concerns about the role of lobbying in the formation and implementation of the CM are instances of a widely held view that large utilities and networks companies in the energy sector have considerable power and use that power to influence policy more broadly. This view is neatly summed up in a recent editorial in *The Guardian*:

‘*In Britain these utilities have for decades used their financial and political muscle to keep their vested interests and fossil-fuel assets in place*’ (*The Guardian* 2016)

Similar views are expressed by campaigners, such as Guy Shrubshell of Friends of the Earth, who argues that: ‘The dirty fingerprints of the Big Six can be detected all over British energy policy’, and Jonathon Porritt, who states that the Big Six have: ‘incredibly close relationships, not just with the outgoing ministers in DECC (Department for Energy and Climate Change) but with a whole generation of civil servants in DECC who can hardly move without consulting with the Big Six first’ (both quoted in Bawden 2015).

They are also found in the academic literature. In his study of corporate influence on British politics and policy Wilks (2013: 129) argues that “The energy sector provides a revealing case study of the implications of privatisation or corporate power and public policy”, and frames an analysis of energy policy making over the 1990s and 2000s as “centred on the corporate strategies of the big energy corporations in a pattern of shared governance.” Within the socio-technical systems literature, which uses the concept of a socio-technical ‘regime’, the influence of energy sector incumbents in seeking to slow or prevent low-carbon energy transitions is framed as ‘regime resistance’ (Geels 2014). Mitchell (2014) also emphasises the power of incumbents to determine the pace and nature of transition change. Helm’s (2003) history of British energy policy makes frequent allusion to attempts – successful and unsuccessful – by corporate actors to influence policy. In more recent commentary he gives a particularly full account:

‘*Capture is a well-known feature of relations between government and industry, and regulators and regulatees...The government wants something done in the public interest, the private sector wants to make money, and the private sector has considerable informational advantages. Both sides play the game. The easiest way is to*'}
try to influence politicians by making it in their own interests to act in those of the companies. “Revolving doors” see politicians and regulators join company boards. Most energy ministers end up on energy company boards, or as their advisors. Next comes the lobbying—donating to political parties and causes close to the interests of political parties, hosting dinners, being attentive to the constituencies of key politicians, and so on. None of this is new, surprising or generally illegal. Rather its aims are to influence the objectives of politicians (and regulators).’ (Helm 2014: 6)

4.2 Theories of lobbying and corporate influence

In this paper we assess the evidence for this view, i.e. that the CM reflects the outcome of influence by powerful energy sector incumbents.  

To assess this ‘capture’ view, it is necessary to draw on theories of lobbying and corporate influence in public policy. A review of the literature also helps identify approaches to the empirical measurement of influence.

In approaching the question of how to assess whether and how the CM policy process may have been captured by corporate influence, via lobbying or other means, it is useful to first consider incumbent corporations as actors, and second the nature of the relationship that they have with the institution (i.e. the state) that they are trying to influence.

A first step in understanding the potential influence of these companies on policy processes is a recognition that, while they may often appear as single actors, their positions are the outcome of sometimes complex internal processes (March 1962, Wilks 2013). These processes arise out of relationships between different parts of a company, different levels of management, and between management and shareholders. Such processes can differ across companies quite considerably according to internal organisation, often giving rise to different specific corporate cultures or world views. In cases where CEOs exercise a strong degree of discretion, such culture can also become identified with the views of a particular individual.

A second, related, issue is about what corporations are trying to achieve through influence and how they identify their interests. In debates about energy policy, it is often assumed that large incumbent firms are driven by simply defined material interests, especially their assets, as

17 Lowes et al (2016) use a definition of incumbency that involves three characteristics of actors: (i) that they currently exist in a socio-technical system (and are likely to have existed for some time); (ii) that they have vested interests in existing technologies and products (which in the context of sustainable transition are unsustainable), and (iii) that they have the capacity to influence system change, or the rules of the system. This definition is highly applicable to the large generator firms in Britain’s oligopolistic wholesale electricity market. As described in Section 6 below, a relatively small group of 12 companies owned 96% of GB electricity generating capacity in 2012, and 94% of unsustainable fossil-fuel thermal generation. This includes the Big Six group, commonly identified as the relevant incumbents influencing energy policy making, and a group of ‘second tier’ electricity generator companies.
indicated in some of the views cited above. However, despite having considerable resources, large corporations often in practice have difficulty in identifying and defining their interests (Wilks 2013). Blyth (2002) argues that this is especially the case in circumstances of heightened uncertainty or crisis, as indeed it is for all actors.

A third point is that, especially in Anglophone non-corporatist political economies (Hall and Soskice 2001), companies are, in Wilks (2013: 25) words, “often reluctant to join with other businesses and competitors in business associations”, i.e. they sometimes find collective action difficult, not least because on some issues they define their interests in different ways.

Taken together, these considerations qualify the idea of a single broad corporate lobby in an area like energy, with well-defined, stable interests pursued with discipline as a group. This is not to say that this can never be the case, but it is to say that it sometimes is not. In the case of the CM, corporate positions (and arguably material interests) were in fact somewhat diverse, as discussed further below.

Given an understanding of what different corporations are seeking to achieve, the next step in thinking about influence will depend on the nature of the relationship between corporations on the one hand and government, or the state, on the other. Views on that relationship in turn vary according to different theories of power and the policy process (e.g. Dunleavy and O’Leary 1987, Hill 2013).

One starting point for a consideration of the relationship between energy corporations and policy makers is a conventional pluralist approach, where policies may be seen as ‘developed in negotiation between government agencies and pressure groups, organised into policy communities’ (Hill 2013: 27). On the pluralist view, the state holds the ring while different interests compete to promote their agendas. Specifically in relation to the exercise of corporate power, this view claims that while economies in may be run along capitalist lines, ‘democratic principles and processes have limited the power of economic interests’ (Wilks 2013: 16).

A pluralist approach on corporate influence focuses attention on the conscious activities of corporations, either collectively through associations or individually, in what would be thought of as classic forms of lobbying: meetings with officials and politicians, promoting messages through the media and using funding to buy access and political favours. However, the interpretation of relationships between representatives of corporate actors and policy makers needs some care here. Within a pluralist approach, the simple fact that such representatives have meetings with policy makers and try to promote their interests should not be unexpected; this is what all actors in a pluralist system would be expected to do. What is more problematic,
on this view, is a situation where corporations, as particular actors, or groups of actors, have *greater or privileged* access and influence within a pluralist process relative to other types of actors (for example, environmental NGOs, consumer groups), in part because their material wealth enables them to mobilise more resources (e.g. Yackee and Yackee 2006).

However, while the pluralist approach acknowledges that corporations may be powerful actors, it does see them as just actors, and like all other actors, subordinate to the political process and to the elected government. This is a useful reminder that, while policy makers may come under a great deal of pressure from business corporations, they also face political pressures in the form of accountability to voters. In the case of energy, policy makers face not only the demands of the energy industry, often framed in terms of sufficient certainty and incentives to invest and thereby ‘keep the lights on’, but also the demands of consumers (also voters) to keep energy affordable.18

Importantly, the pluralist conception of power is that which is exercised overtly through open conflict in the political arena.19 More structural views of power and the policy process are available in number of variants. Much recent analysis on the structural power of corporations in politics and policy draws on the work of Lindblom (1977). Lindblom argued that “privileged" business interests wield structural power by virtue of their control over key economic resources and the investment…processes on which governments and the wider society depend" (Bell and Hindmoor 2017: 104). In particular, it is rational for governments to yield to corporate demands for supportive state policies, because ‘in a democracy, growth and the perception of economic prosperity is a necessity for staying in office’ (Wilks 2013: 28).

This ‘structural dependency theory’ has been quite widely adopted to analyse the relationship between business corporations and policy making in the UK across a range of contexts and sectors (Hay 1999, Wilks 2013, Bell and Hindmoor 2014).20 Wilks (2013) argues that structural dependency theory is particularly apposite to the energy sector, since not only were key decision-making powers moved into business corporations at privatisation in the late 1980s (see also Kuzemko 2016), but at the same time energy is (like finance) a strategic sector that the rest of the capitalist economy relies on (see also Newell and Paterson 1998).

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18 Senior managers in large energy companies are in practice aware of these competing pressures on government, and highly sensitive to the dangers of being seen as having too privileged a position.

19 i.e. Lukes’ (1974) ‘first face’ of power.

20 Lindblom’s approach is somewhat similar to neo-Gramscian theories of corporate power and the state in international relations (see Meckling 2011 for a review)
However, while the basis of structural dependency theory captures the ideas that corporations are not the same as other actors in a pluralist polity, it is also clear that a fully deterministic interpretation of the theory is not convincing. As Wendt (1987: 362) puts it: ‘Structural analysis explains the possible; historical analysis explains the actual’. In other words, the existence of a structural dependency does not mean that corporate energy lobbies automatically get what they want, without trying. Even accounts that take a structural approach should therefore pay attention to the means by which corporate power is transformed into influence.

Bell and Hindmoor (2017: 104) argue that rather than assuming that structural power is a material reality that arises automatically in capitalist societies, ‘ideas, particularly the ideas held by state leaders, condition and mediate structural power’. They build on Bell (2012), who emphasises the importance of agency of policymaking actors, and how they appraise and respond to structural power threats. This agency can be mediated by institutional and wider political factors. The emphasis on the importance of ideas in the social construction of perceived interests and the creation of new policy institutions is now fairly widespread (see Béland 2010 for a review). It is also argued that the use of ideas becomes particularly important at times of uncertainty about the effectiveness of existing institutions, and can be used as ‘weapons’ to drive change, as well as ‘blueprints’ for the design of new institutions (Blyth 2002).

Overall, the body of recent theory on structural dependency produces a more nuanced view, in which structural power is seen as creating opportunities for influence, but where these opportunities are shaped by the nature of the specific institutional context for contact between corporate actors and policymakers, and where that power needs to be ‘exploited and fine-tuned’ (Offe and Wiesenthal 1980: 86) through the use of instrumental power in forms of lobbying, and, crucially, communication through ideas.21

In the case of electricity, the structural dependency of the state on, or the structural power of corporate actors, is very clear. In the words of a senior official interviewed for this paper:

‘The thing you’ve got to remember about Ministers is, about all of us actually, not just Ministers…Ministers and officials… there is one thing that is going to get you fired, and that is this [lights going out]. So to some extent price is a political problem, but we would all be clearing our desks if…’22

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21 This approach implied a particular set of relationships between structural, instrumental and discursive power, rather than just a parallel coexistence, as, say in Geels (2014).

22 Interview 5. For more information on the interviews see Section 5 below and Annex 1.
That major generation-related (as opposed to network-related) blackouts have political importance in Britain can be seen in the fact that the single such event over the last two decades, involving the disconnection of just over half a million homes and businesses in London, Cheshire, Merseyside and East Anglia in May 2008 for an average of 20 minutes, was widely reported in the media, and led to an in-depth report by National Grid on its causes (National Grid 2008).

The powerful political incentive to maintain a reliable electricity system in a modern economy (IEA 2016, Porter 2014) means that, within a privatised energy system, decision makers will be highly attentive to creating conditions for sufficient investment, and especially the mix of risk and reward for investors. This may suggest that a policy like the CM may be driven by the concerns of policy makers alone, and that there is no need for corporate actors to lobby to bring it about; their commercial interests are served merely by the fact that these are aligned with the political incentives of decision makers. Indeed, it might be argued that it is not possible to distinguish these two potential drivers of a policy like the CM, since they are observationally equivalent.

However, the approach taken here suggests that this is not the case. This is because policy makers have choices about what kinds of investment, by which kinds of actors, they seek to ensure system security through. In principle, the closely coupled relationship between political incentive and investment could create opportunities for all sorts of types of investment, including in new technologies, demand side response etc., and all sorts of investors, including new entrants with new business models. In practice, it often creates an opportunity for large corporate actors with incumbent technologies to shape decisions in such a way that they extract a large part of the benefits that policy creates. This need not happen, but it often does, and does so because large corporate actors make efforts to achieve this outcome. The theoretical approach taken here suggests that they will do this in part by shaping the perception of decision makers of the imperative itself (i.e. the risk that the lights will go out), of the types of technologies that are needed to keep the lights on, and of the conditions needed to induce investment to come forward. This in turn suggests that an active effort of corporates is required, and it should be possible to observe that effort.

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23 E.g. [http://news.bbc.co.uk/1/hi/england/7423169.stm](http://news.bbc.co.uk/1/hi/england/7423169.stm)
4.3 Research focus and questions

The theoretical approach to corporate power and influence outlined provides the basis for identifying a set of research foci and questions. The first, fundamental area relates to understanding how corporate interests are constructed, and how corporate actors are organised with respect to the state. The relevant issues include questions of how corporate actors define and identify their interests, the processes by which these actors take decisions and the degree to which they act individually or collectively.

Given an understanding of corporate interests, a second area of focus is on how opportunities to exercise structural power are institutionally mediated. Here, a number of questions arise. One is about the organisation of the policy making process, what capacity for assessing and challenging structural power state actors, including politicians and officials, have within that process, and how these factors shape the power of corporate influence. Another concerns the way that the triadic relationship between corporate actors, the state and households, both as energy consumers and as voters, is structured, and in particular the extent to which the policy issues and process are in the public eye, and the effect this has.

Thirdly, given interests and institutions, there are a set of questions about the mediation of structural power through ideas in communication with policy makers. These questions can be posed for each of the ‘decision points’ identified in section 3 above. They include identifying the ideas deployed by corporate actors, and other actors in the process, and how these were understood and received by policy makers. We are particularly interested in whether corporate actors drawing attention to structural dependency through these ideas. We are looking for evidence that decision makers in government formed views or changed their minds directly in response to corporate views. Supporting evidence would also be if final policy positions reflect what corporate actors wanted, more than what other actors wanted.

Overall, if the idea that corporate lobbying had a significant role in the formation of the creation and design of the Capacity Market is true, we would expect to find evidence that corporate actors had successfully formed coherent views on their interests, and had then made use of available institutional opportunities for promoting those interests, through the communication of ideas that then influenced decision makers in the design of policy.
5. **Methodology and data sources**

The object of our study here is a single case study of a policy process, with a particular focus on corporate influence. In such a situation, the appropriate methodological approach is that of *process-tracing* (George and Bennett 2005, Beach and Pedersen 2013, Bennett and Checkel 2015). Process-tracing seeks to identify causal mechanisms that produce outcomes, through examining a particular case study in some detail. It therefore differs from probabilistic approaches that seek to establish likely causal relationships through the quantitative analysis of many data points. We also argue that process-tracing is a more appropriate methodology than Arts and Verschuren’s (1999) ‘EAR’ approach, since the latter is designed for complex policy making involving decision makers at multiple levels, whereas the relevant CM decisions we are studying are relatively simple and taken by a single actor, i.e. central government.

There is a commonly made distinction between three different types of process-tracing; that aiming to build new theories; that seeking to test particular theories, and that seeking to identify a minimally sufficient explanation of a particular outcome. Here we are essentially seeking to assess the view that corporate influence played a significant role in decisions about the CM, so the study falls into the second category.

In establishing causal mechanisms, Beach and Pedersen (2013: 46-47), following Machamer (2004) also argue the need to identify specific entities at each stage of a chain, along with activities that these entities undertake. In this case, the entities and activities we are interested in are identified in section 4.3 above, especially in relation to the identification and definition of corporate interests, and in the deployment of ideas by corporate actors to influence decisions by policy makers. Evidence is then used to test expectations about the types of causal chain we would expect to see if a particular hypothesis – in this case that corporate actors influenced decisions via the deployment of ideas – is true or false (ibid: 95). Overall, if the idea that corporate lobbying had a significant role in the formation and design of the Capacity Market is true, we would expect to find evidence that corporate actors had successfully formed coherent views on their interests, and had then made use of available institutional opportunities for promoting those interests, through the communication of ideas that then were adopted by decision makers in the design of policy, more than ideas put forward by other actors.

The causal logic of process tracing is Bayesian in nature, so that evidence increases or decreases the posterior likelihood that the theory being tested is true, relative to the prior belief (e.g. Bennett 2010). Here, many observers have a belief that incumbent lobbying played a major role in the formation of the CM, although the evidence for this prior belief is often weak.
and indirect, so a high probability for it should not be prescribed. Evidence produced in this study that supports the belief may therefore produce a posterior probability that is significantly higher. On the other hand, if we find no evidence of corporate influence, it would mean that the belief would be very unlikely to be true.

However, as discussed in section 4.2 above, a particular problem here is that corporate influence is not the only factor at work in relation to energy system security, and in particular that the political interests of decision makers will often align strongly with the commercial interests of incumbents. In addition, both sets of actors have incentives to deny that corporate influence played a unique causal role. These factors suggest that it may be particularly difficult to find evidence that supports the hypothesis that corporate influence is uniquely responsible for policy decisions. It is more realistic to find evidence that only increases or decreases the certainty of such a link, i.e. which increases or decreases its likelihood (Beach and Pedersen 2013, Mahoney 2012).

This in turn implies that while it will be relatively easy to apply what is sometimes called a ‘hoop test’, it will be harder to apply a ‘smoking gun’ test (Van Evera 1997). A ‘hoop test’ is what a hypothesis must clear if it is to avoid being ruled out. It increases the certainty that a hypothesis – in this case incumbent influence on policy making – cannot be ruled out, but it cannot by itself confirm that incumbent influence was uniquely responsible for policy decisions. Thus, for example, if we found evidence that incumbent firms did not have any contact or communication with decision makers over the relevant period, this would decrease the certainty of the hypothesis that they had influence, and it would fail the hoop test. A ‘smoking gun’ test, conversely, involves evidence that an actor was uniquely placed to bring about an outcome, but if a hypothesis fails such a test it is not then ruled out, as it would be if it failed the hoop test.

In the absence of evidence that would enable a hypothesis to pass a smoking gun test, another approach to judge the unique necessity of a factor in a causal chain is counterfactual analysis (Levy 2008). This approach involves asking whether the outcome, in terms of the design of the CM, would have occurred in the absence, in this case, of incumbent lobbying. Counterfactuals should ideally require as few changes to the real world as possible. In this case, then, the counterfactual would not be what would happen in a world in which incumbents do not lobby in general but rather what would have happened to the CM if incumbents had not lobbied in this particular case.

In the process-tracing approach, some care is also given to the formation of _evidence_, defined as observations or raw data which is then assessed for accuracy and interpreted in context.
Here we use evidence as much as possible from a range of different sources, but two of these are particularly important:

- **Interviews** with individuals who had participated in decision making in the CM process, who had been in corporations communicating with decision makers, and who had been close observers of the process. There is some sensitivity about the topic of corporate influence, with both corporate and government interviewees having an incentive to deny or play down the possibility that it occurred, as noted above. We attempted to address this problem by using interview schedules that did not ask direct questions about lobbying, but it is still a possibility that government and corporate interviewees played down the role it played. Interviewees with independent observers are a useful source of triangulation here, but whereas their evidence may not be biased, it may also be less accurate, as such observers were not always present in discussions between decision makers and corporate actors, nor did they participate directly in the formulation of policy. However, in all cases, it should be borne in mind that the events being studied occurred mainly in the period from the late 2000s to 2014, whereas the interviews were undertaken during 2016-17, so that in many cases a substantial amount of time had lapsed, and the memories of interviewees, especially about timing and sequencing of events, may not always be accurate. This issue means that using other, especially documentary, forms of complementary evidence is important.

- **Consultation documents and submissions.** As described in section 3.1 above, there were a number of points in the evolution of the CM where the government published consultation documents that laid out a view on problems and policy options, and where actors then sent in submissions giving their views. In particular we draw on submissions to the December 2010 EMR consultation and the July 2011 consultation on the Capacity Market, which appeared as Annex C of the EMR White Paper (See Annex 4 and Annex 5 for further detail; in the text these submissions are identified by references using square brackets, e.g. Centrica [2010], EDF [2011], etc.). These are a valuable source of data for tracking the evolution of thinking by policy makers, and the potential effects of the deployment of ideas by corporate and other actors. The importance of consultation submissions were identified by some interviewees.24 We also draw on submissions and oral evidence given to three inquiries on the EMR conducted by the House of Commons Energy and Climate Change Committee (ECCC 2011, 2012a, 2014).

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24 E.g. Interview 8.
In addition to these two main types of evidence, the paper also draws on a range of other sources including: on meetings between corporate and other actors on the one hand, and Ministers on the other;\textsuperscript{25} speeches and statements by participants and observers, especially politicians and corporate CEOs, and media reports.

Finally, it should be noted that there are some particular problems relating to evidence in the study of corporate influence through lobbying. It is relatively easy to obtain data on activities, but much harder to produce detailed evidence on causal links to outcomes. Much of this type of activity happens behind closed doors. Publicly available documents rarely contain sensitive information which may nevertheless be shared between actors, and which may often highlight specific commercial interests and explain the approach of individual actors. In the current study it was, for example, possible to obtain information about meetings between companies, officials and Ministers through Freedom of Information requests and other sources, but not information about the agendas or minutes of those meetings.

6. Corporate interests

Following the approach developed in section 4.3 above, we are interested in three aspects of the potential role of corporate influence: how corporate interests were formed and defined; what institutional opportunities there were for influence, and, insofar as corporate actors deployed ideas promoting their interests, whether they had an influence on policy makers, relative to other actors in the debate.

This section focuses on the first of these issues, i.e. the formation of interests. The following section 7 examines evidence on how corporate influence was mediated institutionally. Then in sections 8-12, we examine whether and how corporate influence was brought to bear through the deployment of specific ideas in different aspects of the development of the Capacity Market.

6.1 Corporate actors

The first question is therefore how incumbent companies identified and defined their interests in relation to the issue of the Capacity Market. Of relevance here are companies with significant assets in electricity generation, and we consider two groups in particular. The first is the ‘Big Six’ group of companies which are vertically integrated in electricity generation and supply.\textsuperscript{26}

\textsuperscript{25}See Annex 2 for further details on meetings with Ministers
\textsuperscript{26}The generation arms of these companies are: Centrica, EDF Energy, E.On, RWE, Scottish and Southern Energy and Scottish Power
Between them these companies had a 65% market share in generation of electricity in 2010 (BNEF 2012). Their generation portfolios were dominated by thermal capacity, split fairly evenly between gas- and coal-fired capacity, but with Centrica and EDF especially also having significant nuclear assets arising from the acquisition of British Energy in 2009 (Figure 1).

The Big Six are particularly central to this study, since they are the most visible and powerful group. However, there is a second group comprising a set of ‘second tier’ electricity companies with thermal generating assets but no significant supply businesses. This includes members of the Independent Generators Group, i.e. International Power, DONG UK, Eggborough Power Ltd, Drax Power Ltd, InterGen, and ConocoPhillips. These companies were also heavily invested in thermal fossil fuel capacity, particularly coal and combined-cycle gas turbines (CCGTs) (Figure 2). In 2010 ESB International was also investing in new gas-fired plants. Between them, these two groups of companies – i.e. the Big Six and the second tier generators – owned 96% of GB electricity generating capacity in 2012, and 94% of fossil-fuel thermal generation.

Figure 1: Big Six generating portfolios, 2012

Source: DUKES 2012
6.2 The context

Over the 2000s, the context for these companies was changing significantly because of what was an increasing drive to decarbonise the power sector. Under EU legislation, support for renewable energy was introduced and subsequently reformed to make it more effective, and carbon pricing was also brought in via the EU ETS, albeit fairly ineffectively. In the late 2000s, the commitments to decarbonise and promote renewable electricity became more serious, with the adoption of the 2008 Climate Change Act and agreement on the 2009 EU Renewables Directive, which led to the adoption of new 2020 targets. At the same time, the governing Labour party had reversed its earlier stance on nuclear due to lobbying and was keen to see new plants built (Mitchell 2008: 105-115). All of these changes led to increasing pressure for a new framework for ‘low carbon’ generation, and specifically on the government to provide that framework.

This context was widely seen as important by observers and participants in the CM process. According to a senior official in DECC at the time:

‘…the Secretary of State and the Perm Sec…felt that we had very clear targets but very unclear plans to deliver against them, and industry, I think coming from a different perspective, were knocking on DECC’s door saying “we think this market needs fundamental change”. And if you look back, there was a speech that Paul Golby gave,'
for example, as chief executive of E.ON, where he said the market needs reforming. I think there were similar statements from Centrica... We published the Low Carbon Transition Plan where this...as part of that process was highlighted as an issue. So we’d done some of the 2050 work, we’d got the...modelling, we saw the scale of investment you need in generation, and we asked the question: “Do we think the current arrangements are going to deliver this generation?” and the answer we got back wasn’t convincing...We had a range of stakeholders coming in, not just the usual suspects, but a range of stakeholders coming in saying “the market needs reforming”. And I remember very clearly...one colleague saying: “Government’s the only one who can do this”.

An industry observer and analyst gives a similar view on this period:

‘In the run-up to the 2010 election...there was a lot of political concern about the energy market not being fit for purpose. So we’d gone through the process of...I think the 2002 White Paper initiated it, with “Well we need to think about climate change”....We’re going to need to build a lot of stuff and shut a lot of stuff. Let’s do that by...you know, the big energy companies will sort that out, so we’ll stand back from them, we won’t really hit them hard on their retail prices, ‘cause they can then invest in all this new kit we want. A combination of things happened; firstly, there was a bit of an increasing political angst over energy prices...and secondly, the financial state of the large energy companies changed quite significantly, so their balance sheets simply couldn’t fund these things. So essentially we got to the point where there was a recognition that there was going to be some central support for investments.’

In 2009, the regulator Ofgem undertook ‘Project Discovery’, looking at gaps in the challenge of meeting ambitious decarbonisation targets. The government was somewhat irritated by what they saw as an over-stepping of Ofgem’s remit, but at the same time, the report stimulated debate on the issues. It was this set of drivers that led to the government undertaking an initial scoping of a new framework in the Electricity Market Assessment (EMA) in 2009-10, and then the development of the Electricity Market Review (EMR) itself from 2010 onwards. The EMR had four main elements: a contract-for-difference feed-in tariff (CfD FiT) support mechanism to drive investment in new ‘low carbon’ generation, including new nuclear; a carbon floor price for the EU ETS; a plant-level Emission Performance Standard to prevent new coal-fired plant being...

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27 In a June 2009 speech, Golby said that energy policy was too ‘event driven’ and lacking strategic vision: ‘There is a need to take our energy policy from what I describe as a series of sticking plasters, to a more holistic view with a roadmap of how to get to 2020’ (quoted in Teather 2009).
28 Interview 5
29 Interview 7
built, and a capacity mechanism. However, some industry participants and observers emphasise the particular importance of new nuclear, suggesting that discussions on how to incentivise new nuclear were an important part of what led to the EMR in the first place: According to one industry participant,\(^{30}\) new nuclear was a key part of the context for EMR, as it could not be supported by the Renewables Obligation, and specific subsidy would be ruled out under State Aid rules. This mean that both government and industry had an interest in a support mechanism that could be framed as being for ‘low carbon’ generation. This is corroborated by an independent industry observer: ‘There was an absolute lobby-fest before the 2010 election. This had been going on for a long time.’\(^{31}\) According to this source, there were discussions in a group set up by the Big Six and National Grid, the UK Business Council for Sustainable Energy\(^{32}\) on how to incentivise new nuclear and CCS, which was also a crucial part of the setting up of the EMR: ‘Ed Miliband and DECC bought the idea that energy companies would only invest in gas if not incentivised to build something else. This is what led to the long discussion on CfDs.’

Indeed, by the end of the 2000s, all the Big Six companies were involved in one of the competing nuclear new build consortia.\(^{33}\) In this context, the main initial preoccupation of the major incumbents, at least the Big Six, was not the capacity mechanism, but rather new nuclear build (and to some extent the new CfD FiT framework for renewables support). According to a senior figure on the government side, immediately after the 2010 election, ‘all the Big Six were interested in talking about was new nuclear…then they all dropped out except for EDF.’\(^{34}\) For another interviewee close to the incumbents:

‘Nuclear was what was driving it, but the way it was dressed up was it was for a whole range of low-carbon generation. It was …obvious it was for nuclear, that was what the whole debate was about…’\(^{35}\)

\(^{30}\) Interview 4  
\(^{31}\) Interview 1  
\(^{32}\) The Business Council for Sustainable Energy was an association set up by National Grid and the Big Six – see below section 7  
\(^{33}\) Interview 4. The consortia consisted of: E.ON and RWE seeking to build two plants at Wylfa on Anglesey and Oldbury near Bristol; EDF and Centrica also seeking to build two plants at Hinkley Point in Somerset and Sizewell in Suffolk, and SSE and Iberdrola (owner of Scottish Power) together with GDF Suez seeking to build one plant in Cumbria.  
\(^{34}\) Interview 2  
\(^{35}\) Interview 9
6.3 The construction of corporate interests in relation to a capacity mechanism

It thus took corporate actors some time to focus on the capacity mechanism aspect of the EMR. However, once they did so, one might expect that companies that had the bulk of their sunk investments in existing thermal (i.e. coal-fired, oil-fired, gas-fired and nuclear) generation capacity would have an interest in a policy intervention that would effectively reward companies precisely for holding such assets. However, on closer examination, not all assets are the same from the point of view of a capacity mechanism, with a key difference between existing coal, nuclear and gas plants on the one hand, and new gas-fired plants on the other.

At the end of the 2000s, with capital costs long amortised and the relative prices for coal and gas as generation fuels favouring coal, coal-fired plants were being run as baseload, and coal capacity was profitable in the short run. However, against the wider background of a commitment to the decarbonisation of the economy under the 2008 Climate Change Act, a number of factors were working against the long term viability of coal-fired plants. Many of these plants in Britain were constructed in the 1960s and 1970s. Their age alone meant that they required regular expenditure on maintenance to ensure that safety standards were met. In the mid-2000s, companies had had to make decisions about whether or not to invest in flue gas desulphurisation in order to comply with the EU’s 2001 Large Combustion Plant Directive aimed at mitigating acid rain. Opted-in plant could continue to generate without limit, but opted out plant were allowed only 20,000 running hours in the period 2008-2015 and had to close by the end of 2015. However, further uncertainty for opted-in plant was created by the Industrial Emissions Directive, introduced in 2010 and aimed at mitigating nitrous oxide pollution. The IED would require further investments which companies were still considering at the start of the 2010s. In addition, while the carbon price under the EU emissions trading scheme was too low to have an impact, the government signalled that a floor price would be introduced under the Carbon Price Support mechanism within the EMR, which could have a significant impact on the economics of coal-fired power generation. Uncertainty was such that companies were finding it hard to make decision about how to respond to the IED. According to one industry participant:

‘I think there was so much uncertainty around future IED requirements at that time, but we had put them [the company’s coal-fired power plants] all in the TNP at that time. But…that [investment] was going to be dependent on whether or not they could earn any money in a future market…that was going to be dominated by renewables and

36 Interview 5
37 The Transitional National Plan for the Industrial Emissions Directive. Under the IED, companies wishing to enter a process of investment of fitting emissions controls to plants were required to enter those plants in the Member State’s TNP.
gas...there is always uncertainty, but I think that was the start of, OK, well these plant are not going to be baseload.  

Any form of intervention that would add a certain revenue stream to the use of coal would improve their prospects, so companies with coal in their portfolio (which meant all the Big Six except Centrica, and three of the second-tier generators) might particularly be expected to see such an intervention in their interests.

Similar considerations applied to existing nuclear plants. The long-run phase out of these plants was fairly certain; they were run as baseload but with increasing amounts of down time for maintenance and break downs as they aged. As the owners of the British Energy holding company that owned Britain’s nuclear plants, this would be expected to give Centrica and especially EDF Energy an interest in some form of capacity intervention would provide an additional source of revenue.

However, the position with gas-fired capacity was rather different, since while no companies were contemplating building new coal-fired or nuclear plants (without CfD support), this was not the case with combined-cycle gas turbine (CCGT) plants. In 2010 several companies had either recently completed CCGTs or were in the process of building them. A new CCGT plant would be expected to be run at baseload so as to recover investment costs as quickly as possible. Older gas-fired plant would be run more as shoulder or peaking plant. Revenue for the latter type of plant would be more dependent on peak pricing and so more exposed to uncertainty in a classic energy-only market and even more so with increasing amounts of wind and solar PV. Thus we might expect companies whose gas-fired plant had an older age profile to have more of an interest in some form of capacity intervention.

Conversely those who had recently built new CCGT, or were in the process of building such plants, might be expected to be less keen. This point was noted by SSE in their submission to the 2010 EMR White Paper consultation. SSE argued in favour of a capacity intervention, but go on to say that:

“It should be noted that this is a view not shared by all in the industry, with some arguing that a capacity mechanism is not needed. This argument has been put forward by those who are currently in the process of developing and/or consenting new capacity – this, it is argued, illustrates that there are sufficient incentives for new entrants and that the market can deliver an adequate capacity margin going forward. However it is also these
generators that stand to lose the most from the introduction of a capacity mechanism which brings additional capacity into the market.” (SSE [2010: 3]).

Essentially the same point was also made by a close industry observer: ‘EON had new CCGTs, didn’t want a capacity mechanism…RWE had recent CCGT at that time, whereas the Scottish generators had old coal.’

Table 3 shows the positions that the large generating companies took on whether some form of capacity mechanism was needed in their responses to the 2010 EMR consultation document. It also shows whether they had recently invested in CCGT plants.

**Table 3: Big Six and IGG views in 2010 on need for a capacity intervention, and recent or current CCGT build**

<table>
<thead>
<tr>
<th>Category</th>
<th>Company</th>
<th>In favour of capacity intervention?</th>
<th>Recent CCGT?</th>
<th>Capacity</th>
<th>Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Big Six</td>
<td>Centrica</td>
<td>Yes</td>
<td>Langage</td>
<td>905 MW</td>
<td>2010</td>
</tr>
<tr>
<td></td>
<td>E.ON</td>
<td>No</td>
<td>Grain</td>
<td>1400 MW</td>
<td>2012</td>
</tr>
<tr>
<td></td>
<td>EDF</td>
<td>Yes</td>
<td>West Burton</td>
<td>1300 MW</td>
<td>2012</td>
</tr>
<tr>
<td></td>
<td>RWE</td>
<td>No</td>
<td>Staythorpe Pembroke</td>
<td>1700 MW</td>
<td>2010</td>
</tr>
<tr>
<td></td>
<td>SSE</td>
<td>Yes</td>
<td>Marchwood (JV with ESB)</td>
<td>840 MW</td>
<td>2010</td>
</tr>
<tr>
<td></td>
<td>Scottish Power</td>
<td>Yes</td>
<td>No</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Second tier</td>
<td>ESB International</td>
<td>No</td>
<td>Carrington Marchwood (JV with SSE)</td>
<td>884MW</td>
<td>2016</td>
</tr>
<tr>
<td></td>
<td>International Power</td>
<td>Yes</td>
<td>No</td>
<td>840MW</td>
<td>2010</td>
</tr>
<tr>
<td></td>
<td>DONG UK</td>
<td>No</td>
<td>Severn</td>
<td>824MW</td>
<td>2010</td>
</tr>
<tr>
<td></td>
<td>Drax Power Ltd</td>
<td>Yes</td>
<td>No</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>InterGen</td>
<td>Yes</td>
<td>No</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>ConocoPhillips</td>
<td>Yes</td>
<td>No</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Sources: DUKES 2012, BNEF (2010) and 2010 EMR consultation responses
* Based on responses to the December 2010 EMR Consultation Question 19: Do you agree with our assessment of the pros and cons of introducing a capacity mechanism?

The pattern in Table 3 shows some support for this view on the link between interests in the form of specific assets and corporate position on the proposal for some form of a capacity intervention. Those companies most heavily and most recently invested in CCGT plant (E.ON and RWE) were also those most sceptical about a resource adequacy problem and in favour of continuing with the existing energy-only market, even though they also both had considerable...
old coal and oil-fired assets. On the other hand, although EDF was still building a CCGT at West Burton at this point, its very large coal and nuclear assets seem to have predominated in its support for a capacity intervention. Most clearly, however, the two ‘Scottish’ companies, with the least invested in recent or new CCGT, were in favour of a capacity intervention, and according to one close observer, ‘led the charge’\textsuperscript{41}. Another interviewee said that ‘SSE were particularly…vocal’.\textsuperscript{42} The same pattern can be observed amongst the second-tier power producers, with only those two companies with ongoing CCGT projects (i.e. ESB International and DONG) being opposed to a capacity mechanism in principle.

These factors arguably also affected corporate stances on the issue of what form the capacity mechanism should take. As discussed in more detail in Section 9 below, the key initial design choice was between a targeted capacity mechanism, in which a relatively small amount of capacity would be contracted into a Strategic Reserve (SR) that would be held outside of the wholesale market, and a market-wide mechanism in which all capacity would be eligible for payments. Here, the interests of companies with existing rather than new generation assets, which tended to be the ones that most supported a capacity mechanism at all, could be expected to lie with a market-wide approach:

‘...if you’re a business…running existing assets, a targeted mechanism is a double whammy, in that it introduces new capacity that suppresses [the] wholesale price,…and you don’t get anything back, you don’t get the additional [capacity payment]…so you basically take a hit… In a market-wide mechanism there’s some sort of expectation of quid pro quo, in that there’s some suppression of wholesale price and you get something back through a capacity mechanism. So it was…absolutely a commercial no-brainer.’\textsuperscript{43}

In fact, many of the companies with existing assets that were the most enthusiastic about a capacity intervention (i.e. EDF, Scottish Power, SSE, International Power, InterGen International Power and Eggborough) expressed a preference for a flat capacity payment available to all generators. However, those with newer assets or current projects, including E.ON, RWE and DONG, preferred no intervention, but if there had to be a mechanism, preferred a targeted one.

The interests of the incumbents with respect to the involvement of demand side response (DSR) and distributed storage in the CM, covered in section 11 below, would have fairly well-defined. DSR would be a direct competitor for generation and so one could expect all incumbents to be opposed to a major role for DSR. The Big Six were integrated into supply, which means that

\textsuperscript{41} Interview 1
\textsuperscript{42} Interview 8
\textsuperscript{43} Interview 7
they would also lose supply margin revenue from DSR at peak periods from half-hourly metered customers. In theory, because they had relationships with electricity consumers, these companies might have seen the development of DSR services through the CM as a new opportunity, but with a long history of operating within a supply-side paradigm, this seems unlikely, especially in the early 2010s.

A further influence on the way that companies constructed their interests, especially with respect to their overall stance towards capacity mechanisms, may have been their internal decision-making processes and corporate ‘cultures’. One observer of the process, from within an incumbent, argued that the different Big Six generators had distinct, identifiable world views, often led strongly by their respective CEOs:

‘RWE was very keen on markets, since the early days of privatisation, making markets work, with leadership from [the CEO] and the senior management team. E.ON was similar but a bit behind RWE. EDF has a view of the UK as a place where they can put nuclear; everything they do follows from this. Scottish Power and SSE take tactical views dominated by Scottish politics, Scottish generation etc. Centrica is driven by their gas roots…’

Another observer speculated that because the company that became RWE in the UK was originally been created out of the bulk of the CEGB at privatisation (i.e. National Power), its particularly strong commitment to the ‘integrity of the market’ might be due to its staff having the zeal of converts.

An industry participant in another Big Six company also emphasised the involvement and importance of the chief executive:

‘Anytime there was something you couldn’t resolve at working level, of course we would take it up, we had the structure in place where, we had…well, it was managing director level, but the CEO at the time, was quite involved.’

A commitment to the idea of energy-only markets at very senior corporate level may thus be another factor in the position of E.ON and RWE, opposing a capacity intervention, distinguishing them from the rest of the Big Six.

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44 Interview 3
45 Interview 9
46 Interview 6
There are thus good reasons for thinking that the material interests of the main incumbent corporate actors in electricity generation were not simply determined or identical, but rather that differences in the make-up of assets, perhaps especially in relation to recent or new CCGT, and the world views of corporate leaders were important in shaping these interests. A majority of these actors did have an interest in the introduction of a capacity mechanism, and one which was market-wide, but a significant minority did not. In addition, there is some evidence that ideas about markets held by senior managers in these companies were a factor in the way that perceived interests were constructed.

A final issue in the construction of corporate interests is the position of the transmission and system operator in electricity, National Grid (NG). Because National Grid’s System Operator ultimately became a delivery agent for the Capacity Market, including advising the Secretary of State on the setting of the reliability standard and on the amount of capacity to be procured, its interests and potential conflicts with these roles were openly discussed by government and others, such as the House of Commons Energy and Climate Change Committee (ECCC 2012a: 52-53). The main concern was that the greater the amount of capacity on the transmission network the more NG would benefit (through connection and transmission network charges), and that since the profits arising from NG’s transmission network operating business were of the order of 100 times those from the SO business (see Strbac et al 2014) the company would have a strong incentive to game the calculation of amount to be auctioned, as well as making it more difficult for DSR to participate. More generally this would also imply that NG could be expected to be in favour of a capacity mechanism in general. At the same time, even without the possibility of an incentive arising from the transmission business, it is also likely that NG as the System Operator would have an incentive to avoid a situation where blackouts from inadequate resources were a significant possibility, similar to that facing government but arising more from reputational rather than political and electoral effects:

‘I think there is reputational risk, I think all the incentives are on National Grid to be conservative’

Against these factors shaping NG interests, it was also the case that the idea of a capacity intervention was ultimately a rejection of the existing arrangement of a wholesale energy-only market together with NG managing the system through the Balancing Mechanism and the procurement of ancillary services, including short-term operating reserve as inadequate. Insofar

48 Interview 8
as this was a factor, one might expect NG, and especially the SO business, to be resistant to, or at least cautious about, a capacity mechanism. Finally, NG Group also had a merchant interconnector business, which would have had an interest in seeing interconnectors (or the use of interconnectors) included in the mechanism.

7. Institutional mediation of influence

Given the interests of corporate actors with respect to a capacity mechanism, the possibilities for influencing policy in favour of those interests was mediated by institutional factors shaping opportunities for influence. As Bell and Hindmoor (2017: 113) observe in relation to the influence of banks on financial policy:

‘If power is ideationally mediated then the marketplace of ideas is also institutionally mediated. Certain institutional venues privilege certain interests and with those interests, certain ideas.’

A first relevant aspect of such institutional mediation is that the development of the capacity mechanism fell within the development of the wider EMR, and that development was located within a government department (i.e. DECC), rather than under the regulator (i.e. Ofgem). This contrasts, for example with the development of post-crisis financial policy, which was led by the arms-length institution of the Bank of England’s Financial Policy Committee (Bell and Hindmoor 2017). The decision to take this route was in part influenced by Ofgem taking the lead in the debate on the need for a new policy framework in 2009 with Project Discovery, in turn seen by the Secretary of State at the time, Ed Miliband, as overreach in remit, straying on to the turf of government. The location of the EMR process in government can therefore be seen as a reassertion of the latter’s role. However, this decision also arguably exposed the process to greater influence from political pressures, although it is far from clear that Ofgem would have been more insulated in practice.

A second consideration is the role of public interest in energy, and the degree to which the development of the EMR and CM process was subject to close public scrutiny. Here, there was a rather complex mix of factors. On the one hand, the salience of energy prices grew strongly during the 2000s, as underlying costs rose (Lockwood 2013), and with this public hostility towards and distrust of energy companies also strengthened. On the other hand, most of the details of energy policy remained largely obscure and invisible to the public. Where media attention was turned on these details, it tended to focus mostly on the immediate costs of
support for renewable energy on energy bills, rather than the capacity mechanism (Lockwood 2016). It also appears that the main focus within the EMR, at least initially, was on the CfD and support for new nuclear power stations, and that this is what received a lot of Ministerial attention. This low level of political salience for the CM would be expected to work in favour of potential corporate influence. It also suggests that officials played a particularly important role in its development and shaping.

At the same time, the relationship between the large incumbents (especially the Big Six and the network company National Grid) and government had strengthened and become closer over the course of the 2000s. In a sense this reflected the increase in government interventions in energy markets over that period.

‘…This is purely from recollection, so could be wrong, is that as the market got more shaped by government, one of the interesting things was the growth in all the companies in public affairs staff…because it was more important to lobby and track your corner…’

Certainly, senior figures in the large incumbents met regularly with senior decision makers, including ministers. In the period between the May 2010 election and the end of 2011, by which time the key high-level decisions about the design of the CM had been made, Big Six companies and the UK Business Council for Sustainable Energy on which they sat had a total of 19 formal meetings with the Secretary of State and the Energy Minister at DECC (Table 4).

In terms of simple frequency of meetings, data on ministerial meetings suggests that incumbent corporate actors were not given a particularly privileged position. Only 7% of the formal meetings held by the Energy Minister and 11% of those held by the DECC Secretary of State were with the Big Six, the second tier generators or their associations (Table 5). However, this data is also very limited, as it tells us nothing about the weight given by politicians and officials to the meetings with incumbents relative to those with other actors.

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49 This is the central argument of Culpepper’s (2011) study of the politics of corporate takeovers
50 Interview 9
51 Annex 2 gives a list of meetings held by the Secretary of State at DECC and by the Minister for Energy, between May 2010, following the general election, and March 2012, covering the period over which the key decisions were taken on Capacity Market design.
Table 4: Meetings with DECC ministers and corporate actors (Big Six, National Grid, IGG, and BCSE), May 2010-December 2011

<table>
<thead>
<tr>
<th>Chris Huhne Secretary of State</th>
<th>Charles Hendry Energy Minister</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCSE and other Big 6 (Summer 2010)</td>
<td>BCSE (autumn 2010)</td>
</tr>
<tr>
<td>IGG (Nov 2010)</td>
<td>Scottish Power (autumn 2010)</td>
</tr>
<tr>
<td>RWE (Sep 2010)</td>
<td>Conoco Phillips (Oct 2010)</td>
</tr>
<tr>
<td>Centrica (Jan 2011)</td>
<td>Centrica (Feb 2011)</td>
</tr>
<tr>
<td>RWE (Mar 2011)</td>
<td>SSE (May 2011)</td>
</tr>
<tr>
<td>Centrica (Apr 2011)</td>
<td>Centrica (June 2011)</td>
</tr>
<tr>
<td>EDF (Apr 2011)</td>
<td>RWE (Aug 2011)</td>
</tr>
<tr>
<td>SSE (May 2011)</td>
<td>E.ON (Sep 2011)</td>
</tr>
<tr>
<td>IGG (May 2011)</td>
<td>EDF (Oct 2011)</td>
</tr>
<tr>
<td>Centrica (Oct 2011)</td>
<td>NG (Dec 2011)</td>
</tr>
<tr>
<td>Scottish Power (Oct 2011)</td>
<td></td>
</tr>
<tr>
<td>IGG (Nov 2011)</td>
<td></td>
</tr>
<tr>
<td>E.ON (Dec 2011)</td>
<td></td>
</tr>
</tbody>
</table>

Source: See Annex 2

Table 5: Meetings with DECC politicians, May 2010 to December 2011

<table>
<thead>
<tr>
<th>Meetings with Secretary of State</th>
<th>Meetings with Energy Minister</th>
</tr>
</thead>
<tbody>
<tr>
<td>Big Six companies and associations</td>
<td>11</td>
</tr>
<tr>
<td>Second tier generator companies and associations</td>
<td>3</td>
</tr>
<tr>
<td>Other energy companies</td>
<td>33</td>
</tr>
<tr>
<td>Others (NGOs, academics, unions etc.)</td>
<td>83</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>130</strong></td>
</tr>
</tbody>
</table>

Source: Annex 2

As important for the relationship with government were the more informal contacts arranged through the UK Business Council for Sustainable Energy (BCSE). The BCSE was originally founded in 2001 (launched in January 2002), with an official role of coordinating energy industry input to World Summit on Sustainable Development.⁵² The Council also coordinated inputs to

White Papers and the UK’s Climate Change Programme developed at this time. Its members were the Big Six plus National Grid and United Utilities. Second-tier generator International Power was a strategic partner, and both it and Drax were also financial supporters of BCSE. According to a close industry observer, the driver behind the Council’s formation was a desire by the incumbents to shape policy as it became clear that climate change would receive increasing attention from decision-makers:

‘The BCSE [was] formed because there was a lack of long predictable view in energy policy, a realisation that the climate change agenda was for real. Ian Marchant [CEO of SSE] and Steve Holliday [CEO of National Grid] and others were saying we need to be clear about what sort of incentive we want…’

Although it was not originally intended to play this role, by default the BCSE evolved into a forum for chief executives from the Big Six and National Grid to meet both amongst themselves and with senior figures in government. According to a close observer, in one early event, a Minister observed that it had been years since he had seen all of the Big Six chief executives together in a meeting. By the mid-2000s, it was arguably the important industry forum for discussion of policy, especially on support for renewables, CCS and nuclear. A number of informed interviewees from both industry and government identified it as having a key role in contacts between the Big Six and DECC:

‘BCSE did a lot of the orchestration’

‘DECC used this industry forum [i.e. BCSE] as an interface on EMR. [The DECC official leading on EMR] came in to talk with us early on. There were a series of working groups on EMR, and they brought in other players.’

‘There was a fragmented scene. BCSE was most influential at official level. This was down to [the Chief Executive of BCSE]…it helps to have a senior person who has been inside government to interact with government and can see the trade-offs.’
The BCSE facilitated more informal contact between corporate actors and decision-makers at the most senior level, according to an interviewee who had previously worked at a senior level within a Big Six company:

‘the UK Business Council for Sustainable Energy…operated what it called the “CEO’s Forum”, and the CEO’s Forum…was something which the UK BCSE used to facilitate to have meetings, dinners, with, you know, big bananas, like the regulator, or the Secretary of State…and it would be just the six companies, it wasn’t always the CEOs…but basically substitutes were frowned upon. They were enormously entertaining events…And so the Big Six had that direct access.’

It appears that these events were an important forum for senior politicians to gauge the mood of the most senior figures from the largest companies in the energy industry:

‘If you imagine you were Secretary of State and you sat round there with the six chief executives, it’s a dinner table conversation…so the take that the Secretary of State would get would be of an emerging consensus. Sometimes there would be…clearly disagreement, but it was a sense of the industry moving together…’

The relationship worked both ways; according to a close observer of the process, skilful Secretaries of State would use the BCSE events ‘to get the companies into positions they [i.e. the politicians] wanted them to be in.’

The contacts between CEOs and Ministers took place roughly quarterly. The chief executives would caucus before the meeting to discuss agendas, drawing on briefings from the BCSE secretariat. In addition the Council facilitated regular lower-level meetings between Big Six analysts and government affairs directors on the one hand and DECC officials on the other. In 2010 there were two meetings in May, following the election, and one in September. The BCSE also provided an important coordinating arena for companies to discuss and collate their positions on the EMR. There was a BCSE Working Group on EMR, and an EMR strategy day was held for senior staff in the autumn of 2010.
However, the BCSE was closed down in early 2012 at the instigation of the Big Six themselves, and Energy UK\(^61\) was developed as new body for industry representation. Unlike the BCSE, Energy UK includes many smaller companies, especially suppliers, but it is effectively dominated by the larger players, for example in the composition of the Board.

The second tier electricity generators also had their own association, the Independent Generators Group. Like the UK BCSE, the IGG’s members had different positions on resource adequacy and the desirability of capacity intervention, according to a senior political adviser:

‘The IGG…a strange group with differing interests. I invited them in because we wanted a non-Big Six meeting. Part of the point of EMR was new players.’ \(^62\)

A close working relationship between government and the large incumbents also existed at less senior levels. In the latter stages of the process of developing the CM, DECC set up two mechanisms which brought the latter into close advisory roles. The first of these were a set of ‘Expert Groups’ for aspects of the EMR, including one for the CM, which was coordinated by PwC on behalf of DECC.\(^63\) The large incumbent generators dominated, with seven out of the thirteen members of the Group being from Centrica, RWE, Scottish Power, SSE, Drax, ESB International and Conoco Phillips. The rest of the Group was made up of a consumer representative, a representative from a DSR firm, representatives from National Grid and Ofgem, a US academic economist specialising in capacity markets (Steven Stoft) and a DECC Chair. The CM Expert Group met between February 2013 and April 2013. The role of the Group was to provide expert input and feedback, and it covered a large amount of ground in the detailed design of the CM, including: the determination of capacity and the process for derating; terms of participation in the auction; the setting pf price makers and price takers; enforcement and the penalty regime for non-delivery; the auction design and parameters; the treatment of interconnection; the reliability standard; prequalification; trading and hedging in the secondary market, and the treatment of DSR.

In April 2013, DECC then proposed to create a ‘Collaborative Development’ (CD) process,\(^64\) described as ‘a phase of EMR in which industry works closely with DECC and delivery partners on developing the detailed design of EMR systems and processes for implementation’.\(^65\) CD

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\(^61\) http://www.energy-uk.org.uk/
\(^62\) Interview 2
\(^63\) https://www.gov.uk/government/groups/capacity-market-emr-expert-group
\(^64\) https://www.gov.uk/government/groups/electricity-market-reform-emr-collaborative-development
would ‘ensure deliverability of the designs by asking industry to work with DECC and delivery partners in developing the designs towards implementation’ (Veitch 2013: 2). This process was again facilitated by PwC. The CD process was overseen by an Implementation Steering Group.\textsuperscript{66} In addition to members from DECC and Ofgem, this Group had 16 industry members, of which nine came from Big Six and second-tier generators. Other members included representatives of DSR firms and industrial energy users (although according to one observer close to the DSR industry, some of these representatives felt in retrospective that they ‘were only there to tick boxes’).\textsuperscript{67} The CD involved a set of working groups, including one dedicated to the CM, which held a series of intensive workshops between mid-August 2013 and the end of September 2013 and then follow up meetings in December 2013 and January 2013. These covered the qualification and auction process, the capacity agreement, the governance process, financial aspects, including credit requirements, and DSR.

A third consideration concerns the institutional capacity in DECC to run the large complex project that the EMR became. The complexity just of the CM alone should not be underestimated; the 2016 version of the consolidated Capacity Market rules runs to 244 pages.\textsuperscript{68} While this reflects much of the detail that came late on in the policy process, it is nevertheless the case that effective policy making for the CM required an in-depth knowledge of GB electricity markets and participants throughout. It is often argued that much energy expertise in government was lost following privatisation (Kuzemko 2016, Rutledge 2010), and there is some evidence that this further declined at the end of the 2000s. According to a senior political adviser, amongst the ministerial team, while the Energy Minister (Charles Hendry) know the area well, the Secretary of State (Chris Huhne) and his special advisers did not.\textsuperscript{69} Over much of the period of the development of the EMR, there was no permanent Chief Economist at DECC. One close industry observer took the view that the head of the EMA team in 2009-2010 ‘knew nothing about the energy company agendas’ and ‘the average age of people in DECC was 31; in the old days there were Grade 5’s with huge experience and expertise, who used to understand the market and the lobbies’.\textsuperscript{70} It was also argued that because energy is not a big ministry and has low status (compared with Treasury, welfare, home office etc.), government never built the capacity at the top levels.\textsuperscript{71}


\textsuperscript{67} Interview 11


\textsuperscript{69} Interview 2

\textsuperscript{70} Interview 1

\textsuperscript{71} Interview 3
Others took the view that the fundamental problem with government capacity was not so much expertise and knowledge, but rather a rapid turnover in staff. For a close observer of the Department:

‘What is always a problem is the lack of continuity. So you have new people brought in to lead on capacity mechanism, which is a non-trivial subject…you know, it takes a while to get your head around it. But against that, they’re bright people…I never found that a lack of DECC understanding was ever a problem particularly.’\(^{72}\)

For a participant from one of the Big Six, the problem was a high turnover and low continuity in the team working on the capacity market – two or three changes over a four year period. A secondee who joined in 2012 (see below) was the third person to lead the CM team.\(^{73}\)

Faced with the situation of taking on a major new project, DECC responded in various ways. One was to recruit more staff; between 2010 and 2014 the number of FTE staff at DECC increased by nearly 40%, by far and away the largest expansion across Whitehall, during a period of austerity in which overall civil service FTE numbers fell by 15% (Bouchal 2014). According to a senior official involved in the ENMR process,

‘I must have been the only official, I think in government, but certainly in DECC, who was going in with staffing projections into a business plan meeting being told, “Don’t be daft, you need more people, go away and think about it again”’.\(^{74}\)

A second strategy was the use of secondments from industry, which had been a common practice since DECC was established in 2008 (Carrington 2011, Brown 2013). According to Freedom of Information request evidence (which may be incomplete), in the case of the EMR over the main period in which the key decisions were taken, the number of secondments appears to have been rather small, but in at least one case, quite senior (Table 6). This case involved a secondee from the parent company of one of the second tier generators, i.e. ESB, to the post of Head of Capacity Market Design, a move that did not go unnoticed at the time.\(^{75}\)

\(^{72}\) Interview 7
\(^{73}\) Interview 4
\(^{74}\) Interview 5
Table 6: Secondees into the EMR Directorate of DECC

<table>
<thead>
<tr>
<th>Seconding organisation</th>
<th>Period</th>
<th>Job title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addleshaw Goddard LLP</td>
<td>Jun 2013 - Dec 2013</td>
<td>Legal consultant</td>
</tr>
<tr>
<td>Ernst and Young</td>
<td>Mar 2011- May 2011</td>
<td>Policy advisor</td>
</tr>
<tr>
<td>National Grid</td>
<td>Oct 2011 – Nov 2011</td>
<td>Policy advisor</td>
</tr>
<tr>
<td>National Grid</td>
<td>Nov 2012 – Nov 2013</td>
<td>Policy advisor</td>
</tr>
<tr>
<td>ESB</td>
<td>Sep 2012 – Sep 2014</td>
<td>Head of Capacity Market Design</td>
</tr>
<tr>
<td>Ofgem</td>
<td>Jan 2013 – Jan 2014</td>
<td>Economist</td>
</tr>
<tr>
<td>Ofgem</td>
<td>Feb 2011 – Feb 2012</td>
<td>Policy advisor</td>
</tr>
<tr>
<td>Elexon</td>
<td>Mar 2011 – Jun 2011</td>
<td>Policy advisor</td>
</tr>
</tbody>
</table>

Source: DECC 2012d

According to a close observer and industry consultant:

‘I did raise an eyebrow at the time that [the secondee] was brought in to run the DECC programme as a secondment from ESB, who had a clear strategic objective to introduce a capacity mechanism that was beneficial to the generator community. That did strike me as another piece of evidence that there had been some decision taken that we need to do something…acceptable to the generation community.’

The effects of secondments, and especially the opportunities they open up for corporate influence, are hard to capture. For some analysts, they are a core part of structural power (e.g. Kuzemko 2016), a view also found amongst observers of the CM process more specifically:

‘…most of the work I think up until then had been done by consultants, and then as we moved on from there…DECC moved in a lot of industry resource, so that became embedded…so that would have an influence as well.’

‘I know they [industry] did second…some resource into DECC specifically, so they were there full time, which I would have thought was a bad idea…’

However, one view from within government is the opposite:

‘My view is…when you have a recruitment problem, the instinctive easy thing to do is to recruit from the civil service…I think we were too cautious about bringing people in from the companies. I think if you bring in a range of people from the companies…doesn’t

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76 Interview 7
77 Interview 8
have to be energy companies, can be from the banks, it can from the water sector, people who have got genuine experience of what it’s like, and my experience of people who do that, as long as they are inside and fully delinked from their company, become the most aggressive towards their old bosses, they are most challenging…If there’s a risk of capture, it is that those companies are very good at lobbying, and lobbying has an impact…’

It is also the case that secondees are not the only external actors that potentially have influence on government thinking, since consultants can also be important. However, the point here is that secondments created a further possible route for influence on decision makers. The key challenge for government is then that there is often not sufficient independent knowledge to assess whether advice from secondees is partisan or not.

In summary, the institutional context for the EMR, including the CM, was largely favourable for corporate actors. Policy was being developed by government, which was the institution most directly subject to structural dependency on generators. The public were hostile towards incumbents, but the process of the development of the CM and the CM itself were not readily understood by the public. At the same time, the relationship between government and incumbents had become close, with the latter group well-coordinated through the UK BCSE, which played a key role in creating opportunities for discussions with government at official and ministerial levels. DECC itself drew industry in to the latter stages of the design through the Expert Group and Collaborative Development process. In developing the EMR, including the CM, DECC was generously resourced, especially given the wider political circumstances, but did resort to secondments, which in at least one case appeared to give the incumbent generators a direct route to decision making.

78 Interview 5
79 Interview 11
8. Deciding to have a capacity intervention

In section 6 we discussed the construction of the interests of corporate actors. In section 7 we considered the institutional context for the development of the CM as part of the EMR, and how this context shaped opportunities for those actors to influence decision making about the CM. In this and the following four sections we turn to the question of how corporate actors used these opportunities, and crucially what ideas they deployed, in the attempt to represent those interests. Each of sections 8 to 12 focuses on the key decision points identified in section 3 above.

The first area that we consider is how and why the decision was taken to move away from a long-standing commitment to an energy-only market since 2001 to adopt some form of capacity mechanism. This decision can be seen as taking place over the period between 2009, when a capacity mechanism was not immediately on the agenda, and the end of 2010, when a decision was proposed to have some form of capacity intervention. This section first lays out the way in the government’s approach changed over the period. It then goes on to examine evidence on how the incumbent corporate actors engaged on this issue through the policy process. However, these were not the only ideas present in debates at the time, and to which government actors would have been exposed, so the section also examines these alternative perspectives. Finally, we assess the degree to which corporate engagement may have influenced decisions by government actors, given the positions of other stakeholders.

8.1 The evolution of the decision

The movement in government thinking can be seen in the shifting position in a series of official documents. The July 2009 Low Carbon Transition Plan (DECC 2009b: 53) said:

‘The Government expects the risks to security of electricity supply to be manageable over the next decade as new investment comes through to replace closing power stations. In the longer term, the Government will need to ensure that it maintains security of supply as low carbon technologies become increasingly important.’

The EMA report, published in March 2010, read:

‘The Government is confident that the current arrangements will continue to deliver secure supplies of electricity over the next decade’ (HMT/DECC 2010: 4).
It goes on to give an endorsement to the idea that an energy-only market will continue to support the required investment:

‘While risks to the capacity margin increase nearer to 2020, UK electricity supplies have delivered robust security of supply since liberalisation and if demand forecasts were to increase Government believes the current market arrangements would send the necessary price signals to bring new construction forward.’ (ibid: 12-13)

The lack of urgency in the EMA is confirmed by a senior official who was closely involved with its production. 80

By contrast, the EMR consultation document, published some nine months later in December 2010, stated that:

‘because of the increasing risks to security of supply arising from the transition to low-carbon generation, the Government is consulting on introducing a capacity mechanism to explicitly reward the provision of capacity (as opposed to only the energy from electricity generation)’ (DECC 2010a: 78).

The proposal for a capacity intervention was made in the 2010 consultation document despite the fact that the accompanying Impact Assessment (IA) gave negative estimates of the net present value (NPV) for two different options – a targeted strategic reserve mechanism and a market-wide mechanism – relative to doing nothing (DECC 2010b). On the central assumption for the value of lost load (VOLL) of £20,000/MWh, the NPV over 20 years for the targeted mechanism was -£290m, and that for the market wide mechanism was -£340m. The proposal for an intervention therefore departed from what appeared to be the most cost effective course of action, which would be to do nothing. A more detailed consultation on a capacity mechanism was then carried out in July 2011, and by December 2011, in the Technical Update, a decision was announced that a capacity market would be introduced.

Over this period there was thus a clear shift in the way that the government viewed electricity system security and the need to develop some form of intervention immediately. The overall theory that we are testing here is that there was a causal relationship between corporate influence and the change in government position. As discussed in section 6.1 above, while there was some diversity of interests amongst large incumbent electricity generators, most were in favour of a capacity intervention. At the same time, as discussed in section 7, there were a

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80 Interview 5: ‘The EMA, from memory, seemed to be saying that there was a massive challenge in renewables and low carbon, but security of supply was not so urgent.’
number of institutional opportunities for engaging government open to corporate actors. If the theory of corporate influence were true, we would expect to find evidence supporting it, with that evidence relating to the activities of specific entities, and in particular the deployment of ideas aimed at influencing decision makers.

8.2 Ideas deployed by corporate actors

As discussed in section 6.3 above, the corporate lobby on whether to have a capacity intervention of any kind in what was up to that point an energy-only market was split (see Table 7). However, a clear majority amongst both the Big Six and the independent generators were in favour of some form of mechanism. In this section we examine the ideas they deployed in engaging with decision-makers.

**Table 7: Position of corporate actors on capacity intervention in 2010 EMR consultation**

<table>
<thead>
<tr>
<th></th>
<th>In favour of capacity intervention</th>
<th>Opposed to capacity intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Big Six</strong></td>
<td>Centrica, EDF, SSE, Scottish Power</td>
<td>E.ON, RWE</td>
</tr>
<tr>
<td><strong>Independent generators</strong></td>
<td>International Power, Drax, InterGen, ConocoPhillips</td>
<td>ESB International, DONG</td>
</tr>
</tbody>
</table>

Source: See Annex 4.

As noted in section 5 above, a major source of evidence for company positions are their submissions to the EMR consultations in 2010 and 2011. In these submissions, an argument was made by most of the corporate actors who were in favour of a capacity intervention which covered similar ground to that seen in the academic debate on capacity markets (see section 2 above). This had a number of parts: (i) that there was a ‘classic’ missing money problem in the GB market; (ii) that expansion of intermittent renewables would make this problem much worse, and (iii) that an energy-only market could not handle these problems. Put together these elements added to the argument that without a capacity intervention, there would be insufficient investment in new capacity and security of supply would be threatened.

The classic missing money case was put forward, for example, by SSE [2010: 2]: ‘The current [energy only] market is already deficient in rewarding investment in system reliability.’ International Power [2010: 18] argued that: ‘Regulators and politicians, supported by

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81 Of particular importance are the responses to Q19 in the 2010 consultation document, i.e. ‘Do you agree with our assessment of the pros and cons of introducing a capacity mechanism?’
consumers, may well be tempted to implement price caps and that as a result, ‘we do not consider that an energy only market will reliably remunerate the amount of fossil fuel generation needed to ensure security of supply. A capacity mechanism is therefore essential in providing this “missing money” and protecting security of supplies.’ InterGen [2011 Part 1: 4] likewise argued that CCGT was not profitable, and that: ‘forecast price rises from the tightening of the generation-demand margin as older plants retire will likely be offset by rapid load factor decline as increased low carbon generation penetrates the market and displaces flexible generators.’

However, the submissions of companies supporting a capacity intervention gave even greater weight to the argument that more intermittent renewable generation (as would be expected under the CfD element of the EMR) would worsen the missing money problem. It is also worth noting here that companies invested in a number of commissioned modelling exercises to support their arguments. One was a report on the effects of wind intermittency on markets produced by the consultancy firm Pöyry in July 2009 (Pöyry 2009) on behalf of a group of companies with a range of interests in wind, networks and gas (Centrica, DONG, EirGrd, ESBI, National Grid and RES). The report argued that wind intermittency would increase price volatility and depress investment in conventional capacity, and unfavourably compared the British energy-only market with the Irish market with capacity payments. Another was a study by Oxera [Independent Generators Group 2010] that was commissioned in 2010 by the Independent Generators Group, cited widely by its members and also submitted to the 2010 consultation as a separate document.

Centrica [2010: 11] argued that: ‘the security of supply consequences of large amounts of intermittent generation need to be properly addressed.’ EDF [2010 part 2: 4] took the view that although the energy-only market had seen development of new capacity, a changing landscape that included the growth of intermittent wind, implying a low load factor for peaking plant, plus closure under the LCPD would affects the economics of investment and operation. Citing the missing money problem, SSE [2010: 2] then went on to say that ‘As the level of inflexible plant on the system increases (i.e. wind and nuclear), these problems will be exacerbated, with thermal plant becoming increasingly reliant on infrequent and uncertain price spikes to pay back investment’, and that ‘investment in gas going forward is significantly riskier than previously, because of intermittency.’ Scottish Power [2010] also argued that an increase in renewables would make load factors for conventional plant lower and less predictable; ‘they will interfere

82 Subsequently, in 2013, the then Labour Party leader, Ed Miliband, put forward the proposal of a price cap for retail markets. According to one corporate participant, this development heightened concerns in companies about intervention in the energy-only wholesale market (Interview 6).
with the natural ability of an energy-only market to balance supply and demand and put existing plants....at risk of premature closure.' They repeated this argument in Scottish Power [2011].

There were in fact two variants of the argument about increasing renewables made by different companies. One was that the increase in intermittent generation would specifically require a matching increase in thermal generation that was flexible, i.e. could ramp up and down quickly to accommodate swings in wind output. This argument was emphasised by the second-tier generators, whose commissioned Oxera report examined the issue in detail. Thus for example InterGen [2010: 13], referring to the report, said that: 'system flexibility is expected to be relatively tight between 2015 and 2020, after which substantial new flexible capacity is required.' With greater intermittency: '...it becomes increasingly difficult for flexible plant to predict its running regime with any degree of accuracy.' The InterGen submission goes on to show the modelled analysis of the impact of decreasing load factors on existing flexible plants InterGen [2010: 14], which predicts a 10% load factor by the end of the 2020s. Their conclusion is that: 'the combination of price capture difficulties, price distortions and increased operational costs may, by 2020, leave an existing CCGT (or coal plant) unable to cover its fixed costs by a considerable margin…' and that: ‘Accordingly there is a need for long-term support to all types of flexible plant…’ (ibid). The same argument is repeated in InterGen [2011 part 1]. International Power [2011: 1] argued that intermittent renewables plus inflexible nuclear meant a greater need for flexibility 'that may be difficult to service through existing market arrangements.'

By contrast, other companies laid emphasis not on flexibility but on overall capacity during periods of high demand and low wind output. Scottish Power argued that real security of supply problem was not the very short-term ramp rate (which it argued could be accommodated with existing balancing and short-term reserve measures), but instead:

‘the more difficult problem is likely to be the need for large amounts of power during the sustained periods, such as in calm intervals in winter where low temperatures and low wind generation can coincide for up to a fortnight....This will need substantial generation assets…’ (Scottish Power [2010: 15])

Many companies then went on to argue specifically that existing energy-only market arrangements were therefore problematic. EDF [2011: 1], for example, stated that energy-only market arrangements 'may not provide a sufficient signal for investment in reliable generation capacity, or the provision of demand side response, particularly as increasing amounts of intermittent plant are added to the system.' International Power’s position was that: ‘Whilst the current energy-only market has delivered significant investment over the last 20 years, it was not designed with these increasing levels of subsidies and intermittency in mind…’ (International Power [2010: 4]).
Companies in favour of a capacity intervention then came to the conclusion that without such an intervention, there would be insufficient investment to avoid tightening capacity margins and a threat to security of supply. It was here that companies effectively reminded government of the latter’s structural dependency; in a few cases threats of an investment strike were fairly explicit.

Centrica [2010: 11] argued that: ‘We can no longer be confident that capacity adequacy will be maintained over the long term in the face of the levels of regulatory, market and environmental uncertainties now affecting investment decisions around existing and new plant.’ SSE [2010: 2]’s view was that: ‘…there are serious concerns over whether sufficient investment in form capacity will come forward over the coming decade and many of SSE’s current plans for capacity investment are on hold.’ In their submission to the 2011 consultation they added that: ‘SSE believes that some form of capacity mechanism will be needed to rebalance the risk: reward relationship for generation by increasing the certainty associated with capacity value. This rebalancing is needed to ensure that the UK maintains an adequate de-rated capacity margin.’ (SSE [2011: 3]). Scottish Power [2010: 15] cited forthcoming closure of coal-fired and nuclear power plants, arguing that ‘This is a huge loss of firm capacity which will require strong action to avoid the risk of significant shortfalls, especially during periods when there is little wind.’

International Power [2010: 17] argued that: ‘the absence of revenue certainty [in an energy-only market with increasing intermittency] to support investment means that it is unlikely that new peaking generation would be built in sufficient quantities.’ On the basis of the Oxera modelling, they go on to argue that up to 20GW of existing thermal generation capacity may also close. This position was also adopted by InterGen [2010: 11], who come close to a direct investment strike threat:

‘InterGen can only commit to continuing to invest in the UK if the outcome of the EMR allows us to do so…InterGen’s existing gas assets will struggle to survive in a market focused on providing significant subsidies to renewable and nuclear technologies. Given these subsidies, InterGen believes that a capacity mechanism that rewards flexibility is essential to sustaining its existing fleet. Furthermore, even if capacity margins are tight, InterGen’s planned UK projects will be unable to obtain finance…to support their construction unless a capacity mechanism for flexible generation is introduced.’ (InterGen [2010: 1])

ConocoPhillips [2010: 16] similarly said that: ‘It is difficult to see how any project could proceed with the load factors anticipated by the 2020s if there were no capacity payments available to this type of plant.’
All of these companies acknowledged that the capacity margin at the time (2010-11) was relatively large, but nevertheless urged swift action in setting up a mechanism. For EDF [2010 part 2: 4], a capacity problem was:

‘unlikely to materialise until at least 2016, maybe later. However, we believe it is important to address this issue now to remove an uncertainty that will increase the risk associated with investment decisions in all forms of generation.’

Centrica [2010: 11] argued that:

‘We do not believe that this is an issue in the near term….but] ‘the industry framework needs to be robust against such a situation arising as generators react to a complex mix of market, regulatory and environmental drivers’


‘We anticipate implementation being required in the second half of this decade, driven by a growing demand for flexibility, alongside a loss of flexible capacity by the end of 2015 enforced by the Large Plant Combustion Directive.’…given the time needed to develop it, ‘implementation should commence this year [2011]’.

International Power [2011: 2] was of the view that ‘…the available evidence suggests a capacity payment may have to be in operation earlier than indicated in the Consultation [i.e. 2015].’

The deployment of this set of ideas by corporate actors can also be seen in other sources of evidence. A number of observers and participants pointed to the importance of missing money and intermittency arguments in the debate:

‘Ed Miliband, DECC bought the idea that energy companies would only invest in gas if not incentivised to build something else. This is what led to the long discussion on CfDs. Then the Scottish companies [i.e. SSE and Scottish Power] started talking about missing money’.83

‘Missing money was seen as being at the core of the economic argument.’84

‘…the economics of gas, the preferred choice for new build conventional, was looking challenged. A number of papers came out about the merit order effect, Pöyry, Scottish

83 Interview 1
84 Interview 6
Power commissioned NERA. It wasn’t that long before the case for a capacity market was made; months not years into the process…The wholesale price was nowhere near the new entry price, but already seen as too high [politically]. It took industry some time to see the downward pressure of wind on the short-run marginal cost wholesale market, and even the possibility of wind cannibalisation.\footnote{Interview 4}

Statements by senior company managers at Energy and Climate Change Select Committee evidence sessions also brought out the implicit investment threat. In the 2011 inquiry on EMR, John Campbell, director of energy wholesale at Scottish Power, argued that:

‘The investment will go where the confidence and the returns are for that investment. The electricity market reform has the potential to do the UK’s attractiveness in that respect….’ (ECC SC 2011: Ev 47).

For John McElroy, director of policy and public affairs for RWE:

‘Whatever else we do, the outcome of EMR needs to satisfy the criteria of investors to maintain the attractiveness of the UK going forward.’ (ECC SC 2011: Ev 47).

Sarwjit Sambhi, head of power generation at Centrica made familiar arguments that:

‘Capacity payments incentivise having security of supply in advance of having new nuclear or sufficient wind capacity on the system. In the long run, they are also good for ensuring that we have back-up to take up the slack when the wind isn't blowing. As a package, I think that the measures, as proposed, address the multiple objectives that we’re trying to achieve.’ (ECC SC 2011: Ev 50)

As in the consultation responses over the same period, these actors pushed for speed in the framework and for details, on grounds that investment decisions should not be delayed still further (ECC SC 2011: Ev 50-51). John Campbell of Scottish Power argued that:

‘We have major investment decisions to make over the next 12 months—investment decisions on offshore wind, coal-life extension, carbon capture and storage, and potentially in new gas plant. Like other companies, I do not think that the UK can wait for three or four years to see where this all ends up. We need clarity over the next 12 months, and some of the fine detail, legal application and implementation can come later’ (ECC SC 2011: Ev 51).
Against the arguments for a capacity intervention deployed by the majority of the large incumbent generators over 2010-2011, a minority put a quite different view. This was that the energy-only market had performed well to date, that the case for a need for a capacity intervention had not been made, and that experience from elsewhere suggested that such interventions were often problematic.

E.On [2010: 2] argued that ‘Capacity markets, as a new form of market intervention, can create significant additional uncertainty and unintended effects’, including increased complexity and new sources of regulatory and political risk. They concluded that:

‘Our preference is therefore that, wherever possible, energy only markets in combination with functioning balancing markets should be allowed to work and that capacity mechanisms should be considered only if there is clear evidence that security of supply is at risk…The consultation does not make that case convincingly and the modelling only suggests a relatively modest reduction in the level of demand unserved.’ (E.On [2010: 1])

RWE [2010] took the position that price signals available under the existing energy-only market design would be sufficient to provide the required incentive to maintain capacity in the GB electricity market, regardless of the level of renewable penetration. They argued that electricity trading arrangements (energy plus balancing services markets) have been ‘remarkably successful and resilient in operation’ (p 19). The company believed that increased volatility would drive investment in flexible plant, and argued that indeed: ‘This is already happening. The new capacity being installed is already relatively flexible plant.’ (RWE [2010: 21]). They went on to argue that the strengthening of existing price signals (suggested as a parallel reform in the consultation document) should be first priority when seeking to improve incentives, through making the cash-out system in the balancing market more cost reflective of actions taken by the system operator:

‘Successful resolution of these issues will not only provide signals in the short term but will feed into future investment decisions on capacity and delivery of demand-side initiatives…without the unintended and adverse effects of a capacity mechanism’ (ibid).

By contrast, RWE took the view that the introduction of a capacity mechanism could dilute and distort price signals significantly, with examples from other jurisdictions showing that capacity mechanisms have been introduced only because of poor market design which the company believed that the GB market was free of. The company was critical of the idea that a central administrative authority attempting to set required capacity, arguing that they would be ‘more than likely inadequate or wrong’ (RWE [2010: 4]). There were also concerns about cost, with an
estimate of up to £7.5bn in net present value terms for the period 2015-2025. These arguments were repeated in the later 2011 consultation submission (RWE [2011]).

An important part of RWE’s argument was that the government’s concern (also emphasised by some incumbents) about a period of high demand and low wind output over several days was spurious, for a number of reasons (RWE [2010: 3]). These included: the scope for demand response by consumers from 2020 onwards; the fact that it is in the interests of generators to retain some ramping capacity to manage the possibility of unplanned outages at existing power stations, the existence of other opportunities for running flexible plant, including as a result of transmission constraints, and the possibility of using existing back-up plant sited at hospitals, water companies etc., which are currently under-utilised.

Amongst the second-tier generators, DONG and ESB International also made counter-arguments against a capacity mechanism. Like RWE, DONG [2011: 1]:

‘...believes that the requirement for a capacity mechanism is significantly lessened if the other market failures in the White Paper July 2011 were to be handled effectively. Resource adequacy and security of supply would be most cost effectively delivered through well-functioning wholesale markets with sufficient liquidity, where investment incentives and price signals are transparent and trustworthy to all investors in the market.’

DONG [2010: 5] recognised the changes in generation mix and need to support the expansion of wind with ‘appropriate and necessary measures for reserve capacity’ (not just generation but also DSR and via interconnection), but went on to argue that:

‘The case for introducing a broad capacity mechanism to promote investment in new generation in general is more difficult to justify at this time. There is little conclusive evidence that these intrusive mechanisms have been demonstrated to improve the performance of electricity markets and the case for signalling the need for new investment in the UK is not proven as the underlying fundamentals clearly indicate that new capacity will be needed to replace that which is closing.’ (ibid)

They also anticipate the issue of new and existing capacity:

‘While capacity mechanisms are an effective means of stabilising the income of generators, there is no clear evidence that they encourage investment in new generation…arguably a capacity mechanism is only required where market prices are capped…’ (DONG [2010: 15])
ESB International [2010: 8]: ‘…note with concern DECC’s proposals to introduce a capacity mechanism’ and believe that: ‘…an ill-considered approach could materially undermine the competitive market and the many benefits it has brought to consumers.’ Like RWE and DONG, they expressed a confidence in the existing market approach:

‘…the current bilateral market structure will deliver many of the required investment signals, if liquidity is improved. This is particularly important for encouraging new entrants and new sources of finance….A liquid wholesale market, in association with a less opaque system for transmission ancillary services, could deliver the flexible capacity required…’ (ESB International [2010: 2-3])

They also pointed out that: ‘Indeed market signals have led to the construction of a significant tranche of new gas-fired capacity in recent years…We are strongly of the view that the market is delivering the new capacity required to meet future demand peaks.’ (ibid: 8). They reasserted their position in the 2011 consultation:

‘ESBI remains of the view that a competitive liquid wholesale market remains the best way in which to deliver secure, lower carbon generation at the most economic cost to consumers. We are concerned that any move away from these principles would be ill-advised and risk increasing costs at a time when consumers are increasingly worried about the cost of energy…’ ESB International [2011: 2]

8.3 Alternative ideas in the debate

Just as incumbents were in fact partially divided on the issue of whether a capacity mechanism was needed, there was not a strong consensus amongst other stakeholders. There were 265 responses in total to the 2010 EMR consultation document. Excluding the 12 respondents identified as incumbents in this study, and 21 individual/anonymous responses, there were a total of 232 responses from identifiable organisations (Table 8).
Table 8: Responses on capacity mechanism proposals in 2010 EMR Consultation document by actors other than Big Six and second tier generators

<table>
<thead>
<tr>
<th>Question</th>
<th>Did not answer the question</th>
<th>Yes</th>
<th>No</th>
<th>Don’t know/more work needed/mixed views</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q19 Do you agree with our assessment of the pros and cons of introducing a capacity mechanism?</td>
<td>126</td>
<td>66</td>
<td>26</td>
<td>14</td>
<td>232</td>
</tr>
<tr>
<td>Q20. Do you agree with the Government’s preferred policy of introducing a capacity mechanism in addition to the improvements to the current market?</td>
<td>138</td>
<td>59</td>
<td>29</td>
<td>6</td>
<td>232</td>
</tr>
</tbody>
</table>

Note: Excludes 21 individual and anonymous responses

A majority of these responses did not answer the questions on the capacity mechanism at all, as they focused on the other parts of the ERM agenda, especially the CfD. Of the 106 submissions that did have a specific response to Question 19 on the government’s assessment of pros and cons of introducing a capacity mechanism, 66 (62%) agreed with that assessment, 26 (25%) disagreed, while 14 (13%) were unclear, had mixed views (usually submissions from associations with memberships) or said that more work was needed. On the issue of the government’s proposal to introduce a capacity mechanism (Q.20), the numbers were similar. 138 out of 232 submissions did not answer the question. Of the 94 that did, 59 (63%) agreed, 29 (31%) disagreed and 6 (6%) were unsure.

Of those who expressed a view, a majority thus agreed with the government’s analysis and proposed actions, but a significant minority did not. Within this latter group, as with the more sceptical incumbents, the view was that there was no proven need for an intervention at the time, and that an energy-only market would deliver necessary investment, or at least that the government should first undertake other reforms on balancing signals and liquidity before taking a decision on a capacity mechanism. In the report on its inquiry into the EMR in the spring of 2011, the House of Commons Energy and Climate Change Committee noted that:

‘While there is little debate over the potential for increased levels of inflexible and intermittent sources of power to pose problems to the system, many witnesses questioned whether the case for a new capacity mechanism at this point in time had been adequately made. Several witnesses felt that modifications to the existing balancing mechanism…and the Short Term Operating Reserve contracts that are run by National Grid could be sufficient to meet requirements imposed by increased penetration of renewable generation.’ (ECCC 2011: 49).
The report went on to quote National Grid:

‘We do also agree that it is important to consider whether an additional intervention to bring on sufficient “back-up” generation is necessary. However, there is more work to be done before we can conclude that further intervention in the form of explicit capacity payments is required. It may be that adjustments to existing market mechanisms will be sufficient to facilitate the investment.’ (ibid.)

This position echoed that of National Grid in their submission to the December 2010 EMR consultation [National Grid 2010]. Other sceptical witnesses included Simon Less of Policy Exchange, who stated that:

‘On capacity mechanisms, I am in the wait and see camp. I don’t think that the evidence put forward is convincing and that we need to make this intervention in the market now. The projected difference between what we think capacity will be and what we would like capacity to be is quite small - between 5% and 11% projected, with 8% to 12% being optimal, according to the consultation.’ (ECCC 2011: Ev 30).

They also included Rhian Kelly of the CBI, who said:

‘On the third bit of the [EMR] package, the capacity [mechanism] and demand response, we think more work is required on that to understand that in more detail.’ (ECCC 2011: Ev 105)

Adrian Haworth of GE Energy also expressed some scepticism:

‘It doesn’t seem to be clear exactly what the capacity mechanism is yet. The market is already handling the situation quite well, and given some adaptation, there could be a mix between new potential peaking capacity, if it’s required, or investment in the existing plant to make it fit for purpose as it changes its back-up role for renewables to demand-side measures that may be just as strong as supply-side measures. It is not clear yet what is required, and I’m not sure that anything in the document specifies what, in fact, the Government wish to drive forward. I am not sure that we know what is going to be necessary or what will be the best solution moving forward.’ (ECCC 2011: Ev 76).
8.4 Influence on the decision

It is therefore clear that there were differing views on the need for a capacity mechanism over the period that the government developed its position. There were different views on how near-term and how acute a capacity problem there would be, and also on whether the existing energy-only market would be able to deliver required investment, with some important actors believing that it could with some less radical reforms to increase liquidity and price signals, while others disagreed. There was no obvious consensus view facing government.

There is a considerable amount of evidence that some corporate actors, including most (but not all) the Big Six vertically integrated firms and the second tier generators, deployed arguments for the adoption of a capacity mechanism. However, it does not necessarily automatically follow that the shift from the government’s stance on a capacity mechanism was entirely or mainly due to corporate lobbying. This is because there is also evidence that the move to adopt a capacity mechanism was in part driven by factors with government itself. However, some of these factors were in turn closely bound up with the structural power of corporate energy actors.

The first issue was directly linked to the change of government that occurred with the general election in May 2010. The Labour government headed by Gordon Brown was replaced by a Coalition government headed by David Cameron and Nick Clegg. The agenda of greater intervention in the energy market to bring forward investment in new low-carbon generation capacity, and a possible complementary mechanism for associated security of supply challenges had been raised under the Labour government in the form of the EMA. However, the same issues were on the agendas of the other parties, and proposals for the key elements of electricity market reform, including some possible form of security of supply intervention, were in the Conservative manifestos. A commitment to ‘reform energy markets to deliver security of supply and investment in low carbon energy’ then made it through the very brief negotiation process into the Coalition Agreement.\(^86\)

There was then a desire to act, and be seen to act, fast. According to a close observer, a core driver for the Coalition was that “We’re the government for action” in comparison with a Labour government that had reviewed the problem but not acted:

‘But in the new government, politically, at that time there was a sense that the discussion had previously been theoretical and it now because more practical and more

...So when Coalition government politicians came in they instructed DECC officials to get on with it. The first 3 months were spent by officials in fighting back and saying “It’s more complex than that, you have to consult etc.” There was a need to work out what it means and how to do it. 87

The new Secretary of State for Energy and Climate Change, Chris Huhne, himself drew a picture of a government keen to get on with delivery, in a speech in November 2010:

‘By its end, the previous Government had good intentions and the right ambition. But it failed to grasp the nettle of delivery. That is where we will be different.’ 88

There was thus already in the autumn of 2010, well before formal consultation, a determination amongst ministers to move from theoretical possibility to concrete delivery. A speech by Energy Minister Charles Hendry in October 2010 also gave several clear signals:

‘So at the heart of [low carbon investment] will be the price of carbon. But looking at other issues such as capacity payments, looking at what other measures may be necessary to secure investment. But if we don’t put that in place it’s not a question about climate change, we simply won’t get the investment coming forward into Britain in the new plant that is going to be necessary...The capacity market will help deal with the fact that people may want to use plants when demand is particularly high.’ 89

The approach of the new government can be seen in that ministers and advisers actively sought out meetings with industry actors on EMR in the autumn of 2010, for example with the IGG. 90

A second issue was the political incentive for government actors (both politicians and senior officials) to take a conservative position on electricity system security. As discussed above in sections 4 and 6 above, this is a general phenomenon, and a key source of structural power for energy corporates, since the government cannot ‘keep the lights on’ directly. However, there is some evidence that it was specifically in play in the formation of the Capacity Market in GB.

87 Interview 7
88 Speech by Chris Huhne to the Guardian Cleantech Energy Summit, 23 November 2010, https://content.govdelivery.com/accounts/UKDECC/bulletins/2ad2c
90 Interview 2
Certainly, concerns about security of supply had started to rise up the political agenda by the end of the 2000s (e.g. Helm 2009). In October 2009, Ofgem published its major scenarios project, Project Discovery, which included analysis of de-rated capacity margins,\(^91\) subsequently updated in February 2010 (Ofgem 2010a). This projected a marked tightening of margins in the late 2010s, and again around 2024.

However, as discussed earlier in this section, whereas the government’s view expressed in the EMA in early 2010 was that there was no capacity margin problem sufficient to warrant immediate action, by the end of 2010 this had changed. In a retrospective justification for the introduction of the Capacity Market, the Secretary of State for Energy and Climate Change in 2014, Ed Davey, maintained that:

“There was a real risk back in 2010 that an energy crunch would hit Britain in the middle of this decade and lead to damaging power cuts.”\(^92\)

The immediate justification for the new position in the consultation document was new modelling showing that, if the existing energy-only market continued, then there would be a capacity crunch by the late 2010s. A detailed analysis of how the official position on de-rated capacity margins evolved over this period is given in Annex 3; here we give a summary.

In the period leading up to the EMR, official expectations of capacity margins were published in annual Energy Market Outlooks (EMOs), and were based on modelling by Redpoint, an industry consulting group (see Annex 3 for further details). These expectations also formed the basis of the view in the March 2010 EMA report that capacity margins would be comfortable at least until the early 2020s. However, the EMR Consultation document (DECC 2010a), published in December 2010, had a different projection, based on new modelling from Redpoint (2010), which showed a sharp fall in the peak de-rated capacity margin in the late 2010s, associated with a sharp uptick in expected average unserved energy from 2018 onwards, under the existing energy-only market. It was this new projection that gave an apparent justification for proposing a capacity mechanism.

On close inspection, reason for the differences between the two sets of modelling lay in the assumptions made (see Table A.3.2 in Annex 3). Both sets made similar assumptions about future demand and new build, but there were changes in the assumptions about plant closure.

\(^91\) Capacity margins show the expected excess of generating capacity over peak demand in any one year. De-rated margins take into account the fact that all forms of generating capacity are sometimes off line for maintenance or because of breakdown, and for intermittent renewables, because they do not always generate, i.e. when there is no wind or sun.

The earlier modelling that formed the basis of the EMOs and the EMA already took into account the likelihood that some 18GW of nuclear and coal-fired capacity would close by 2018, the former due to end-of-life closure\(^{93}\) and the latter because they had opted out of the EU Large Plant Combustion Directive aimed at reducing sulphur-related air pollution. However, the later modelling also made new specific assumptions about the effects of a second EU Directive on Industrial Emissions (aimed at reducing nitrous oxide pollution) on coal- and oil-fired capacity which were absent from earlier modelling. According to a close observer of the modelling process, the IED assumptions and the way in which they affected plant-level economics and closure decisions, were determined by Redpoint, not the government.

These results, produced over the autumn of 2010, formed part of the context for officials and politicians. However, it is also clear that decisions were not based purely on modelling, but were also strongly influenced by an ultimately political desire to minimise risk. There was a fundamental uneasiness about sticking with the energy-only approach, according to one senior official:

‘The interesting thing is, if you look at the time there wasn’t a capacity payment in British power market history, it was very short…’\(^{94}\)

At the same time, the basic uncertainties in predicting demand and capacity in a privatised market and the fear of the political consequences of the downside risk produced a willingness to engineer a degree of over-investment. In the words of a senior official:

‘..how do you make sense of the economic analysis around this? Security of supply is a particular problem, because the numbers are geared, and so you divide one number by the other. And so if you imagine you’ve got 100 units of demand, and you’ve got 120 units of supply, you’ve got a nice comfortable 20% capacity margin. Your advice to Ministers would be: “There’s some risk here, you can never get rid of all risk, but that’s pretty comfortable”…But it doesn’t take many units of demand to go up, let’s say you’re out by 5% on demand, which is not impossible three or four years out, in fact its highly

\(^{93}\) Dungeness B (1110MW) was due to close in 2018, and Heysham 1(1160MW) and Hartlepool (1190MW) in 2019. These plants later had their lifetimes extended into the early 2020s.

\(^{94}\) Interview 5. This view of the efficacy of energy-only markets in the investment cycle contrasts with that held by others. For example Pollitt, quoted in Tsagas (2014) argues that: ‘large power plants are built on a replacement cycle. The fact that old plants are due to close as planned can easily be handled by the market. This process has been going on for nearly 25 years, since liberalization..’papers which show the planned closures of power plants leading to a projected deficit in capacity are economically illiterate, because they ignore how this would lead to incentives to build new plants if these are needed.’
likely. You are one or two stations worth, ten units are out because you haven’t understood what the economics of individual plants are…whatever it is, you can end up fairly quickly in a world where you’ve got 110 over 105, and suddenly you’ve got a really big security of supply problem. ⁹⁵

Politicians in the newly elected government had the same concerns; according to a political adviser in DECC, ‘Chris Huhne would always ask about the lights going out.’ ⁹⁶ However, it also seems that in the period leading up to the 2010 consultation document where a proposal for a capacity intervention was first floated, this had not yet become a major concern, so that developing a capacity intervention was not so much an urgent priority at this stage but more of an insurance policy:

‘…views on this [capacity adequacy] definitely changed over time, but not as early as winter 2010. It was not a major part of the narrative. Maybe more in 2011. But overall this rose incrementally as an issue, rather than a big shift...IGG were not saying that without a capacity market they wouldn’t build new plants, maybe in 2011 this became clearer...The capacity market was always talked about as a backstop measure. In discussions early on, the idea was to take powers in case we needed them.’ ⁹⁷

Similarly, in the spring of 2011, as the first EMR consultation was coming to a close, Chris Huhne have an account of the capacity mechanism as a sort of back-up policy to the House of Common’s Energy and Climate Change Committee:

‘…obviously what [the capacity mechanism] doesn’t do is provide you with the base load. The way we envisage it, it is the Contract for Difference that is arguably doing the really heavy lifting in encouraging the investment. The capacity mechanism is envisaged in the consultation document as a marginal mechanism, and a number of the respondents have been saying that maybe we don’t need it in the current circumstances precisely because of the spare capacity that has been opened up by the recession. Over time, it may become important and be one of the weapons in our armoury but we don’t need it in the short run.’ (ECCC 2011: Ev 116)

It is thus plausible that these two factors – i.e. a desire to take action quickly as part of a political narrative and a tendency for energy ministers and officials to take a conservative view on electricity system security driven by political incentives – also contributed to the government

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⁹⁵ Interview 5
⁹⁶ Interview 2
⁹⁷ Interview 2
shifting from its position that no mechanism was necessary in the short term to one in which a mechanism would be developed, if only as a form of insurance policy.

8.5 Summary and conclusion

Between early 2010 and the end of the that year there was a clear shift in policy with respect to a capacity mechanism, from a view that it might be needed at some point in the future to a proposal to develop a mechanism which then became a decision at the end of 2011.

Four of the Big Six vertically integrated generators and four of the six second tier generators were in favour in some form of mechanism, and there is ample evidence that they lobbied for the introduction of a capacity market. The key argument these actors put forward, through consultation submissions and meetings with Ministers and officials, was that the growth of renewable electricity arising from the measures in the EMR would exacerbate the missing money problem, with some incumbents (but especially the second-tier generators) then emphasising the need for intervention to ensure investment in sufficient flexible capacity and others arguing that the problem would be capacity in general. All these actors also argued that fairly urgent action was needed to avoid the capacity problems that they anticipated in the second half of the decade.

At the same time, there was a significant minority view opposed to a capacity mechanism amongst the incumbent companies themselves and other organisations making submissions to the 2010 EMR Consultation, as well as scepticism from other politically important actors, such as National Grid, the CBI and the House of Commons Energy and Climate Change Committee. Many of these actors argued that the energy-only market would continue to be sufficient to bring forward investment, and that a set of reforms to strengthen liquidity and balancing pricing signals should tried before a decision on a capacity mechanism was made.

The fact that the official position changed from a wait-and-see policy to a decision to develop a capacity mechanism over a period when the majority of incumbents wanted to see such an intervention might be taken as evidence for the view that the decision was indeed influenced by the lobbying that these companies undertook. This view might also be supported by the fact that, over the period December 2010 to the decision point at the end of 2011, the government generally employed similar arguments to justify the proposal to start the development of a mechanism as were used by the pro-intervention incumbents.
However, such a view is complicated by the fact that there is evidence that there were other factors bearing on the government’s position that also worked in favour of the introduction of a capacity mechanism. First, there was a change of government in May 2010, and the new Coalition administration was determined to be a government that ‘grasped the nettle of delivery’. There is evidence that Ministers already wanted a capacity mechanism by early autumn 2010. This does not necessarily mean that they weren’t influenced by incumbents, but it does mean that they were already forming a view before the formal consultation opened. Secondly, all governments have strong political incentive to take a conservative view on electricity resource adequacy, and there is evidence that this was at work in the case of the new Coalition government. Concern about future resource margins may have been influenced by modelling commissioned in the autumn of 2010 that incorporated for the first time the possible effects of the Industrial Emissions Directive on coal closures and produced a more serious forecast capacity crunch in late 2010s than earlier modelling (although, like all modelling in this period, it got demand growth wrong). However, there is also some evidence that such modelling played a supportive role to a decision made more on grounds of a high level of caution in the face of uncertainty. It also appears to be the case that developing a capacity mechanism was seen in the early stages as a back-up policy in case of need, rather than for immediate deployment. It was only over the period 2011-2012 that its introduction was accelerated (see section 10 below).

Overall, then, while there is clear evidence that the pro-intervention incumbents were pushing for a capacity mechanism, there is also evidence that they were pushing at an open door to a great extent. There appears to have been an alignment of interests, as constructed by political and commercial incentives, between this group and the government. It is entirely plausible that the Coalition government might have proceeded with the development of a capacity mechanism even in the absence of majority support from the incumbents (although had there been strong opposition from the majority of incumbents this is less clear).
9. Moving from Strategic Reserve to Capacity Market

The second issue we examine is the high-level decision to have a market-wide capacity mechanism, rather than a targeted approach involving a Strategic Reserve (SR). This section first lays out the way in the approach changed over the period. It then goes on to examine the evidence on how the incumbent corporate actors engaged on this issue through the policy process. Finally, we assess the degree to which this engagement may have influenced decision, given the positions of other actors.

9.1 The evolution of the decision

As noted in the previous section, a capacity mechanism was first proposed in the initial EMR consultation document published in December 2010 (DECC 2010a). As this stage the proposal was for an intervention in the form of ‘targeted payments to encourage security of supply through the construction of flexible reserve plants or demand reduction measures (so-called negawatts)’ (DECC 2010a: 6). The SR approach involved the following key elements:

- A central body would determine required reliability level and whether the market is likely to deliver this. If not, additional capacity would be procured through a competitive process.
- The contracted capacity would be withheld from the wholesale electricity market and would only be despatched when prices rose above a certain level.

As shown in Figure 3 below, the SR option was considered to be distinct from ‘market-wide’ approaches, of which there were several possible variants, including the capacity auction which was eventually chosen later in the process. In market-wide options, a key difference is that the contracted capacity would not be withheld from the market, and plant could earn both payments for capacity and for generation as normal.
Following the consultation an EMR White Paper (‘Our Electric Future’) was then published in July 2011 (DECC 2011a), with another consultation on two more developed options for a capacity mechanism. One option was named ‘Targeted mechanism – Strategic Reserve’, and was described as ‘a development of the lead option from the [2010 EMR] consultation document which aims to mitigate concerns raised by stakeholders. This comprises centrally-procured capacity which is removed from the electricity market and only utilised in certain circumstances’ (DECC 2011a: 163).

The second option, named ‘Market-wide mechanism: Capacity Market’ narrowed the choice by rejecting capacity payments and focusing in on a capacity market, with DECC particularly keen to get views on a reliability market design. The consultation on the capacity mechanism proposals in the 2011 White Paper closed in October. In December 2011, DECC published an EMR Technical Update document (DECC 2011c), along with a third Impact Assessment (DECC 2011d). Whilst in previous documents, including the White Paper, a targeted mechanism within

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98 A Reliability Market design involves placing an obligation on suppliers to contract for capacity, in proportion to their market share, rather than a central administrative body.
a Strategic Reserve was the lead, or preferred approach, the Technical Update stated that the
government would now choose a market-wide approach, i.e. a Capacity Market (CM) (DECC 2011c: 22).

This decision was taken despite the fact that the government’s own cost-benefit analysis
consistently supported the SR approach. The Impact Assessment (IA) accompanying the 2010
EMR consultation document suggested that, while neither a targeted approach nor a market
wide mechanism were cost effective relative to doing nothing, the targeted option would be the
less costly of the two forms of intervention (DECC 2010b). According to a consultant close to
the modelling, the work ‘very, very clearly demonstrated that the targeted option was best’.99 A
second IA published with the EMR White Paper in July (DECC 2011b), again gave negative
NPVs for the SR approach and a market wide option (the Reliability Market), but again the SR
was the less costly of the two. A third IA published alongside the Technical Update in December
2011 also suggested that the market-wide approach would cost more than a SR (DECC 2011d).
The SR option had a ‘best estimate’ NPV of £1.12bn, compared with a CM ‘best estimate’ NPV
of £2.613bn. This apparent anomaly between this series of impact assessments and the final
decision was later picked up by others, including Baker and Hogan (2014) and Whitehead
(2014), who noted that the SR:

‘was rejected as an option after a series of “qualitative” analyses, which I know had at
least one former DECC civil servant scratching his head at the time when he reported (to
me) “all the time during this period it was clear to all of us that the strategic reserve was
the right way to go. How we ended up with this, I really do not know.”’

9.2 Ideas deployed by corporate actors

A clear majority of the major corporate actors in generation wanted a market wide approach and
were opposed to a SR. This group of companies consistently put their views across to
government throughout the period from the second half of 2010 through to the decision point at
the end of 2011. Consultation responses were an important route, as well as commissioned
analyses by consultants, public statements before the House of Common ECC Committee,
speeches and meetings with ministers.

It is likely that this issue was raised with ministers over the autumn of 2010. The Energy Minister
met with BCSE and Scottish Power over this period.100 The Secretary of State met with two

99 Interview 7
100 See section 9.2 above
strong promoters of a market wide approach: Centrica in October 2010 and the IGG in November 2010. According to one close observer of the process:

‘I know they [the IGG] came to me and said…that they had a meeting with the minister, at which they huffed and puffed about capacity mechanism, being targeted rather than market wide. And the minister said “Well OK, send me a paper which explains why market wide is the right thing to do”.’\(^{101}\)

The IGG (with Drax playing the lead role in coordination) subsequently commissioned Oxera to undertake a critical assessment of the SR option and make the argument for a market wide approach, which they then sent to government.\(^{102}\)

In their responses to the 2010 EMR Consultation Document, none of the major corporate actors stated support for a SR mechanism (Table 9). Of those who were in favour of some form of capacity intervention, all preferred a market-wide approach, with some wanting a straightforward capacity payment. Of those opposed to any form of intervention, i.e. supporting continuation of an energy-only market, DONG reluctantly argued for a market-wide approach, E.On argued for a reliability market, and RWE and ESB International simply reasserted opposition to any form of intervention. This meant that there was no industry support for the government’s preferred option, and the overwhelming majority passively or actively preferred a market-wide approach.

**Table 9: Big Six and second-tier generator positions on the principle and form of capacity intervention in responses to 2010 EMR Consultation**

<table>
<thead>
<tr>
<th>Position on intervention</th>
<th>Preferred form of intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Market-wide</td>
</tr>
<tr>
<td><strong>In favour</strong></td>
<td>Centrica, EdF, SSE, Scottish Power, Intergen, International Power, Drax</td>
</tr>
<tr>
<td><strong>Opposed</strong></td>
<td>DONG, E.On</td>
</tr>
</tbody>
</table>

Sources: See Annex 4

\(^{101}\) Interview 7

\(^{102}\) The Oxera report was submitted to the 2010 EMR consultation – see Annex 4
In putting forward their opposition to a SR approach, this group of corporate actors put forward a range of ideas, but one was particularly important. This is often characterised as a ‘slippery slope’ problem, summarised in SSE [2010: 13]:

‘With the potential for significant volumes of centrally-tendered plant…market-based investment would be sterilised. Developers would be concerned that if they did invest this would be “crowded-out” by tendered plant and hence would hold back investment or may even strategically defer investment in the hope of securing a tender. Tenders of new plant would also force premature closure of existing plant – raising the overall costs of securing an adequate capacity margin. This would all lead to a “slippery slope” – where an increasing amount of plant is tendered for and the role of the market is eroded.’

In other words, the fear was that a SR, deployed at times of scarcity, would suppress peak prices in the wholesale market, thereby undermining investment incentives. This would lead in turn to a shortage of capacity in the market, and the consequent need for a greater SR over time.

A market-wide mechanism would also be expected to reduce peak prices, because it would mean that a much larger volume of capacity was kept in the market. From a generator point of view, however, the loss of revenues from peak prices would be offset to a much greater degree because capacity payments would be available to much greater range of market participants (all participants if there was a straightforward capacity payment, or a large number if there was an auction). In a SR approach, only those who were contracted to provide reserve would get payments, which could be a substantially smaller number, at least initially.

The argument appeared widely in the responses to the 2010 EMR consultation document, with many of the responses explicitly using the ‘slippery slope’ terminology – see E.ON [2010], SSE [2010], Scottish Power [2010], International Power [2010], ESB International [2010], DONG [2010], Drax [2010], InterGen [2010] and ConocoPhillips [2010]. It was also made over

103 The responses were to the following questions in the document:
Q20: Do you agree with the Government’s preferred policy of introducing a capacity mechanism in addition to the improvements to the current market?
Q21: What do you think the impacts of introducing a targeted capacity mechanism will be on prices in the wholesale electricity market?
Q22: Do you agree with the Government’s preference for the design of a capacity mechanism:
   - a central body holding the responsibility
   - volume based not price based; and
   - a targeted mechanism, rather than market-wide?
the early part of 2011 by a number of Big Six CEOs in the House of Commons Energy and Climate Change Select Committee inquiry on EMR and in speeches:

‘We are a big supporter of capacity payments because a market which may have more intermittency in future. We are not particularly happy about the initial proposals or discussion topics from DECC on that. Experience from all round the world says reward all firm capacity. If you try to target for peak periods, what tends to happen is you displace investment and end up with the scheme migrating towards all firm capacity being rewarded. We think we should make sure that we get that right from the beginning. (John Campbell, CEO Scottish Power, quoted in ECC 2011: Q171, Ev 49).

‘We need a capacity market in the UK, and it should be for all capacity. Any targeted mechanism anywhere in the world ends up being changed into all or nothing.’ (Ian Marchant, CEO SSE quoted in ECC 2011: Q171, Ev 50).

‘[Capacity payments]…will reward investment in firm, available generation – helping provide the security of supply we all need, as increasingly more intermittent generation such as wind is placed on our grid. And, in rewarding such generation for its important role in maintaining security of supply, we believe it is only sensible that these payments should be made to all plant that is ready and available at times of peak demand.’  

The role of the slippery slope argument was also highlighted by industry participants in and observers of the process:

‘The discussion in BCSE on strategic reserve vs market wide was based on slippery slope arguments.’

‘As I recall it was the slippery slope argument…we didn't believe that you could leave it to be a small strategic reserve, that it would grow…’

‘…clearly what was happening was that there was a very, very strong pushback from the industry against a targeted capacity mechanism…so basically what they were all saying was that, you know, it was not economically rational to pay a part of the market a capacity mechanism because the domino effect, and all you’re going to do is encourage a slippery slope…’

104 Speech by Vincent de Rivaz, CEO EdF Energy at Talk Power Conference, 8 February 2011, Available at: http://media.edfenergy.com/r/528/speech_by_vincent_de_rivaz_at_talk_power_2011_conference
105 Interview 4
106 Interview 6
107 Interview 7
A related argument deployed against the SR by some of the corporate actors was that a targeted approach would not provide sufficient volume of despatchable capacity to ensure system security at times of high demand and low wind output, especially in winter during meteorological high pressure events that could last several days. Scottish Power [2010: 17] provided the fullest statement of the issue:

*the principal security of supply problem will not be short term ramp rates, but the ability of the system to keep going through a prolonged lack of wind energy… The Nera analysis [commissioned by Scottish Power] demonstrates that the Government’s current proposal for a targeted capacity mechanism will not work in this context, unless the “target” is so broad as to encompass substantially all firm plant.*

It was also expressed by others, including International Power [2010] and SSE [2010]. However, the slippery slope argument ultimately underlies this volume argument, since the need to take a large amount of capacity out of the market into a reserve would exacerbate both the need and the temptation for a government to deploy that reserve more frequently, with a greater negative impact on investment incentives.

In the summer of 2011, in the consultation on more detailed proposals for a capacity mechanism in an annex of the EMR White Paper, the government again put forward a Strategy Reserve as a preferred option, but included a number of proposed remedies for the problems raised by industry actors in the 2010 consultation. These included (DECC 2011a: 166-167):

- To meet the slippery slope concern, the proposed remedies were to set a high despatch price, above the highest LRMC in the electricity market, but below the theoretical VoLL. SR would be despatched only as a ‘last resort.
- To meet the concern that the despatch price would be lowered at times of high prices and stress, this price would be set through a well-defined process and would not be changed because short-term political pressures.
- To meet the concern that the cost of the Strategic Reserve would not be reflected in wholesale prices, this cost could be included in the cash out calculation in the Balancing Mechanism, as with the cost of existing STOR
- SR procurement would include a mix of sources, based on criteria designed to allow flexible capacity, including DSR, storage and interconnection.
However, in their responses most of the Big Six corporate actors mainly dismissed these proposed remedies and repeated the arguments made earlier.\(^\text{108}\) Centrica [2011] argued that a very high despatch price would not be credible, with no objective, legally binding basis for defining the price, and repeated the slippery slope argument. EDF [2011] likewise did not consider that the remedies fully addressed the slippery slope problem. Similarly to Centrica, their argument was that the volume of SR needed, the despatch criteria and the impact on imbalance price would change over time as the amount of intermittent generation rose and it would be ‘extremely difficult’ to set these parameters correctly. E.On [2011] also did not consider that DECC’s approach mitigated concerns over ‘market distortions’ from SR, as setting a ‘correct’ despatch price would be impossible because it would vary constantly with fuel prices. There was a particular concern about the time taken to establish credibility in the setting of the despatch price; in the interim there would be delays in investment while participants see whether the government or regulator would succumb to political pressures to reduce the despatch price. Scottish Power [2011] likewise thought that there would be a delay in investment ‘pending clarity on SR availability and dispatch price’, leading to a slippery slope. They also thought that an SR would not be sufficient to address the missing money problem. SSE [2011] argued that a targeted SR could actually jeopardise security of the system. Its ‘fundamental flaw’ was that it wouldn’t mitigate the risks faced by generators in the energy only market, as it would be primarily aimed at providing capacity only in exceptional circumstances, and so wouldn’t draw new investment into the market. They also repeated the slippery slope argument.

A majority of the IGG corporate actors were similarly critical of the SR. International Power [2011] argued that it would subject the rest of market to price cap, and that there would be uncertainty about how the despatch price would be determined. Intergen [2011] also was of the view that the proposed remedies would not avert a slippery slope. Like SSE, they saw the SR as a relatively marginal intervention that would not be enough to address the capacity need. Intergen also criticised the Swedish SR model which the consultation document had drawn on, because it had led to price distortion. Drax [2011] saw a SR as the least desirable approach, as it would not incentivise plant outside the Reserve, it would be difficult to define the volume

\(^{108}\) The responses were to the following questions:

Q1: Does this table capture all of your major concerns with a targeted Capacity Mechanism? Do you think the mitigation approach described will be effective?

Q11: Given the design proposed here and your answers to the above questions, do you think a Strategic Reserve is a workable model of Capacity Mechanism for the GB market?

Q25: What is the most appropriate design of Capacity Market for GB and why?

Q27: Which Capacity Mechanism should the Government choose for the GB market and why?
required, the despatch criteria and price, and a risk of political intervention would lead to a slippery slope.

There were a few dissenting voices, amongst those corporate actors which had been opposed to any form of capacity intervention in the original 2010 consultation (ESB International [2011], RWE [2011], DONG [2011]). For these actors, the priority and only truly desirable course of action was reform of the existing wholesale market to make it more liquid and to provide sharper incentives for investment. The view from some of these dissenting voices was that of the two options (SR vs market wide), the SR was the lesser of two evils as least cost and less distorting for the wholesale market, and could be made to work under certain circumstances, especially with clarity about the ‘last resort’ circumstances in which an SR mechanism would be used. For RWE [2010: 6], ‘Any broad based mechanism would undermine the economic and efficient operation of the electricity trading arrangements’, and the company was sceptical about the volume argument for a market-wide mechanism, pointing out that more demand side options would be available by the 2020sm, and that companies already had incentives to retain ramping capacity.

9.3 Alternative ideas in the debate

In addition to the dissenters amongst the incumbent corporates, there were also others who argued that a SR approach remained preferable to a market-wide mechanism. In the 2010 EMR Consultation, where the SR was the government’s preferred approach, roughly four times as many respondents supported that option compared with a market wide approach. There were 265 responses in total to the 2010 EMR consultation document. Excluding the 12 respondents identified as incumbents in this study, and 21 individual/anonymous responses, there were a total of 232 responses from identifiable organisations (Table 9). A majority of these responses did not answer the relevant question, but of those that did, many more were supportive of an SR approach. However, it should also be borne in mind that many respondents to the consultation were not involved in the details of the energy market, and there may have been an affirmation bias, in that those not knowing a lot about the issue may have been inclined to agree with the proposed option as a default.
Table 9: Responses on capacity mechanism proposals in 2010 EMR Consultation document by actors other than Big Six And second tier generators

<table>
<thead>
<tr>
<th>Q22c Do you agree with the Government's preference for the design of a capacity mechanism: a targeted mechanism, rather than market-wide?</th>
<th>Did not answer the question</th>
<th>Yes</th>
<th>No</th>
<th>Neither/Don’t know/more work needed/mixed views</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>170</td>
<td>41</td>
<td>11</td>
<td>10</td>
<td>232</td>
</tr>
</tbody>
</table>

Note: Excludes 21 individual and anonymous responses

However, there were some close observers of the electricity market who were strongly against a market-wide mechanism. Energy consultancy Pöyry [2010] were of the view that an SR approach would be less disruptive of the existing market arrangements, and put forward their own model for capacity ‘options’. It would also cost less to consumers, a point reinforced by the Impact Assessments. Pöyry was not convinced that a major intervention in the market was required, despite the growth of intermittent renewables.

Late on in the process, Baker and Hogan (2014) argued that the government’s shift in preferred option from SR to market-wide was both unnecessary and would harm consumers. They picked up on Redpoint’s original 2010 options analysis, which showed a clear cost advantage to an SR approach (as was also the case in subsequent Impact Assessments in 2011 – see section 9.1 above). They argued that this was despite the fact that the Redpoint analysis involved assumptions that ‘clearly favoured a market wide [mechanism], such as an assumption that all scarcity pricing would disappear from energy prices’. (Baker and Hogan 2014: 6). As with the dissenting incumbents, they also argued that sharper cash-out incentives would make a market-wide capacity mechanism redundant (as was the decision in the Texas ERCOT market), but that if introduced it would work against such incentives.

Both Baker and Hogan (2014) and Mitchell (2014) argued that an SR approach would be more transparent and less open to distortion through detailed design features than a market-wide approach because the latter would require a reliability standard and a methodology for converting that standard into a capacity requirement (see Section 10 below). Mitchell (2014) also argued that an SR mechanism would be more flexible, able to distinguish between capacity (for example on carbon intensity criteria), and would not depress prices.109

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109 In principle, an SR, by taking capacity out of the market, would increase scarcity and increase prices (up to the peak at which SR capacity would be deployed).
9.4 Influence on the decision

As with the question of whether to introduce a capacity mechanism at all, there was thus a range of views on the issue of a SR vs market-wide design. However, decision makers were also confronted with a clear (majority) corporate lobby from the generators strongly opposed to a targeted approach. There is evidence that the slippery slope and volume arguments put forward by the lobby were the most influential. For example, these arguments are reflected in the Technical Update document in which the decision was made public:

‘In reaching a decision to introduce a Capacity Market, we considered a number of alternatives. The leading alternative mechanism, a Strategic Reserve, would require wholesale electricity prices to spike to very high levels. This would mean keeping potentially efficient plants outside the market. It could also lead to concerns from investors that the Government or regulator would intervene to reduce prices. We share concerns expressed by a significant proportion of consultees that this may lead to a “slippery slope” where more and more capacity needs to form part of the reserve, particularly if the security of supply problem turns out to be significant.’ (DECC 2011c: 29)

But it is also confirmed in other sources. For a senior official in DECC:

‘I think the thing that flipped us was not just the security of supply numbers; it was the understanding around what can be described as a slippery slope. The switch from a strategy reserve to a capacity market was more concerned with the fact that as those scenarios got a bit more challenging, strategic reserve just didn’t seem to stand up, and in fact, we were of the view, which I think has been borne out actually, so I think it was the right view, that you end up in a world where marginal plant has an incentive to come off, to get itself in the reserve…’

‘...the intervention was considered to be an insurance policy in a comfortable world that suddenly looked like it was going to be under more pressure given the new analysis, and I think given that analysis, the slippery slope argument felt much more compelling…it doesn’t take long before you start getting very, very large numbers of the reserve that you need to realise this is potentially not going to be economic.’

\[\textsuperscript{110}\] Interview 5
According to a senior political adviser:

‘There was a perception that a market-wide mechanism was more market based and would be less of a return to a CEGB.\textsuperscript{111} There was also the slippery slope concern...’\textsuperscript{112}

From evidence to the House of Commons Energy and Climate Change Committee inquiry on the EMR in the spring of 2011, it is also clear that the arguments of the corporate lobby had had an impact. The then Secretary of State Chris Huhne was asked about the slippery slope argument, He replied that:

‘I don’t think that is quite fair. I take the point and I think that that is one of the things that we have to take away from the consultation and get to the bottom of. But I take the basic point, which is obviously at the moment what happens is that when you get peaks, surges of demand, you get also peaks in the price. That becomes an important part of the revenue stream for particular types of generating plant in coming on grid. I take that point and obviously as the capacity mechanism begins to operate what will tend to happen is that you will even out the rather alpine-looking chart of price changes and that might also have an impact on the total rate of return to particular types of plant. I think the fundamental point that you are making is right. I wouldn’t go as far as you to say that it then effectively has to cover everything. I think it depends on the circumstances.’ (ECCC 2011: Ev 116)

Huhne then handed over to the then Director General for Energy Markets and Infrastructure at DECC, Simon Virley, who added:

‘Could I just add there are obviously trade-offs either way and we are looking at the responses to the consultation now. If you have a capacity mechanism covering the whole market then you have to be careful you are not paying twice for the same capacity. There are obviously arguments both ways.’ (ECCC 2011: Ev 117)

Shortly afterwards, Huhne again emphasised the role of the consultation:

‘...clearly one of the reasons for having the consultation is precisely because we are not wedded to particular elements and we do want to make sure that the whole system fits together in a coherent manner. That is precisely what, taking account of all the

\textsuperscript{111} The Central Electricity Generating Board was the state-run institution for determining capacity prior to privatisation of electricity in 1989.

\textsuperscript{112} Interview 2
responses that we have had, we want to do, so we are certainly very aware of that.’
(ECCC 2011: Ev 117)

These comments clearly show the weight given to the slippery slope – the central argument made by the corporate lobby – and its interaction with worsening official expectations about the capacity gap over 2010 and 2011 (see sections 8.3 and 10).

However, it also appears that the government increasingly became concerned about the volume of future capacity (Scottish Power’s argument) rather than flexibility (the argument of the second tier generates and others), with that concern symbolised by the problem of the extended winter high with low wind and high demand. This is despite the fact that Pöyry’s 2009 analysis of wind data over 8 years suggested that such events would be relatively rare, with only a handful incidences over that period where wind output was below 5% of capacity for longer than 18 hours at a time (Pöyry 2009: 4-5).

A senior advisor in DECC recalled that the decision to go for a market-wide design:

‘…was also about scale; if this was a small requirement, a strategic reserve makes sense, if a bigger issue than a market wide approach is better… Throughout, there was concern about the infamous five still days in January’

There is some evidence that senior government views may also have been influenced a particularly cold snap in late November and December of 2010 which coincided with a period of low wind output from mid-November to early December (National Grid 2011: 38). The Energy Minister at the time, Charles Hendry, also said in evidence to the Energy and Climate Change Committee inquiry on the EMR in the spring of 2011 that:

‘I think that what we learned from the period before December, when it was so cold and the wind was not blowing very much, is that the great challenge for us in this decade is how we move from the power being available when the resource is there to the power being available when the consumer needs it.’ ECCC (2011: 116).

113 Interview 2
9.5 Summary and conclusion

The decision at the end of 2011 to adopt a market-wide design for a capacity mechanism is perhaps where there is the clearest case for corporate influence. Throughout 2010 and most of 2011, the government’s preferred option was for a targeted mechanism, which was the more cost effective according to its own Impact Assessments. However, following a strong push-back from the majority of incumbent generators over the course of two rounds of consultation (plus various meetings with ministers and officials), the government changed course and adopted the incumbents preferred market-wide option.

A number of arguments were put forward on either side, with proponents of SR arguing that it was cheaper, more flexible, a better fit with the existing market and would distort prices less, while advocates of the market-wide approach argued that the SR would suffer from the ‘slippery slope’ problem and would not be adequate for periods of low wind and high demand in the 2020s. Some arguments – notably that their approach would make better use of DSR – were put forward on both sides.

However, as the government’s concern about a possible capacity crunch grew through the year (see Section 10 below), it appeared that decision makers were unwilling to take the more incremental design option and were swayed by the arguments of the majority incumbent lobby. Here, had this lobby not been so strong it seems very plausible that government might have stayed with its original preferred option.
10. Setting the reliability standard

A crucial element of the Capacity Market design was the setting of the reliability standard. A reliability standard refers to the level of security of supply that is to be aimed for. It would be impossible and/or prohibitively expensive to guarantee that the supply of electricity would never be insufficient, because generating plants might go off line for various reasons, including accidents or unplanned repair or maintenance, and because demand might rise unexpectedly quickly. A reliability standard is therefore probabilistic in nature. It can be expressed in different ways, but one common metric is in terms of an amount of time (e.g. number of hours) within a year ‘in which supply is expected to be lower than demand under normal operation of the system’ (Ofgem 2016: 3). This is known as ‘loss of load expectation’ (LoLE). For the GB Capacity Market, the standard was ultimately set at a LoLE of 3 hours a year.

However, it is notable that the commitment by 2011 to have a CM in general preceded the formal definition of a reliability standard, i.e. what level of LoLE was to be allowed and therefore what capacity margin was to be targeted, which was decided on only in 2013. In the words of industry insider David Porter (2014: 289), ‘…the discussions around [the CM] seemed to take place without much debate about the level of security we were trying to achieve…’ Thus the early debates on resource adequacy took place without an absolute basis, which allowed much greater space for competing interpretations of what kinds of risk were tolerable, or how the assessment of risk should be constructed.

From a given LoLE target a capacity margin, i.e. excess of generation capacity over expected peak demand, required to meet that target can be derived, using a methodology that makes assumptions about plant availability and capacity factors. Both of these steps – i.e. the setting of the reliability standard and its conversion into a capacity margin requirement – require making judgements and assumptions, and so can be seen, in Mitchell’s (2014) words, as ‘eminently riggable’.

This section first lays out the way which the reliability standard was defined, and the development of the methodology for converting this standard into a target amount of capacity to be procured. It then goes on to examine the evidence on how the incumbent corporate actors engaged on this issue through the policy process. Finally, we assess the degree to which this engagement may have influenced decision, given the positions of other actors.
10.1 The evolution of the decision

The decision to have a market-wide capacity mechanism with auctioning had been taken by the end of 2011. In 2012, work started on the Energy Bill that was to transform the EMR into legislation. During the course of 2012, the government formally commissioned National Grid as the System Operator to be the delivery body for the EMR, including the Capacity Market.

At the time of the publication of the Bill in November 2012, DECC also published a policy overview document (DECC 2012a), in which it noted that implementing the CM would require forecasts of peak demand for the periods to be covered by contracts, and a net amount of capacity need to ensure security of supply, ‘which is likely to be informed by an enduring reliability standard’ (p. 19). Further details were given in an Annex (DECC 2012b).

In early 2013, National Grid began work on detailed analysis on the expected impacts of key EMR policies, and developed proposals for a reliability standard and methodology for calculation of the required capacity margin. In July 2013, as part of the consultation on the EMR Delivery Plan, these were published. The key points were:

- The reliability standard was to be ‘enduring’, i.e. permanent in nature. To give investors clarity, it would be fairly fixed, with a proposal to review only once every five years.
- The standard would be expressed as a LoLE, ‘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’ (DECC 2013b: 47-48)
- The proposed reliability standard was 3 hours a year, translating into a system security level of 99.97%. This proposal was the result of ‘an analytical approach to identify the most cost effective reliability standard for the GB market, and comparison with standards in neighbouring markets.’ (DECC 2013b: 48-49)
- National Grid as system operator would be responsible for setting out how much capacity to procure in order to meet the reliability standard, and provide advice to the Secretary of State, who would ultimately be responsible for the decision
- National Grid’s methodology would not be simply to give a single target figure for the amount of capacity to auction for, but rather a demand curve which sets out a range around the target.

The process by which the reliability standard was calculated drew on two key variables. The first was a measure of how much electricity is valued by consumers, in the form of the Value of Lost Load (VoLL), i.e. the value that consumers place on avoiding the loss of electricity supply. Based on a study by London Economics jointly commissioned by Ofgem and DECC (London Economics 2013), the proposal was that this should be considered to be around £17,000/MWh. The second variable was the cost of supplying energy in the cheapest way, which was taken to
be a new combined cycle gas turbine (CCGT) plant. This is usually referred to as the cost of new entry (CONE) and was estimated to be around £47,000/MW-year, on the basis of a review by engineering consultancy firm Parsons Brinkerhof. The willingness of consumers to put up with loss of electricity supply, i.e. the LoLE, is then calculated as the ratio between how much it costs to provide extra supply (CONE) and the value they give to that supply (VoLL) (see DECC 2013a: 10-11).

The consultation on the EMR delivery plan closed in September. In October, the government consulted again, on a more detailed Implementation Plan (DECC 2013c) covering payment, institutional arrangements, the legal framework, pre-qualification and other details. Finally, in December 2013 a finalised EMR Delivery Plan was published (DECC 2013g). This confirmed the reliability standard at a LoLE of 3 hours/year.

The LoLE standard was then used as the basis for determining how much capacity to auction, using a methodology that was originally developed by National Grid for Ofgem’s Electricity Capacity Assessments from 2012 onwards. This process involved a number of steps. First, a view was taken on what peak demand would be up to the early 2020s. Second, a view was taken on what mix of generating capacity (including interconnectors) would be available, both that eligible for the CM and that not eligible. These estimates also draw on assumptions about the availability of plant, as discussed further below. Both these assumptions are based on a set of scenarios that National Grid have used more widely in their Future Energy Scenarios work. The methodology then uses a ‘Dynamic Despatch Model’ (DDM) to make a probabilistic estimate, given the capacity and demand projections, of whether the 3 hours/year LoLE standard would be reached, and if not, how much extra capacity would be needed to ensure that it would be, under each scenario (with a limited range of sensitivities, such as particularly cold winters). This then yields a range of possible amount of capacity to procure through the CM; in the 2014 report the full range was from 48GW to over 56GW (National Grid 2014: 48).

To choose the amount to procure amongst this range, National Grid used a technique known as ‘robust optimisation’, which selected an amount based on the costs of over- or under-procuring capacity. Because these costs represent what happens when the anticipated outcome does not materialise, this approach is also known as ‘least worst regret’. Since the relationship between adding capacity and reducing the expectation of lost load is non-linear, the impact of under- or over-procuring at low capacity margins is not symmetrical (National Grid 2014: 50), effectively pushing the amount to procure above threshold below which LoLE starts to rises rapidly. The

\[ \text{LoLE} = \frac{\text{CONE}}{\text{VoLL}} \]

\[ \text{VoLL} = \frac{\text{£17,000/MWh}}{\text{£148.920m/MW-year}} = 0.0003165 \]

\[ \text{CONE} = 0.03156\% \]

\[ \text{LoLE} = 2.765 \text{ hours} \]

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114 The £17,000/MWh VoLL figure converts into a figure of £148.920m/MW-year. Dividing the £47,000/MW-year CONE figure by this yields a ratio of 0.0003165, which represents the LoLE. In percentage terms this is 0.03156%, which is the derivation of the 99.97% system security figure above. Multiplied by the number of hours in a year (8,760), this then comes to 2.765 hours, which is then rounded up to 3 hours.
NG capacity reports then provide the basis for their advice to the Secretary of State, who formally gives authorisation for auctioning to proceed.

10.2 Ideas deployed by corporate actors

The most central corporate actor in this element of the CM policy process was not in fact the large generators, but rather National Grid, since it was giving advice directly to Ministers on the amount of capacity to procure, based on a methodology that the company itself had devised. Within what seems like a fairly technical process, a number of ideas were introduced that actually involved judgements potentially open to corporate or political influence.

One issue was the definition and interpretation of the Loss of Load Expectation (LoLE) concept. In international convention, the LoLE concept relates not to an expectation that power would be lost for an average of 3 hours a year (i.e. black outs) because of shortages of generation, but rather that it would be expected that on average, over an extended period of several decades, the system operator would have to take some actions to prevent a loss of load for three hours a year (IET 2014). These might include reducing voltage, asking generators to exceed rated capacity for a short period, bringing in additional balancing services, cutting interconnection exports to zero or requesting imports. Most of these actions would cost less than the chosen VOLL of £17,000/MWh. However, in National Grid’s methodology the application of such measures was counted within the LoLE.

A second issue was assumptions made in National Grid’s modelling work about plant availability factors. These give an indication of how far the theoretical capacity of a power station should discounted because of forced outages, and affect the derating of capacity. National Grid chose to base their assumptions on a broad metric of availability in recent years. As discussed further below, this was criticised at the time by a Panel of Technical Experts appointed by DECC (see Section 10.3 below). The Panel was also critical of the treatment of interconnectors, which were excluded from bidding in the first auction. It also raised questions about whether an auction for the period 2018/19 was necessary, based on available information at the time. Finally, in adopting the ‘least worst regrets’ approach to using scenarios to model the range of required capacity, National Grid were making a choice amongst several different options, with implications for the outcomes.

Overall, critics of the methodology argued that all of these decisions led to a more conservative assessment of required capacity than would otherwise have been the case (see section 10.3 below).
By contrast with National Grid, the Big Six and second tier generators appear to have had a more indirect engagement with the setting of the reliability standard and National Grid’s methodology. All of the Big Six and some of the second tier generators responded to the July 2013 consultation that contained the details of the reliability standard. However, unlike in earlier consultation phases, DECC did not publish the individual responses to the consultation, but summarised responses in a single document (DECC 2013h), and it is not possible to identify specific corporate positions. As reported in this document, most of the submissions were supportive of the government’s decision. Some generators also made brief submissions to Ofgem’s consultation on its 2012 Electricity Capacity Assessment, including on the modelling approach by National Grid that also underlay the 2014 Electricity Capacity Report. Again, they were generally supportive of the decisions proposed.

However, there is also evidence that over the period between 2010 and the end of 2013, when the decision was finally taken on a reliability standard, a context for the decision was set by signalling from some Big Six companies firstly that system security would be threatened towards the end of the 2010s and into the early 2020s, and secondly that there was an increasing urgency to make decisions and start auctions for capacity.

The capacity margin in the early 2010s was actually high by recent historical standards, but was forecast to fall rapidly (DECC 2011a: 65). The concern was what might happen later in the decade, driven by the closure of coal-fired and nuclear plants from 2015 onwards. However, it was also the case that over the period that the Capacity Market was being developed and as the reliability standard was being set, the economics of gas-fired power generation was very difficult because of low relative coal prices, and over the early 2010s a number of plants were mothballed or closed (Figure 4).
Paradoxically, these actions reflected a glut of capacity, but it is clear that some companies used these closures to signal the possibility of a future capacity crunch and the urgency of signals for new investment, effectively reminding government of its structural dependency in relation to electricity supply. In the words of a close observer of the industry:

‘...through 2011, things began to look tight...Huhne looked at near term winters and gulped...by then, generators were sitting on their hands and mothballing or closing CCGTs, trying to force the debate on the capacity market’

In its response to the 2010 EMR consultation, SSE had complained about the uncertainty created by the EMR, a resulting hiatus in investment and specifically the closure of a plant in Fife (later mothballed) and scaling back of plans for a new plant at Abernedd (SSE [2010]). In March 2011 the company scaled down the scale of operations at Baglan CCGT, and GDF Suez

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115 Interview 1
116 This was also reported in the media - http://www.bbc.co.uk/news/uk-wales-south-west-wales-12678852; http://www.scotsman.com/business/scottish-amp-southern-cuts-planned-power-plant-on-demand-uncertainty-1-1530607
(which had bought International Power) mothballed a CCGT at Teeside (Athanasiou 2012). At the end of June 2011, just ahead of the publication of the EMR White Paper and accompanying consultation on a capacity mechanism, the CEO of Centrica, Sam Laidlaw, gave a speech (widely covered in the media) in which he claimed that:

‘The clock is ticking. In my view, we as a nation have got one year in which to take action, or our carbon reduction targets may have to be sacrificed in the interests of safeguarding the security of our energy supplies.’

In 2012, an old Magnox nuclear plant at Oldbury (434MW) was closed. In March the same year, Centrica also took a number of actions, with the closure of CCGTs at Barry and Kings Lynn (later announced only mothballed), and the switching of Peterborough, Brigg and Roosecote (later announced closing) away from market to STOR operations.

At this stage a number of senior industry figures also started explicitly to put pressure on the government to accelerate the process of making decision on and delivering the capacity mechanism. Their message was somewhat contradictory, as most acknowledged that the fall in demand relative to expectations had pushed a capacity problem further out, but they argued that clarity would be needed soon to bring forward investment in the future. Giving evidence before the House of Commons Energy and Climate Change Committee’s pre-legislative scrutiny of the draft Energy Bill, the CEO of EDF, Vincent de Rivaz argued that the Capacity Market would be needed for the 2020s and wanted the first auctions in 2015 for delivery in 2020-ish. Andy Taylor, Energy Markets Group Director at Intergen, while he saw no immediate need for the CM, did see margins getting tighter in 2016/17, concluding that: ‘We should probably just put the mechanism in place so it is there as the insurance policy it is intended to be.” (ECCC 2012b: Ev 51). Steve Reilly, CEO of International Power argued similarly:

‘There is certainly oversupply in the market now…“Risk of the lights going out” is probably a bit strong but there will be the need for new capacity before the end of this decade certainly.’ (ibid)

Even RWE, which had been opposed to a capacity intervention, pressed for final policy decisions. Director of Policy and Public Affairs John McElroy reported that:

‘Our position has been that we don’t believe that the case for a capacity mechanism has been made. We believe that efficient price signals in the market can deliver. We have

seen quite a lot of investment in CCGTs over the last five years… [but]…we have almost driven ourselves to a position where we have to get on, and we have to provide the clarity and deliver it, because everyone is sitting on their hands at the moment and will not invest until such time as the capacity mechanism is detailed.’ (ECCC 2012b: Ev 21)

E.ON also added to the pressure on government, with press releases in the autumn of 2012 quoting CEO Tony Cocker as arguing that ‘the capacity market must be introduced at the earliest opportunity’,\(^\text{118}\) that clarity on the CM was needed for investment to be forthcoming, and that there was a:

‘…very real and present need for the Government to deliver a framework that will provide a sustainable future for existing power stations and the new age of investment this country needs. Over the coming months more power stations will stop powering the UK and this provides a most striking example of the need for a clear, straightforward and customer-centric solution to be delivered by the Energy Bill. We need to get it right, and quickly, so we and other investors can build new plants with confidence.’\(^\text{119}\)

2013 started with a statement from Scottish Power’s Chief Corporate Officer, Keith Anderson, in January arguing that:

‘…it is crucial to ensure that progress is made on the Government’s current delivery timetable with CfDs and a capacity mechanism being introduced in 2014. Ofgem’s evidence on security of supply and accelerated closure of coal-fired power stations means that there is a need to progress with a first capacity auction in 2014.’\(^\text{120}\)

In March, SSE announced the outcome of a review of its fossil fuel generation operations, with plans to mothball a CCGT at Keady and close coal-fired power stations at Peterhead and Ferrybridge by the end of 2014. A press release from the company argued that it would make no new-build investment in gas-fired electricity generation in Great Britain until at least 2015, and that: ‘the Government needs to bring forward to 2014 capacity payments for existing plant if


it wants to reduce the risk of a serious capacity “crunch” in the next three years.” It went on to say that its review of plant:

‘…has also been influenced by the prolonged and ongoing uncertainty around the UK Government’s Electricity Market Reform (EMR). In particular, a lack of clarity on both the timing and operation of a capacity mechanism means there is huge uncertainty regarding future revenue streams for existing thermal plant and what level of return might be achieved by new investments in thermal generation plant. The convergence of these market conditions and prolonged public policy uncertainty, all of which run counter to achieving security of electricity supply for Britain, has led SSE to conclude that it can no longer absorb the impact of them without a significant adjustment to its electricity generation portfolio.’

In April, a gas plant at Barking was also mothballed. In the summer of 2013, Sam Laidlaw returned to the fray, quoted in the Telegraph:

‘Mr Laidlaw echoed recent warnings over a rising risk of power shortages as old coal plants close, saying blackouts could happen “if there are further plant closures without new investment”…Mr Laidlaw said ministers should…bring forward the introduction of a new system of capacity auctions that are not due to start making payments until 2018.’ (Gosden 2013)

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121 http://sse.com/newsandviews/allarticles/2013/03/review-of-thermal-generation-operations/. SSE’s tone and approach here differed somewhat from that of its CEO, Ian Marchant, in the summer of 2012, when he appeared before the ECCC pre-legislative inquiry and said that: ‘We simply need less capacity from 2015 onwards than we thought we did five or six years ago. Therefore, we may be trying to solve a much bigger problem than the actual problem we face. I have changed my view. I thought a capacity mechanism was essential. I now think it is desirable but it is not essential. I thought intervention mechanisms to improve investment were essential. I now think they are not essential. The industry can deliver the scale of investment needed in the next decade.’ (ECC 2012b: Ev 11). Marchant left SSE in 2013.
10.3 Alternative ideas in the debate

Against the judgements made by National Grid and the signals on a looming capacity crunch sent by some of the incumbent generators described above, there were other voices that were critical of both.

In 2013, academics Pollitt and Brophy Hanley for example, argued that: ‘the case for a market-wide capacity mechanism is not yet clear.’ (2013: 12-13). Pollitt, quoted in Tsagas (2014) also argued that:

‘…the whole idea of a capacity market for Great Britain was based on scare mongering about electricity supply shortages, which would not have materialized. There was no serious evidence of capacity shortages developing in the light of the anticipated evolution of supply and demand. Given the actual evolution of supply (where, if anything, renewables have been added quite quickly) and demand, which has remained flat, there would have been even less of a problem that might have been anticipated.’

The specifics of the government’s approach to the reliability standard were also challenged. One issue highlighted by a number of observers was the definition and interpretation of the Loss of Load Expectation (LoLE) concept. National Grid’s approach to LoLE described above was criticised by the IET (2014), and by Baker and Hogan (2014) who argued that while it reflected:

‘…custom and practice in GB, is not consistent with practice elsewhere and introduces yet another layer of questionable conservatism into the assessment.’ (Baker and Hogan (2014: 2).

Newbery and Grubb (2015) argue that confusion over the meaning of ‘loss of load’ drove Ministers to be excessively conservative, choosing the top of the range of system security recommended by National Grid. This in turn led to an excessive target for the capacity margin (and hence the capacity auction), because the reliability standard was too high given the range of mitigation measures available, and because the range of options for such measures could be broadened further. Baker and Hogan (2014) and Newbery and Grubb (2015), also argued that a reliability standard should be interpreted as a target for average performance over a long period, allowing for year to year variability, whereas the 3 hours/year figure was in fact being treated as an absolute minimum never to be breached, which again produced an excessively conservative approach.
National Grid’s assumptions on plant availability were also criticised by a Panel of Technical Experts (PTE) which had been appointed by the government in February 2013 to review the assumptions used in National Grid’s modelling. The panel comprised three academics, one member with a background in the nuclear industry and one member from an engineering consultancy. This Panel produced an initial report on National Grid’s analysis which was published in July 2013 (DECC 2013f) as part of a consultation on the EMR delivery plan (DECC 2013b). In this first report, the PTE argued that National Grid had adopted the wrong approach to making assumptions about plant availability, basing these on general availability, rather than on peak period availability where generators have a greater incentive to make plant available. The PTE argued that the factors applied by National Grid were ‘extremely conservative (low) by industry standards’ (DECC 2013f: 18), leading to an overestimation of future capacity requirements. In response to this criticism, DECC commissioned engineering consultancy Arup as an ‘independent technical advisor’ to re-examine availability rate assumptions. However, in its subsequent 2014 report, the PTE remained critical of the relevance of the evidence gathered (DECC 2014e). This point was also picked up by others, including Baker and Hogan (2014) and IET (2014). The Panel was also critical of the highly conservative treatment of interconnectors which were excluded from bidding in the first auction (see also Baker and Hogan 2014 and Newbery and Grubb 2015). It also raised questions about whether an auction for the period 2018/19 was necessary, based on available information at the time.

Finally, while the PTE did accept the ‘least worst regrets’ modelling methodology adopted by National Grid for the capacity assessments (see Section 10.2 above), others were more critical. According to one observer close to industry:

‘The way they [National Grid] actually look at scenarios is extremely suspect…You would normally do a Monte Carlo analysis or something, where you…define a load of scenarios and try to put a weighting against how likely each one was, then you run the numbers and you come out with an answer. But they don’t do that – they select a range of scenarios…equally likely to occur, they call this the ‘least worst regrets’ process. And it is an established statistical technique, but you have to be very careful about selecting a balanced set of scenarios…But they don’t do that – they start including things like what happens in a one-in-ten winter…”

122 https://www.gov.uk/government/groups/electricity-market-reform-panel-of-technical-experts
123 Interviewee 3 also complained about ‘arbitrary de-rating on availability’.
124 Interview 8
10.4 Influence on the decision

Decisions on the setting of the reliability standard and on the methodology for setting required capacity to auction, therefore came under two types of corporate influence. One was National Grid’s close involvement in, even determination of, the latter process. A second was a constant drip-drip of statements from the Big Six generators expressing concern about future system security and the need for urgent action, over the entire period leading up to the setting of the reliability standard. These factors arguably would have reinforced the political incentives for government to choose a stringent reliability standard and move quickly to an early auction for an amount of capacity that would have been excessively large.

At the same time, there were also many voices that were critical of the emerging decisions on the reliability standard and the related methodology for determining how much capacity to auction, as well as of the wider view that there was a real capacity crunch looming.

However, there is considerable evidence that decision makers were not convinced by these dissenting views, but rather were aligned with the ideas put forward by corporate actors. First, they appeared to have been convinced that the risks of resource inadequacy were critical and increasing over this period. As discussed in section 8 above, in 2010 the idea of a capacity mechanism was seen as much as an insurance policy as much as something which was urgently needed for immediate use. According to a political advisor in DECC, fears of resource inadequacy built up only incrementally. However, it is clear that views in government did indeed change over time. In the words of a senior official:

‘The most fundamental change in outlook [over EMR], from when we started to when we finished, was in security of supply.’

By mid-2014, the then Secretary of State, Ed Davey, was talking about a ‘ticking time bomb of electricity supply risks.’ The signalling from Big Six suppliers was by far from being the only factor here. One issue was that as it expanded the EMR team (see section 7 above) DECC also built up its own in-house modelling capacity and was exploring a greater range of scenarios, including more risky ones:

125 Interview 2
126 Interview 5
‘When I joined the team we did all our modelling through consultants, so it was Repoint…and Poyry. Interestingly, one of the reasons I think our view changed was we built our own in-house model. The difference is, once you have you own in-house model, it’s much easier for anybody, including the Director and the Director General, to say: “Can we test what happens if…”. It sounds like a kind of trivial thing, but it made such a big difference, because suddenly…under normal circumstances if I’d used my…cash up, for me to ask the question “What happens if nuclear power stations stay on longer than their current life expectancy?” – that’s a three-week process, that costs extra money etc., whereas if you’ve got an in-house team, it’s much more organic and direct. And so I think we got a more realistic understanding of the substance behind security of supply as we started doing our own in-house modelling, which meant…suddenly the projections went from being fairly comfortable to looking much more concerning.’\textsuperscript{128}

Under the 2011 Energy Act, and preceding National Grid’s Electricity Capacity Reports, Ofgem was tasked with producing an annual capacity assessment, The first of these, appearing in 2012, showed de-rated capacity margins shrinking in the near term (i.e. by 2015/16) and according to one close industry observer, was the catalyst for the instruction to set up the Supplementary Balancing Reserve (SBR) mechanism in 2014 (in fact it appears that the SBR was never actually drawn upon - see ECIU 2017).\textsuperscript{129}

In this context of the perception of rising risks, the basic political incentive to err on the side of caution, discussed in sections 4.2 and 8.3 above, was enhanced. There is some evidence that this factor played a key role in influencing what might appear to be the purely technical or evidence-based process of setting a reliability standard and associated methodology for setting a capacity auction requirement, but which actually involve what are series of judgements, some of which are inherently political in nature. In the words of one close industry observer:

‘There’s the whole problem with reliability standards, I mean they sound great on paper when they are economically derived, but politically they are not acceptable because nobody is going to…no politician is going to want to be in the chair when all this [i.e. power shortages] comes along…’\textsuperscript{130}

\begin{footnotes}
\item[128] Interview 5
\item[129] Interview 1
\item[130] Interview 8
\end{footnotes}
This view is in fact also found within government, as for example in the account of a senior DECC official:

‘There’s a logical way of calculating VoLL [value of lost load] based on the economic costs etc. of outages…but I would say genuinely that the cost to a country of significant outages, because generation outages are significant, they are not like…I’ve had two power cuts in my house in the last month but that’s not a disaster for anybody…but it’s very different when you’re pulling industry off and…understanding the emergency protocol, if we ever had to cut off swathes of households…the damage to UK credibility as an economy of sustained losses, is extremely high. So I think what you end up with…you have a fairly robust way of to say “What are the economic costs of being cut off, therefore how much do customers value lost load?” therefore using that as a benchmark. But within that there is a series of possibilities and you will always be on the cautious end. And that comes down to a very deep question about what you think the role of politicians is in policy in general and energy in particular. And I would argue…that it is a Ministerial responsibility to trade off cost versus security of supply.’

It is worth noting that this view of the policy process is actually quite widely acknowledged. According to the government’s response to the 2013 consultation on the EMR delivery plan, in relation to the methodology for determining the reliability standard,

‘…some respondents stressed that this is also a political judgement and therefore need not be based only on the analysis, particularly as the parameters of the calculation [i.e. VoLL and CONE] were uncertain.’ (DECC 2013h: 62).

There are different views on the role of National Grid here (as there are on the treatment of the demand side – see section 11 below). One is that, as discussed in section 6.1 above, the National Grid Group as a whole has a commercial interest dominated by its transmission asset business, which would benefit more the higher the amount of capacity in the system, and that this would determine the choices of the team working on the methodology. This pressure would also be enhanced by the reputational risk to the System Operator part of National Grid if there were major power shortages due to generation inadequacy. The other is that National Grid was actually pushed to make certain choices by government, which wanted to be able to justify a decision to auction a large amount of capacity. An independent observer with a good knowledge of both government and National Grid, tends to the latter view, in answer to a question about what the government would do about fears of blackout:

\[131\] Interview 5
Well, by taking a lot of very conservative assumptions; and getting National Grid to take a lot of very conservative assumptions…They (i.e. National Grid) took awfully low availability levels…they used data that they, as experts, must have known was not really representative, because they look back over a number of years where we had bags of plant, so there was no real push for anybody to…improve their availability…Their assumptions about interconnection contributions…were very low.

I think there is reputational risk, all the incentives are for National Grid to be conservative. But in my experience of National Grid, technically they are pretty good, and I am sure they have been put under pressure to do things which will increase the amount of capacity to be procured…from politicians, and that pressure I think has increased as the auctions have gone on…'

10.5 Summary and conclusion

The process of setting a reliability standard and applying it to set the amount of capacity to be auctioned involved a number of judgements, both in the choice of definition and level of the standard itself, and in the methodology for converting it to a required capacity (including scenario weighting and assumptions about future demand and plant availability). The decisions about these judgements, which were ultimately endorsed by the Secretary of State, were made jointly by the government and National Grid, but with the latter taking the more active role. This arrangement immediately raises the question of whether these judgements, which were criticised by some observers as all erring on the conservative side (i.e. implying that more capacity was auctioned for than was necessary), were influenced by National Grid for commercial gain. At the same time, over a period of two years leading up to the decision on the setting of the reliability standard many of the incumbent generators were signalling to the government that they expected an increasingly serious capacity crunch.

However, just as with the decision to adopt a capacity mechanism in the first place, the commercial interests of generators, and potentially National Grid, in a conservative reliability standard that would mean an over-generous capacity margin and excessive auctions coincided with political incentives for government. Certainly, there is some evidence that within the parameters of the modelling available to them, officials and Ministers were drawn to the conservative end because of a desire to drive the risk of blackouts to a minimum.
It is plausible that pressure from incumbent generators encouraged further in this respect. With respect to National Grid, who had the greatest direct input to the policy process, it is unclear from the evidence here whether the company led the government to adopt an excessively conservative methodology and assumptions; or the other way round, as one close observer implied (or indeed whether the two talked each other into a mutual agreement). However, what is likely is that if the setting of the standard and methodology had been undertaken by other, more independent actors, they would have been less conservative. This is suggested by the fact that what limited independent oversight that there was, in the form of the Panel of Technical Experts, was critical of some aspects of the approach, and continued to be so throughout the process.

11. The treatment of demand side response (DSR)

The Capacity Market is in a sense a misnomer, since the problem it is trying to solve is not one of capacity (i.e. for generation) shortage, but rather one of resource shortage, where those resources include demand side response (DSR) and storage (for example in the form of batteries). Early on in the process of developing the Capacity Market, official statements, and those of politicians, seemed to give prominence to the idea that the development of a capacity mechanism was an opportunity to help develop DSR, seen as part of the energy system in the future. However, by the time of the first auction, it was clear that a number of decisions had been taken that were problematic for DSR, certainly as seen from the perspective of the industry that the government apparently wanted to develop. Indeed, in December 2014, the demand-side company Tempus Energy took out a legal challenge to the General Court of the European Union stating that the CM design was unlawful and should not be allowed under State Aid rules because of its treatment of DSR. This section first lays out the way in which decisions on the treatment of DSR evolved between 2010 and 2014. It then goes on to examine the evidence on how the incumbent corporate actors engaged on this issue through the policy process. Finally, we assess the degree to which this engagement may have influenced decision, given the positions of other actors.

11.1 The evolution of decisions

Demand side response was officially included in the proposals for a capacity mechanism from the start. The December 2010 EMR consultation document introduces the principle of capacity payments as:
‘...targeted payments to encourage security of supply through the construction of flexible reserve plants or demand reduction measures (so-called negawatts) to ensure the lights stay on.’ (DECC 2010a: 6)

In the section on a capacity mechanism, the document had specific discussion of actions to support the demand side, arguing that:

‘Technologies such as demand side response, storage and interconnection offer the opportunity to have a greater diversity of technologies, so improving security of supply, as well as reducing emissions. A more dynamic demand side also increases competition and the effective functioning of the market. Demand side measures (energy efficiency, Demand Side Response (DSR) and distributed generation) can reduce the need for investment in infrastructure by reducing overall need and making more efficient use of network and generation capacity.’ (DECC 2010a: 82)

The document went on to argue that ‘For DSR to be fully effective the enabling technology and incentives for consumers need to be right’ (ibid: 83). This included the rolling out of smart meters, and the planned reforms to the wholesale market, including sharpening cash out price signals, and improving market liquidity. Few further details on how the design of a capacity mechanism might affect DSR were discussed at this point. There is a general statement that a capacity mechanism ‘can also be structured to reward demand-side response, storage and any other technology which can provide capacity’ (ibid: 86-87). Under the targeted Strategic Reserve option it is noted in passing that ‘It may be possible to take different approaches for different types of resource (e.g. to treat DSR differently to generation capacity).’ (ibid: 91).

The highlighting of DSR continued in the 2011 EMR White Paper, but again with little detail. The White Paper specifically notes in introducing the capacity mechanism discussion that:

‘New non-generation measures such as demand side response (DSR), storage and new connections to other countries offer significant opportunities to improve security of supply and reduce the overall generating capacity that is needed. Market arrangements need to ensure that these approaches can play their part in enabling secure supplies for consumers.’ (DECC 2011a: 61)

There is again clarification that the objective is resource adequacy, and that:

‘This includes not just traditional power stations but also non-generation technologies and responses such as DSR, storage, interconnection, and other innovative approaches.’ (ibid: 63)
DSR, along with storage and interconnection, is then again singled out in a section on ‘non-generation technologies’, where the White Paper states that:

‘The Government is keen for non-generation technologies and approaches, as well as traditional electricity generation, to form a central element of delivering security of supply and play a fair and equivalent role in a Capacity Mechanism.’ (ibid: 77)

However, there is again, virtually no discussion of how design options might affect DSR participation, or any details of how DSR might in practice be treated differently from generation.

At the end of 2011 the EMR Technical Update was published (DECC 2011c), where the decision was announced that the mechanism would take a market-wide form. This was partly justified on the grounds that: ‘A Capacity Market will also offer opportunities for non-generation approaches such as DSR to participate on a fair and equivalent basis with generating capacity…’ (p. 29) (although earlier DECC documents had also seen DSR participating effectively in a SR approach). The Technical Update also contained some further details on how the CM was to operate, specifying a central buyer and an auction. This document introduced some principles for rules, including on qualification and the need for financial collateral; the possibility of differential treatment of sources of capacity in terms of contract length etc.; penalties for non-delivery, and most importantly, specific rules relating to non-generation technologies, including DSR (ibid: 32). The document envisaged DSR providers as participating in the main auctions, but also in a secondary market.

Much of 2012 was taken up with the drafting of the Energy Bill, but at the end of that year a EMR Policy Overview was published (DEC 2012a). This document first introduces the idea of ‘transitional arrangements to support the development of DSR and storage to better enable their participation in the Capacity Market’ (p 20). These include the proposal for special auctions for DSR and storage in 2014 for delivery in 2015-2017.

An Annex to the main Overview document contains further details of proposed rules (DECC 2012b). The Annex argues that two barriers prevent the potential contribution of DSR and storage from being fully realised: a long (four year) lead time, because ‘it is difficult for DSR providers to forecast their ability to provide capacity this far ahead’ (p 21); and the requirement to provide capacity across a whole delivery year, since DSR can often only be exercised for a limited period, and is in any case most useful at times of peak demand (p 22). This approach leads on to proposals for ‘tailored arrangements’ for DSR and storage, which include (DECC 2012b: 22-23):
• Time-banded products, specifying delivery parameters such as duration and hours of operation, to be offered in a secondary auction closer to the delivery year
• Preparatory T-1 auctions for DSR and storage in 2014 for delivery in 2015-17, aimed at building the capacity of the DSR and storage industries
• Retaining the possibility for DSR and storage to participate in the main, primary T-4 auction.

The Annex also proposes certain other relevant rules. One is that in the main auction the agreement is for one year, except for new plant or plant undergoing refurbishment, which at this stage are thought of as up to 10 years in duration.

From early 2013, DECC set up a CM Expert Group\textsuperscript{132} (see above section 7) which met regularly from early 2013 to the spring of 2014. DSR was discussed by the Expert Group in March 2013, reviewing DECC’s proposals for a draft EMR Implementation Plan. Between mid-August 2013 and the end of September 2013 a series of intensive workshops were also held with industry actors in the Collaborative Development process (see above section 7). These also included discussion of DSR arrangements.

Shortly after these workshops, in October 2013, DECC published a consultation document on an EMR Implementation Plan (DECC 2013c)\textsuperscript{133}. This document contained quite detailed proposals across a number of areas:
• The principle of ‘technology neutrality’ is stated upfront (p 153).
• There is a \textit{de minimis} for contracted capacity of 2 MW, with smaller amounts of capacity having to be aggregated to this minimum.
• Pre-qualification to be divided into ‘existing DSR’, where providers can demonstrate the provision of service in the past (e.g. in ancillary services) and ‘prospective DSR’, where providers must produce a business plan and submit a bid bond (set at £4,420/MW) as collateral.
• DSR will be de-rated ‘according to a central figure for the capacity type’ by National Grid (pp 195).
• For DSR and storage, the proposal of running year ahead (i.e. T-1) auctions is retained, along with transitional arrangements in advance of the first of these year ahead auctions. Transitional arrangements are now for two auctions to be run in 2015 and 2016 for delivery the following years. It is not possible to participate in the transitional arrangement auctions and the main T-4 and T-1 auctions (p. 201). The transitional arrangements auctions will

\textsuperscript{132} https://www.gov.uk/government/groups/capacity-market-emr-expert-group

\textsuperscript{133} Not to be confused with the July 2013 consultation document on an EMR \textit{delivery} plan (DECC 2013b), which with respect to the CM was mainly concerned with the reliability standard (see section 10 above)
include time-limited products (certain hours of day), but this element is expected to be phased out over time.

- DSR and storage, along with existing generation, will be offered contracts of one year duration, with only new and refurbishing plant being offered longer contracts (p 171).
- In terms of delivery, a four hour warning of stress events requiring extra generation or DSR turn-down is proposed (p 183).
- There is a proposal to spot test providers; for DSR this means providers have to nominate up to 6 half-hourly settlement periods in advance where they must demonstrate a prescribed demand reduction on three occasions. No funding for these tests will be provided (p 188).
- Payment to CM providers will ultimately come from electricity consumers. This will be collected through suppliers via a charge. The proposal is that: ‘The proportion of the annual amount payable by a particular licenced supplier is determined by reference to that supplier’s market share at the time of system peak demand. Market share at the time of system peak demand will initially be calculated by the settlement agent based upon a forecast collected from licenced suppliers not less than three months prior to the start of the delivery year. This forecast will be of the average electrical demand that the supplier expects its customers will be drawing across the three Triad134 peak periods of the delivery year’ (DECC 2013c: 209). This approach is taken partly because it creates an incentive for consumer to reduce peak demand, which helps deuce the amount of capacity required from auctions, and thereby also helps to stimulate further DSR.

The EMR Implementation Plan consultation closed on Christmas Eve 2013. However, the government’s response was not published until June 2014, at the same time as the final implementation plan. In the interim, some issues were discussed further by both the CM Expert Group and the CM working group in the CD process during January 2014, well after the closure of the formal consultation.

Many of the proposals listed above were confirmed as final decisions in June 2014, but some had been changed. First, the bid bond required of ‘prospective’ (later termed ‘unproven’) DSR was increased to be the same as that for generating capacity providers, at £5,000/MW. Second, the basis for charging suppliers to pay for the CM was also changed, from the forecast market share in the three highest periods of half-hourly demand (Triad) to forecast market share for the hours of 4-7pm on weekdays over the whole of the period November to February inclusive, i.e. around 100 days.

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134 The TRIAD periods are the three highest half-hourly periods of demand, and fall in the winter months.
As discussed further in section 11.3 below, the DSR industry was unhappy with a number of aspects of the decisions made, especially in relation to the emerging nature of the industry. Amongst the more important were: the requirement to choose between participating in transitional arrangement auctions and in primary auctions; criteria applied in practice for classifying DSR as proven or unproven; the disproportionate cost of bid bonds for smaller actors; only one-year contract durations being available; four-hour warning of stress events, and cost recovery being spread over a wide period. The CM had received approval to proceed from the European Commission under State Aid rules in July 2014. However, in December 2014 the DSR company Tempus Energy brought a challenge to the European General Court arguing that State Aid approval was unlawful, on the grounds that the CM discriminated against DSR providers. At the time of writing the case is still not been decided.

Some DSR did participate in the first primary T-4 auction and in subsequent primary auctions. The first transitional auction for DSR and storage took place in early 2016, for delivery in 2016-2017.

11.2 Ideas deployed by corporate actors

In their submissions to the 2010 and 2011 consultations, many corporate actors appear to argue for equivalent treatment for generation and DSR (e.g. E.ON [2010, 2011], SSE [2010], International Power [2010], Drax [2010, 2011], InterGen [2010], ESB [2011]), and some to be supportive of DSR in principle.

Support was also expressed by senior representatives of the Big Six giving evidence to the House of Commons Energy and Climate Change committee hearings for its pre-legislative scrutiny of the Energy Act in June 2012. For example, Sarwjit Sambhi, Managing Director of Power Generation for Centrica told the Committee that:

‘Our assumption, and I think DECC’s assumption, is that demand side response will participate in the capacity market. The question is how well it will participate and that is a level of detail that DECC have not yet defined but I think everybody starts from the

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135 http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:62014TN0793&from=EN. This challenge was on the basis that DSR participants could obtain only one-year duration contracts, compared with 3-15 year contracts for new and refurbished generating plants, that DSR participants were forced to choose between transitional and enduring auctions, that the final cost recovery mechanism was not proportionate, that capacity event sin the main auction were not time-bound, that the bid bond arrangements were discriminatory and that there was a failure to recognise the value of avoided transmission and distribution costs in the CM contracts.

136 DONG in particular explicitly argued that generation-only solutions to intermittency are not desirable: ‘Any mechanism that is introduced must be flexible enough to accommodate smart grids, smart meters and demand side measures that will develop…’ (DONG [2010: 3]) and ‘Including cost-effective participation of DSR is fundamental to solving resource adequacy and security of supply constraints and any market intervention should be designed to allow participation and growth of this service.’ (DONG [2011: 6]).
assumption that they will participate. I think it is a great opportunity to have innovation in the electricity market.’ (ECCC 2012b: Ev 21).

Incumbents also used an apparent concern for DSR to justify their preferred positions on a capacity mechanism. Those corporate actors opposed to a targeted out-of-market Strategic Reserve (SR) form of a capacity mechanism (see section 9 above) argued that SR would not work well for DSR, compared with a market-wide approach. This argument was made in the 2010 EMR consultation by Centrica [2010], partly on the basis that as the point of SR was to be used only as a last resort, and hence infrequently, then it would not work particularly well for DSR, and also create problems for assurance of availability. It was also argued that SR would dampen prices, reducing volatility, which would work against DSR. Similar arguments were made by EDF [2010], ESB International [2010], E.ON [2011], SSE [2011] (but disputed by RWE [2011]). Those incumbents opposed to any form of capacity intervention also used DSR to support their position. RWE [2010] argued that such interventions would dilute price signals and therefore have detrimental effects on both DSR and storage, and that new forms of DSR available through smart meters would obviate the need for a capacity intervention in the future.

However, alongside these apparently supportive statements, corporate submissions also fire warning shots about what they see as the inferior nature of DSR. One criticism is that DSR can only be of use in solving resource adequacy problems over short time period (Scottish Power [2010, 2011], International Power [2010], ESB International [2011]). International Power [2011: 9] argues against treating DSR on the same terms as generation in practice:

‘Capacity market designs with the same payments to all resources regardless of attribute have led to an excessive amount of demand reduction bidding into the market and contributed to an apparent capacity over-supply, depressing prices and discouraging new investment.’

Another criticism was about reliability. E.ON [2010: 17] argues that DSR and storage should be eligible in a capacity mechanism, but that there is a need to ‘demonstrate that they can genuinely provide value and that the contracted capacity can be delivered when required.’ Scottish Power [2010] and International Power [2011] expressed concerns about whether demand reduction would in fact be delivered, citing problems in the past with interruptible gas contracts. They also raised difficulties of establishing baselines, as did EDF [2011]

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137 This was especially in response to Q23: What do you think the impact of introducing a capacity mechanism would be on incentives to invest in demand-side response, storage, interconnection and energy efficiency? Will the preferred package of options allow these technologies to play more of a role?
However, as described in section 11.1 above, the key detailed decisions about the treatment of DSR were not taken until later on in the process, in the period 2013-14, with the development of the draft EMR Implementation Plan in October 2013 and through to the final decisions announced in June 2014. The important forms of contact between government and incumbent corporate actors in this period were not only through formal consultations but also, if not more, through the other mechanisms described in section 7 above. One was the Expert Group on the CM, which met regularly from early 2013 to the spring of 2014. DSR was discussed by the Expert Group in March 2013, which reviewed DECC’s proposals for the draft Implementation Plan. The other forum was the Collaborative Development CM working group, which met over the autumn of 2013 just ahead of the publication of the draft Implementation Plan.

As noted above, the formal consultation period for the implementation plan ended on 24 December 2013. The document reporting the responses (DECC 2014a) summarises and does not differentiate responses by companies, so it is impossible to identify the positions of particular incumbents. However, some of the summaries of responses indicate the approach to DSR within parts of the industry. According to DECC 2014a: 102):

‘Respondents generally felt the participation of DSR should be encouraged but not unduly advantaged, although inevitably views differed on where that line was drawn…
Respondents were also divided on the long-term participation of DSR with some respondents claiming that DSR could not operate in the Capacity Market as currently envisaged…’

There was also opposition to the proposal, which DECC had seen as helping incentivise DSR, to base charging on peak periods, partly on the argument that predicting such periods was difficult (p 106).

However, the formal consultation was not the end of engagement between industry and the government, at least in this last area of the cost recovery issue. According to one close observer of the energy industry, Energy UK lobbied the government on cost recovery over Christmas 2013 and by early January the approach had been changed. Certainly, the issue was discussed by the CM Expert Group (which included industry members) in a meeting in late January, after the consultation document was published. At that meeting DECC tabled a document that noted that:

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138 [https://www.gov.uk/government/groups/capacity-market-emr-expert-group](https://www.gov.uk/government/groups/capacity-market-emr-expert-group)

139 Interview 11
‘Suppliers raised concerns around this peak charging approach in advance of, and in response to, the EMR implementation consultation…Though there is no unanimously supported alternative, there is broad support from large suppliers for basing charges on suppliers’ forecast share of demand over the entire year…’ (DECC 2014f: 1)

Arguing that it wanted to keep some link between cost recovery and periods of high demand, DECC proposed that cost recovery be based on the forecast market shares of suppliers for the period between 4 pm and 7 pm on afternoons between November and February, which it saw as a ‘reasonable compromise which takes account of the principle [sic] concerns from suppliers relating to the variability of a peak charge approach without losing the demand reduction incentive.’ The issue was also subsequently discussed at an industry-government Collaborative Development meeting on 27 January 2014, at which the same paper was tabled. According to an observer close to the DSR industry, the arguments of the suppliers were challenged by a representative of that group, but they were told that the decision was made.140 More widely, there are reports of representatives of the DSR industry in CD meetings being ‘aggressively shouted down’141 by incumbents:

‘And also they set up lots of working groups, that were again highly populated by industry people, and you know, you heard stories about how viciously they opposed …demand response providers and it all got quite vicious because they thought they were actually taking away their generation revenues.’142

11.3 Alternative ideas in the debate

The decisions made by government on the treatment of DSR were made within a context that was not set solely by messages from incumbents. In fact, the role of DSR in the CM was one of the more widely publicly debated aspects of the policy. As suggested above, this was in part because the idea that some form of capacity mechanism143 could be used to help develop the DSR industry in Britain was being promoted by outside bodies, including the Regulatory Assistance Project144 (see Gottstein and Schwartz 2010, Gottstein and Skillings 2012), E3G, Friends of the Earth145, Green Alliance146 and WWF (2013), and also by some independent

140 Interview 11
141 Interview 11
142 Interview 8
143 Although not a market-wide mechanism of the nature that the GB CM finally took.
144 RAP is an advisory group set up by ex-regulators from the US – http://www.raponline.org/
145 See e.g. written submission to ECCC (2012: Ev 139-140)
146 See e.g. written submission to ECCC (2012: Ev 174-175)
expert observers. The House of Commons Energy and Climate Change Committee was also supportive of a role for DSR, with its 2012 Pre-legislative scrutiny report critical of the draft Energy Bill’s treatment:

‘The draft Bill and its associated documents are fundamentally flawed by the lack of consideration given to demand-side measures, which are potentially the cheapest methods of decarbonising our electricity system. Responsive demand features only to a limited extent in the proposed capacity market…’ (ECCC 2012a: 16)

Some of these actors promoted quite specific ideas about ways of making capacity market design work for DSR – for example, time-banded rather than open ended products, in part based on experience in the US, especially in the PJM market, where demand response has increased from 600MW in 2007 to more than 3,000 MW in the 2010 auction (Rious et al 2011).

It should also be noted that in the initial consultation phase, the demand side and storage industries themselves were not opposed to some form of capacity mechanism in principle. Most companies preferred targeted SR form, as they saw it as an opportunity to develop these options further. Thus Kiwi Power argued that:

‘A well-designed capacity programme that targets meaningful quantities of demand side resource can be much shorter in contractual duration than feed-in tariffs, carbon pricing systems and other forms of low carbon legislation.’ (Kiwi Power [2010: 3])

Along with Flexitricty [2010] they were also firmly in favour of an SR approach. For EnerNOC [2010], with experience in US capacity markets, the key issue was having some sort of mechanism that allowed for DSR. Storage companies were also supportive of a capacity mechanism (Electricity Storage Network [2010], Highview Power Storage [2010]).

Some companies gave guidance on aspects of CM design that they thought would be supportive of the development of DSR. Kiwi Power [2010] stressed the importance of advance (i.e. day ahead) notification for deployment of DSR within the contract period, and Kiwi Power [2011] argued that relatively expected low frequencies of utilisations would work better for DSR, with some ability to opt out of certain windows, with an event duration of around 2-4 hours being realistic. They also raised concerns that excessively high penalties for non-delivery would make participation too risky for DSR (see also WWF 2013), and that a qualification process that

147 See, for example, oral evidence from Prof. Catherine Mitchell and Simon Skillings in ECCC (2012)
148 PJM is a US regional electricity system and market that covers an area in the eastern US ranging from New Jersey down to Kentucky – see http://www.pjm.com/
requires DSR providers to have committed customers’ contracts several years ahead of programme start would exclude too many potential providers. They were also concerned that in other capacity markets, run-up and run-down rates had been designed around generators, and did not fit DSR providers well. EnerNOC [2011] emphasised the need for a stable, durable mechanism, as an on-and-off mechanism would deter companies offering DSR. They also noted that potential DSR participants would want clarity on expected frequency of dispatch, length of expected dispatch and temporal distribution (e.g. more than once a week).

As discussed in section 11.1 above, the key decisions on CM design details relevant to DSR were developed only quite late on in the process, from 2013 onwards. Certainly DSR firms did engage in the consultation on the draft implementation plan, in the last quarter of 2013. Concerns were raised about: the unsuitability of using a one-size-fits-all de-rating methodology for DSR and storage; pre-qualification as being too cumbersome and complex; the need to limit obligations on DSR providers to provide a level playing field; and excessively high bid bond amounts for unproven DSR being a barrier (DECC 2014a). However, as noted above the only decision that was changed in these areas was to increase the bid bond amount (in response to generator concerns that a discount unfairly advantaged DSR).

Many DSR firms were relatively new at this stage, and all (with the possible exception of the US firm EnerNOC) were relatively small, and could not match the capacity of the large generators in terms of policy capacity and research, according to one observer close to the industry.149 EnerNOC did eventually commission a report from consultants (NERA 2014) about the potential for DSR to lower CM costs, and engaging with some of the design issues, but it appeared rather late in the process. This report focused on the rules facing DSR in the three different types of auction available to it:

- The main T-4 auctions, held 4 years ahead of delivery, where the bulk of capacity would be auctioned for. The first of these would be in 2014 for delivery in 2018/19
- The T-1 auctions, held a year ahead of delivery, which were for ‘fine tuning’ capacity procurement nearer delivery time. The first of these would be in 2017 for delivery in 2018/19
- The transitional arrangement (TA) auctions for DSR, which were to be held in 2015 and 2016.

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149 Interview 11
As mentioned above, the rules did not allow a DSR provider who had entered the T-4 auctions in 2014 or 2015 from subsequently entering a TA auction. The NERA paper argued that this was a serious disincentive to enter the larger T-4 auction, and prevented DSR providers from building up a longer set of contracts through a number of different auctions, to help grow the DSR sector.\textsuperscript{150}

The need for longer contracts reflects the argument that while DSR may involve lower capital costs than generator, it still involves a degree of investment and commitment from large energy users, which will not be forthcoming on the prospect of only a single year’s revenue. This point was also made in 2014 by Jeremy Nicholson of the Energy Intensive User Group (essentially heavy industry) in evidence to the House of Commons Energy and Climate Change Committee inquiry into the implementation of the EMR:

\begin{quote}
I think it is strange, and some of us have struggled to understand why this should be the case, that there is not a demand-side product for more than a year’s duration. After all, some businesses will have to make physical investments. They may not recover the costs of those investments in order to provide demand-side service that can be certified and delivered reliably and so on, of the sort we would all want, competing against supply. If those costs cannot be recovered within a year or so, it is going to make the commercial case for their involvement rather problematic.\textsuperscript{151}
\end{quote}

The paper also pointed out that DSR could only access one year contracts, whereas new gas plants could access contracts of up to 15 years, while refurbishing generators (most likely to be coal plants upgrading to be compliant with the IED) could get three year contracts. Finally, the paper argued that if the rules were changed, and DSR providers were encouraged to bid into the main T-4 auction, this would yield cost savings for the consumer.

\textsuperscript{150} In the paper tabled at the CM Expert Group in January 2014, DECC noted that there had been calls from DSR providers to be able to participate in both transitional arrangement auctions and primary T-4 auctions, to build a longer stream of revenue around which to build their service. However, the paper rejected these calls, on the grounds these were coming mainly from existing ‘sophisticated players who do not need the support of the TA. This would risk…crowding our less mature participants.’ However, in hindsight this argument is not particularly convincing. As providers were not allowed to enter into both auctions, one would expect to see the more mature providers, with a higher proportion of proven DSR, entering into the T-4 auction, while mainly unproven DSR entering the TA auction. However, this is not the case. In the 2015 TA auction, proven DSR made up 12% of total cleared capacity, whereas in the 2014 T-4 auction, proven DSR made up less than 5% of the total DSR that cleared.

Beyond these written submissions, DSR firms did also participate in the CM Expert Group and in the Collaborative Development CM working group, although they were somewhat outnumbered by incumbent generators. In the case of the cost recovery issue, where DSR providers saw a Triad basis for the methodology as an important principle, there was a major debate in January 2014, and the issue went on to form part of the Tempus legal case. The argument of the suppliers on cost recovery focused on the difficulty of forecasting market share, and predicting Triad periods, although the tabled document notes that: ‘Suppliers have not supplied any quantitative evidence to substantiate these concerns, e.g. to demonstrate the relative volatility of Triad periods and the difficulty of Triad forecasting’ (DECC 2014f: 3). However, some close to the DSR industry argue that the real interests of suppliers lay in the generation arms of their vertically integrated businesses. Placing cost recovery on Triad periods would have provided a strong incentive for Triad avoidance, which would have reduced peak demand and in turn generators’ revenue. It would have also calculation of required capacity for future auctions and so future CM payments. On this view the decision to spread cost recovery over a wider period makes the CM less about reducing demand and more about bringing forward new gas capacity to bulk up generation in the winter.

11.4 Influence on the decision

There is evidence that early on in the process, there was a considerable amount of enthusiasm for a major role for DSR in the CM at the political and senior official level. Giving evidence to the Energy and Climate Change Committee in the spring of 2011, the then Secretary of State, Chris Huhne, said:

‘Absolutely crucially, we envisage [the capacity mechanism] supporting the negawatts concept, that is, supporting an ability to pay companies that might go into a particular area and say “We will pay all off the consumers in this area a certain amount or install a gadget that will turn off the fridge and the freezer for those few minutes over the Coronation Street advertising break. It won’t affect their ability to keep their frozen peas frozen, but it will save us the need for a peaking plant.”. (ECCC 2011: 116)

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152 Appearance at meetings varied, and information is only available for two CM working group meetings in September 2013, but these included 8 representatives from the Big Six and second tier generators and one DSR firm (Flexitricity) on one occasion, and 7 incumbent generators and 5 DSR firms (EnerNoc, Open Energi, Kiwi Power, Flexitricity) and the UK Demand Response Association on the other (at which DSR rules were discussed). See ‘Notes of the workshops so far’ at https://www.gov.uk/government/groups/electricity-market-reform-emr-collaborative-development

153 Interview 11
Charles Hendry, the then Energy Minister, added:

‘…the capacity mechanism has no single structure to it. It is to enable us to look broadly either at backup capacity or, alternatively, at ways of taking demand out of the system. It is a very new approach to capacity mechanism.’ (ECCC 2011: 116)

The then Director General for Energy Markets and Infrastructure at DECC, Simon Virley then went on:

‘The real prize, as Charles [Hendry] was indicating earlier, is to link the demand side and make sure the demand side is no longer passive but is responding and consumers are able to respond through the rollout of smart meters, through the rollout of smart grids, to the demand they really want to see and whether they are willing in some way to see a slightly lower reliability, revealing the preference of consumers. The long-run solution is obviously linking the demand and the supply sides together.’ (ECCC 2011: Ev 117)

At this general level, the same interest seems to have been there amongst officials:

‘So, it [DSR] was quite strong in our thinking. I think there’s always a tendency…to feel that security of supply is about generation meeting demand, and it was still quite a new concept that you can flex demand to manage generation adequacy, but it was a large part of our thinking. I think we thought that the Capacity Market was going to be a way in which DSR and DSM could be significantly increased…’

As noted above, there was considerable lobbying by civil society organisations and by technical expert groups like the Regulatory Assistance Project (RAP), with evidence that this had some effect:

‘Greg Barker was keen on this, prompted by E3G, ECF – they were pushing.’

‘Meg Gottstein [of RAP] had influence early on…was doing a lot of work for DECC for free…she argued the whole necessity of a CM originated from a CfD…this is how you get DSR in…you need a CM in order to get revenue streams for DSR.’

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154 Interview 5
155 Interview 2. ECF is the European Climate Foundation
156 Interview 1
Gottstein and a colleague produced a paper (Gottstein and Schwartz 2010) on the role of capacity markets in developing DSR in May of 2010, which was then subsequently cited in the December 2010 EMR Consultation document.

However, others (mainly participants in or close observers of industry) were less convinced that the political commitment to DSR went particularly deep:

‘…the fundamental driver was always new build. What [politicians] wanted was system adequacy in the long term. The focus on system adequacy and the long term was correct but they pretended they wanted DSR because of lobbying.’

‘But in the end all the people that Meg Gottstein thought she was setting up for DSR have complained that the rules don’t work for them. It is because the capacity market was all about capacity from the outset. RAP tried to shoe horn DSR into the capacity market which was all about keeping the lights on.’

‘DSR didn’t so much fall of the agenda as come late to the party. The original genesis of the Capacity Market had nothing to do with DSR. DSR came in through the detailed design phase, under pressure from E3G and others…the pressure was not coming from the Big 6 and the IGG.’

As discussed in section 11.1 above, beyond high-level rhetoric, the important decisions on the terms of participation of DSR in the CM came after the passage of the Energy Bill, and in the detailed rules and regulations determined between 2013 and 2014. At this stage the key actors were not Ministers, who would not understand or engage with such a level of detail, but officials, who appear to have been the target of lobbying by both the large incumbent generators and the DSR industry (with the latter having fewer resources).

The approach of officials to DSR in this detailed rule setting phase seems in the end to have been cautious, with an underlying scepticism about DSR as a resource. In the words of a senior official in DECC:

‘There was a bit [of concern about DSR delivery reliability]. I think that we felt…it was interesting going to the US…I think the US capacity market suffered from the problem that we feared would happen with us, which is over-procurement. They had lots of DSR,'
but they had lots of stuff, they had loads of everything… and so… I remember the guys saying: “We don’t really know how much of this DSR is going to turn up, that’s the problem, on the day…” \textsuperscript{161}

The degree to which DSR was in fact a ‘new concept’ in the early 2010s is disputable. Both demand turn-down and behind-the-meter substitute generation had been used for many years by the System Operator as ancillary services. There was also by this stage considerable experience in the US with DSR. Certainly, DECC looked at the PJM Capacity Market in some depth, including the role of storage. \textsuperscript{162} This experience is cited in a general way early on, in the 2020 EMR consultation document:

‘Experience from other markets (e.g. New England USA) shows that bringing demand side resources into the market can reduce the costs of the system. For example, participation of demand side resources in the first capacity auction run in the New England market (called ISO-NE), potentially saved customers as much as $280 million by lowering the price paid to all capacity resources in the market. Benefits have also been seen in the other US market that has implemented this (called PJM).’ (DECC 2010a: 82)

On the other hand, in 2014 the Panel of Technical Experts imply that the role of the demand side in the US was less well understood:

‘The Panel has also drawn from the experience of its members in other Capacity Mechanism markets, such as PJM and New England, as well as its experience in other key areas where the need to procure capacity includes the demand side. The Panel has been somewhat reassured that DECC has drawn on the PJM experience, but the Panel remain concerned that not enough evidence has been provided on the potential contribution that the demand side might make, particularly the extent to which embedded generation might become available.’ (DECC 2014e: 9)

The value of DSR in the US was also reinforced by the fact that in the winter of 2013/14, just as the Expert group and CD Working Group were finalising the rules, DSR played a major role in helping system operators in the Eastern parts of the US handle generation outages and fuel disruptions in severe winter conditions (FERC 2014, Mitchell 2015)

\textsuperscript{161} Interview 5
\textsuperscript{162} Interview 11
However, the view of the official quoted above does imply that there was at base a concern about the reliability of DSR delivery, aligning with a key argument made by the large incumbent generators (see above section 11.2), and therefore an uneasiness about providing conditions in the CM design for a rapid growth in DSR.

11.5 Summary and conclusion

In deciding about the treatment of DSR, the government was operating within a context of considerable debate and differing views on CM rule design. There is considerable evidence that despite general rhetorical support for DSR in the CM, the large incumbent generators also presented arguments against it having a major role, and then in the course of detailed rule-setting, lobbied heavily against measures that would have given the development of DSR greater support. In the event the government appears to have been more open to the arguments of the incumbent generators than those of the DSR industry and other actors who were enthusiastic about the potential of DSR. In the words of Jeremy Nicholson of the Energy Intensive Users Group in late 2014:

‘I think there are some concerns there that certainly on the demand-side there could have been greater involvement, perhaps if certain barriers had not been erected and some of the stakeholder consultation had been more even-handed between the supply and the demand side.’[^163]

Despite the fact that it was nominally talked about as a new, emerging technological option that needed development, DSR in the end was treated in the main auctions on the same terms as existing generation, on less favourable terms than new-build generation. The openness of government to generator arguments about DSR appears to have been underpinned by a paradigm (also shared by incumbents, including, National Grid[^164]) which defaulted to supply-side solutions, with a general sense in which the CM was really always about generation capacity, with DSR as an add-on. Such a paradigm, of course, also fitted well with the material interests of generators. It also appears to be the case that while Ministers made bold statements about DSR in the early stages of the development of the CM, they did not follow through with attention to the detail of policy design, leaving this not only to relatively junior officials, but indeed to joint industry-government processes in which incumbents had some advantage.


[^164]: Interview 11
12. Deciding not to differentiate capacity

A further decision that emerged through the CM process was that the product to be contracted was simply capacity (or DSR), undifferentiated in any way. Of particular interest here, given the critiques of the CM noted in the Introduction, are the lack of differentiation by the carbon intensity of capacity, and by the flexibility of capacity. Unlike in some areas, there is very little discussion of this issue in the CM official documentation. The 2011 EMR White Paper (DECC 2011a: 208) gives the non-committal statement that: ‘A Capacity Market offers incentives to any provider of reliable capacity, including low carbon generation.’ By late 2012, in the Annex to the 2012 EMR Policy Overview, it is clear that there will be a single, undifferentiated capacity product (DECC 2012b: 18).

12.1 Carbon intensity

Consideration of the carbon implications of the CM was only briefly floated in the early stages of the CM process, and then fairly quickly ruled out. The general approach appears to have followed a standard micro-economic analysis by having separate measures for each problem (i.e. that decarbonisation should be pursued by other means, such as carbon taxation), and adopting technological neutrality as a design principle for the CM itself.

The 2010 EMR Consultation document raises the possibility of combining a capacity mechanism with support for low-carbon generation, with a single instrument ‘used to reward both decarbonisation and capacity, with a higher payment for capacity that also delivers low carbon’ (DECC 2010a: 91). However, this idea was not taken any further. It also suggests that inasmuch as a capacity mechanism supports demand side resources it could also contribute to decarbonisation targets (ibid: 92).

The October 2013 EMR Implementation consultation (DECC 2013c: 156-157) then effectively ruled out differentiation by carbon intensity: ‘The Capacity Market is intended to be a technology-neutral mechanism in which all types of capacity are able to participate.’ However, there is further mention of the issue buried in the June 2014 Impact Assessment, which states that the CM should be coherent with decarbonisation goals: ‘to avoid unintended consequences…to minimise design risks and ensure compatibility with other energy market policies, including decarbonising the power sector.’(DECC 2014b: XX).

While the capacity product itself was undifferentiated, other rules within the CM actually appeared to offer existing coal plants some advantages, relative to both existing CCGT and DSR. This is because those coal plants seeking to opt in to the Industrial Emissions Directive
requirements, which necessitated investment in NOx controls, could potentially obtain three-year capacity contracts (as opposed to the standard one-year contract) if their refurbishment costs were above the threshold of £250/kW. Littlecott (2014) argued that this was in fact against State Aid rules, which only allowed support for exceeding, not meeting, EU environmental law.

However, while the issue of carbon-intensity of the capacity procured was raised within the assessment of the CM by the European Commission when giving clearance under State Aid rules, the Commission did not take up the three-year contract point. Instead, it focused on Point 233(e) of the 2014 State Aid Guidelines which stated that a measure should ‘give preference to low-carbon generators in case of equivalent technical and economic parameters’ (EC 2014a: C200/40). The Commission took the view that the CM was consistent with this condition because all fossil-fuel generators would be subject to the EU ETS carbon price and the Carbon Price Floor (EC 2014b), and that this would have the equivalent effect to secondary selection criteria.

The carbon issue was largely absent in incumbent corporate responses to the key consultations in 2010 and 2011. Where it was alluded to (usually indirectly) the pressure was against differentiation. E.ON [2010: 14] argued that because capacity mechanisms should be aimed at providing a stable environment and reliable incentives for investors, they:

‘s should not…be used to deliver other policies, such as environmental goals which should be addressed through policies, such as the EU ETS or the Industrial Emissions Directive, appropriate to those goals.’

E.ON took a similar position in its response to the 2011 White Paper consultation, arguing that all plant providing the same capacity should be rewarded on the same terms with no differentiation between new and existing capacity or: ‘in terms of its environmental impact, which should be driven by other mechanisms’ [E.ON 2011: 9-10]. International Power [2010] also made the argument for technology neutrality, while also emphasising the continuing need for thermal generation. InterGen [2010] made an argument for considering the carbon intensity of capacity, but only within the context of arguing for giving a greater value to gas capacity than coal.

By contrast, it was those large generators who were opposed to a capacity mechanism who raised concerns about the CM being incompatible with policy on decarbonisation. RWE [2011: 2] argued that experience elsewhere suggested that one possible effect would be ‘to adversely impact on the CO₂ intensity [of generation]’. DONG, primarily a wind energy company, argued in relation to eligibility criteria for capacity that: ‘environmental criteria aligned with the
Government’s climate targets in the UK should be considered for inclusion and supported by the increasing EPS requirements.’ (DONG [2011: 5]).

At the same time, most of the environmentalist lobby paid much more attention to the CfD and especially the Emissions Performance Standard elements of the EMR than the CM. Friends of the Earth [2010]. Greenpeace [2010] and Green Alliance [2010] were all open to a targeted approach to a capacity mechanism, but the main thrust of their responses were that proposals were too supply focused, and the demand side, storage and interconnection should be better integrated. None raised the question of whether capacity should explicitly differentiated (or ruled out) by carbon intensity. None of these groups subsequently then submitted responses to the 2011 EMR White Paper Annex C consultation on further design options for the CM. Only E3G had pursued the point that coal-fired plants might be given the advantage of longer contracts (Littlecott 2014).

In the context of support in the corporate lobby for technology neutrality (and possibly a determination by some to keep coal-fired assets within the scheme), insufficient attention from politicians to drive the issue through and the absence of a strong lobby from (most) environmentalist organisations, it would seem that officials did not push the issue.

According to a senior DECC official:

“Yes we did, we absolutely discussed carbon content, and came to the conclusion that the additional complexity of the mechanism to do so…just simply didn’t warrant the sort of way in which to do it… And so when you think about how to apply carbon content to a capacity auction you end up with a very complicated set of formulae calculating how much people are going to get paid.

And we felt at the time…that the other mechanisms we had a. to incentivise low carbon and b. to prevent the extension of...for example building new coal…should be enough to drive the transition we were trying to drive. So the argument at the time, rightly or wrongly, was: CfD is going to produce all this [low carbon] plant, over time these [high carbon] power stations are going to need more and more expensive upgrades; at some point they are going to be closed down.”

165 Interview 5
For a political adviser involved in the process:

‘Coal wasn’t a huge concern at the time; as framed in meetings and discussions, it was that it could bring innovative capacity on board. But there was also a sense that the policy team paid lip service to this because of ministerial concern.’

12.2 Flexibility

As noted in the introduction, another critique of the CM is that it rewards capacity irrespective of how flexible that capacity is, whereas what is important as intermittent renewables rise in volume is the ability of back up generation or demand response to ramp up and down quickly to accommodate large, swift swings in wind power output.

The initial 2010 EMR consultation document (DECC 2010a) outlined both these problems, but a frequent observation in responses to the consultation was that the government itself seemed somewhat confused as to which problem it was trying to fix. In the 2011 White Paper, the government clarified its position. The Paper laid out three linked problems: diversification of supply, operational security and resource adequacy (DECC 2011a: 62). Support to renewables and nuclear were to address the first problem, and National Grid as System Operator was to address the second through Short Term Operating Reserve (STOR). The Capacity Mechanism was therefore now seen as squarely addressed to resource adequacy.

On this issue there was a clearly defined split in the corporate lobby between the majority of the Big Six vertically integrated utilities, who wanted a flat payment for all capacity, and the IGG, who were strongly in favour of a mechanism that rewarded flexible capacity only.

In their submission to the 2010 EMR consultation, E.On were clear that they wanted a mechanism ‘where all generation (or demand side response) providing firm capacity (or an equivalent reduction in demand) is rewarded at the same value, given that it is offering an identical product’ [E.ON 2010: 14]. They repeated this position in their response to the 2011 White Paper Annex C consultation on the design of the capacity mechanism [E.ON 2011: 9-10]. Similarly while EDF [2010] argued that the government needed to be clearer in distinguishing the need for capacity and that for flexibility, their preference was for a flat capacity payment payable to ‘all generation capacity’. EDF [2011: 12] further argued that a differentiated bespoke approach ‘would …introduce significant extra complexity into the market….we believe that, in the long run, the standardised approach should be more stable and will offer greater certainty.’

166 Interview 2
Centrica initially proposed ‘some differentiation between types of plant in any capacity market depending on system need’ (Centrica [2010: 13]), but in their 2011 consultation response shifted their position to backing a single, undifferentiated capacity product to ensure maximum liquidity and comparability (Centrica [2011: 2]). SSE [2010, 2011] also wanted a payment to all capacity without distinction. In their submission to the 2010 EMR consultation, Scottish Power dispute the need for flexibility, arguing that the main problem was the volume of capacity that would be needed in high demand/low wind situations. In their subsequent response to the 2011 White Paper Annex C consultation, they imply a direct influence on government thinking:

‘The Government’s White Paper rightly emphasises that a major challenge in the early 2020s will be long periods of low wind generation in winter when there is a high volume of wind on the system. This particular challenge was highlighted by the analysis from NERA that we submitted with our original response to the Government’s December 2010 consultation on EMR. (Scottish Power [2011]: 3)

This analysis implies that there should be no premium for flexibility, and indeed Scottish Power [2011] argues for a payment made to all capacity, without distinction.

The outlier amongst the Big Six was RWE, who were opposed to any kind of capacity mechanism at all. In their submission to the 2011 White Paper Annex C consultation, they took the view that an independent procurement body should decide on the criteria for the kinds of capacity that may be required, adding: ‘We would envisage that the procurement body would procure a range of different types of capacity…with differing technical characteristics relating to ramping times, minimum on time, warming periods and length of sustained running.’ (RWE [2011 part 1: 10].

In contrast to the Big Six, the IGG corporate actors all argued for payments specifically for flexible capacity, drawing on the analysis in their commissioned paper from Oxera which forecast hourly swings in wind output of up to 17GW by 2020 and 25GW by 2030. International Power [2010: 2] argued that:

‘This is not just a “peak capacity” issue but also on of the system’s inherent ability to cope with wind intermittency on a large scale. Existing thermal plant will still be needed to manage this intermittency’

As a result they expected: ‘capacity to be eligible via a set of “basic” flexibility criteria, but would be open to DSR and storage’ (International Power [2010: 4]) and expressed a ‘strong preference…for a broader capacity mechanism aimed at incentivising the provision of flexible capacity to the market’ (ibid: 23). They repeated this view in their response to the 2011 White
Paper Annex C consultation (International Power [2011]). Drax [2010] also emphasised flexibility and cited the Oxera analysis. Taking an almost directly opposed view to Scottish Power’s analysis, they argued that ‘DECC’s preferred solution focuses too narrowly and exclusively on meeting extreme peak demand scenarios (such as winter peak requirement) and fails to address the looming issue of flexibility in low demand periods.’ (Drax 2010: 4), and go on to advocate a capacity mechanism that is available to resources that are capable of providing reliable flexibility services. InterGen [2010] similarly call explicitly for support for flexible generation. In their response to the White paper consultation they argued that ‘…the Capacity Mechanism must support not simply capacity but flexible capacity’ (InterGen [2011: 1]), and called for specific requirements for flexibility for eligibility (ibid: 8). Finally, ESBI [2010: 3] stated that they: ‘believe that the issue that should be addressed is one of flexibility, not a requirement for additional generation to meet peak demand’, and call for a market for flexibility rather than a market for capacity.

Outside of the debate amongst incumbents, there were also many other voices arguing that a capacity mechanism should be acting to support flexible resources, including DSR as part of policy for transitioning to a new type of system (e.g. Keay-Bright 2013, University of Exeter [2010]).

However, in the event, it appears that, as in the case of carbon, the key factor was the complexity of differentiating an auction process. According to a senior official:

‘On flexibility, again I think it was ruled out on the grounds of complexity…we didn’t talk this so much [as carbon]. I think we did see it as a resource adequacy problem…

So flexibility was an issue…but wasn’t as significant an issue.’

**12.3 Summary and conclusion**

In the case of the absence of a differentiation of capacity by carbon intensity in the CM (or indeed the ruling out of high carbon coal or diesel), it seems that a decision was made by default. Corporate actors mostly seemed to have assumed that there would be no differentiation, and such an option was only briefly considered by decision makers before being abandoned as too complex and on the grounds that carbon intensity would be handled by other policies. At the same time, the lobbying efforts of the majority of environmental organisations were focused elsewhere, on the Emissions Performance Standard.

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*Interview 5*
In the case of differentiation of capacity by flexibility, there was more of a split within the incumbent generator group, with many of the second–tier generators (which had a lot of gas in their portfolios) making the case for rewarding flexibility in particular. However, by the middle of 2011, the government had clarified that they saw a capacity mechanism as being more about volume of capacity (which fitted with its shift towards a market-wide approach – see Section 9 above) rather than flexibility. This also fitted with a desire to avoid further complexity.

13. Conclusions

Despite its length, this paper represents work in progress. The development of the Capacity Market was a long and complex process involving many actors, and the evidence presented here is not comprehensive, and conclusions cannot be decisive.

The general aim of the paper was to explain why the Capacity Market came to have the design it did. However, there was a specific focus on the role of the large companies that dominated the wholesale electricity market over the period that the policy was developed. This group of incumbents is taken to include the 'Big Six' suppliers, but also a group of six second-tier generators. It was argued that these companies cannot be viewed simply as one set of actors within the wider universe of stakeholders in Britain. This is because the government has powerful political incentives to keep the lights on, while at the same time it is dependent on these companies to do that. However, it was also argued that while this means that the government has a form of structural dependency on these incumbents, it does not automatically follow that they can simply dictate policy to the government. Rather, their structural power has to be deployed in concrete ways. Based on this approach, the paper seeks to address a number of research questions:

- How were corporate interests in relation to the Capacity Market constructed?
- How were corporate actors organised with respect to the state?
- How were opportunities to exercise structural power institutionally mediated?
- How was the structural power of incumbents deployed through ideas in communication with policy makers?
- What was the role of these ideas in the thinking and decisions of policy makers?

Overall, if the idea that corporate lobbying had a significant role in the formation of the creation and design of the Capacity Market is true, we would expect to find evidence that corporate actors had formed coherent views on their interests, and had then made use of available institutional opportunities for promoting those interests, through the communication of ideas that
then were adopted by decision makers in the design of policy, more than ideas put forward by other actors. In judging the overall importance of incumbent lobbying, a useful question is whether it is plausible, on the basis of the evidence gathered, that the government would have come to a different decision in the absence of that engagement.

The first question addressed in the paper concerned incumbent interests (Section 6). In general, any scheme for payment of generating capacity would potentially benefit companies owning such capacity, which in the case of the GB mechanism meant any thermal capacity including existing (but not new) nuclear. However, there is also some evidence that companies that had made large investment in new CCGT plants at the time of the initial policy proposals would be less inclined to be supportive. There is also some evidence that perceptions of interests by incumbents were shaped by the ideas of senior managers, especially regarding the efficacy of markets. It was also argued that incumbents could be expected to favour a market-wide approach to capacity market design over a targeted mechanism, as the former would provide more opportunities for payment. Companies could also be expected to argue for design features that matched their portfolios – i.e. those owning coal would resist differentiation of capacity payment by carbon intensity, those with CCGTs might push for differentiation by flexibility etc.

As a result of these factors, there was no single united incumbent lobby on the Capacity Market. A majority of incumbents, with older thermal assets, were in favour of a capacity mechanism with market-wide approach. A minority, with investments in new gas and with more of a commitment to the energy-only market, were far more sceptical about the need for an intervention, and especially the major step of a market-wide mechanism.

The other important corporate actor here is National Grid, which owns the system operator (which came to play an important role in CM policy development) as well as the electricity transmission grid in England and Wales, as well as interconnection businesses. National Grid's portfolio in theory gives it a range of different interests, but its transmission business dominates financially, and would potentially benefit from a CM that led to a bigger network than would otherwise be the case without a CM, or with a CM heavily weighted towards the demand side.

If the incumbent lobby was somewhat split, the institutional context for influence was supportive. Decisions on a capacity mechanism were to be taken by government, directly exposed to political incentives on system security, rather than a more politically insulated regulator. While energy costs had high political salience, the details of policy did not, and where public attention was turned on the EMR process, it was much more about the CfD process, and especially the evolving nuclear deal, rather than the CM. The Big Six and National Grid also benefitted from the existence of the UK Business Council for Sustainable Energy, which had emerged over the
2000s to become a key forum for informal contact with government at the most senior levels. At a less senior level, incumbents also had the opportunity to play a major role in the joint industry-government mechanisms set up later in the CM design process, including the Expert Groups and the Collaborative Development process. The scale and complexity of the EMR process meant expanding resources within DECC, which in turn meant a small number of secondments from industry. There are divided views on the significance of such secondments for influence, but the appointment of a secondee from a generation background as CM team leader in 2012 did raise eyebrows at the time.

Given this background, there is a considerable amount of evidence that incumbents engaged closely with decision makers throughout the process of developing the CM. The first decision point was the commitment to have some form of capacity mechanism (Section 8). Between early 2010 and the end of the that year there was a clear shift in policy with respect to a capacity mechanism, from a view that it might be needed at some point in the future to a proposal to develop a mechanism which then became a decision at the end of 2011. Four of the Big Six vertically integrated generators and four of the six second tier generators were in favour in some form of mechanism, and there is ample evidence that they lobbied for the introduction of a capacity market. The key argument these actors put forward, through consultation submissions and meetings with Ministers and officials, was that the growth of renewable electricity arising from the measures in the EMR would exacerbate the missing money problem. All these actors also argued that fairly urgent action was needed to avoid the capacity problems that they anticipated in the second half of the decade.

At the same time, there was a significant minority view opposed to a capacity mechanism amongst the incumbent companies themselves and other organisations making submissions to the 2010 EMR Consultation, as well as scepticism from other politically important actors, such as National Grid, the CBI and the House of Commons Energy and Climate Change Committee. Many of these actors argued that the energy-only market would continue to be sufficient to bring forward investment, and that a set of reforms to strengthen liquidity and balancing pricing signals should tried before a decision on a capacity mechanism was made.

However, there is also evidence that there were other factors bearing on the government’s position that also worked in favour of the introduction of a capacity mechanism. First, there was a change of government in May 2010, and the new Coalition administration was determined to be a government that ‘grasped the nettle of delivery’. Secondly, all governments have strong political incentive to take a conservative view on electricity resource adequacy, and there is evidence that this was at work in the case of the new Coalition government. Concern about future resource margins may have been influenced by modelling commissioned in the autumn
of 2010, but there is also some evidence that such modelling played a supportive role to a decision made more on grounds of a high level of caution in the face of uncertainty.

Overall, then, while there is clear evidence that the pro-intervention incumbents were pushing for a capacity mechanism, there is also evidence that they were pushing at an open door to a great extent. There appears to have been an alignment of interests, as constructed by political and commercial incentives, between this group and the government. It is entirely plausible that the Coalition government might have proceeded with the development of a capacity mechanism even in the absence of majority support from the incumbents (although had there been strong opposition from the majority of incumbents this is less clear).

The second decision, which also came at the end of 2011, was that to adopt a market-wide design for a capacity mechanism rather than a targeted ‘Strategic Reserve’ model (Section 9). This is perhaps where there is the clearest case for corporate influence. Throughout 2010 and most of 2011, the government’s preferred option was for a targeted mechanism, which was the more cost effective according to its own Impact Assessments. However, following a strong push-back from the majority of incumbent generators over the course of two rounds of consultation (plus various meetings with ministers and officials), the government changed course and adopted the incumbents preferred market-wide option.

A number of arguments were put forward on either side, with proponents of SR arguing that it was cheaper, more flexible, a better fit with the existing market and would distort prices less, while advocates of the market-wide approach argued that the SR would suffer from the ‘slippery slope’ problem and would not be adequate for periods of low wind and high demand in the 2020s. However, as the government’s concern about a possible capacity crunch grew through the year, it appeared that decision makers were unwilling to take the more incremental design option and were swayed by the arguments of the majority incumbent lobby. Here, had this lobby not been so strong it seems very plausible that government might have stayed with its original preferred option.

The third decision of interest was the setting of a reliability standard (Section 10), which then determined the amount of capacity to be auctioned. This step involved a number of judgements, both in the choice of definition and level of the standard itself, and in the methodology for converting it to a required capacity (including scenario weighting and assumptions about future demand and plant availability). The decisions about these judgements, which were ultimately endorsed by the Secretary of State, were made jointly by the government and National Grid, but with the latter taking the more active role. At the same time, over a period of two years leading
up to the decision on the setting of the reliability standard many of the incumbent generators were signalling to the government that they expected an increasingly serious capacity crunch.

However, just as with the decision to adopt a capacity mechanism in the first place, the commercial interests of generators and National Grid, in a conservative reliability standard which would mean an over-generous capacity margin and excessive auctions coincided with political incentives for government. Certainly, there is some evidence that within the parameters of the modelling available to them, officials and Ministers were drawn to the conservative end because of a desire to drive the risk of blackouts to a minimum.

It is plausible that pressure from incumbent generators encouraged further in this respect. However, in relation to the role of National Grid it is unclear from the evidence here whether the company – who as discussed in section 6.3 above had somewhat mixed interests – led the government to adopt an excessively conservative methodology and assumptions, or the other way round, as one close observer implied (or indeed whether the two talked each other into a mutual agreement). However, what is likely is that if the setting of the standard and methodology had been undertaken by other, more independent actors, they would have been less conservative. This is suggested by the fact that what limited independent oversight that there was, in the form of the Panel of Technical Experts, was critical of some aspects of the approach, and continued to be so throughout the process.

A fourth decision point was the treatment of DSR within the CM. There is considerable evidence that despite general rhetorical support for DSR in the CM, the large incumbent generators also presented arguments against it having a major role, and then in the course of detailed rule-setting, lobbied heavily against measures that would have given the development of DSR greater support. In the event the government appears to have been more open to the arguments of the incumbent generators than those of the DSR industry and other actors who were enthusiastic about the potential of DSR.

Despite the fact that it was nominally talked about as a new, emerging technological option that needed development, DSR in the end was treated in the main auctions on the same terms as existing generation, on less favourable terms than new-build generation. The openness of government to generator arguments about DSR appears to have been underpinned by a paradigm (also shared by incumbents, including, National Grid\textsuperscript{168}) which defaulted to supply-side solutions, with a general sense in which the CM was really always about generation

\textsuperscript{168} Interview 11
capacity, with DSR as an add-on. Such a paradigm, of course, also fitted well with the material interests of generators. It also appears to be the case that while Ministers made bold statements about DSR in the early stages of the development of the CM, they did not follow through with attention to the detail of policy design, leaving this not only to relatively junior officials, but indeed to joint industry-government processes in which incumbents had some advantage.

Finally, largely implicit decisions were taken within the process of developing the CM not to differentiate rewards for or treatment of capacity, by carbon intensity or by flexibility. In the case of the absence of a differentiation of capacity by carbon intensity in the CM (or indeed the ruling out of high carbon coal or diesel), it seems that a decision was made by default. Corporate actors mostly seemed to have assumed that there would be no differentiation, and such an option was only briefly considered by decision makers before being abandoned as too complex and on the grounds that carbon intensity would be handled by other policies. At the same time, the lobbying efforts of the majority of environmental organisations were focused elsewhere, on the Emissions Performance Standard.

In the case of differentiation of capacity by flexibility, there was more of a split within the incumbent generator group, with many of the second–tier generators (which had a lot of gas in their portfolios) making the case for rewarding flexibility in particular. However, by the middle of 2011, the government had clarified that they saw a capacity mechanism as being more about volume of capacity (which fitted with its shift towards a market-wide approach – see Section 9 above) rather than flexibility. This also fitted with a desire to avoid further complexity.

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How far, overall, then can we say that the design of the CM was influenced by the incumbent lobby? Certainly, not all incumbents got everything that they wanted, but it true that the majority – essentially those with an older portfolios – did get most of what they wanted.169 There is certainly plenty of evidence that incumbents lobbied and that decision makers used the ideas...

169 It is worth noting that in some details incumbents did not get what they wanted. For example, incumbents generally were keen to see strong fines (set at penal but not punitive levels) for non-delivery in the build programme or at times of system stress. This can be seen as being in the interests of system security, but the risks involved could also act as a barrier to smaller, newer actors. These, together with backing investors, argued successfully against this and the fines were set at a level that has allowed non-delivery and/or withdraw from the Capacity Agreements. In this case, CM design seems to have been driven by one of the avowed aims of the policy, which was to encourage greater competition in the market, although elsewhere (e.g. in DSR aspects) this aim seems to have had lower priority.
put forward by the majority group in several aspects of the CM design. The hypothesis of incumbent influence therefore passes a quite high process-tracing ‘hoop test’ (see Section 5), i.e. it cannot be rejected, and there is considerable evidence to support it and increase our confidence in it. In Bayesian terms, this study increases the likelihood of the posterior relative to the prior.

However, it is harder to say that most incumbents got what they that wanted solely because of their lobbying, as there is considerable evidence that political incentives on the government produced an approach that erred strongly on the side of caution in the CM decisions. In most aspects of the CM design process, we do not have sufficient evidence to say that the hypothesis of incumbent influence passes the ‘smoking gun’ test (see Section 5), i.e. that we have strong evidence that incumbent lobbying uniquely caused these decisions to be taken. Another way of approaching this is through the counterfactual – i.e. even in the absence of incumbent lobbying, it is still plausible that the government would have adopted a capacity mechanism, and adopted a conservative reliability standard. The main area where we come closest to ‘smoking gun’ evidence is the move from a targeted approach to a market-wide approach, where it is far more plausible that the government might have stuck with its original preferred choice had there not been such a strong push back from a majority of incumbents.

What are the implications for policy making in energy transitions? The CM was developed over a period in which the electricity system was beginning to change, and by the time of the first auction, that change was accelerating rapidly. Distributed generation was booming, the costs of electrical storage were starting to fall, and expectations about the potential of DSR were also becoming much more serious. However, against this background, the CM looks like a backward-looking piece of policy. In theory, it could have offered more of a bridge to the future energy system, by prioritising the development of new resources. Instead, it has largely to date mainly rewarded traditional sources of capacity, which were what the government was most comfortable with and which were owned by the incumbents. Because of this, it can be seen as actually slowing down the pace of change, maintaining older, high carbon capacity on the system for longer than they otherwise would have been. However, partly because of the changing landscape in which it now sits, the CM has led to some unexpected consequences, including the emergence of small-scale diesel generators winning contracts. At the same time, incumbents themselves see that the wider context is changing and have begun to take actions that may change their interests and positions (for example such as selling large-scale thermal assets). The long-term role of the CM itself is also open to question – one view is that the CM,

170 While it has specifically addressed DSR, it has done so in ways that do not necessarily work well for that resource – see Section 11.
like capacity markets elsewhere in the world, will evolve over time to resemble the energy-only markets that they were designed to augment.\textsuperscript{171}

Beyond the specifics of the CM itself, this study also suggests some conclusions for the wider study of the role of incumbent influence in energy policy. First, it points to the importance of a nuanced understanding of incumbents; such actors do not have homogenous interests and positions. Second, corporate actors are perhaps less likely to focus their efforts in areas where they have fairly clear structural power with respect to government, rather they are likely to give special attention to shape policy where governments appear to have a more open mind (such as with the issue of targeted vs market-wide approaches to the CM). Third, while energy sector incumbents sometimes do get what they want, this is not always the case; for example, at the time of writing, despite quite fierce opposition from the Big Six, it seems that the current government will introduce some form of price regulation in retail energy markets. Fourth, echoing Culpepper (2011), incumbents are able to exercise influence with less scrutiny in policy areas and on decisions that receive less attention from the public and from Ministers, i.e. in what might be called ‘orphan’ issues.

Such implications lead to the question of whether and how the policy process might be different. This study has not been a straightforward policy assessment of the CM itself. It does not lead to proposals for reforming the CM, which in any case continues to evolve. Rather, it leads to consideration of the implications of the CM as a case study for the process of policy making in the energy sector in Britain. What, if any lessons can be learned, especially about policy making given the realities of incumbent lobbying, and the propensity of senior civils servants and politicians to be excessively cautious about system security, neither of which are going to disappear any time soon? This is a particularly important question at a time when a new energy system is emerging, but where many of the key actors in that system are smaller, less well-organised and have fewer resources to represent their perspectives on policy.

Broadly, one can think of potential actions first in terms of changing processes internal to the decision making process, and second, changes to the external landscape aimed at levelling the playing field.

In terms of changes to internal processes, an initial step would simply be greater explicit self-awareness amongst decision makers (perhaps especially amongst officials, who tend to be less politically-minded than Ministers) both about industry lobbying and their own political incentives.

\textsuperscript{171} Personal communication, Chris Harris.
As Helm (2014: 6) notes, ‘it is curious that capture does not feature in the appraisal manuals for new policies, in the scrutiny of legislation and in the design of interventions.’ In embarking on a new policy, an essential step should be the development of a clear analysis of who the main incumbents are and what their interests are likely to be. This further implies the capacity to develop such an analysis, and the value to government of officials who have a deep knowledge not only of the economics of the energy industry but also its political economy. The importance of this agenda increases the less that a policy area gets high-level public and political attention, because such ‘orphan’ issues are the ones that are most likely to vulnerable to external influence. It is worth noting that the government did this in one area, i.e. in potential conflicts of interest for National Grid in taking on the role of delivery agent for the EMR, including the CM.

At the same time, the policy process would be less vulnerable to being distorted by the structural dependency of government on industry if policy makers acknowledged and took steps to counter their own political incentives, in the case of the CM to keep the lights on. There is evidence from interviews that there is actually a self-awareness of these incentives amongst senior figures in government, but at the same time, there seems little interest in taking some steps to temper the effects of those incentives on decision making.

An obvious way of doing that is involving others who do not have those incentives – such as independent experts – in the decision making process. In its own limited way, the example of creating a Panel of Technical Experts to provide feedback on the methodology used for converting the reliability standard into capacity auction targets shows this, as it provided greater transparency about the process. However, the government also in the end did not take much notice of the PTE’s views on plant availability assumptions. While it is true that major energy policy decisions should ultimately be taken by elected politicians, as they have democratic legitimacy, a greater role for independent oversight and deliberation would help reduce distortion. This approach is taken quite successfully in other countries, for example as in Denmark’s udvalg system (see Lockwood 2015). It would also fit well with the option of facilitating a wider range of views externally (see below).

Finally, it is also worth reflecting in this context on the role of Impact Assessments (IAs) in the CM policy process. A total of seven IAs were carried out over the course of the development of the policy, relating to different aspects, including on the costs and benefits of introducing a mechanism, and then on various design options. Most of these, including the initial 2010 and 2011 IAs on adopting a mechanism and 2011 IAs on targeted vs. market-wide design, implied that the government’s final policy choice was not the most cost effective, or at least that the policy could not be justified on estimated cost grounds. There is evidence that the decisions in these case were made on other grounds, especially political judgement and risk. The problem
with this process is that it undermines the (albeit already problematic – see e.g. Cairney 2016) concept of ‘evidence-based policy making’, and the credibility of the decisions, since the IAs were published for all to see and compare with the decisions made. Being more explicit about political incentives would therefore also mean rethinking the role of IAs, and being clearer about how exactly they are supposed to relate to decisions.

A second area to think about is how government sets the terms of engagement for external actors. One of the issues emerging from this analysis is the role of modelling, evidence and analysis. A feature of corporate lobbying of government in this area was the use of reports commissioned from energy consultancy firms that involved a mix of modelling and evidence to support the arguments of incumbents. For example, early on, a group of firms with gas-fired interests commissioned work on the impact of wind intermittency on wholesale markets (Poyry 2009). In the autumn of 2010, in the lead up to the first EMR Consultation, Scottish Power commissioned analysis from NERA (2011) on the volume issue, while the Independent Generators Group commissioned Oxera [2010] to show that their preferred issue of flexibility mattered (apparently directly in response to a Minister telling them to go and put their case down on paper).

The importance of analysis commissioned by lobby groups in influencing policy is not unanimously accepted. For some, consultancy reports lack credibility because they are seen as shaped to say whatever the lobby wants them to say. Government in any case will produce its own modelling. On the other hand, commissioned work often appears to provide weight to particular views. It is also notable that industry groups still believe that they are worth investing in. It is also likely that the exercise of commissioning such work helps groups clarify their arguments and work out which elements are the most compelling. The issue here is one of resources; typically incumbents can access resources for commissioned analysis in a timely manner, whereas new entrants, NGOs and independent observers often cannot match such resources, or take so long in accessing them that the moment for influencing has passed. For example, the UK Demand Response Association also commissioned research on the effects of various CM design issues for DSR but, as discussed in section 11 above, it came too late in the process to influence the outcome. A closely related issue is that incumbent corporate actors generally have the resource to produce longer and more detailed submissions to consultations than do other actors.

One way in which the government could produce a more level playing field and a wider range of arguments would therefore be to provide resources to a range of actors, including new entrants, NGOs and expert independents, to commission (or possibly undertake) analysis and evidence gathering as part of the policy development process. This would have the effect of increasing
the amount of evidence, in ways that the government might itself not think of, and provide a useful testing of arguments. As noted above, where the government did do this, with the Panel of Technical Experts, it at least had the effect of making decision making on capacity requirements more transparent. The government did also appoint an academic expert in the latter stages of CM design, but only one, and only after the high level decisions had already been taken.

In summary, large, resource-rich incumbent actors will inevitably seek to influence policy making in areas where they have interests. Governments should explicitly acknowledge that inevitability, and develop better mechanisms for avoiding capture.

172 It is also not without precedent – for example, in 2010 Ofgem undertook a review of transmission charging that involved the commissioning of a range of independent analyses from a number of different perspectives. – see the papers at https://www.ofgem.gov.uk/electricity/transmission-networks/charging/project-transmit
Annex 1 – Interviews

A number of interviews were conducted between July 2016 and July 2017 for the research underlying this paper (see table A1.1). The interviews were semi-structured, using bespoke interview schedules (available on request) that differed between interviewees but covered the main issues discussed in sections 8 to 12 of this paper.

Table A1.1: Interviews

<table>
<thead>
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<th>No.</th>
<th>Date</th>
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<th>Role in process</th>
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<tr>
<td>1</td>
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<td>Head of NGO</td>
<td>Observer</td>
</tr>
<tr>
<td>2</td>
<td>12 July 2016</td>
<td>Political advisor in government 2010-2012</td>
<td>Government participant</td>
</tr>
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<td>3</td>
<td>19 July 2016</td>
<td>Regulation director in a Big Six company</td>
<td>Observer from within incumbent</td>
</tr>
<tr>
<td>4</td>
<td>21 July 2016</td>
<td>Manager in a Big Six company</td>
<td>Corporate participant</td>
</tr>
<tr>
<td>5</td>
<td>27 July 2016</td>
<td>Senior official in DECC</td>
<td>Government participant</td>
</tr>
<tr>
<td>6</td>
<td>23 February 2017</td>
<td>Policy manager in a Big Six company</td>
<td>Participant from within incumbent</td>
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<tr>
<td>7</td>
<td>17 May 2017</td>
<td>Consultant</td>
<td>Consultant and observer</td>
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<td>8</td>
<td>9 June 2017</td>
<td>Consultant</td>
<td>Observer</td>
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<td>9</td>
<td>28 June 2017</td>
<td>Staff member in UK Business Council for Sustainable Energy</td>
<td>Participant</td>
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<td>11</td>
<td>20 July 2017</td>
<td>Commercial energy lawyer</td>
<td>Observer</td>
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Annex 2 – Meetings with Ministers

Source:

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<td>Shell</td>
<td>Introductory meeting</td>
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<td>June 2010</td>
<td>BP</td>
<td>Introductory meeting/energy issues</td>
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<tr>
<td>June 2010</td>
<td>Nuclear Industries Association</td>
<td>Introductory meeting</td>
</tr>
<tr>
<td>June 2010</td>
<td>STATOIL</td>
<td>Introductory meeting</td>
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<td>Westinghouse</td>
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<td>June 2010</td>
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<td>June 2010</td>
<td>Eon</td>
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<td>June 2010</td>
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<td>Introductory meeting</td>
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<td>June 2010</td>
<td>Electromagnetic Pulse Council</td>
<td>Introductory meeting</td>
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<td>July 2010</td>
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<td>Gazprom</td>
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<td>July 2010</td>
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<td>Low carbon economy</td>
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<td>June 2011</td>
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<td>Society of Motor Manufacturers</td>
<td>Low carbon transport</td>
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<td>June 2011</td>
<td>Tony Gallagher (Telegraph)</td>
<td>General discussion</td>
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<td>June 2011</td>
<td>FT Energy Leaders Summit</td>
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<tr>
<td>June 2011</td>
<td>Evgeny Lebedev (Evening Standard/Independent)</td>
<td>General discussion</td>
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<td>June 2011</td>
<td>FT’s Annual Summer Party</td>
<td>Social</td>
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<td>Mainstream Renewable Power, DONG Energy, EDP Renovaveis, Enevo Wind UK Ltd</td>
<td>To discuss energy and climate related issues</td>
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<td>July 2011</td>
<td>Ovo Energy, Good Energy, Cooperative Energy, First Utility, Cornwall Energy, Ecotricity</td>
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<td>July 2011</td>
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<td>To discuss energy and climate related issues</td>
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<td>July 2011</td>
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<td>July 2011</td>
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<tr>
<td>July 2011</td>
<td>DONG Energy</td>
<td>To discuss energy and climate related issues</td>
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<tr>
<td>July 2011</td>
<td>Consumer Focus</td>
<td>To discuss energy and climate related issues</td>
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<td>July 2011</td>
<td>E3G</td>
<td>To discuss energy and climate related issues</td>
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<tr>
<td>July 2011</td>
<td>Association for the Conservation of Energy</td>
<td>To discuss energy and climate related issues</td>
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<tr>
<td>September 2011</td>
<td>UNICEF</td>
<td>To discuss climate related issues</td>
</tr>
<tr>
<td>September 2011</td>
<td>E3G</td>
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<td>Date</td>
<td>Organisation/Event</td>
<td>Purpose</td>
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<tr>
<td>September 2011</td>
<td>Country Land and Business Association</td>
<td>To discuss energy and climate related issues</td>
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<td>October 2011</td>
<td>Centrica</td>
<td>To discuss energy and climate related issues</td>
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<tr>
<td>October 2011</td>
<td>Aldersgate group</td>
<td>To discuss energy and climate related issues</td>
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<td>October 2011</td>
<td>London School of Economics</td>
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<td>October 2011</td>
<td>Unicef</td>
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</tr>
<tr>
<td>October 2011</td>
<td>BP</td>
<td>To discuss energy and climate related issues</td>
</tr>
<tr>
<td>October 2011</td>
<td>Scottish Power</td>
<td>To discuss energy and climate related issues</td>
</tr>
<tr>
<td>October 2011</td>
<td>PILOT</td>
<td>To discuss oil and gas issues</td>
</tr>
<tr>
<td>October 2011</td>
<td>Nuclear Development Forum</td>
<td>To discuss energy and climate related issues</td>
</tr>
<tr>
<td>October 2011</td>
<td>CBI</td>
<td>To discuss energy and climate related issues</td>
</tr>
<tr>
<td>October 2011</td>
<td>Peter Hain MP, Cardiff University and Ravensrodd Consultants</td>
<td>To discuss energy and climate related issues</td>
</tr>
<tr>
<td>November 2011</td>
<td>Price Waterhouse Coopers</td>
<td>To discuss energy and climate related issues</td>
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<td>November 2011</td>
<td>Carbon Capture and Storage (CCS) Development Forum</td>
<td>To discuss CCS issues</td>
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<td>November 2011</td>
<td>Carbon Trust</td>
<td>To discuss energy and climate related issues</td>
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<td>November 2011</td>
<td>WWF, Greenpeace, Cafod, Tearfund, Christian Aid, RSPB, Friends of the Earth, Oxfam</td>
<td>To discuss energy and climate related issues</td>
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<tr>
<td>November 2011</td>
<td>Gas and Electricity Supply Forum</td>
<td>To discuss energy and climate related issues</td>
</tr>
<tr>
<td>November 2011</td>
<td>Moneysupermarket.com</td>
<td>To discuss energy and climate related issues</td>
</tr>
<tr>
<td>November 2011</td>
<td>National Housing Federation</td>
<td>To discuss energy and climate related issues</td>
</tr>
<tr>
<td>November 2011</td>
<td>Independent Generators Group</td>
<td>To discuss energy and climate related issues</td>
</tr>
<tr>
<td>Date</td>
<td>Organization</td>
<td>Purpose</td>
</tr>
<tr>
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<td>Moneysavingexpert.com</td>
<td>To discuss energy and climate issues</td>
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<td>November 2011</td>
<td>Solent Local Enterprise Partnership</td>
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<td>November 2011</td>
<td>WWF, Greenpeace, Cafod, Tearfund, Christian Aid, RSPB, Friends of the Earth, Oxfam, ActionAid, Save the Children, Unicef</td>
<td>To discuss energy and climate issues in the run up to Durban UNFCCC negotiations</td>
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<td>November 2011</td>
<td>Quiller Consultants</td>
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<td>December 2011</td>
<td>E.ON</td>
<td>To discuss energy and climate issues</td>
</tr>
<tr>
<td>December 2011</td>
<td>Garrad Hassan</td>
<td>To discuss energy and climate issues</td>
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<td>December 2011</td>
<td>Crossrail</td>
<td>To discuss energy and climate issues</td>
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<tr>
<td>December 2011</td>
<td>Renewable Energy Association &amp; Solar Trade Association</td>
<td>To discuss energy and climate issues</td>
</tr>
<tr>
<td>December 2011</td>
<td>Riverstone</td>
<td>To discuss energy and climate issues</td>
</tr>
</tbody>
</table>
Annex 3 – Evolution of official capacity margin forecasts

Under the Labour government, the official statement of expectations on capacity margins appeared in annual Energy Markets Outlook (EMO) documents. The 2009 EMO (DECC 2009a) focused on expected closures of coal-fired and nuclear plants, especially from 2015/16 onwards (DECC 2009a: 31). Projected de-rated capacity margins, based on modelling by Redpoint (an industry consulting group), showed quite generous margins of over 15% out to 2019, and dipping below 10% only by 2022 (ibid: 42). The Outlook is fairly sanguine about the 2010s, stating that while there were uncertainties, ‘the risks to security of supply over the next decade are manageable. This view was supported in National Grid’s consultation on system operation to 2020’ (ibid: 43).

The original EMA report, published at the time of the March 2010 Budget, took a similar view, suggesting that while there might be a problem by the 2020s, and that options should be developed ahead of that time, action would not be needed before 2020 (HM Treasury/DECC 2010: 4). This position was based on assumptions that some 18GW of capacity (mostly nuclear and opted-out coal) would close by 2018, but also that ‘significant new investment’ was planned in wind and gas (around 10GW under construction and a further 11 GW with planning consents). This gave an overall picture of capacity margins in the late 2010s and early 2020s likely to be no lower than in 2008/09.

This view, however, changed by the time of the EMR Consultation document (DECC 2010a), published in December 2010, based on new modelling from Redpoint (2010). The consultation document reported the baseline simulation, which showed a sharp fall in the peak de-rated capacity margin, from an expected 25% in 2012 down to around 5% by 2020 (DECC 2010a: 30). This was associated with a sharp uptick in expected average unserved energy from 2018 onwards, from near zero over the 2000s up to around 5GWh in 2020.

The EMR White Paper, published in July 2011, had a similar analysis, stating that modelling suggested that investment in the current energy-only market would not be sufficient to avoid ‘potentially difficult levels of energy unserved’. However, the capacity crunch had been moved by 2-3 years off into the early 2020s. This modelling aimed to take into account the effects of the CfD.

A summary of the way that official DECC commissioned modelled forecast de-rated capacity margins for selected years evolved over the period 2009 to 2011 is given in Table 5. It shows that the big shift, which played a role in creating a justification for the government’s case for a capacity intervention, came with the 2010 EMR consultation document.
Table A.3.1: The evolution of modelled de-rated capacity margins

<table>
<thead>
<tr>
<th>Year</th>
<th>2013</th>
<th>2018</th>
<th>2023</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009 EMO</td>
<td>33%</td>
<td>17%</td>
<td>12%</td>
</tr>
<tr>
<td>2010 EMR Condoc</td>
<td>26%</td>
<td>9%</td>
<td>6%</td>
</tr>
<tr>
<td>2011 White Paper</td>
<td>24%</td>
<td>11%</td>
<td>6%</td>
</tr>
</tbody>
</table>

Sources: See Annex 3

It is therefore worth looking at the new modelling commissioned from Redpoint in 2010 in more detail. The approach was to produce a baseline model for 2010 to 2030 which included expected plant closure and new build but no new policies. Various decarbonisation policy scenarios were then developed, including the preferred CfD option. These start to affect margins in the model from 2018 onwards. The CfD option initially improves margins relative to the baseline up to 2023 but then leads to a distinct deterioration from then onwards (Redpoint 2010: 64). This translates into increasing expected energy unserved from 2018 onwards as before, but to much higher levels in the 2020s under the targeted low carbon policy options, including the CFD FIT (p 65)

The Redpoint modelling, following the government, assumed that peak demand would very gradually rise by about 3% between 2010 and 2020, and about 1.5% between 2020 and 2030 (Redpoint 2010: 124). In reality, peak demand fell by 7.4% between the winter of 2010/11 and that of 2015/16 (National Grid Winter Review 2015/16., Ofgem 2015 Security of Electricity supply).

Table A.3.2: Assumptions and modelled results, selected documents

<table>
<thead>
<tr>
<th>Source</th>
<th>Closures</th>
<th>New build</th>
<th>Peak demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy Markets Outlook 2009</td>
<td>12 GW under LCPD, 7 GW of nuclear by 2018</td>
<td>9 GW under construction; 11GW has planning consent; ~7 GW CCGT built 2010-2014, then none until 2034; new build by 2020 is 18GW</td>
<td>From 2009 Updated Energy Projections - Flat at 58GW (National Grid ACS)</td>
</tr>
<tr>
<td>EMA March 2010</td>
<td>18 GW of plant to close by 2018</td>
<td>10 GW under construction; 11 GW has planning consent; more with transmission connection. No formal modelling but up to ~58GW new build in total if all the above get built</td>
<td>From 2009 Updated Energy Projections - Flat at 58GW (National Grid ACS)</td>
</tr>
<tr>
<td>2010 EMR consultation document</td>
<td>12 GW under LCPD, 7 GW of nuclear by 2018, models further 11GW of coal and gas closures under IED by 2023 in baseline scenario</td>
<td>~6 GW CCGT built 2010-2012, then none until 2020, then 11.2 GW built by 2025; new build by 2020 is 30GW</td>
<td>From 2010 Updated Energy Projections – 3% rise 2010-2020, 1.5% rise 2020-2030</td>
</tr>
</tbody>
</table>

1. Energy Markets Outlook, October 2009, p. 42:

![Chart 4.8: Modelled level of (de-rated) capacity margin](chart)

2. EMA report, March 2010, p. 13:

![Chart 2.A: Existing and planned electricity capacity](chart)
3. Redpoint modelling report, December 2010, p. 29:

**Measures of capacity margin – Baseline**

![Graph showing measures of capacity margin over time]

4. EMR consultation document, December 2010, p. 30:

**Figure 3: Electricity Security of Supply Metrics**

- **Peak de-rated capacity margin**
- **Expected average unserved energy (GWh)**
5. EMR White Paper, July 2011, p. 65:

Figure 10: Peak de-rated capacity margin and expected energy unserved (GWh) to 2030

New build assumptions:

1. DECC Energy Markets Outlook, October 2009

Chart 4.6: New build UK electricity generating capacity. Source: Redpoint analysis for response to CCS consultation
2. Redpoint (2010), December 2010
Annex 4 – 2010 EMR Consultation Responses

References are made in the text to responses to the December 2010 consultation on the proposals for Electricity Market Reform, including the need for a capacity mechanism. In the text this is indicated by references in square brackets, e.g. SSE [2010]. These responses can be found at: https://www.gov.uk/government/consultations/electricity-market-reform. The consultation ran to March 2011. There were in total 265 responses.

Annex 5 – 2011 Capacity Market Consultation responses

References are made in the text to responses to the July 2011 consultation on the proposals for a capacity mechanism (Annex C of the EMR White Paper). In the text this is indicated by references in square brackets, e.g. SSE [2011]. These responses can be found at: https://www.gov.uk/government/consultations/possible-models-for-a-capacity-mechanism. The consultation ran to October 2011. There were 68 responses in total.
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Linklaters (2014) *Capacity mechanisms: Re-igniting Europe’s energy markets*


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