



Department  
of Energy &  
Climate Change

# **Electricity Market Reform Delivery Plan: Summary of responses and Government response to the July 2013 Consultation**

December 2013

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## Background

From 17<sup>th</sup> July to 25<sup>th</sup> September 2013 the Government consulted on the draft strike prices for the Contracts for Difference for renewable technologies and the reliability standard for the Capacity Market in the draft Electricity Market Reform (EMR) Delivery Plan. This document presents an overview of issues raised by stakeholders and the Government responses.

## Executive Summary

This section gives an overview of the main points made in the consultation responses as well as the Government's response to these. Further information on the responses received for each consultation question can be found in the section 'Summary of Responses'.

### **CfD strike price methodology for renewables**

There was general agreement that Contracts for Difference (CfD) strike prices should be set to be as broadly equivalent to the Renewables Obligation (RO). Some consumer groups felt that the strike prices should be set lower, while some industry groups felt that, as a new instrument, strike prices should be set to be more favourable during the period in which the RO and CfD are both available to incentivise uptake of the CfD.

**The Government has considered these responses. It believes there is a case for setting the CfD strike prices at broadly equivalent levels to the RO in order to enable a smooth transition between the instruments and avoid investors disproportionately preferring one or the other, while the two instruments are operating in parallel. However, the RO-X methodology is a guideline and not a rigid equivalence. There are clearly different assumptions that can be made about factors such as future wholesale prices, and there is no commitment on the Government's part to maintain this equivalence in future.**

Some felt that differences in the terms of the RO and CfD instruments made it difficult to compare them in practice.

**The Government has set strike prices at a level that ensures broad equivalence, including taking account of key differences such as the shorter term of the CfD (15 years), the lower cost of capital, and the different inflation indices. However, given differences in how the instruments protect investors against risk and the uncertainty over some assumptions, it is not possible to achieve perfect equivalence.**

### **Strike prices and technology costs**

Several respondents said that strike prices were too low – especially for the offshore wind strike price. Some respondents such as consumer groups argued that strike prices were too high and should be reduced across the board. Some industry respondents submitted evidence suggesting that the costs of their projects were higher than the averages assumed in the DECC technology costs reports. Some felt that certain costs such as potential increases in balancing costs of constrained wind generation had not been adequately accounted for in the setting of strike prices.

Most consultation responses agreed with the principle of cost degression. However, respondents made a number of detailed points about whether technology costs were indeed coming down for all technologies, and whether the rates of cost reduction assumed were correct. Others felt that the rates of degression should be directly linked to rates of deployment. Some argued that it would help the industry to know strike prices further into the future.

**The Government has considered the evidence provided. We acknowledge that there is significant uncertainty about future technology costs. We have concluded that, for offshore wind, the rate of cost reduction used in the draft Delivery Plan modelling in July was too rapid and have therefore**

**adjusted it to more accurately reflect the rate in the Crown Estates report (with the £100/MWh aspiration in their report being assumed to be met for projects reaching FID in 2020).**

**For other technologies we have concluded that the evidence provided did not justify changing our technology cost assumptions. The fact that individual projects have higher costs does not mean that the overall cost curve, covering all projects, is incorrect. We consider that we have used the best assumptions possible at this time. While balancing costs in the future are uncertain we did not find there was sufficiently strong evidence to change our cost assumptions or the PPA discount rates assumed (see below).**

**We continue to consider that strike prices should fall over time, to reflect the fact that as technologies mature and deploy at greater volumes their costs should come down. For the first Delivery Plan period this may not be the case for all technologies, and for some like biomass conversion, reductions in capital costs are potentially offset by increases in operating costs such as fuel costs. We are not proposing to link the strike prices automatically to deployment. However, we will monitor actual deployment levels and keep future strike prices under review.**

**Future strike prices (e.g. for the years 2019/20 and 2020/21) will be set out in an Annual Update to the Delivery Plan.**

### **Cost of capital assumptions**

Many respondents agreed that the CfD would reduce revenue risk for projects and this should reduce the cost of capital. However, respondents also argued that



these gains were as yet uncertain, the size of the impact was uncertain and that the reduction in cost of capital could be partly (or wholly) offset by other risks that are introduced in the CfD regime. The sorts of risks mentioned were summarised in the Brodies LLP report and included the risk of capacity adjustment leading to reduced support or the loss of the CfD contract, allocation risk, and construction risk.

**We have considered the evidence submitted on cost of capital carefully, and commissioned NERA to undertake an analysis of the consultation responses as well as reviewing other existing sources of evidence on the potential impact of the CfD such as reports by banks and brokers on cost of capital under the CfD, reports from other countries with similar support mechanisms (Germany and Denmark) and cost of capital information from regulated industries in the UK. The NERA report covers the consultation responses on other risks introduced through the CfD and is published alongside this Delivery Plan<sup>1</sup>.**

**On the basis of the NERA report and the consultation responses we have concluded that there is a strong evidence base supporting the argument that the CfD would enable a lower cost of capital than the RO for most technologies and that this will enable lower support levels, reducing the amount of support that consumers pay for most renewable technologies. We have adjusted the technology specific hurdle rates in line with the NERA report (see Annex H of the Delivery Plan). As a result of this we have adjusted strike prices for a number of technologies.**

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<sup>1</sup> <https://www.gov.uk/government/publications/electricity-market-reform-delivery-plan>

**There has been a small increase in the CfD hurdle rate (compared with the RO) for some technologies (see annex H to the Delivery Plan). This has been reflected in the offered strike prices.**

### **Other key assumptions in the strike price analysis**

Other key assumptions which the consultation responses covered were the maximum build rate rates for each technology, the power price assumptions, the Power Purchase Agreements (PPAs) discounts and the revenues assumed from the capacity market (once support under the RO or CfD has ended) and from the sale of Levy Exemption Certificates (LECs).

Some responses were critical of the assumption that investors would take a conservative view of future power prices (in the modelling investors assume flat power prices after five years) and felt that wholesale power price assumptions were too low. The inclusion of assumed revenues from both Levy Exemption Certificates (LECs), and the capacity market (for renewable projects after they have stopped receiving revenues from the RO or CfD) – were both challenged. The assumed discount rates in Power Purchase Agreements (PPAs) between generators of renewable electricity and suppliers were considered by some respondents to be too low.

**We have increased maximum build rates to be more consistent with high levels of deployment observed in our pipeline of projects, especially for onshore wind. We have also updated our analysis to be consistent with the latest commercial data on deployment for certain technologies (e.g. onshore, solar, biomass, nuclear – see Annexes D and H of the Delivery Plan).**

**We have considered the evidence on power price projections and the 5-year investor foresight. We consider DECC's price projections to be in line with other power price projections available from the market. We consider that it is justified to continue to use the 5-year investor foresight assumption as our commercial intelligence (including from financiers and banks) suggests that financing decisions in the renewables industry are made on the basis of imperfect foresight and often quite conservative price projections.**

**Furthermore, as the 5-year investor foresight assumption was used during the RO banding review, removing it would conflict with the principle of RO-equivalence and could lead to consumers overpaying under the CfD.**

**On PPA discounts, we consider that the available evidence does not justify increasing the discount assumptions used for the draft Delivery Plan. However, the PPA discounts assumed for solar and other intermittent technologies have been made consistent with those for onshore wind under CfDs.**

**On revenue from LECs we consider that while it is true that actual revenues from LECs are uncertain, this revenue is counted on both the CfD and RO side so removing it would have no impact on the strike prices as calculated. Furthermore there is no clear, strong evidence that these revenues will definitely absent or lower.**

**On revenues from the capacity market these also appear on both the RO and CfD side of the calculation so would not affect the strike price calculation.**

### **Renewable deployment and affordability**

Some respondents said that strike prices should be set in line with a scenario which delivers 35% renewable electricity as this would give greater certainty of meeting the renewable energy target, particularly if other sectors under delivered or if electricity demand was higher than expected. Other respondents said that the 30% scenario should be sufficient to meet the Government's targets and would mean lower costs for consumers.

**The Government considers that the strike prices in the Delivery Plan, which achieve around 33% renewable electricity in 2020 in National Grid's modelling, strike the right balance between delivering on the renewable energy target and minimising costs to consumers, but we will continue to monitor the electricity sector's contribution towards the wider UK renewable energy target.**

**The Government considers that aiming for 30% renewable electricity would increase the risk of not delivering the renewable energy target if for example electricity demand was higher than our central assumption (see Annex D to the Delivery Plan where National Grid's analysis illustrates the potential impact of such uncertain variables on the Government's objectives).**

### **Indexation and £5 rounding**

Some respondents argued that the inflation index used should be RPI rather than CPI.

**This is a policy decision taken for the CfD and the Government continues to consider that CPI is the right index to use. We consider that there is a clear case for CPI to be used for indexation. It is the standard Government measure of inflation and potentially less volatile than RPI. CPI is also an**

**important measure of inflation for the EU<sup>2</sup> and is a familiar index to international investors. We believe that CPI is a more robust measure of actual inflation.**

Some respondents argued that rounding to the nearest £1/MWh would be better than £5/MWh.

**The Government considers that for consistency with the RO and in order to avoid giving the impression that strike prices can be calculated very precisely during the administrative price setting we should stick to rounding to the nearest £5/MWh.**

### **Capacity market reliability standard**

Most agreed with a reliability standard defined as Loss of Load Expectation of 3 hours per year. Others questioned the values used for the Value of Lost Load (VoLL) and the Cost of New Entry (CONE) where doubts were raised over the appropriateness of the chosen reference plant.

The demand curve methodology was largely endorsed by respondents but some would like to see technology capacity factors as part of the calculation.

**The final reliability standard will be 3 hours Loss of Load Expectation each year. Respondents said they considered that this is to an extent a political decision, but the standard is strongly supported by the analysis. A LoLE of 3 hours is well within the range of uncertainties presented in Annex C on the reliability standard.**

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<sup>2</sup> [http://epp.eurostat.ec.europa.eu/statistics\\_explained/index.php/Glossary:Consumer\\_price\\_index\\_\(CPI\)](http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Glossary:Consumer_price_index_(CPI))

**The value of CONE was based on independent analysis, however we recognise that this value may not feed directly into the first capacity market auction and it is subject to further consultation.**

**The VoLL value used in the calculation for the reliability standard is the result of a robust analytical study that took careful consideration of consumers' preferences, and further details of how this value was estimated can be found in the London Economics Study<sup>3</sup>.**

**The auction parameters are also subject to a separate consultation.**

### **Wider modelling changes**

Other modelling changes have been made which do not result from specific consultation responses. These are set out in Annex H of the Delivery Plan.

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<sup>3</sup>[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/224028/value\\_lost\\_load\\_electricity\\_gb.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/224028/value_lost_load_electricity_gb.pdf)

## Introduction

1. Electricity Market Reform (EMR) is the biggest change to the UK energy sector since privatisation. Reform will enable the Government to meet its targets on decarbonisation, renewable energy and security of electricity supply while keeping the costs to consumers down.
2. Given the Government's commitment to tackling climate change (with legally binding targets for 2020 and 2050), investment in the UK's electricity production and infrastructure is both required and long overdue. We have already seen significant closures in the last two years, with around a fifth of Great Britain's ageing power plant decommissioning by 2020, and further closures in the 2020s. In addition, electricity demand is likely to grow significantly over the next 40 years as we increasingly turn to electricity for heat and transportation.
3. EMR provides an opportunity to successfully deliver the UK's legally binding obligations on climate change, at a lower cost than would otherwise have been the case, using existing policy instruments. This is because EMR, through the introduction of CfDs, lowers the cost of capital to investors for most renewable technologies meaning that lower support is required from consumers to bring on investment in renewable electricity generation.
4. While the core purpose of EMR is to deliver on the UK's climate change targets, the policy will also provide additional benefits to Great Britain – in the form of additional investment, jobs and lower energy bills – when compared with existing policy instruments.

5. The reforms will help enable up to £110 billion in investment, and support up to 250,000 jobs throughout the supply chain during this decade alone. Consumers will benefit directly from these measures too, average annual household electricity bills will be around 6% - or £41 per annum lower over the period 2014 to 2030<sup>4</sup>, than if the Government had not introduced EMR.
6. In November 2012, the Government set out its intention to publish an EMR Delivery Plan every 5 years, beginning in 2013. The purpose of the Delivery plan is to publish key decisions on EMR, notably the strike prices for renewable electricity Contracts for Difference (CfD), information about the budget available to support low carbon technologies and decisions related to the Capacity Market. In addition, the Government will provide Annual Updates each year on the progress of the Electricity Market Reform programme.
7. We consulted on proposed strike prices for renewable technologies between July 17th and September 25th in the draft Delivery Plan<sup>5</sup>. National Grid produced modelling for both the consultation and this Delivery Plan to assess the impact of the strike prices on the Government's objectives in a process scrutinised by an independent Panel of Technical Experts. National Grid's analysis also assessed how robust achievement of the Government's objectives was to uncertainty in e.g. technology costs, fossil fuel prices and electricity demand. National Grid's modelling was published alongside the consultation document and updates of this analysis were published as an annex to the December Delivery Plan.

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<sup>4</sup> Real 2012 prices

<sup>5</sup> <https://www.gov.uk/government/consultations/consultation-on-the-draft-electricity-market-reform-delivery>



8. The draft Delivery Plan also consulted on the proposed reliability standard for Great Britain's electricity market. This standard will be used to inform the amount of capacity to be contracted to ensure an uninterrupted supply.

### **Purpose of this Document**

9. This document provides a summary of consultation responses received and the Government's response to these issues.

### **Structure of this Document**

10. This document is organised by consultation question. A Summary of responses lays out an overview of stakeholder responses to each of the 17 consultation questions.
11. The Government response is set out at the end of the summary of responses to each question.
12. Where respondents raised an issue concerning one aspect of the policy as part of a response to a question on a different aspect, these have been dealt with in responses to the most appropriate questions.
13. This document does not attempt to respond individually to every comment received during the consultation period but responds to significant issues raised by respondents. However, all points raised during the consultation have been taken into account when considering whether changes to the policy were required.

14. We would like to thank all respondents who submitted a formal response or participated through the various activities held during the consultation.

## Summary of Responses

15. We received over 100 responses to the consultation. The majority of these (70) were from England and Wales. Around 27 identified themselves as from the United Kingdom, with around 6 from Scotland and 1 respondent from Ireland. We also received responses from the USA, Canada, the United Arab Emirates and Norway.
  
16. A broad spectrum of electricity market stakeholders were represented in the responses to the consultation. Responses were received from:
  - Energy generation companies
  - Electricity suppliers
  - Electricity network operators
  - Industry groups
  - Consumer groups
  - Charity or campaign groups
  - Investment firms
  - Energy consultancies
  - NGOs

**Question1** - Do you agree that CfD strike prices should be set comparable to the Renewables Obligation for the period 2014/15-2016/17? If not, why and what alternative would you propose?

17. The majority of respondents agreed with this rationale as broad RO-equivalence would provide similar risk-adjusted returns.
18. However, a number were keen to stress that uncertainty can be inherent in new policy instruments which could put the CfD at a relative disadvantage to the RO. It was suggested that strike prices under CfD should provide more favourable terms than the RO to encourage investors to overcome associated new uncertainties.
19. It was also suggested that there is a need to provide additional support to certain technologies where the RO has failed to incentivise significant wider deployment, such as such as Advanced Conversion Technology (ACT) and Combined Heat and Power (CHP) schemes. In these cases, respondents felt CfD strike prices should be set higher than under the RO.

Government response

20. The Government has considered these responses. It believes it is right to set the CfD strike prices at broadly equivalent levels to the RO in order to enable a smooth transition between the instruments and avoid investors disproportionately preferring one or the other while the two instruments are operating in parallel. However, the RO-X methodology is a guideline and not a rigid equivalence. There are clearly different assumptions that can be made about factors such as future wholesale prices, and there is no commitment on the Government's part to maintain this equivalence in future.

21. The Government does not consider that it should set strike prices at a higher level than RO-equivalence in order to compensate for the newness of the instrument. Most of the detail of how the CfD would work is now published. The CfD is very similar in structure to premium FIT schemes available across Europe, e.g. Denmark and the Netherlands. By the time the CfD allocation process begins in late 2014 industry will have had time to digest the detailed contract terms. In addition, there are several advantages of the CfD instrument that it has not been possible to take into account in the RO-X methodology.
22. The Government does not consider that there is a case for increasing the support levels higher than those set in the RO Banding Review.

**Question 2 - The methodology for setting Renewables Obligation-comparable strike prices is described in Box 1 and the resulting strike prices are in Table 1. Do you agree that the strike prices we have set offer support that is comparable with the Renewables Obligation?**

23. There was challenge over some of the applied assumptions in the methodology. Specifically, some put forward the view that CfD methodology assumes much lower RO revenues than have in practice been achieved.
24. Some thought strike prices were too low to support the desired levels of deployment, particularly for offshore wind, wave, tidal stream and biomass CHP.
25. Some respondents objected to the strike prices for ACT being coupled to offshore wind.

26. There was concern over perceived contractual differences in the terms of the RO and CfD. Some objected to the shorter 15 year period of the CfD instrument and wanted CfDs to last 20 years as under the RO.
27. Some respondents felt that the published strike prices should be extended beyond the period 2018/19 to match the period covered by the Levy Control Framework (LCF). Others felt there was a need to extend the planning horizon on to the next 10-15 years.
28. Others expressed a fear that rounding strike prices to the nearest £5 was not precise enough recommending this be changed to prices rounded to the nearest £1.
29. Concern was raised over the use of the Consumer Price Index (CPI) rate of inflation for CfD, which differs from the Retail Price Index (RPI) used under the RO scheme. Some respondents felt that the RPI represents a better deal for investors because it covers a greater amount of potential inflation.
30. Certain stakeholders felt that in cases where there exists an explicit cost per-unit-installed of a specific technology, there should be more regular reviews and adjustments of strike prices.
31. Respondents raised specific issues in relation to the Devolved Administrations. These included:
  - The strike prices have been set comparable to the RO for England and Wales; it is therefore difficult to compare them to the Northern Ireland RO and Scotland RO.

- In Northern Ireland, significant delays in grid connection can be extensive and outside the control of developers. It was suggested Northern Ireland should have higher strike prices than Great Britain in acknowledgement of this.
- It was also suggested that Northern Ireland should have separate strike prices for offshore wind. This was justified on the basis of the proposed separate strike price for Scottish Islands onshore wind projects which was consulted on over the Summer.
- Some respondents proposed that a proportion of the Levy Control Framework be set aside for Northern Ireland investors as CfDs will not apply to Northern Ireland until after 2016.

### Government response

32. Respondents' belief that RO revenues have been underestimated stems from a rejection of the 5 year wholesale power price foresight used in the RO-X strike price calculation.
33. After assessment of the evidence submitted in response to the consultation the Government has altered the strike prices since the draft Delivery Plan (for one or more years) for all technologies with the exceptions of biomass conversion, wave and tidal stream technologies.
34. There are no plans at present to set the ACT strike price at a higher price than offshore wind. Offshore is the marginal technology and the Government

does not believe it would represent good value for money to pay a higher price for ACT at this time.

35. The decision for a 15 year contract is based on a trade-off between value for money for consumers, affordability within the Levy Control Framework, and ability to secure investment. Our analysis suggests that 15 years provides an appropriate balance of these factors. Strike prices have been calculated using the RO-X methodology and have been set higher to compensate generators for the fact that CfD support is over 15 years, as opposed to 20 years.
36. Analysis shows that projects could still operate economically after 15 years on price in all but the most extreme scenarios.
37. In this first EMR Delivery Plan, we are publishing strike prices up until 2018/19. This gives investors sufficient certainty to make sound investment decisions and provides similar foresight to the arrangement under the RO. For those technologies where we believe there are long lead-in times, there is the facility within EMR to publish anticipated future strike prices as part of an Annual Update in 2014 or 2015.
38. Retaining the £5 rounding will maintain consistency with the RO bands (which were set at 0.1ROC intervals). Given this, and the need to avoid giving a false sense of modelling precision, the Government has concluded that there is not a strong case for changing the rounding of model figures from £5 to £1.
39. While some investors indicated a preference for RPI, we consider that there is a clear case for CPI to be used for indexation. It is the standard Government measure of inflation and potentially less volatile than RPI. CPI is



also an important measure of inflation and the standard one used in the EU<sup>6</sup> and is a familiar index to international investors.

40. The best available evidence was used to assess the level at which strike prices will be set and their rates of degression. Annual updates supported by secondary legislation provide an opportunity to assess and adjust the strike prices for specific technologies.
41. The strike prices for the technologies are not geographically specific, with a single price applying across the UK for each technology (except where, as for Scottish Islands onshore wind, we have good reason to set a separate strike price). The Government has chosen to make the RO-X methodology comparable to the RO for England and Wales. In the final Delivery Plan we have however amended the hydro RO band used to be comparable to the Scottish RO band. This is on the basis of DECC's 2011 report "Review of the generation costs and deployment potential of renewable electricity technologies in the UK" which suggests that all the UK's build potential for large scale hydro is in Scotland<sup>7</sup>.
42. Northern Ireland has consented to use the final strike prices as set out in the Final Delivery Plan. Northern Ireland has the ability to set their own strike prices, but any additional costs are not borne across the UK.
43. The Government is committed to introducing the CfD into Northern Ireland in line with reforms to the Irish Electricity Market in 2016/17, ensuring that Northern Irish projects will have the ability to apply for CfD along with all other projects in GB. We recognise that there may need to be variations to the

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<sup>6</sup> [http://epp.eurostat.ec.europa.eu/statistics\\_explained/index.php/Glossary:Consumer\\_price\\_index\\_\(CPI\)](http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Glossary:Consumer_price_index_(CPI))

<sup>7</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/42843/3237-cons-ro-banding-arup-report.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/42843/3237-cons-ro-banding-arup-report.pdf), Page 56

allocation process and/or contract to accommodate the different market arrangements and legal and regulatory frameworks that exist in Northern Ireland.

**Question 3** - We propose that where technology costs are expected to decline, strike prices should decline over time to reflect technology cost reductions and ensure value for money. Do you agree that this the most appropriate basis on which strike prices should change over time? If not, why and what alternative would you propose?

44. Respondents generally agreed that strike prices should fall over time in real terms.
45. It was suggested that for offshore wind, strike price depression should be clearly linked with rates of deployment.
46. Some respondents felt that the potential for a significant rise in grid imbalance costs over time had not been adequately addressed.

#### Government response

47. The Government has adjusted the assumed cost depression for offshore wind. This results in the cost depression profile for offshore wind being less steep. This is set out in more detail in the response to Q7.
48. The Government has reviewed the evidence provided on future grid imbalance costs. We received insufficient evidence to suggest that these costs would increase as a result of the move from the RO to CfD. However, the PPA discounts used in our modelling for solar and other intermittent technologies have been aligned with those for onshore wind under CfDs.

**Question 4 - Do you believe that the recommended strike prices shown in Table 1 change over time in a way that appropriately reflects technology cost reductions and ensures value for money?**

49. Some thought the rate of strike price degeneration was too steep for their technologies. This was most strongly expressed for technologies with specific costs of deployment yet to be overcome, such as offshore wind and ACT.
50. For wave and tidal stream technologies, respondents disagreed with the 30MW cap for receiving £305 as opposed to the offshore wind strike price.
51. For technologies reliant on fuels, such as biomass combined heat and power (CHP), a number of respondents suggested that strike prices should be linked to fuel costs, and that these costs have been set too low in the DECC model.
52. Linked to this was the contention that increases in constraints on the transmission grid could necessitate costly and time consuming infrastructure upgrades that would not be reflected in the level of support available through the strike price.

Government response

53. The Government has reviewed its evidence on cost degeneration for offshore wind, and adjusted the learning rate. This is set out in more detail in the response to Q7, and results in the cost reduction profile being less steep than previously assumed.
54. For ACT, external advice was commissioned from the bio-economy consultants – NNFCC - to review new cost evidence submitted to the consultation. The advice that we have received is that the cost information

received is not significantly different to that which was used in the modelling for the draft Delivery Plan. Therefore, the costs information has not been updated.

55. It is important to incentivise further development of early-stage technologies such as tidal stream and wave but, given the high level of revenue support needed, the high strike prices being offered will continue to be available up to a capacity cap. This is to encourage the move towards commercialisation for these sectors whilst managing overall costs to consumers.
56. We take account of fuel costs in setting support levels for biomass technologies. However, there is no reliable index which covers the various biomass fuel types. Therefore, we do not think it is practical to index-link the strike prices to fuel costs. In addition, linking strike prices to a particular index could risk artificially inflating prices and impacting other sectors that utilise wood.
57. We are aware of the concern that the greater penetration of low-carbon generation could increase the frequency of System Operator actions to balance the electricity system or resolve transmission constraints. At present, generators affected by these System Operator actions receive market-based compensation for the impact on their operations. Whilst we do not consider it likely, it is possible that the current system of market-based compensation could be replaced by one that does not provide generators with economic levels of compensation.
58. As a result we are developing a further compensation mechanic. This compensation would be applied in the unlikely scenario where Government has directly intervened in the market and the result is that the relevant CfD

generator is curtailed involuntarily and less than a minimum level of compensation is paid. This should ensure that investors do not increase hurdle rates in order to reflect a risk that is unlikely to materialise.

## Question 5 - Do you agree with the key assumptions underpinning the strike price analysis?

### Build constraints

59. Some consultees argued that build limits were too low for solar, ACT and offshore wind.
60. For tidal stream technology, there was some question as to whether the projected deployment would be realised by 2020 given the high upfront costs of this technology. The level of revenue support provided to the industry was highlighted as a primary constraint. Some thought that the industry had the potential to exceed the rates of deployment given current pipelines, if the right enabling mechanism was in place.

### Government response

61. We have reviewed the build rate assumptions following the consultation and as a result offshore wind build limits have been increased.
62. ACT build limits have remained the same after review of the evidence presented in the consultation.
63. Build limits for solar PV have been reviewed based on observed deployment and expected deployment out to 2014/15. Based on this, we judge that a build limit of 1024MW per year remains appropriate.

64. Evidence submitted did not substantiate higher upfront cost claims for tidal stream. Cost data submitted was reviewed and was deemed to be similar in all material respects to our existing evidence so no change has been made.
65. We have also increased the build limits for onshore wind. This is based on the high levels of deployment seen potentially coming forward within the Renewable Energy Planning Database (REPD).

### Hurdle rates

66. Hurdle rates were considered too low for many of the technologies with particular concern for biomass CHP, ACT, tidal stream, wave, offshore wind and solar. It was argued that some key assumptions are wrong and that hurdle rate reductions are too large.

### Government response

67. Since publication of the draft strike prices the Government has commissioned a report from NERA to review existing evidence on the cost of capital under CfDs, including analysing consultation responses, analyst reports and interviewing members of the financing community. The evidence supported a cost of capital reduction under the CfD for most renewable technologies.
68. However, for some technologies the evidence suggested the reduction would be lower than what was previously assumed (offshore wind) and for others the evidence suggested it would be higher (onshore wind).
69. In addition, Government reviewed publically available evidence from PWC on the differential between hurdle rates for offshore wind round 2 and 3. The



evidence suggests a smaller differential than previously assumed was appropriate. .

### Wholesale power prices

70. Respondents argued that there is no reason to believe that investors will assume flat power prices after 5 years. It was suggested CfD methodology use the power prices projections used in the Renewables Obligation Banding Review (ROBR).
71. There were responses that claimed that the wholesale power prices assumptions used in the draft Delivery Plan were too low.

### Government response

72. At the time of the ROBR, consultation responses suggested that foresight of five years was appropriate, and ROC bands were set higher than would have been the case had longer foresight been assumed. It is therefore the Government's view that the foresight assumption should remain unchanged.
73. The Government has reviewed its wholesale power price projections and found them to be broadly aligned with those of other organisations. This and the insufficient evidence provided to support a change to wholesale power prices during the consultation means there is no justification for an adjustment.

### Levy Exemption Certificates (LEC)

74. Some responses relayed concerns over the future of Levy Exemption Certificates, stating that the continuation of LEC support is dependent on Government policy and may not be available in the future.

### Government response

75. The Government has reviewed the evidence on the future value of LECs. As the future trajectory of the LEC value is based on uncertain forecasts, it is not possible to confidently determine the likelihood of a collapse in the value of LECs. The issue of LEC values will continue to be monitored going forward.
76. On revenue from LECs we consider that while it is true that actual revenues from LECs are uncertain, this revenue is counted on both the CfD and RO side so removing it would have no impact on the strike prices as calculated. Furthermore there is no clear, strong evidence that these revenues will definitely absent or lower.

### Power Purchase Agreements (PPAs)

77. A number of respondents felt that the PPA discounts assumed in the draft Delivery Plan would be unlikely to materialise. Some respondents felt that PPA discounts should be the same between the RO and CfD while others raised concerns that PPA terms could deteriorate due to rising imbalance charges.
78. Concerns were raised over contractual difficulties and a current lack of availability of long -term PPAs.

79. A view was expressed by some respondents that the PPA discounts for onshore and offshore wind should be similar, if not equal, rather than a significantly lower discount for offshore wind as was proposed.

### Government response

80. Evidence<sup>8</sup> suggests that, all other things being equal, the transition from RO to CfD should lead to lower PPA discounts that reflect the changing risk landscape<sup>9</sup>. The Government has reviewed the evidence provided by respondents who felt these discounts should be equal or higher than under the RO (for example, as a result of rising imbalance costs). However, we received insufficient evidence to suggest that discounts would increase directly as a result of the move from the RO to CfD. As such, and consistent with the RO-X methodology, the PPA discount assumptions have not been adjusted for this reason.

81. The PPA discounts assume a reasonably competitive PPA market and efficient pricing of imbalance risk and route to market costs – the Government is currently considering intervention options, if required, to promote competition in the PPA market.

### Other

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<sup>8</sup> For example, analysis by Baringa, available online at: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/253175/Baringa\\_analysis\\_of\\_PPA\\_market\\_liquidity.\\_Presentation\\_at\\_April\\_workshop\\_\\_\\_Report\\_published\\_July\\_2013\\_.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/253175/Baringa_analysis_of_PPA_market_liquidity._Presentation_at_April_workshop___Report_published_July_2013_.pdf)

<sup>9</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/68771/7072-government-response-to-the-house-of-commons-energy.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/68771/7072-government-response-to-the-house-of-commons-energy.pdf)

82. It was also felt that Capacity Market revenues should not be included in the calculations as they are subject to some uncertainty and are unattractive to intermittent generators.
83. Some stakeholders also felt that the Capacity Market calculations have not incorporated the income received by wind operators when they are constrained from the grid.

### Government response

84. In setting final strike prices for all technologies, the Government will continue to model capacity market payments after Government support has ended. Firstly, it is a committed Government policy, which we intend to fully support. Secondly, capacity market payments have been de-rated in our modelling for all technologies, to reflect differing levels of plant availability.
85. Under the CfD, intermittent operators may be constrained from the grid after gate-closure by the System Operator – this was also the case under the RO. Under both the RO and the CfD, generators will continue to receive wholesale revenue for contracted energy. While curtailment by the System Operator would mean generators would lose ROCs or CfD difference payments (settled on metered output), we believe generators will continue to receive market-based compensation (e.g. through the Balancing Mechanism) in the event they are curtailed.
86. For the CfD, we are developing a further compensation mechanic to be applied in the unlikely scenario where Government has directly intervened in the market and the result is that the relevant CfD generator is curtailed involuntarily and less than a minimum level of compensation is paid. This

should ensure that investors do not increase hurdle rates in order to reflect a risk that is unlikely to crystallise, and should reduce risk relative to the RO.

**Question 6** - Do you agree with our judgement that setting strike prices consistent with Core Scenario 32% (described above and in the Report from the System Operator at Annex E) is the best way to balance the Government's objectives of renewables deployment and affordability? If not, please state why.

87. Some respondents said that strike prices should be set in line with a scenario which delivers 35% renewable electricity as this would give greater certainty of meeting the renewable energy target, particularly if other sectors under delivered or if electricity demand was higher than expected.
88. Other respondents said that the 30% scenario should be sufficient to meet the Government's targets and would mean lower costs for consumers.

#### Government response

89. The Government considers that the strike prices in the Delivery Plan which achieve around 33% renewable electricity in 2020 in National Grid's modelling strike the right balance between delivering on the renewable energy target and minimising costs to consumers, but we will continue to monitor the electricity sector's contribution towards the wider UK renewable energy target.
90. The Government considers that aiming for 30% renewable electricity would increase the risk of not delivering the renewable energy target if for example electricity demand was higher than our central assumption (see Annex D to the Delivery Plan where National Grid's analysis illustrates the potential impact of such uncertain variables on the Government's objectives)

91. The scenarios presented are indicative. It is unlikely that the electricity generation mix in 2020 will match one scenario exactly. It is possible to deliver towards the higher end of the ranges for technologies – particularly if costs continue to fall.
  
92. This is based on modelling using current cost assumptions and constrained by the overall LCF envelope. However, with cost reductions in the sector , higher levels of deployment would be possible.

**Question 7 - Do you agree with our proposed approach by technology?  
Please provide evidence to support your position.**

**Advanced Conversion Technology (ACT)**

93. Some respondents said that strike prices should be higher and degression rates less steep to boost deployment . Some respondents felt it was not appropriate to tie degression for ACT to that for offshore wind, as ACT is a less mature technology that will not see the same level of cost reduction as offshore wind given its projected deployment.
94. ACT costs have been reviewed by an external consultancy – NNFCC – who advised that costs used in setting strike prices for this technology should not be changed, given that evidence on costs submitted during the consultation was not significantly different from that included in modelling for the draft EMR Delivery Plan.
95. Others wished for a distinction to be drawn between standard and advanced ACT technologies when setting strike prices.
96. Some respondents argued that the non-renewable element of ACT should be eligible for the Capacity Market in order to adequately support the technology overall.

Government response

97. Pipeline data and activity under the RO to progress a number of projects is a positive sign that strike prices under the RO were sufficient to 2017. Because the ACT strike price is intended to be RO equivalent, we consider that the



strike price is set at a rate sufficient to bring forward deployment of ACT technology.

98. There are currently no plans to delink ACT strike prices from offshore wind. The offshore wind strike price is viewed as the maximum support level for renewable electricity generation. (The exception to this is wave and tidal stream, which have a higher strike price to encourage development of these early stage technologies and are subject to a capacity cap for the higher strike price).
99. After a review of the evidence and additional data submitted we still consider that the costs of standard and advanced ACT are not sufficiently different to offer separate strike prices.
100. We have chosen to maintain the principle that electricity-generating sites which receive a CfD are not eligible for capacity payments. While a proportion of the fuel used by ACT is non-renewable, it would not be feasible to split out renewable and non-renewable for the purpose of providing capacity at short notice. In addition, we consider that funding the renewable portion under CfDs will be sufficient for projects to deploy.

## Anaerobic Digestion

101. The strike price for this technology has changed since that proposed in the draft Delivery Plan, and has increased by £5/MWh to £150/MWh for 2014/15, 2015/16 and 2016/17 reflecting our updated assumptions about the

cost of capital. Following 2016/17, the strike price degresses in line with that for offshore wind.

## Biomass conversions and Dedicated Biomass with combined heat and power (CHP)

102. Consultees suggested that uncertainty over fuel costs in the event of wider biomass deployment means that the strike price for biomass-based technologies should be linked to fuel prices. There was also a wider view that the strike price for dedicated biomass CHP set out in the draft Delivery Plan was too low. Conversely, other responses stated that the strike prices for biomass generation were too high as the technology already has a well-developed infrastructure, less in need of support than other less mature technologies.
103. Many responses expressed disappointment that neither dedicated biomass (without CHP) nor bioliquids will be supported under CfDs. Some responses also suggested that co-firing stations should continue to be supported, as they are under the RO.
104. Regarding dedicated biomass CHP, many responses raised that there is uncertainty over the Renewable Heat Incentive (RHI) tariff for CHP technologies, which at that time was pending the outcome of a separate consultation on RHI support.<sup>10</sup> Related to this, some responses suggested that the 10-year assumption around heat sales included in the draft Delivery Plan analysis was incorrect, and that this should be 20 years.

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<sup>10</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/66160/RHI\\_-\\_expanding\\_the\\_non-domestic\\_scheme.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/66160/RHI_-_expanding_the_non-domestic_scheme.pdf)

105. Finally, some stakeholders felt there should be greater encouragement for generators to provide heat to local communities, regardless of individual circumstances.

### Government response

106. Conversion of coal power or biomass co-firing stations or units to sustainable biomass offers a quick, cost-effective way to rapidly decarbonise electricity generation in the short to medium term, as well as contributing to security of supply through the extension of the lifetime of generating assets.

107. We are offering a flat strike price throughout this Delivery Plan period for biomass conversion, instead of reducing strike prices, to both take account of the shorter contract term being offered to biomass conversions and the expected increase in imported fuel costs due to our proposed changes in sustainability standards. The decision to end payments to biomass conversions in 2027, which results in the shorter contract term, is in line with Government's longer-term sustainability objectives as set out in the Bioenergy Strategy. We consider that this offers a fairer, more cost-effective solution than attempting to establish fuel price indices as suggested by some consultees.

108. In light of the recently published outcome of the Government's consultation on RHI support, the Government has moved to modelling the new RHI tariff for CHP technologies eligible for the RHI tariff. Therefore, the assumption is that dedicated biomass CHP plants now receive 4.1p per kWh of heat generation, in addition to their revenue streams under the CfD.

109. In response to stakeholders' comments we have reviewed historic data on the duration of CHP heat supply from the CHP Quality Assurance database which suggests that in many cases heat supply duration can often be longer than 10 years. We have therefore adjusted the heat sales assumption from 10 to 20 years. We have also revised hurdle rates in line with the updated assumptions on the cost of capital.

110. The strike price for biomass CHP has increased by £5/MWh. This is due to a change in the hurdle rate under CfDs, and making an adjustment to take into account longer heat contracts.

111. As set out in Chapter 4 of the Delivery Plan and in line with previous policy statements, we are not supporting co-firing plants, bioliquids and dedicated biomass without CHP under CfDs.

112. For more information on dedicated biomass CHP policy please see the October EMR: Consultation on Proposals for Implementation<sup>11</sup>.

### Energy from Waste CHP

113. Responses centred on what was felt to be an unrealistic assessment of the capital costs of the technology. This was felt to necessitate a higher strike price to encourage wider deployment.

114. Stakeholders highlighted impending EU emissions legislation that may require operators to develop and install more advanced equipment. It was felt

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<sup>11</sup> <https://www.gov.uk/government/consultations/proposals-for-implementation-of-electricity-market-reform>

that these additional costs should be reflected in an increase in strike prices over time.

### Government response

115. Strike prices for Energy from Waste CHP are reduced by £10 to £80/MWh in line with our updated assumptions on the cost of capital. As a mature technology, we consider that there is limited scope for further cost reduction, for example, due to the potential for fluctuations in fuel costs. We therefore offer a flat strike price throughout the Delivery Plan period.

116. We published proposals in October outlining our intention to pay the CfD on the Qualifying Power Output (QPO) of the plant<sup>12</sup>.

117. Due to State Aid rules we are not permitted to increase strike prices to offset impending emissions legislation.

### Geothermal

118. Several respondents referred to the Atkins review of geothermal potential which was published on 22 October<sup>13</sup>. The Government committed to consider the findings of the report and the industry's subsequent response to the report in setting the final strike prices.

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<sup>12</sup> <https://www.gov.uk/government/consultations/proposals-for-implementation-of-electricity-market-reform>

<sup>13</sup> <https://www.gov.uk/government/publications/deep-geothermal-review-study>

119. Industry feedback was that the strike prices as proposed in the draft Delivery Plan were not set at a level for the deployment of deep geothermal power projects.

120. The industry noted the Atkins report's assessment of the UK's deep geothermal power potential, provided comparisons with the level of support for deep geothermal in Germany and the recent AECOM report on deep geothermal potential in Scotland.

121. In setting the final strike price the industry recommended a level equivalent to that for offshore wind as a minimum, though sought parity with the level of support for wave and tidal stream. In addition, the sector would require further grant funding to support initial development and to demonstrate viability.

### Government response

122. The Atkins report concludes that the deep geothermal power potential in the UK is limited (with an upper bound of 3-4% of total generation in 2050), will be fairly insensitive to tariff-levels for the period 2014/15 to 2018/19 given the level of upfront risk and uncertainties, and that the economic viability of all schemes will be heavily dependent on heat sales.

123. The Government has weighed up the evidence in the Atkins report and the responses. The Government's assessment and overall approach to deep geothermal is that it should adopt a phased approach to the development of the deep geothermal sector as a whole. This is consistent with both the Atkins and AECOM reports' findings. It has therefore concluded that the final strike price for deep geothermal power for the period 2014/15 to 2018/19 should be set to achieve RO equivalence. However, in line with our updated

assumptions on cost of capital the strike prices have increased to £145/MWh to 2016/17 and £140 for 2017/18 and 2018/19 in line with the offshore wind strike price.

## Hydro

124. Respondents argued that the RO-X strike price for hydro should be based on the Scottish RO (1 ROC) rather than the RO for the rest of the UK (0.7 ROCs). The basis for this was that the majority of potential hydro projects are in Scotland, so comparability should be based on support that Scottish projects currently receive. Some responses also requested support for refurbishment of existing hydro plants.

### Government response

125. The Government has revised the strike prices for hydroelectric so that they are broadly equivalent to the current support under the Scottish RO band (1 ROC instead of a 0.7 ROC equivalent strike price). This is on the basis of DECC's 2011 report "Review of the generation costs and deployment potential of renewable electricity technologies in the UK" which suggests that all the UK's build potential for large scale hydro is in Scotland<sup>14</sup>.

126. This change combined with the updated means that the strike price increases from £95/MWh to £100/MWh. The strike price has been left flat and not reducing over time as the evidence suggests there is limited potential for cost reductions over the timeframe for this technology.

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<sup>14</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/42843/3237-cons-ro-banding-arup-report.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/42843/3237-cons-ro-banding-arup-report.pdf), Page 56

127. We are investigating the case for supporting hydro refurbishment.

### Landfill Gas and Sewage gas

128. Respondents felt that Landfill gas strike price should be at parity with sewage gas rather than £20/MWh less.

### Government response

129. Evidence submitted comparing the costs of these two technologies was insufficient to justify adjusting the strike price for landfill gas.

130. The strike prices for both landfill gas and sewage gas have been reduced by £10/MWh to £55/MWh and £75/MWh respectively, to reflect updated assumptions on the cost of capital. The strike prices have been left flat and not reducing over time as the evidence suggests there is limited potential for cost reductions over the timeframe for these technologies.

### Offshore Wind

131. Several respondents stated that the strike price degression rates were too steep and failed to reflect rates of learning in the industry. In particular, The Offshore Wind Cost Reduction Taskforce findings<sup>15</sup> were quoted as evidence that strike price degression should be shallower than that proposed. Many consultees argued that the Crown Estate's report and the target of £100/MWh levelised cost were based on projects reaching FID in 2020 was more appropriate. They also suggested that the cost reductions profile assumed was too steep given the deployment set out in the draft Delivery Plan, and

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<sup>15</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/66776/5584-offshore-wind-cost-reduction-task-force-report.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/66776/5584-offshore-wind-cost-reduction-task-force-report.pdf)



that the learning rate – and the cost reduction profile – should be tied to volume of deployment rather than time.

132. Many consultees suggested that offshore wind round 2 and round 3 projects should have different strike prices. They also suggested that the strike prices set out in the draft Delivery Plan would be insufficient to bring forward any round 3 projects.

133. Some responses raised the point that there was insufficient deployment of offshore wind in the scenarios set out in the draft Delivery Plan to encourage development of the supply chain.

134. Finally, some responses raised the point that offshore wind needs more certainty beyond the period of the first Delivery Plan, because the project development and construction periods are longer for offshore wind projects than for other technologies.

### Government response

135. The Government has considered concerns raised by stakeholders and revised cost reduction profiles to be more in line with the Crown Estate report. The learning rate has therefore been adjusted, to be an equal weighting between a 12% cost reduction per cumulative doubling of deployment, and a cost reduction trajectory that reaches £100/MWh for projects reaching FID in 2020.<sup>16</sup> This, along with the updated assumptions on cost of capital, has influenced the decision to increase the strike price for 2018/19 by £5, to £140/MWh. The cost of capital differential between R2 and R3 projects has

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<sup>16</sup> In the draft Delivery Plan, the assumption was an equal weighting between a 12% cost reduction per cumulative doubling of deployment, and a cost reduction trajectory that gets to £100/MWh for projects commissioning in 2020.<sup>16</sup>

also been reduced to be more in line with the evidence provided by PwC for the Crown Estate Cost Reduction Pathways study.

136. Improvements to the CfD contract terms also need to be considered alongside the strike price, as they reduce risk to the developer. The Government is allowing offshore wind projects to deploy in phases so that a developer can construct over several years and receive 15 years of support for each phase. Each subsequent phase will receive the same strike price as the first phase. This is, in effect, allowing for some volume to be deployed beyond the timing of the current Delivery Plan.

137. While there is only one strike price that applies to both Round 2 and Round 3 projects, the modelling does make different assumptions for the costs underpinning both groups of projects. There is overlap between the costs of the two groups, reflecting that some Round 3 projects have similar characteristics to Round 2 and Round 2 extension projects. For example some Round 3 projects are located relatively close to the shore and in relatively shallow waters. This is reflected in the analysis, which shows both Round 2 and Round 3 projects deploying over the period of this Delivery Plan.

138. The Government considers that the total package of support for offshore wind – strike prices, phasing and contract terms – should enable sufficient volume of deployment which will give the supply chain the confidence it needs to invest and expand. This, in turn, will help drive cost reduction which will benefit the industry over the longer term.

139. The Government understands that technologies with long lead times like offshore wind require clarity on support levels several years into the future.

We will set out strike prices for 2019/20 and 2020/21 in an Annual Update to the Delivery Plan.

## Onshore Wind

140. Several stakeholders felt that the proposed depression of strike prices for onshore wind was not appropriate. It was felt that the technology is at a level of maturity that means there is limited scope for further cost reductions.

141. We also received a range of responses relating to cost of capital assumptions and hurdle rates under CfDs, including some from stakeholders who felt that the cost of capital assumptions were too low. The Government commissioned NERA to consider the responses received on this issue, alongside other relevant evidence, and provide fresh analysis on costs of capital under CfDs. Their report is published in full alongside this document

## Government response

142. While onshore wind is a mature technology, and there is limited scope for further cost depression, we have maintained a £5 depression over the period of this Delivery Plan. This is to reflect the need to live within the Levy Control Framework. We did not receive any new evidence as part of the consultation to change this decision.

143. Based on NERA's analysis of the latest cost of capital evidence, including that submitted to this consultation, we have lowered the strike price for onshore wind by £5/MWh in each year to reflect changes to our cost of capital assumptions.

## Solar photovoltaic (PV)

144. Some stakeholders from the solar industry cited EU trade measures against Chinese PV module imports as a reason to see initially higher strike prices.
145. However, many industry responses seemed confident that once this short term rise in costs is overcome, strike prices could in fact be lower than those proposed in later years. This echoed some stakeholder views that more solar PV will come online than is currently projected.
146. There was also some criticism of the perceived low level of ambition for solar given the 20GW ambition set out in the UK Solar PV Strategy Part 1: Roadmap to a brighter future.
147. Others felt that the stated load factors associated with electricity generated from solar, as set out in the draft Delivery Plan, were higher than is achievable in practice.
148. They also felt that the capital allowances for solar generation should be in closer alignment with other technologies.

## Government response

149. Levels of deployment expected this year and next suggest that projects remain viable even against the backdrop of anti-dumping, although any assessments of future cost changes remain uncertain.

150. In the Government's Solar PV strategy the range used for large scale solar PV is 1.8-3.2GW by 2020, i.e. the same numbers as presented in the draft Delivery Plan in July 2013. The December 2013 Delivery Plan suggests that at the strike prices set and based on pipeline analysis we could see higher deployment of large scale solar PV of around 2.4-4GW.

151. We are confident that our assumptions on load factors remain appropriate for the most cost-efficient projects which it is our intention to incentivise.

152. Capital allowances are set by HMRC who have decided that solar PV should not receive the same Enhanced Capital Allowances (ECAs) as other operators. Details can be found at this link<sup>17</sup>.

### Tidal Range (including tidal barrage and tidal lagoon projects)

153. Respondents agreed that strike prices for this technology should be set on a case-by-case basis.

### Government response

154. As stated in the consultation, given the lack of cost data available, we will consider the appropriate length of contracts and how best to set strike prices for credible tidal range projects on a case by case basis.

### Tidal Stream and Wave

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<sup>17</sup> <http://www.hmrc.gov.uk/tiin/tiin684.pdf>

155. Stakeholders concerned with both tidal stream and wave expressed the opinion that strike prices should be higher for these technologies due to the relative level of immaturity of the technologies. On the principle of degression in the future for tidal stream projects, respondents highlighted that technology costs are not expected to decline significantly over the first Delivery Plan period.
156. There was some resistance to the strike prices cap for tidal stream and wave, where capacity beyond the first 30MW will receive a lower strike prices, aligned with that for offshore wind. This was seen as a barrier which would prevent these projects from being developed.
157. There was a request for differentiated wave and tidal stream strike prices due to the differences in technology and context.
158. Some respondents felt that phasing should be introduced for wave and tidal stream technologies.

### Government response

159. Wave and tidal stream technologies have been considered independently, and have been given separate strike prices – although set at the same level in this Delivery Plan period. We anticipate that future strike prices for each technology may be different.

#### *Tidal Stream*

160. The Government has reviewed the evidence provided and we are confident the strike price has been set at a level that should bring forward some tidal stream projects.

161. We have reviewed the supplied capital cost data and found that they do not differ significantly from those in our model. On this basis, there has been no revision to the tidal stream strike prices. The updated assumptions on cost of capital could suggest a higher strike price. However, we do not consider that there is a case for increasing the strike price given that they are already receiving a significant premium compared to other technologies. For this reason the Government has chosen to maintain the strike price at £305/MWh.

### *Wave*

162. The case for wave was reviewed and considered against the need to provide consumers with value for money. The strike price offered for wave is significantly higher than other strike prices for renewable technologies (except for tidal stream). The updated assumptions on cost of capital could suggest a higher strike price. However, we do not consider that there is a case for increasing the strike price given that they are already receiving a significant premium compared to other technologies. For this reason the Government has chosen to maintain the strike price at £305/MWh.

### *Tidal Stream and Wave*

163. There is currently no degression of strike price for these technologies<sup>18</sup>. In the longer term, we anticipate the strike prices to come down, in line with increased deployment and associated cost-reduction of each technology

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<sup>18</sup> This refers to support up to 30MW project cap. Support above 30MW project cap to be supported in line with offshore wind.

164. The 30MW project cap is consistent with the RO. We anticipate that most of the deployment of wave and tidal stream to 2019 will be of projects below the 30MW threshold. Given the current high strike prices offered to both wave and tidal stream, the 30MW cap is a budget control measure to protect consumers. It does not reflect our expectation of the size of future projects in the following Delivery Plan periods, once these sectors become commercially viable. We anticipate that over time this cap will lift, as the volume of projects increases, the costs of the technologies come down and in line with this, the level of support needed decreases.

165. The Government does not believe that there is currently a case for introducing phasing for wave and tidal stream technologies akin to that available for offshore wind where projects where build out takes places over several years from a single investment decision. However, in future, if the size and design of wave and tidal stream projects require single investment decision with long and uncertain build times we will be prepared to consider introducing similar phasing arrangements for wave and tidal stream technologies.



**Question 8** - We have not set a strike price for (biomass) co-firing plants because our preference is for conversions, which are more sustainable and provide higher levels of renewable generation. Do you agree with this approach?

166. Some respondents believed that Government support should be available to all renewable, low carbon technologies, as the purpose of such support is to maximise carbon savings.

#### Government response

167. We are not offering CfDs for co-firing plants because our preference is for full biomass conversions. Conversions provide higher, more reliable levels of renewable generation. In the past, co-firing has taken place in an ad-hoc manner. Significant support for biomass co-firing under CfD could potentially undermine this policy aim with no guarantee of delivery of renewable electricity.

**Question 9** - Government's 2012 Bioenergy Strategy concluded that support for new dedicated biomass should be treated with caution given the lock-in risks for this technology and its relatively high costs of carbon abatement compared to biomass co-firing/conversions. In line with this conclusion, we have not set a strike price for dedicated biomass without CHP. Do you agree with this approach?

168. A selection of respondents disagreed with this, stating that dedicated biomass can make a valuable and cost-effective contribution towards meeting renewable energy targets with or without CHP.

169. It was felt that new dedicated biomass projects without CHP, subject to the new 400MW cap, up to March 2017, should also be eligible for support under the CfD within the same cap.

#### Government response

170. We took the decision to constrain deployment of Dedicated Biomass in line with the conclusions of the 2012 UK Bioenergy Strategy; in the medium to long term, new build electricity-only biomass plant do not offer as cost-effective a means of decarbonising the electricity grid as other renewables technologies, such as the marginal technology, offshore wind.

171. However, we were aware that several plans for projects were well advanced, having invested heavily in getting their projects "shovel-ready". For this reason, we decided to provide a mechanism to allow those projects to come forward and introduced a 400MW non-legislative cap with a notification procedure under the Renewables Obligation.

172. Several projects asked for FID-enabling and were looking at the CfD route but offering a CfD at this stage would circumvent our policy intent to discourage electricity-only new build and to encourage more resource-efficient technologies such as CHP and heat. In line with the conclusions of the Bioenergy Strategy, we have decided not to offer a strike price for dedicated biomass under EMR.

**Question 10** - We have not set a strike price for standard bioliquids, as we do not wish to divert this technology from more suitable sectors such as transport. Do you agree with this approach?

173. Many respondents expressed a belief that bioliquids should be allowed as part of a fuel mix for plant under CfD. To support this, respondents cited the UK Government's position to date, which has been to support heat, power and transport in roughly equal measures and let the market decide on the most cost effective route to decarbonisation. They felt this was still the most appropriate policy.

#### Government response

174. In line with the Government's 2012 UK Bioenergy Strategy, the Government's intention is to provide support for bioliquid electricity generation which is unlikely to cause a significant diversion from the other key sectors, such as transport, and within the limits of sustainable supply. Under the RO, we estimated that this is broadly equivalent to 2 TWh/year in 2017. Establishing further caps under EMR could risk undermining our policy intent. We have therefore decided not to offer a strike price for bioliquids electricity of with CHP.

**Question 11** - We have not set a strike price for geopressure since the technology is at development stage, and no geopressure projects have come forward through the Renewables Obligation. Do you agree with this approach?

175. A better definition of geopressure was sought by some respondents but there was general agreement that this technology should be re-assessed as more projects come forward.

176. One respondent felt that a strike price would provide a clear signal to the market that support would be available beyond the development stage.

#### Government response

177. No evidence was provided to justify a strike price for geopressure technology, although clearer definitions may be set after reassessment of the technology should more projects come forward.

## Stakeholder Responses – Capacity Market Reliability Standard

### Question 12 - Do you agree with our proposed reliability standard of 3 hours LOLE?

178. Most respondents agreed with loss of load expectation (LOLE) as the measure of the reliability standard and that it should be around 3 hours per year.

#### Government response

179. The reliability standard will be kept at three hours and will be expressed in terms of a loss of load expectation.

### Question 13 - Do you agree with the methodology underpinning the reliability standard that is to calculate this using the value of lost load and the cost of new entry?

180. Respondents generally agreed that the reliability standard ought to balance the interests of customers' desire for security of supply and their willingness to pay for it.

181. However, 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 were uncertain.

182. A further issue raised was that the values of lost load and the cost of new entry might change over time and therefore if the reliability standard were linked too closely to these parameters it would undermine the certainty that we are looking to provide as it would lead investors to believe that these would change over time.

### Government response

183. The Government accepts these responses. While the reliability standard is informed by analysis, we acknowledge there are uncertainties around the estimates used to determine it. That is why the standard is not purely the result of a mechanistic calculation based on the cost of new entry and the value of lost load. It is important for example that the standard is set in the context of the reliability standards of our interconnected neighbours.

184. The Government also accepts that this is a political decision as well as an analytical one. However, it is important that the standard is supported by the analysis and we think that 3 hours is well within the range of uncertainties presented in Annex C, which covers the reliability standard.

185. Once the reliability standard has been fixed, we are not proposing to revisit it within the next five years but we do think that if in the future, we believe that the costs of security of supply and / or the value of lost load are radically different then the reliability standard ought to change. In addition, we think that the market will be able to tolerate this level of relatively limited uncertainty.

## Question 14 - Do you agree with the analysis of the value of lost load as described on Page 48 and in Annex C?

186. Some respondents questioned the final estimate of the Value of Lost Load (VoLL) that was used in the reliability standard calculation. In particular, respondents queried the use of the Willingness to Accept methodology to determine the value rather than using the Willingness to Pay. They asked for more transparency on how the estimate was calculated.
187. Some stakeholders suggested VoLL was set relatively high, stating that Ofgem uses a price of £6,000/MWh<sup>19</sup> for disconnections and voltage control.

### Government response

188. We do not believe that there are any grounds for changing the VoLL but we understand the need for more explanation of why it was chosen. OFGEM's price for disconnections and voltage control of £6,000/MWh is based on the London Economics study used to set DECC's assumed VoLL. However, OFGEM have made other considerations when setting their price for disconnections and voltage control, such as international comparisons as well as the need to avoid the risk that market participants face high disconnection charges.
189. Furthermore, another reason that OFGEM's price for voltage control and disconnections differs from DECC's VoLL is that DECC is introducing a capacity market, which means that the cash-out price does not need to reflect the consumers' marginal VoLL in order to ensure security of supply.

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<sup>19</sup> <https://www.ofgem.gov.uk/ofgem-publications/82294/ebscdraftdecision.pdf>



190. Annex C of the Delivery Plan provides more detail on the VoLL and LOLE.

**Question 15 - Do you agree with our estimate of the cost of new entry as described on page 49 and in Annex C?**

191. Many of the respondents felt that that the figure of £47,000/MW for CONE was too low. There were a number of reasons for this which are set out below:

**The choice of technology:**

192. Some respondents questioned the rationale in selecting the reference plant. They believe a 565MW OCGT plant using large frame F-class turbines is very unlikely to participate in the 2014 capacity auction as no plant of this size currently has planning permission. Therefore, either a smaller OCGT or a CCGT ought to be considered as the marginal plant. If this was the case then this would lead to a higher CONE with two respondents suggesting that would increase costs to around £450/kW rather than the £300/kW estimated by Government. Some respondents preferred the CONE to be based on an actual named peaking plant.

**The costs included:**

193. Respondents questioned which costs were included (e.g. business rates, insurance, land costs and gas connection costs) and thought that both capital and ongoing costs are too low.

## **Economic life of 25 years:**

194. Respondents questioned the assumption of a 25 year economic plant life as the basis CONE, given the maximum contract length for new plant will be 10 years. Respondents believed a plant cannot rely on income beyond the 10 years of the capacity agreement, as they will be price takers from the 11th year. Therefore, they expect investors to try to recover all their capital expenditure over the duration of the capacity contract (10 years), which will mean that capacity market bids will be higher than estimated in the draft Delivery Plan.

## **Hurdle Rate**

195. Stakeholders thought the hurdle rate was too low given the risks faced by the generators (e.g. volatility in revenues, risk of penalties under the Capacity Market, liquidity of the secondary market). A respondent put forward the possibility of having two separate hurdle rates for the Capacity Agreement period and for the period after the end of the Agreement.

## Government response

196. As pointed out by the consultation responses, there are significant uncertainties around the cost of new entry, particularly in the first auction where investors might be conservative when pricing bids in a new mechanism and where there might not be any large scale OCGT projects participating. We are consulting separately on how auction parameters should be set for the first auction.

197. However over time we would expect the marginal cost of new entry in the Capacity Market to move towards the estimate from the consultancy PB

Power, as more large scale OCGT projects come forward and as the market becomes more comfortable investing in the Capacity Market. We therefore believe that the estimate from PB power is appropriate for informing the reliability standard analysis as the reliability standard is intended to be an enduring parameter and provide greater certainty to the market about the level of capacity that will be procured over time. We will review the standard every five years and will look to update the reliability standard only if there are significant changes in the underlying analytical foundation that justify a change.

**Question 16 - Do you agree the reliability standard should be reviewed every five years to reflect any future evidence in the value of lost load and the cost of new plant entry?**

198. Most respondents felt that 5 years seemed reasonable.

199. More importantly, many stakeholders wanted the review process to be rigorous, transparent, and to set out the scope and procedures for consultation with market participants in order for it not to create additional uncertainty for them.

#### Government response

200. Reviewing the reliability standard on a periodic basis allows for a balance between market certainty and flexibility. This gives us the flexibility to modify the Standard in response to changes in the VoLL and the CONE if needed.

201. The process on how to review the Standard will be set out through the EMR Delivery Plan which will be consulted on.

### Question 17 - Do you agree with the proposed methodology for the auction demand curve?

202. A significant number of respondents agreed with the high level methodology. One respondent argued that the auction price cap ought to be sloping rather than capped because it better reflected customers' true welfare.

203. Many respondents focused their concerns on the specific parameters of the auction, including CONE.

#### Government response

204. We acknowledge the comments on the auction parameters, although we note that these auction parameters are being consulted on separately<sup>20</sup>.

205. We appreciate that, in theory, the demand curve should allow VoLL to increase in line with LOLE but we believe there is a balance to be struck to ensure value for money for customers and to preclude the possibility of gaming by capacity market participants.

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[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/255254/emr\\_consultation\\_implementation\\_proposals.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/255254/emr_consultation_implementation_proposals.pdf)

## Annex A- List of respondents

2OC ltd	Energy From waste (Darley and Associates)
A B Sugar	Energy UK
Advanced Plasma Power	Environmental Services Association
Alstom	Enviropower
Anglesey Against Wind Turbines	E.ON
Aquind	ESB International
Biossence Ltd	First Flight Wind
British Retail Consortium	Friends of the Earth
British Solar Renewables	GDF Suez
Committee on Climate Change	Good Energy
Centrica Energy	Greenpeace
Combined Heat & Power Association	Heatcatcher Ltd.
CLG Energy Consultants	Helius Energy plc
Confederation of UK Coal Producers	Highland and Island Enterprise
Consumer futures	Imperial College
Drax Power	IN EOS
Ecofin Foundation	Infinergy Ltd
Ecotricity	Infinis
Eden Project	Isle of Anglesey County Council
EDF Energy	Institution of Mechanical Engineers
EDP Renewables	Lateral Power
EEW Energy from Waste UK Ltd.	Lighthouse Fuels
Eggsborough Power	Lightsource
EGS Energy	Masdar
Employee of E4tech (UK) Ltd	MGT Power Limited
Ener-g PLC	Mitsubishi Power Systems Europe Ltd
Energy Power Resources Limited	

National Grid	
Navitus Bay	Repsol Nuevas Energias UK Limited
National Energy Action	Renewable Energy Systems
National Energy Action Northern Ireland	RWE Npower
Neas Energy	Scottish Enterprise
New Earth Solutions	Scottish Power
Northern Ireland Renewables Industry Group	Scottish Renewables
North London Waste Authority	Scottish Water
Norwich Power House LLP	SeaMW
No Tiree Array	Siemens
NUR Energy	Skelton Group Investments
Olleco	SSE
Peel Energy	Solar Trade Association
Pelamis Wave Power	Stag Energy
Perpetuus Tidal Energy Centre	Statkraft
Plasco Energy Group Inc	Statoil
Power NI	Tandem Expansion
Private Individual 1	Isle of Anglesey County Council
Private Individual 2	The Whitehouse Consultancy
Private Individual 3	Tidal Lagoon Power
Wood Panel Industries Association	UK Demand Response Association
REG Windpower	Vattenfall
Renewable Energy Association	Vestas
Renewable UK – Tidal	Waste2Tricity Limited
Renewable UK – Wave	Wave Energy (Renewable UK)
	Which?

There were also a number of confidential responses.



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<https://www.gov.uk/government/publications/electricity-market-reform-delivery-plan>

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