

<b>Title:</b> Consultation on changes to financial support to solar PV. Part A: Controlling spending on large-scale solar PV within the Renewables Obligation  <b>IA No:</b> DECC0163  <b>Lead department or agency:</b> Department of Energy and Climate Change  <b>Other departments or agencies:</b> HMT, Defra, CLG, BIS, Scotland Office	Impact Assessment (IA)			
	<b>Date:</b> 13/05/2014			
	<b>Stage:</b> Consultation			
	<b>Source of intervention:</b> Domestic			
	<b>Type of measure:</b> Secondary legislation			
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## Summary: Intervention and options

**RPC:** N/A

Cost of Preferred (or more likely) Option				
Total Net Present Value	Business Net Present Value	Net cost to business per year (EANCB in 2009 prices)	In scope of One-In, Two-Out?	Measure qualifies as
£180m	N/A	N/A	No	N/A

### What is the problem under consideration? Why is government intervention necessary?

The EU Renewable Energy Directive commits the UK to meeting 15% of its energy needs from renewable sources by 2020. The Renewables Obligation (RO) is currently the Government's main financial policy mechanism for incentivising the deployment of large scale renewable electricity generation in the UK. As part of the Electricity Market Reform, large-scale renewable electricity will be eligible to receive support through the new Feed-in Tariff with Contract-for-Difference scheme (CfD). The first allocation round is expected to open in October 2014. The Levy Control Framework (LCF) sets annual limits on the overall cost of DECC's levy funded policies, including the RO. The accompanying analysis to the Final Delivery Plan (December 2013) published indicative scenarios of deployment of renewable technologies in 2020, suggesting around 2.4GW to 4GW of solar could be deployed to the end of 2020, within the LCF budget. Figures from Ofgem and industry projections suggest that solar deployment under the RO could exceed what is set out in the Final Delivery Plan before 2017.

### What are the policy objectives and the intended effects?

The policy objective is to limit spend on Solar PV under the RO in Great Britain, in order to help us remain within the limits of the LCF, while seeking to provide certainty to projects that have made a significant financial commitment. The preferred approach is to limit spend on large scale (>5MW) solar PV, which will result in a reduction in deployment of that technology through the RO. These projects will still be able to apply for a Contract for Difference (CfD). We intend to limit spend on large scale solar PV in a way which limits the risk to government of future overspend against the LCF, while offering a degree of certainty to industry.

### What policy options have been considered, including any alternatives to regulation? Please justify preferred option (further details in Evidence Base)

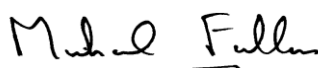
To limit the deployment of large scale (>5MW) solar PV the following proposals were considered; Option 1: Do Nothing; Option 2: RO closure; Option 3: Capacity or supplier cap. Section 3 explains why we are not considering undertaking an RO banding review. The preferred option is Option 2, to close the RO to large scale (>5MW) solar projects from 1st April 2015, with a grace period aimed at projects that have made a significant financial commitment on or before 13<sup>th</sup> May 2014. It is the preferred option because it limits spend on solar PV as early as possible, while providing certainty to projects that have made a significant financial commitment. While Option 3 (a cap) is assumed to offer an equivalent NPV as the central scenario in Option 2 (both equivalent to 3.2GW deployment of solar PV), we believe Option 2 offers greater certainty for government.

### Will the policy be reviewed? It will not be reviewed. If applicable, set review date: N/A

Does implementation go beyond minimum EU requirements?			No		
Are any of these organisations in scope? If Micros not exempted set out reason in Evidence Base.	<b>Micro:</b> No	<b>&lt; 20:</b> Yes	<b>Small:</b> Yes	<b>Medium:</b> Yes	<b>Large:</b> Yes
What is the CO2 equivalent change in greenhouse gas emissions? (Million tonnes CO2 equivalent)			<b>Traded:</b> N/A	<b>Non-traded:</b> N/A	

*I have read the Impact Assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits and impact of the leading options.*

Signed by the responsible Minister:



Date: 1<sup>st</sup> May 2014

# Summary: Analysis & Evidence

## Policy Option 2

**Description:** RO closure to Solar PV above 5MW from April 2015 with grace periods

### FULL ECONOMIC ASSESSMENT

Price Base 2012	PV Base 2013/14	Time Period Years 29	Net Benefit (Present Value (PV)) (£m)		
			Low: £90m	High: £270m	Best Estimate: £180m <sup>1</sup>

COSTS (£m)	Total Transition (Constant Price) Years		Average Annual (excl. Transition) (Constant Price)	Total Cost <sup>2</sup> (Present Value)
Low			£2	£50
High			£5	£160
Best Estimate			£4	£100

**Description and scale of key monetised costs by 'main affected groups'**  
The monetised costs are the increase in costs of EU Emissions Trading Scheme allowance (EUA) purchases to the UK power sector compared to the Do Nothing option (as we deploy less solar, increase generation from cheaper fossil fuel alternatives and as a consequence, purchase more EUAs)

**Other key non-monetised costs by 'main affected groups'**  
Wider macroeconomic impacts of a reduction in solar deployment (e.g. on employment). Air quality impacts due to increased fossil fuel generation. Increased risk of UK failing to meet 2020 renewables target.

BENEFITS (£m)	Total Transition (Constant Price) Years		Average Annual (excl. Transition) (Constant Price)	Total Benefit <sup>3</sup> (Present Value)
Low			£5	£140
High			£15	£420
Best Estimate			£10	£280

**Description and scale of key monetised benefits by 'main affected groups'**  
The monetised benefits are the lower resource costs of generating electricity through cheaper alternatives rather than solar PV, due to reduced solar PV uptake compared to the Do Nothing option.

**Other key non-monetised benefits by 'main affected groups'**  
Wider macroeconomic impacts of any decrease in electricity prices due to lower levels of solar PV generation.

<b>Key assumptions/sensitivities/risks</b>	<b>Discount rate (%)</b>
Uncertainty exists around: <ul style="list-style-type: none"> <li>- The level and speed of future solar PV deployment</li> <li>- The level of future deployment of other renewable technologies to 2020.</li> </ul>	3.5%

### BUSINESS ASSESSMENT (Option 1)

<b>Direct impact on business (Equivalent Annual) £m:</b>			<b>In scope of OITO?</b>	<b>Measure qualifies as</b>
<b>Costs:</b> N/A	<b>Benefits:</b> N/A	<b>Net:</b> N/A		
			No	N/A

<sup>1</sup> Figures may not add due to rounding

<sup>2</sup> Figures are rounded to the nearest £10m

<sup>3</sup> Figures are rounded to the nearest £10m

# Evidence Base

The evidence base is set out as follows:

- Strategic overview;
- Rationale for intervention / policy objective;
- Description of options considered;
- Impacts of shortlisted options considered;
- Summary and preferred option.

## 1. Strategic overview

The EU Renewable Energy Directive commits the UK to meeting 15% of its energy needs from renewable sources by 2020. The Renewables Obligation (RO), introduced in 2002, is currently the Government's main financial policy mechanism for incentivising the deployment of large scale renewable electricity generation in the UK. The RO places an obligation on UK electricity suppliers to source an increasing proportion of the electricity they supply from renewable sources. Renewables Obligation Certificates (ROCs) are issued to operators of accredited renewable generating stations for the eligible renewable electricity they generate. ROCs are then used by suppliers to demonstrate that they have met their obligation<sup>4</sup>.

Since the introduction of the RO in 2002, there has been a significant increase in the UK's renewable generation, from 1.8% to 14.8% in 2014<sup>5</sup>. The RO is expected to close to new renewables stations from 1st April 2017<sup>6</sup>, whilst maintaining support for existing stations in the scheme out to their respective end dates (of which the latest would be expected in 2037). As part of the Electricity Market Reform, large-scale renewable electricity will be eligible to receive support through the new Feed-in Tariff with Contract-for-Difference scheme (CfD). The first allocation round is expected to open in October 2014.

The Levy Control Framework sets annual limits on the overall cost of DECC's levy funded policies<sup>7</sup>. As the LCF forms one overall capped amount, any increase in spend for one sector under these financial incentives will reduce the level of support available for other sectors within the Framework. As the costs of the levy funded schemes are paid for by consumers through their energy bills, the Government takes potential risks to the LCF very seriously and will act where necessary to ensure that costs are contained and that consumers receive value for money from initiatives supported by the LCF.

## 2. Rationale for intervention / policy objective

The Government Response to the RO Banding Review and the last comprehensive banding review of RO support in December 2012<sup>8</sup>, announced RO bands for the period 1st April 2013 to 31st March 2017 that should contribute towards sufficient growth in renewable energy deployment to help meet the UK's 2020 renewable energy targets. At the conclusion of the last comprehensive banding review of RO

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4 If suppliers do not present a sufficient number of ROCs to Ofgem (who administer the scheme) to meet their obligation, they can pay an equivalent amount into a buy-out fund, which is re-distributed to those that submit ROCs once Ofgem's administration costs are paid for. Further detail on the Renewables Obligation can be found on Ofgem's website: <https://www.ofgem.gov.uk/environmental-programmes/renewables-obligation-ro>

5 <https://www.gov.uk/government/publications/renewables-section-6-energy-trends>

6 In March 2014 DECC published details on grace periods:

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/289078/Transition\\_and\\_Grace\\_Periods\\_Government\\_Response\\_-\\_12\\_Mar\\_2014.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/289078/Transition_and_Grace_Periods_Government_Response_-_12_Mar_2014.pdf)

7 The LCF covers the Renewables Obligation, the small-scale Feed-In Tariffs scheme, Warm Homes, Investment Contracts for the Final Investment Decision Enabling for Renewables process, and Contracts for Difference.

8 <https://www.gov.uk/government/consultations/levels-of-banded-support-for-solar-pv-under-the-renewables-obligation-for-the-period-1-april-2013-to-31-march-2017>

support in December 2012<sup>9</sup>, we made it clear that the levels of Renewable Obligation Certificate (ROC) support were intended to encourage slow but steady deployment of solar PV.

The accompanying analysis to the Final Delivery Plan published indicative scenarios of deployment of renewable technologies in 2020.<sup>10</sup> This analysis suggested around 2.4GW to 4GW of solar could be deployed to the end of 2020, within the LCF budget.

Figures from Ofgem now show that some 545MW of solar PV projects have already accredited under the RO by the end of March 2014. We expect approximately a further 1.2GW to accredit over the next few months, on the basis of known projects that have applied for full RO accreditation and are awaiting a decision from Ofgem. In addition, recent public commentary from sources in the solar industry suggests that a further 1.5GW of large-scale projects could be added during 2014/15, and that interest in the sector remains buoyant and is unlikely to be slowed by the scheduled reductions in ROC rates in 2015/16 and 2016/17.

The Do Nothing option in this impact assessment estimates a range of deployment without action under the RO of between 2.8GW and 6.3GW of solar PV deployment by the end of 2017, compared with the range of 2.4GW to 4GW in 2020 in the Final Delivery Plan. Therefore, in the absence of intervention, there is risk that deployment is higher than the estimates in the scenarios in the Final Delivery Plan, which would result in increased spend against the LCF<sup>11</sup>.

**Table 1: Deployment and annual spend for the Final Delivery Plan and revised estimates (Do Nothing option) (£2011/12)**

		Low	Central	High
Final Delivery Plan scenarios <sup>12</sup>	Deployment in 2020 under RO and CfD (GW)	2.4	2.7	4.0
	Annual RO spend	-	£170m	-
Option 1 (Do Nothing – revised projections)	Deployment in 2016/17 under RO (GW)	2.8	4.5	6.3
	Annual RO spend (from 2017/18)	£170m	£270m	£370m
Change in RO annual spend for Option 1 relative to the Final Delivery Plan scenario one from 2017/18		£0m	+£100m	+£200m

Note: For consistency of comparison between options, a simplifying assumption has been made in calculating spend, in that all solar deployment comes in under the RO and not CfDs.

As explained in the consultation document an increase in spend on one technology may have adverse consequences for Government's management and use of the LCF as a whole. The proportion of the LCF which is available for deployment under CfDs would be reduced, as a higher proportion of the LCF would necessarily be allocated to the RO to cover the costs of the additional solar projects.

Government's view is that the CfD is a more cost-effective mechanism than the RO. The CfD provides for earlier certainty of support levels than the RO and greater stability of revenue streams by providing a fixed strike price, investors are protected from wholesale price volatility and should benefit from a reduction in their cost of capital, making the development of low carbon generation cheaper for both investors and consumers.

<sup>9</sup> <https://www.gov.uk/government/consultations/levels-of-banded-support-for-solar-pv-under-the-renewables-obligation-for-the-period-1-april-2013-to-31-march-2017>

<sup>10</sup> See 'Report from the system operator, National Grid': [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/267614/Annex\\_D\\_-\\_National\\_Grid\\_EMR\\_Report.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/267614/Annex_D_-_National_Grid_EMR_Report.pdf)

<sup>11</sup> All other things being equal; so assuming deployment of other technologies is as estimated for the Final Delivery Plan.

<sup>12</sup> The low scenario is consistent with high technology cost scenario in the Final Delivery Plan. The high scenario is consistent with the low technology cost scenario and the central estimate is consistent with the remaining scenarios as set out in the Final Delivery Plan including; scenario one, high and low fossil fuel prices, high and low demand and higher offshore and biomass conversion deployment. See Final Delivery Plan documentation, Annex D: report from the system operator National Grid: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/267614/Annex\\_D\\_-\\_National\\_Grid\\_EMR\\_Report.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/267614/Annex_D_-_National_Grid_EMR_Report.pdf)

### 3. Description of options considered

This section sets out the options considered as part of the consultation on changes to financial support for large scale (>5MW) solar PV, including;

- RO banding review
- Closing RO to new build Solar PV (>5MW).
- Supplier cap
- Capacity cap

The preferred option is to close the RO to large scale (>5MW) solar projects from 1st April 2015, with a grace period aimed at projects that have made a significant financial commitment on or before 13<sup>th</sup> May 2014. We assess the costs and benefits of this option in section 4, against a Do Nothing scenario (taking no action under the RO to constrain deployment of large scale solar PV).

The RO is currently open to all sizes of solar PV projects greater than 50kW<sup>13</sup>. As explained in the consultation document we have considered whether to close the RO to all new solar PV capacity from April 2015, including projects of 5MW and below. Our current information suggests that at present, projects below 5MW are a relatively small part of expected future solar deployment. This suggests that the rate of deployment of these smaller solar PV projects poses less of a risk to the LCF when compared to the risk from projects above 5MW in size. We therefore propose to keep the RO open to solar PV projects of 5MW and below in size.

One possible consequence of closing the RO early to solar PV projects above 5MW is that some developers will choose to split larger projects into separate stations of 5MW and below in order to ensure that they can access RO support, potentially undermining some of the control that we are aiming to achieve. We therefore propose to monitor closely, deployment of projects of 5MW and below, and will consider taking further action to protect the LCF should it be necessary to do so. Deployment and cost projections shown in this IA include small scale (>50Kw - 5MW) projects.

#### RO Banding Review

As explained in the consultation document, the Government has the powers to carry out a banding review of RO support in England and Wales for any technology at any time if certain legislative conditions are met.

The legislative requirements are set out in article 33(3)<sup>14</sup> of the Renewables Obligation Order 2009 and summarised below:

- i. connection to or use of transmission or distribution system charges have changed significantly;
- ii. charges imposed by network operators on generators have changed significantly;
- iii. a new way of generating renewable electricity is being, or has been, developed;
- iv. there has been a change in any other support provided to renewable electricity and that change is likely to have a significant impact on the generation of renewable electricity;
- v. the costs of generating the renewable electricity are significantly different from the costs to which the Secretary of State had regard when making the banding provisions;
- vi. there is evidence over a significant period that the bioliquid cap is having a material effect on trade in bioliquid ROCs;
- vii. in an obligation period the number of ROCs is likely to exceed the level of the renewables obligation; or

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<sup>13</sup> Projects below 50kW and less are 'micro-generators' and eligible for support under the small scale Feed in Tariff (FiT) scheme.

<sup>14</sup> The legislative conditions for a banding review are set out in Article 33(3) of the Renewables Obligation Order 2009: <https://www.gov.uk/government/publications/renewables-obligation-order-2009-as-amended-by-the-renewables-obligation-amendment-order-2011--2>

- viii. an event has occurred which is relevant to the matters that the Secretary of State must consider during a banding review (e.g. costs, income, promoting renewables industries, impacts on consumers, EU targets), and the event was not foreseen by the Secretary of State when making the banding provisions, and the event has had or is likely to have a material effect on the operation of the RO.

In December 2012 we undertook an RO banding review for large scale solar PV. The Impact Assessment<sup>15</sup> accompanying the government response to the consultation estimated that current tariffs could incentivise between 0.45GW to 0.86GW of new build solar PV over the banding review period, 2013/14 to 2016/17. The banding review concluded in December 2012, before we had outturn deployment data for 2012/13. In the ROCs register today, around 0.3GW of solar PV deployed under the RO to the end of 2012/13, bringing total modelled deployment of solar PV at the time of the last banding review to between 0.8GW and 1.2GW by the end of 2016/17.

**Table 2: modelled new build solar PV capacity supported under the RO, MW (cumulative from 2013/14)**

	2013/14	2014/15	2015/16	2016/17
December 2012 projections	210	240-400	310 - 720	450-860

Source: DECC in-house modelling; results have been rounded. Notes: a. Figures for UK solar PV installations supported under the RO, i.e. >5MW installations plus sub-5MW uptake additional to that modelled in IA supporting FITs consultation 2A Government response; b. Range represents uncertainty over proportion of marginal segment of the large scale solar PV supply curve that will be built, e.g. under the lead option in 2014/15, between 0-20% of the large scale solar PV supply curve is projected to be built.

In December 2013, with a revised view of the pipeline, these projections were updated for the Final Delivery Plan scenarios to between 2.1GW and 3.7GW (2.4GW central) of new build solar PV to 2020, bringing total deployment to between 2.4GW and 4GW of solar PV deployment by the end of the decade. However, as explained in section three, figures from Ofgem and industry projections suggest deployment could exceed this projection.

There are several potential reasons why previous projections differ from current projections of solar PV deployment, including;

- the costs of large-scale ground mounted solar may be different to those gathered in December 2012 and used in the modelling for the Final Delivery Plan
- the costs may have fallen further and faster than projected during the 2012 comprehensive banding review.
- The technical potential assumed in the modelling (currently around 1GW deployment potential per annum<sup>16</sup>) could be too low and so at a given support level, more deployment could be possible.

We do not have evidence to suggest which of the above factors if any are different, or have changed, compared to our assumptions when we set the RO bands in December 2012.

In addition, for all types of solar PV projects, future costs are uncertain and difficult to predict. To a large extent future costs will depend on global solar PV deployment and associated economies of scale. The speed of deployment and variability of solar costs, along with the uncertainty around how costs will be affected from the end of 2015 when EU anti-dumping measures on Chinese panels end, would make it very difficult to know where to set the RO support rates to the end of the banding review period.

<sup>15</sup> IA accompanying the government response on solar PV ROC bands December 2012: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/66199/Renewables\\_Obligation\\_consultation\\_-\\_solar\\_PV\\_-\\_impact\\_assessment.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/66199/Renewables_Obligation_consultation_-_solar_PV_-_impact_assessment.pdf)

<sup>16</sup> See table 4, page 12 of the IA accompanying the government response on solar PV bands, [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/66199/Renewables\\_Obligation\\_consultation\\_-\\_solar\\_PV\\_-\\_impact\\_assessment.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/66199/Renewables_Obligation_consultation_-_solar_PV_-_impact_assessment.pdf)

The fact that costs and/or other factors may be significantly different now compared to what had been expected two years ago and the uncertainty surrounding future costs, leads us to conclude that the RO is unlikely to be an effective mechanism for controlling spend on large-scale solar PV. We believe that the CfD process, which allows for competitive price discovery, is a more appropriate scheme for ensuring that large-scale solar PV is supported in a way that offers better value for money for bill payers. **Therefore, this option is not considered in more detail in this impact assessment and the impacts of this option are not analysed in section 4.**

## **RO closure to new build solar PV (>5MW) (preferred option)**

Under the preferred option, the RO would be closed to new-build solar from the end of 2014/15.

This option would allow all solar PV projects above 5 MW to apply for RO accreditation until 31 March 2015. There would be no change to RO eligibility for small scale (<5MW) solar projects, although this would be kept under review. Projects which had made a significant financial commitment on or before 13<sup>th</sup> May 2014 can apply for a grace period, the detailed requirements for which are outlined in the consultation document.

This option will allow us to limit spend (and deployment) of large scale solar PV under the RO in 2015/16 and 2016/17, whilst still seeking to protect developers that have already made a significant financial commitment. Projects that are no longer eligible to apply for the RO will still be able to apply for support under a Contract for Difference (CfD) in 2015/16 and 2016/17. The first allocation round is expected to open in October 2014.

This option would increase the administrative costs of the scheme, faced by Ofgem. These costs are paid for through the buyout fund and so do not increase the overall costs of the scheme, but instead mean those that submit ROCs receive slightly less back from the buyout fund than they would have done otherwise. To put this into context, the buyout fund in 2012/13 was around £170m in £2012/13 prices, of which around £3.5m were Ofgem's administration costs.

We have made a number of assumptions in the modelling, as detailed below and there remains considerable uncertainty around likely deployment under this option. Therefore, the estimated deployment and spend figures quoted in section 4 should be considered as plausible scenarios, used to give an indicative range.

In addition, because solar PV is a fast moving sector and projects can deploy very quickly, it is possible that our deployment estimates may change as the consultation unfolds. We will update our assessment of the pipeline deployment in the final impact assessment and, as noted in the consultation, may need to consider applying stricter controls if evidence indicates that solar PV deployment poses a bigger budgetary threat than we have estimated here. The estimated impact of this option is compared to the deployment estimates outlined in the Final Delivery Plan and the Do Nothing option in section 4 below.

While this is our preferred option, the European Commission have recently adopted new guidelines on environmental protection and energy aid. The new guidelines introduce several changes in the eligibility requirements for aid for renewable energy developments, including aid delivered through Member States' existing support schemes. Depending on the outcome of the consultation, and our further analysis of the new state aid guidelines, we may implement one of the alternative non-closure options.

## **Supplier cap**

A supplier cap would limit the number of ROCs from large scale solar PV accredited between 1<sup>st</sup> April 2015 and 31<sup>st</sup> March 2017, which electricity suppliers can submit for compliance against their obligation. The cap would be set on the percentage of their obligation that suppliers can meet with that technology. It would be similar to the working of the bio-liquid generation cap, currently set at 4% and the co-firing cap (which was removed in April 2013).

The level of the cap must be fixed in advance in the legislation, whereas the size of each supplier's renewables obligation will vary from year to year depending on electricity sold. Due to the speed at which solar PV projects can deploy, however, there is a risk that the level of a supplier cap could be overtaken by the amount of generation that actually deployed before the cap came into effect.

The uncertainty created by a supplier cap means that large scale solar PV ROCs may be less valuable to suppliers because of the limit placed on the proportion of such ROCs that may be used to fulfil a supplier's obligation. This option would therefore deter deployment of solar PV due to the risk of not being able to sell these ROCs and therefore limit spend on large scale (>5MW) solar PV.

While this option would cap spend on large scale (>5MW) solar PV, RO closure is preferred because of the certainty it provides to government in forecasting expected deployment and spend on large scale (>5MW) solar PV. While both interventions may encourage price discovery of this technology through the CfD scheme, we consider this to be more likely under the RO closure option, as in the "low" Do nothing deployment scenario, we may not reach the cap before 2016/17.

In addition, a supplier cap may disproportionately affect independent generators as they depend entirely on suppliers to buy their ROCs and it does not provide certainty to those projects that have made a significant financial commitment.

Ofgem's administrative costs are expected to increase by a very small amount under this option in order to make changes to their IT system, compared to the likely higher costs associated with the RO closure option.

The monetised impact of a cap (supplier and capacity) is considered to be similar to that of RO closure, see section 4 below. However, for the non-monetised reasons set out above, this is not the preferred option.

## **Capacity cap**

A capacity cap sets the maximum level of new build solar PV capacity that DECC considers acceptable and affordable. The cap would apply to all projects above 5MW accrediting after 31 March 2015. Once the cap is reached, no more large scale solar PV (>5MW) would be eligible to come forward under the RO.

This option would increase the administrative costs faced by Ofgem (assuming the cap is to be administered by Ofgem), by less than the RO closure option, though there is the potential for risk in determining the last project to enter under the cap, thereby potentially creating risk of legal challenge. In addition, this option does not provide assurance to those projects that have already made a significant financial commitment.

In order for developers to access finance they require some certainty over the revenues they expect to receive. As a cap is approached some projects may find it more difficult to access finance. Therefore, at any level the cap could be set, it is expected that less capacity would come forward in practice than the capped level, creating uncertainty for government around how much solar would deploy under any given cap. We have not estimated in this IA what effect on deployment this might have, but it is likely that we would not reach the level at which the cap is set.

As explained under a supplier cap option, while a capacity cap would cap spend on large scale (>5MW) solar PV, RO closure is preferred because of the certainty it provides to government and in encouraging price discovery of this technology through the CfD scheme.

The monetised impacts of a cap (supplier and capacity) are considered to be similar to that of RO closure, see section 4 below.

## **4. Impacts of shortlisted options considered**

This section outlines the monetised and non-monetised costs and benefits of the following shortlisted options:

- Option 1: Do Nothing
- Option 2: RO closure to Solar PV above 5MW from April 2015 with grace periods
- Option 3: Capacity or supplier cap on solar PV above 5MW under the RO.



## Option 1: Do Nothing

Under this option RO bands for new build large scale solar PV installations would remain at current levels, for both building-mounted and ground-mounted solar PV as set out in table 3. Deployment and therefore spend is now estimated to be above the modelled projections accompanying the Final Delivery Plan, outlined in tables 4 and 5.<sup>17</sup>

**Table 3: RO support bands for new build large scale solar PV installations from 2013-17 (ROCs/MWh of renewable electricity supplied)**

Current bands	2013/14	2014/15	2015/16	2016/17
Building-mounted	1.7	1.6	1.5	1.4
Ground-mounted	1.6	1.4	1.3	1.2

**Table 4: Deployment (GW) in 2020 for the Final Delivery Plan**

	Low	Central	High
Delivery Plan scenarios	2.4	2.7	4

Note: For consistency of comparison between options, a simplifying assumption has been made in calculating spend, in that all solar deployment comes in under the RO and not CfDs.

The low scenario in table 4 above is consistent with high technology cost scenario in the Final Delivery Plan. The high scenario is consistent with the low technology cost scenario and the central estimate is consistent with the remaining scenarios as set out in the Final Delivery Plan including; scenario one, high and low fossil fuel prices, high and low demand and higher offshore and biomass conversion deployment. The cost to consumers per annum of 2.7GW of solar deployment is estimated to be around £170m in 2011/12 prices (rounded to the nearest £10m); consistent with the assumptions used for the Final Delivery Plan<sup>18</sup>. Both options one and two have been compared to this spend estimate.

Deployment projections since the Final Delivery Plan have increased from between 2.4GW and 4GW by 2020 to between 2.8GW and 6.3GW by the end of 2016/17, see table 5. Spend in scenario one of the FDP is estimated to be £170m, which could increase by between £0m and £200m given the high pipeline deployment estimates (and this range assumes no further deployment beyond the end of 2016/17).

**Table 5: Solar deployment from 2016/17 onwards and associated annual spend under the RO based on updated pipeline projections under Option one (2011/12 prices)**

		Low	Central	High
Option 1	Deployment (GW)	2.8	4.5	6.3
	Annual RO Spend (£m) (from 2017/18)	£170m	£270m	£370m
	Change in spend compared to scenario one in the Final Delivery Plan, of £170m (£m)	£0m	+£100m	+£200m

Note: a) It is assumed that 25% of pipeline deployment is from small scale <5MW that applies for accreditation under the RO; costs of this deployment are included here. b) For consistency of comparison between options, a simplifying assumption has been made in calculating spend, in that all solar deployment comes in under the RO and not CfDs. c) Spend figures are rounded to the nearest £10m

DECC's prices and bills analysis suggests that the impact of this option on average household electricity bills could be an **increase** in the range of £0 (0%) to around £2 (around 0.4%) per household per annum

<sup>17</sup> See Final Delivery Plan documentation, Annex D: report from the system operator National Grid [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/267614/Annex\\_D\\_-\\_National\\_Grid\\_EMR\\_Report.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/267614/Annex_D_-_National_Grid_EMR_Report.pdf)

<sup>18</sup> Including the deployment profile and a 11% load factor.

from 2016/17 (central estimate of around £1 (0.2%) per household per annum) **compared to the Final Delivery Plan** scenario one. The impact on business electricity bills<sup>19</sup> is estimated to be similar in percentage terms, from around 0% to 0.7%, with a central estimate of around 0.3%.

It is necessary not to overspend against the LCF and to deliver a diverse mix of low carbon generation within this control framework. The potential for rapid future deployment of solar PV under the RO, risks future increases in estimated spend against the LCF. This option would not provide effective control of spending under the LCF and is therefore not recommended.

## Option 2: RO closure to Solar PV above 5MW from April 2015 with grace periods

This option would allow all solar PV projects above 5 MW to apply for RO accreditation until 31 March 2015. Projects which had made a significant financial commitment on or before 13<sup>th</sup> May 2014 can apply for a grace period. Estimated deployment and spend under this option is given in table 6 below, compared to the estimates for the Final Delivery Plan and the Do Nothing option above.

**Table 6: Solar deployment from 2016/17 onwards and associated annual spend under the RO based on updated pipeline projections under Option two (2011/12 prices)**

		Low	Central	High
Option 2 (recommended option)	Deployment (GW)	2.1	3.2	4.3
	Spend (£m)	£140m	£200m	£270m
	Change in spend compared to scenario one in the Final Delivery Plan, of £170m (£m)	-£30m	+£30m	+£100m
	Change in spend (£m) compared to Do Nothing option	-£30m	-£70m	-£100m

Note: a) It is assumed that 25% of pipeline deployment is from small scale <5MW eligible under the RO; costs of this deployment are included here. b) For consistency of comparison between options, a simplifying assumption has been made in calculating spend, in that all solar deployment comes in under the RO as opposed to CfDs c) Spend figures are rounded to the nearest £10m

Table 6 clearly demonstrates that even with closure of the RO from 2015/16 to new build large scale solar PV projects, we may still spend more compared to the projections from the Final Delivery Plan with its diverse low carbon generation mix (range -£30m to £100m compared to scenario one in the Final Delivery Plan). However, compared to the Do Nothing option, the saving could be in the range of £30m to £100m.

The solar PV deployment ranges in this scenario assume 1GW to 1.8GW total solar PV deployment in the RO by the end of 2013/14 (1.4GW central). Figures from Ofgem now show that some 545MW of solar PV projects have already accredited under the RO by the end of March 2014. We expect a further 1.2GW to accredit over the next few months, on the basis of known projects that have applied for full RO accreditation and are awaiting a decision from Ofgem. Deployment data for 2013/14 will be published by Ofgem in June 2014.

Solar deployment continues to move at a rapid pace. We will continue to monitor these figures and update our estimates accordingly for the government response to this consultation, recognising that the balance of risks is tilted towards a further acceleration in deployment.

DECC's price and bills analysis suggests that the impact of this option on household electricity bills could be **between a reduction** of -£0.40 (-0.1%) and an **increase** of around +£1 (0.2%) from 2016/17 (central estimate of an increase of around +£0.30 (0.1%) per household per annum) **compared to the Final Delivery Plan** scenario one. The impact on businesses is estimated to be similar in percentage terms, from around -0.1% to +0.3% (with a central estimate of around +0.1%).

<sup>19</sup> Bill impacts do not include VAT.

However, **compared to the Do Nothing option** this option could **reduce** average household electricity bills by between around -£0.40 (-0.1%) and around -£1 (-0.2%) from 2016/17 (central estimate of a reduction of around -£0.75 (-0.1%) per household per annum) compared to the Do Nothing option. The impact on businesses is estimated to be from around -0.1% to -0.3% (with a central estimate of around -0.2%). Therefore, in terms of the impact on electricity prices and bills, the option to take action under the RO is preferred to the Do Nothing option.

### **Option 3: Capacity or supplier cap on total Solar PV above 5MW under the RO.**

A supplier cap or capacity cap would be set to replicate the deployment expected under the central scenario of the preferred option of 3.2GW total solar PV deployment by the end of 2017. This is within the range set out in the Final Delivery Plan.

The uncertainty associated with these options as outlined on page 7 means that less than 3.2GW of total solar deployment could come forward under a cap. However, it has not been possible to quantify this uncertainty, therefore the expected resource costs, carbon savings and present values are assumed to be 'up to' the savings estimated in the central case in Option 2, as outlined below in the monetised impact section.

### **Monetised impacts**

The monetised costs and benefits associated with Options 1 and 2 are presented in Tables 7 to 9 below. Option 3 is assumed to have 'up to' the equivalent savings as the central case in Option 2, compared to the Do Nothing option, as explained above. The low central and high scenarios are based on the low, central and high deployment scenarios presented in tables 5 and 6. The lifetime resource costs are calculated as the difference between the central levelised cost estimates of large scale solar PV and the long run variable cost (LRVC) of electricity supply.<sup>20</sup> In other words, a lower level of solar PV deployment is assumed, in this analysis, to be replaced by an increase in electricity generation from cheaper alternatives (represented by the LRVC of electricity supply).

In summary, Option 2 leads to lower resource costs as deployment of solar PV is reduced compared to the Do Nothing option. This is because solar PV has higher capital costs and operating costs relative to cheaper electricity generating alternatives. Option 2 also has lower benefits compared to Option 1, as avoided emissions and lifetime EUA costs under Option 2 are lower compared to Option 1. Specific impacts can be summarised as follows:

- Lower levels of relatively more expensive solar PV deployment lead to lifetime resource costs of £830m to £1,750m under Option 2, which are significantly lower at the high end of the range compared to Option 1.
- Lower levels of solar PV deployment, and its assumed substitution with cheaper electricity generating alternatives, leads to lower avoided grid CO2 emissions of around 8Mt to 17Mt under Option 2.
- The emissions reductions (offset by increases elsewhere in the EU<sup>21</sup>) under Option 2 are valued at the DECC central traded carbon appraisal values<sup>22</sup> and amount to around £140m to £310m of EUA purchase cost savings, compared to savings of £190m to £460m under Option 1.
- The present value of monetised impacts range from -£690m to -£1,440m under Option 2, compared with a lower value of -£770m to -£1,700m under Option 1.

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<sup>20</sup> See DECCs levelised cost estimates and IAG guidance table 9 here:

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/269888/131217\\_Electricity\\_Generation\\_costs\\_report\\_December\\_2013\\_Final.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/269888/131217_Electricity_Generation_costs_report_December_2013_Final.pdf)

<https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal>

<sup>21</sup> The UK power sector is part of the EU Emissions Trading System (EU-ETS). This means that any reductions in UK power sector greenhouse gas emissions will be offset by increases (or foregone reductions) elsewhere in the EU-ETS. However, there is a benefit to the UK from such emissions reductions in terms of avoided carbon allowance (known as EUAs) purchase costs.

<sup>22</sup> Which can be found on DECC's website here:

[http://www.decc.gov.uk/en/content/cms/about/ec\\_social\\_res/iag\\_guidance/iag\\_guidance.aspx](http://www.decc.gov.uk/en/content/cms/about/ec_social_res/iag_guidance/iag_guidance.aspx)

**Table 7: Costs and benefits associated with Option 1, Do Nothing**  
(calculated over an assumed lifetime of 25 years for solar PV to 2041/42<sup>23</sup>, 2012 prices)

	Low	Central	High
Lifetime resource costs, £m, 2012	970	1540	2170
Avoided lifetime emissions, MtCO <sub>2</sub>	10	17	24
Avoided lifetime EUA costs, £m, 2012	190	320	460
Present Value (PV), £m, 2012	-770	-1220	-1700

Source: DECC internal modelling. Note: all spend figures are rounded to the nearest £10m and discounted at the social discount rate

The Present Value (PV) is calculated as the lifetime resource costs minus the avoided lifetime EUA cost, so in the central scenario -£1,540m minus £320m equals a PV of -£1,220m

**Table 8: Costs and benefits associated with Option 2, RO closure**  
(calculated over an assumed lifetime of 25 years for solar PV to 2041/42, 2012 prices)

	Low	Central	High
Lifetime resource costs, £m, 2012	830	1260	1750
Avoided lifetime emissions, MtCO <sub>2</sub>	8	12	17
Avoided lifetime EUA costs, £m, 2012	140	220	310
Present Value (PV), £m, 2012	-690	-1040	-1440

Source: DECC internal modelling. Note: all spend figures are rounded to the nearest £10m and discounted at the social discount rate

**Table 9: Net Present Value (NPV) of Option 2 compared to Option 1**  
(calculated over an assumed lifetime of 25 years for solar PV to 2041/42, 2012 prices)

	Low	Central	High
NPV (£m, 2012 prices)	90	180	270

Source: DECC internal modelling. Note: all spend figures are rounded to the nearest £10m and discounted at the social discount rate

The Net Present Value of Option 2 compared to Option 1 in the table above is calculated in the central scenario as the PV of Option 2 minus the PV of Option 1 so -£1,220m minus -£1,040m equals £180m. In conclusion, it is preferable to take action under the RO to limit spend (and therefore deployment) of large scale solar PV compared to the Do Nothing option.

## Non-monetised impacts

It should be noted that the monetised costs and benefits above do not include several potentially significant impacts, principally those relating to security of supply, the UK meeting its environmental targets, and potential macroeconomic effects. These are covered below, however it should be noted that given the level of solar PV deployment projected in this IA, these impacts are likely to be small.

### *Security of supply impacts*

The Do Nothing option would marginally reduce reliance on imported fossil fuels relative to

<sup>23</sup> Over an assumed 29 year period, with a PV base of 2013/14 and assuming the final (small scale) solar PV projects enter the RO in 2016/17.

Option 2, but would also increase the amount of intermittent generation, which would increase the need for balancing services, back-up generation, interconnection, storage and/or demand-side response. The costs of any additional balancing services have not been quantified. They will depend on the overall level and composition of intermittent generation on the grid, meaning it is difficult to isolate the costs associated with solar PV alone.

#### *Risk of missing 2020 renewables target*

Option 2 includes more solar deployment than that outlined in the Final Delivery Plan. However, this option marginally increases the risk of missing the 2020 renewables energy target and interim targets by reducing incentives for solar PV deployment under the RO in the UK, if deployment of other renewable technologies does not come forward.

#### *Macroeconomic impacts*

Growth in the UK solar PV sector is anticipated to be lower under Option 2. However, resources will be redeployed into other sectors, meaning any net impact on GDP is likely to be small.

#### *Environmental Issues*

Option 2 will lead to lower levels of solar PV deployment and hence increased carbon emissions within the UK power sector relative to the Do Nothing option, but these will be offset by decreases in emissions elsewhere within the capped EU-ETS traded emissions sector. There will therefore be no net impact on greenhouse gas emissions. Given the expected change in electricity generated through solar PV is small under Option 2, compared to total UK electricity generation, the resulting impact on air quality is believed to be negligible.

#### *Small Firms*

Option 2 will result in slightly lower electricity costs relative to Option 1. Electricity is likely to represent a larger proportion of income for smaller companies, as they are less likely to have their own generation compared to, in particular, large industrial users with heavy electricity requirements.

The majority of smaller businesses involved in solar PV generation are likely to continue to seek support under FITs, as the simplicity and income-certainty of FITs makes it better suited to small business needs. Small businesses involved in licensed electricity supply should not experience any additional burdens from these proposals.

## 5. Summary and preferred option

The preferred option as recommended in this impact assessment is to close the RO to new build large scale (>5MW) Solar PV from 1<sup>st</sup> April 2015. There would be no change to RO eligibility for small scale (<5MW) solar projects, although this would be kept under review. Projects which had made a significant financial commitment on or before 13<sup>th</sup> May 2014 can apply for a grace period, the detailed requirements for which are outlined in the consultation document.

Table 10 below summarises the costs and benefits of Option 2, compared to the Do Nothing option

**Table 10: Net Present Value of Option 2 compared to Option 1 (calculated over an assumed lifetime of 25 years for solar PV to 2041/42, 2012 prices)**

	Low	Central	High
NPV (£m, 2012 prices)	90	180	270

Source: DECC internal modelling. Note: all spend figures are rounded to the nearest £10m and discounted at the social discount rate

In conclusion, it is preferable to take action under the RO to limit spend (and therefore deployment) of large scale solar PV compared to the Do Nothing option. This option has a net benefit to the economy and helps to maintain the diverse generation mix set out in the EMR Final Delivery Plan. Option 2 also provides greater certainty to government and businesses relative to Option 3.

## **Implementation**

The RO is administered and enforced by Ofgem, who report annually on their administration of the RO and conduct regular audits in relation to compliance with the RO.

DECC is responsible for monitoring the impact of the RO on the development of renewable energy and collects detailed information on growth in renewable energy generation and projects under development.