

<b>Title:</b> Government Response on the Feed-In Tariffs Scheme Part A: Closure of the scheme to new applications after 31 March 2019 Part B: Administrative measures <b>IA No:</b> BEIS012(C)-18-CE <b>RPC Reference No:</b> N/A <b>Lead department or agency:</b> Department for Business, Energy and Industrial Strategy <b>Other departments or agencies:</b> N/A	<b>Impact Assessment (IA)</b>			
	<b>Date:</b> December 2018			
	<b>Stage:</b> Government Response			
	<b>Source of intervention:</b> Domestic			
	<b>Type of measure:</b> Secondary legislation			
	<b>Contact for enquiries:</b> feedintariff@beis.gov.uk			

<b>Summary: Intervention and Options</b>	<b>RPC Opinion:</b> Not Applicable
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**Cost of Preferred (or more likely) Option**

Total Net Present Value	Business Net Present Value	Net cost to business per year (EANDCB in 2014 prices)	One-In, Three-Out	Business Impact Target Status
£0.4bn - £0.6bn	N/A	N/A	Not in scope	Non qualifying provision

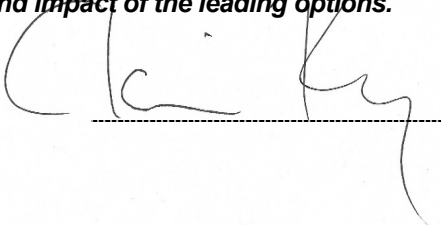
**What is the problem under consideration? Why is government intervention necessary?**  
Electricity generation accounts for over 20% of UK greenhouse gas emissions and without government intervention market incentives would not have not been sufficient to meet the UK's climate change commitments. The Feed-In Tariffs (FIT) scheme was introduced in 2010 to provide support for small-scale low-carbon generation (generation tariff) and a route to market (export tariff). As costs decline, public attitudes change and technology develops, the requirement for government support is reducing. Government proposes to close the current FIT flat rate export tariff, given the government's desire to move towards fairer, cost reflective pricing and the continued drive to minimise support costs on consumers as set out in the Industrial Strategy and Clean Growth Strategy. Further, in 2015 government announced its intention to end generation tariffs for new entrants from March 2019 and is now seeking to implement that decision.

**What are the policy objectives and the intended effects?**  
The policy intention is to close the scheme to new applicants. Specifically, to limit the impact of the FIT scheme on consumer bills. The primary objective is to close the existing export tariff at the same time as the generation tariff will close on 31 March 2019 so that no new applications will be accepted under the scheme (subject to a small number of time-limited extensions and a grace period) after that date. In parallel, an administrative measure to the FIT scheme will be implemented, specifically allowing net metered exports costs to be included in the levelisation mechanism.

**What policy options have been considered, including any alternatives to regulation? Please justify preferred option (further details in Evidence Base)**  
Option 0 – Do nothing. From 31 March 2019 the flat export tariff continues along with generation tariffs. No administrative changes are made to the scheme. This counterfactual is subject to uncertainty and should be considered illustrative only.  
Option 1.a – Close the FIT scheme to new applicants. Implement the 2015 decision to close the generation tariff from 31 March 2019, and close the export tariff in parallel.  
Option 1.b – Implement Option 1.a and allow the levelisation of net metered exports (see section 4 for more detail).  
The Government is implementing Option 1.b as it meets the aforementioned objectives.

<b>Will the policy be reviewed?</b> It will not be reviewed. <b>If applicable, set review date:</b> N/A				
Does implementation go beyond minimum EU requirements?			No	
Are any of these organisations in scope?			<b>Micro</b> Yes	<b>Small</b> Yes
			<b>Medium</b> Yes	<b>Large</b> Yes
What is the CO <sub>2</sub> equivalent change in greenhouse gas emissions? (Million tonnes CO <sub>2</sub> equivalent)			<b>Traded:</b> 1 - 3	<b>Non-traded:</b> 0

***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: 17/12/18

## Summary: Analysis & Evidence Policy Option 1.a

Description: Close the FIT scheme to new applicants

### FULL ECONOMIC ASSESSMENT

Price Base Year 2017	PV Base Year 2019	Time Period Years 37	Net Benefit (Present Value (PV)) (£m)		
			Low: £0.4bn	High: £0.6bn	Best Estimate: N/A

COSTS (£m)	Total Transition (Constant Price) Years		Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	-		-	£0.1bn
High	-		-	£0.2bn
Best Estimate	-		-	N/A

#### Description and scale of key monetised costs by 'main affected groups'

Under this policy option the deployment of small-scale low-carbon electricity generation decreases relative to the 'Do Nothing' baseline. The scale of this impact is uncertain therefore a range is estimated with no central best estimate. The key monetised cost identified is from forgone low-carbon generation being met by marginal grid plants which typically have higher greenhouse gas content (valued at PV £0.1bn to £0.2bn). No other monetised costs have been identified.

#### Other key non-monetised costs by 'main affected groups'

Non-monetised costs identified for this policy option are:

- a potential reduction in employment in the low-carbon sector from lower deployment (qualitatively assessed); and
- a reduction in air quality from displacing small-scale low-carbon generation with marginal grid generation, which features more thermal generation such as gas (qualitatively assessed).

BENEFITS (£m)	Total Transition (Constant Price) Years		Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	-		-	£0.5bn
High	-		-	£0.8bn
Best Estimate	-		-	N/A

#### Description and scale of key monetised benefits by 'main affected groups'

The benefits of this policy option are also driven by the estimated reduction in small-scale low-carbon generation, again estimated as a range with no central best estimate. The key monetised benefits identified are: a reduction in the resource costs of electricity generation (valued at PV £0.5bn to £0.8bn) from replacing small-scale generation (higher cost) with marginal grid generation (lower cost); and a reduction in administrative costs to the scheme administrator (valued at PV £8m).

#### Other key non-monetised benefits by 'main affected groups'

Non-monetised benefits identified for this policy option are:

- A reduction in subsidy support costs to electricity consumers of £45m (2011/12 prices) per year from 2021 as a result of closing the FIT scheme to new applicants; and
- The associated impact on consumer bills from closing the scheme to new applicants. Estimated as a £1 saving to an average household.

<b>Key assumptions/sensitivities/risks</b>	<b>Discount rate (%)</b>	3.5
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The largest single uncertainty in this analysis is the choice of deployment scenarios for small-scale low-carbon generation under all the policy options (including Do Nothing). These underpin all the monetised costs, benefits and support costs presented in this assessment. To reflect this uncertainty this assessment does not present a single central scenario. Rather it considers a spectrum of deployment scenarios and presents two specific scenarios in this appraisal. This appraisal now only considers 3 years of deployment given the uncertainty over the length of time the FIT and export tariff would continue if not closed in 2019. The main result of this is a reduction in the NPV compared to the consultation stage impact assessment.

### BUSINESS ASSESSMENT (Option 1.a)

<b>Direct impact on business (Equivalent Annual) £m:</b>	<b>Score for Business Impact Target (qualifying provisions only) £m: N/A</b>		
Costs: N/A	Benefits: N/A	Net: N/A	N/A

## Summary: Analysis & Evidence

## Policy Option 1.b

Description: Close the FIT scheme to new applicants and implement an administrative change

### FULL ECONOMIC ASSESSMENT

Price Base Year 2017	PV Base Year 2019	Time Period Years 38	Net Benefit (Present Value (PV)) (£m)		
			Low: £0.4bn	High: £0.6bn	Best Estimate: N/A

COSTS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	-	-	£0.1bn
High	-	-	£0.2bn
Best Estimate	-	-	N/A

#### Description and scale of key monetised costs by 'main affected groups'

Same as option 1.a.

#### Other key non-monetised costs by 'main affected groups'

Same as option 1.a. The introduction of the proposed admin measure would not change how any payments are made to FIT generators. It would ensure that the costs of the scheme, paid by electricity suppliers, are efficiently proportioned amongst suppliers.

BENEFITS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	-	-	£0.5bn
High	-	-	£0.8bn
Best Estimate	-	-	N/A

#### Description and scale of key monetised benefits by 'main affected groups'

Same as option 1.a.

#### Other key non-monetised benefits by 'main affected groups'

Same as option 1. a.

#### Key assumptions/sensitivities/risks

Same as those presented above. Note key assumptions and sensitivities are Same as option 1.a. and explored in more detail in section 5.4.

Discount rate

3.5

### BUSINESS ASSESSMENT (Option 2.b)

Direct impact on business (Equivalent Annual) £m:	Score for Business Impact Target (qualifying provisions only) £m:
Costs: N/A   Benefits: N/A   Net: N/A	N/A

## **Section 1: Background, and problem under consideration**

### ***The Feed-In-Tariffs scheme***

1. The Feed-In Tariffs (FIT) scheme was introduced to support the widespread adoption of proven small-scale (up to 5MW) low-carbon electricity generating technologies. The scheme was intended to give the wider public a stake in the transition to a low-carbon economy and in turn foster behavioural change that would support the development of local supply chains and reductions in energy costs.
2. The FIT scheme is funded through levies on electricity suppliers, and ultimately consumers, regardless of whether they directly participate in the scheme. That is why controlling costs was paramount in the reviews of the scheme in 2011/12<sup>1</sup> and 2015,<sup>2</sup> the latter of which provided consumers and industry with clarity on levels of small-scale low-carbon electricity support until March 2019.

## **Section 2: Rationale for intervention**

3. Electricity generation has been a significant contributor to greenhouse gas emissions and government intervention has been necessary to ensure market incentives are sufficient to meet the UK's climate change commitments. To this end the FIT scheme has been one of the key enablers in driving the uptake of a range of small-scale low-carbon electricity technologies. As costs decline<sup>3</sup> and new, smart technologies become accessible, market incentives are beginning to align with government objectives (see section 5.2 for more detail) meaning that it is important that interventions reflect such development and do not place an undue burden on consumer bills.
4. The specific intervention considered in this impact assessment (IA) is the implementation of the 2015 policy decision to close the scheme's generation tariff in March 2019, in combination with the proposal to also close the export tariff (Option 1.a) and implement an administrative change to the scheme (Option 1.b). The FIT scheme would therefore be closed to new applications from the 31 March 2019 and the export tariff would also not be available to new applicants. Time-limited extensions to the closure and a grace period for grid/radar delay are set out in the accompanying Government response. Alongside the closure, an administrative change to the scheme is also to be implemented. In the context of declining technology costs and the emergence of smart technologies, these changes would ensure that the support costs of the FIT scheme are kept under control and that these costs are distributed efficiently.

## **Section 3: Policy objectives**

### ***Closure of the scheme***

5. The policy objective regarding the closure of the FIT scheme is to ensure value for money of subsidy support as technology costs decline and limit the impact of future deployment on consumer bills. This builds upon the objective of the 2015 FIT

<sup>1</sup> <https://www.gov.uk/government/consultations/feed-in-tariffs-first-phase-of-a-comprehensive-review>

<sup>2</sup> <https://www.gov.uk/government/consultations/consultation-on-a-review-of-the-feed-in-tariff-scheme>

<sup>3</sup> See 2015 FIT review or more recent evidence from BNEF.

review that sought to control spending under the FIT scheme with the introduction of deployment caps and a £100m budget.

### ***Administrative measures***

6. The administrative measure being implemented is described in more detail in section 4. The policy objective of this measure is to improve the administrative functioning of the scheme.

## **Section 4: Description of options considered**

### **Option 0: Do nothing**

7. This is the baseline counterfactual against which the policy options are compared. The 2015 FIT Review government response announced the decision to end generation tariff support on 31 March 2019,<sup>4</sup> however this change has not yet taken place. Therefore the 'do nothing' baseline presented in this IA consists of continued support under both the generation and export tariffs until 2021. This baseline counterfactual is subject to uncertainty and should be considered illustrative (more detail on how this scenario is constructed can be found in section 5.2).
8. The net costs and benefits of this option are zero. For the purposes of this appraisal we assume that in the counterfactual the scheme would run for an additional three years. This is a reduction compared to the five years assumed in the consultation stage impact assessment, reflecting the uncertainty over how long the FIT scheme would have continued for. Over this period deployment would not be constrained by any caps and new applicants would receive both a generation and export tariff.<sup>5</sup> Estimates of potential levels of deployment and subsidy support are set out in section 5. Consumer support under this option would increase relative to current projections of the cost of the scheme set out by the Office for Budget Responsibility<sup>6</sup> (OBR) and therefore require larger payments to be levied on consumer bills.

### **Option 1.a: Implement the 2015 decision to close the generation tariff after 31 March 2019, and close the export tariff alongside**

9. This option closes the scheme to new applicants after the 31 March 2019. Specifically, both generation and export tariffs would cease to be available to any new applicants after this date. Time-limited extensions, such as those granted to installations with preliminary accreditation received on or before 31 March 2019, are set out in Part A of the accompanying Government response. Deployment caps and tariffs set out in the 2015 FIT review and administered by Ofgem would remain in place until this date. Any unused capacity accumulated by March 2019 would not be reallocated. Under this option consumer support under the scheme would be consistent with those reported by the OBR. Unsupported deployment in the future would not receive additional payments, and therefore this policy option avoids additional costs being levied on consumer bills.

<sup>4</sup> For further detail, see: <https://www.gov.uk/government/consultations/consultation-on-a-review-of-the-feed-in-tariff-scheme>

<sup>5</sup> It is assumed tariffs decline with default depression.

<sup>6</sup> <http://obr.uk/efo/economic-fiscal-outlook-march-2018/>

10. Government did consider extending the export tariff in a revised form. However, it was concluded that there was insufficient information and evidence on whether (and if so, to what extent) the different sub-sectors within the small scale low-carbon sector require support; or how to design any new export tariff in a way that protects consumer bills and takes advantage of the developments in the energy market and smart agenda, achieving the vision set out in the Industrial Strategy and Clean Growth Strategy. A call for evidence was published alongside the consultation to identify the challenges and opportunities from small-scale low-carbon electricity generation in contributing to government's objectives for clean, affordable, secure and flexible power; and the role for government and the private sector in overcoming these challenges and realising these opportunities.
11. Government has considered evidence provided through the consultation responses and has decided to close the scheme in full to new applications after 31 March 2019. This option is deemed to meet the aforementioned objectives.

### **Option 1.b: Implement Option 1.a and make an administrative change to the scheme**

12. This option would build on Option 1.a by making an administrative change that would improve the delivery of the existing FIT scheme. The change relates to how support costs of the scheme are shared across electricity suppliers – a process known as 'levelisation'. Specifically, levelisation is the mechanism by which the cost of the FIT scheme is apportioned across all licensed electricity suppliers according to their share of Great Britain's electricity market, taking into account any applicable exemptions.<sup>7</sup>
13. Currently only the net costs of export tariffs for deemed exports (export tariff payments made to generators under 30 kW) are included in the levelisation process. In practice this means suppliers submit the annual cost of deemed payment, to the levelisation process (in a similar approach to aggregated generation payments). Ofgem then determines the value of these payments based on the Secretary of State's annual determinations.<sup>8</sup> Any difference, i.e. net difference, between the two is then factored into the levelisation fund. For example, if total deemed payments made by a supplier exceed the value set by Ofgem then the difference (i.e. the excess paid by the supplier) is included in the levelisation fund. The result being that all suppliers bear an equal proportion of scheme costs.
14. Under this option the levelisation process would be amended to include the net costs of *metered export* payments (i.e. export payments made to generators above 30kW receiving the FIT export tariff) as well as net *deemed export* payments. There would be no change in actual generation or export payments to generators. Rather, the distribution of costs between suppliers would change to reflect actual costs to suppliers.

## **Section 5: Monetised/non-monetised costs and benefits**

### **5.1 Approach to assessing the policy options**

<sup>7</sup> For example if a supplier makes 20% of all FIT payments in a given year and their share of the electricity market in that year is 10% then the supplier will be compensated via the levelisation fund. Conversely, a supplier making only 5% of annual FIT payments with a market share in excess 10% in the same year would be required to pay into the levelisation fund.

<sup>8</sup> <https://www.gov.uk/government/publications/feed-in-tariffs-fits-determinations>

15. The framework for assessing the impact of the policy options is based around deployment scenarios of small-scale low-carbon generation under the baseline counterfactual, and subsequently the two policy options. Comparisons are then made between the policy options and the baseline counterfactual to determine the impact across a number of metrics. These deployment scenarios are highly uncertain, therefore a range is estimated and at this stage no central estimate is made (see section 5.2 below for more detail).
16. Based on these deployment scenarios, the following monetised impacts are estimated and included in the cost-benefit analysis:
  - *Generation costs* – the resources (capital, operating, financing and development costs) used to generate electricity. Primarily this analysis compares the costs of generation from small-scale low-carbon capacity against those of meeting the same level of generation from the GB electricity grid.
  - *Value of greenhouse gas emissions* – varying the mix of small-scale low-carbon generation and generation from the GB electricity grid will affect the levels of greenhouse gas emitted, as a significant share of power from the GB grid – at least in the near term – is from fossil fuel sources.
  - *Administrative costs* – whether the FIT scheme remains open (as under the baseline counterfactual) or closes to new applications (as under options 1.a and 1.b) will affect the costs of administering the scheme. Estimates of this are taken from the current scheme administrator, Ofgem.
17. Details on how these impacts are estimated and monetised are in section 5.4. The monetised costs and benefits are calculated and discounted in accordance with HM Treasury’s *Green Book* and supplementary guidance on valuing energy use and greenhouse gas emissions.<sup>9</sup>
18. Not all of the anticipated impacts of the policy options can be quantified, and for some where they can be quantified it is not possible (or appropriate) to include them in the cost-benefit analysis – for example because of methodological differences or double-counting with impacts already captured under ‘Monetised impacts’ above. The non-monetised impacts considered in this assessment are:
  - *Impact on jobs* – in scenarios where closing the FIT scheme to new applicants reduces deployment of generation capacity, it is likely that levels of employment in the small-scale low-carbon sector will change. These effects are assessed qualitatively, as based on the evidence available it is not possible to robustly quantify these effects.
  - *Air quality* – similarly to greenhouse gas impacts, where electricity demand is met from the GB grid rather than from small-scale low-carbon generation, there will be a greater use of thermal generation technologies (such as gas) under Options 1.a and 1.b. This will likely have an impact on the air quality around sites where these plants are located. There will also be air quality improvements as less anaerobic digestion (AD) generators would be expected to deploy in this scenario. This is assessed qualitatively at this stage.

<sup>9</sup> Available here: <https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government>

- *Support costs and consumer bills* – in scenarios where the FIT scheme closes the level of subsidy support provided from electricity consumers will reduce, which would lead to a reduction in consumer bills compared to if the scheme remained open to new applicants.
19. The deployment scenarios that drive the impacts described here assume that deployment continues for three years after 31 March 2019. This time period should be considered illustrative. The impacts are then assessed over a 37 year period, reflecting the asset lifetime of 35 years from the last installation that is assumed to be made in the year 2021.

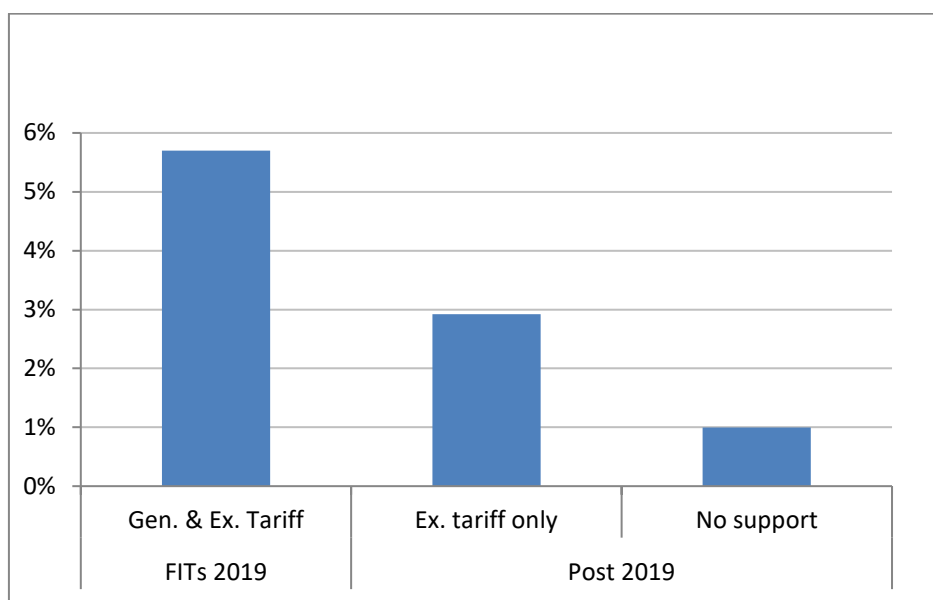
## 5.2 Deployment scenarios

20. The appraisal methodology in this assessment uses a scenario based approach to understand the uncertainty surrounding future deployment. Multiple scenarios, encompassing varying trajectories of future deployment and generation, are first established and then used to ascertain the potential impact of option 1.a and 1.b relative to the counterfactual of option 0.

### *Internal Rate of Return*

21. The extent to which generators deploy under the baseline and policy options will depend heavily on how attractive it would be to an investor with and without FIT support. The following illustrative graph sets out the private investment economics for an illustrative 3 kW solar generator in three scenarios; where i) generation and export tariffs continue, ii) export tariffs continue only, and iii) all tariff support is removed. Each is shown in turn to demonstrate the marginal impacts of each. Specifically, it considers the internal or expected rate of return of a project (IRR). For more detail on the methodology consult Annex A.

**Figure 1: Illustrative IRRs for 3kW solar generator**



22. The first scenario, where generation and export tariffs continue (the counterfactual), has the largest IRRs. Holding all other factors constant this would suggest that this scenario would likely produce the highest levels of future deployment as generation tariffs, export tariffs and bill savings provide the



maximum possible revenue to a generator. Conversely, the scenario whereby all support is removed has the lowest IRR and would likely result in the lowest levels of deployment. Note that the private economics are most attractive with FIT support; however, it is likely that even though IRRs will be lower without support they are likely to be sufficient in some cases for deployment to occur, and therefore we would expect to see some – though uncertain – deployment in the absence of FIT support. Indeed, were capital costs to fall further and therefore lower generation costs or a generator had un-representative characteristics (e.g. high on-site consumption) would make the private economics more attractive.

23. The case whereby the export tariff is maintained, in absence of a generation tariff, is more nuanced. In the illustrative example presented above the FIT export tariff, in absence of a generation tariff, has a sizeable impact to the economics of a illustrative generator. However, in some cases generators will be able to negotiate a power purchase agreement (PPA) at a value above that of the FIT export rate. One could assume that in such circumstances the presence of the FIT export tariff has no bearing on the economics of a project. However, a long term PPA market may only give revenue security for a few years ahead. Unlike the FIT export tariff, they do not necessarily provide revenue security over the lifetime of an asset. Thus in such cases the export tariff can still provide a boost to the site specific economics of a generator by effectively working as a floor price for the lifetime of the asset. Consequently, one would expect deployment in the presence of an export tariff to exceed deployment in a scenario where both generation and export tariffs are removed. For more detail consult Annex A.

### **Deployment ranges**

24. While it is likely that investor returns with and without FIT support will lead to some level of future deployment, forecasting this is inherently uncertain. Consequently, the approach taken here considers a range of potential deployment scenarios. They can be broadly summarised as follows:

<b>Table 1: Summary of deployment scenarios</b>	
<b>Scenario</b>	<b>Detail of assumptions behind scenario</b>
Supported (counterfactual)	Assumes that future deployment continues along observed trends. Specifically, trends observed since the introduction of deployment caps. Note total applications (which can exceed caps), not granted capacity (which is constrained by caps), is used to establish these trends.
Unsupported – high	Assumes that only half of the deployment observed in previous scenarios comes forwards.
Unsupported – Low <sup>10</sup>	Assumes a yearly growth rate of 0.7% to reflect evidence presented in the consultation responses

25. In this assessment the counterfactual scenario is assumed to represent option 0 where generation and export tariffs continue. This is driven by the greater economic incentives due to the scheme remaining open, as outlined in the IRR analysis in Figure 1.
26. Following the same reasoning this assessment assumes that policy option 1.a and option 1.b, whereby FIT payments cease, would be associated with a lower deployment trajectory than the counterfactual. Consequently, this analysis

<sup>10</sup> This scenario has changed since the consultation impact assessment to reflect feedback received as part of the consultation.

assumes that the “unsupported-high” and “unsupported-low” deployment scenarios reflect the potential deployment ranges of policy option 1.a and option 1.b. Note that the two scenarios used to investigate the impacts of policy option 1.a and option 1.b are a range of possible future deployment levels. It is possible that deployment falls above or below these ranges. Indeed, to reflect this uncertainty no central scenario is considered. For more detail on these assumptions consult Annex B.

27. It would be expected that deployment under an export tariff only support option to also be lower than deployment in the counterfactual. However, it would also be likely that deployment in such a scenario would exceed deployment in the scenarios whereby all support is removed. These conclusions were set out in preceding IRR analysis. Deployment forecasting is inherently uncertain and consequently no specific deployment trajectory for an export tariff only support option has been developed.

### 5.3 Generation and deployment

28. Table 2 shows the assumed deployment trajectories for the counterfactual, option 0, and intervention, option 1.a and option 1.b, for each FIT technology. As outlined previously the “supported” deployment scenario represents the counterfactual, option 0, and the “unsupported-high” and “unsupported-low” scenarios reflect the possible outcomes of the intervention scenarios, option 1.a and option 1.b. Note there is no central deployment scenario, reflecting the uncertainty on future deployment.

<b>Table 2: Total Capacity Added MW</b>			
	<b>2019</b>	<b>2020</b>	<b>2021</b>
<b>Counterfactual</b>			
Solar	207	216	224
Wind	73	80	87
Hydro	23	26	28
AD	5	5	5
mCHP	0.003	0.003	0.003
<b>Option 1a&amp;b, medium deployment</b>			
Solar	104	106	108
Wind	37	38	40
Hydro	12	12	13
AD	3	3	3
mCHP	0.005	0.005	0.005
<b>Option 1a&amp;b, low deployment</b>			
Solar	39	40	41
Wind	6	6	6
Hydro	2	2	2
AD	2	2	2
mCHP	0.001	0.001	0.001

29. Generation resulting from the deployed capacities has been calculated by taking the load factor assumptions outlined in the 2015 FIT impact assessment and applying these to the cumulative capacity for the relevant technology in our deployment scenarios. Specifically, these are the load factor assumptions used in

setting tariffs. Additionally, for the purposes of this appraisal total deployment is broken down by various sizes of installations. For example, approximately a quarter of all solar deployment is assumed to be over 50kW, and approximately three quarters at or below 50kW. More detail on these assumptions is outlined in Annex B. No specific assumption on export volumes has been established for this appraisal.

#### 5.4 Monetised costs and benefits

30. The monetised costs and benefits of the policy options, net of the baseline counterfactual, are combined into a net present value estimate. The net present value is calculated as the discounted value of all benefit less the discounted value of all costs. The social discount rates specified in the Green Book guidance have been applied in this assessment. Each monetised cost or benefit is examined here in turn. The costs and benefits of all the options have been revised downwards since the consultation stage IA, primarily driven by a reduction in the number of assumed years of deployment from five to three to reflect the significant uncertainty over how many years the FIT scheme would have continued in the absence of any intervention at this stage.

#### *Generation cost savings*

31. The generation cost savings of option 1.a and option 1.b compared to option 0 is generation forgone from FIT technologies being supplied by cheaper non-FIT technologies via the GB electricity grid. Specifically, this is calculated as the difference between the levelised cost<sup>11</sup> of FIT generators and the long run variable cost (LRVC) of electricity supply from the GB grid. This assumes that any generation that would have come from a FIT generator in option 0 is now replaced by generation representing the average marginal GB grid generator in that particular year. Typically, FIT generators have a higher levelised cost, in £/MWh, than the LRVC and therefore there is a net resource benefit from implementing option 1.a and option 1.b.

<b>Table 3: £m, total discounted savings (2017 prices)</b>	
Option 1.a & 1.b, “unsupported-high”	£497m
Option 1.a & 1.b: “unsupported-low”	£816m

#### *Value of changes in greenhouse gas emissions*

32. FIT installations are low-carbon generators and reducing their deployment will result in larger amounts of more carbon intensive generation being sourced from the rest of the GB electricity system. This assessment therefore estimates the value (or cost) of the increase in greenhouse gas emissions associated with reducing deployment of FIT generators. Specifically, the costs associated with reduced deployment of solar PV, wind and hydro projects are considered.<sup>12</sup> This is estimated by taking the two scenarios of generation forgone by implementing option 1.a and option 1.b and the long run marginal generation based emission factors in the Green Book supplementary guidance. Carbon volumes are then

<sup>11</sup> A ‘levelised cost’ is the average cost over the lifetime of the plant per MWh of electricity generated. It reflects the cost of building, operating and decommissioning a generic plant for each technology. Potential revenue streams are not considered. See 2016 BEIS Electricity Generation costs report, available here: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/566567/BEIS\\_Electricity\\_Generation\\_Cost\\_Report.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/566567/BEIS_Electricity_Generation_Cost_Report.pdf)

<sup>12</sup> Note that the carbon costs from lower deployment of anaerobic digestions has not been quantified as part of this appraisal.

assigned a cost by using the centrally traded carbon values set out in the Green Book supplementary guidance.

<b>Table 4: £m, total discounted carbon costs (2017 prices)</b>	
Option 1.a & 1.b, “unsupported-high”	£108m
Option 1.a & 1.b: “unsupported-low”	£183m

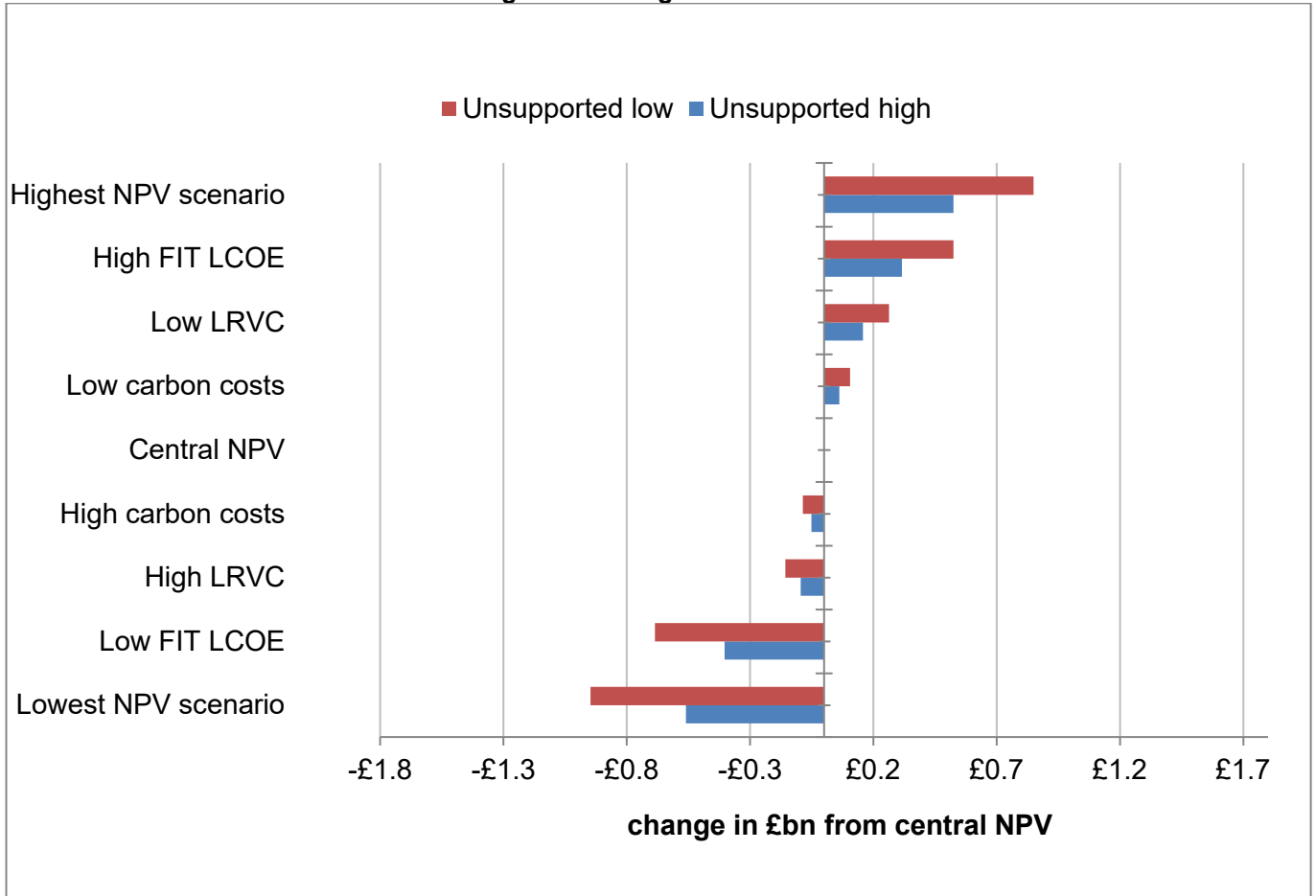
### ***Administrative savings***

33. Closing the FIT scheme to new applicants will reduce, albeit not remove, the administrative burden on the scheme administrator, Ofgem. This administrative cost saving, over the entire appraisal lifetime, has been estimated with Ofgem as approximately £8m in 2017 prices. Savings cover the entire appraisal period and are assumed to start in 2020, thus allowing one year of familiarisation and reflecting that processing applications will extend beyond 2019. Savings are assumed to be constant in the intervention scenarios. This appraisal also expects the FIT licensees’ (i.e. electricity suppliers responsible for making FIT payments) administrative costs which are assumed to be passed through to consumer bills will reduce; these savings have not been monetised at this stage.

### ***Net present value (NPV)***

34. The NPV from implementing options 1.a and 1.b range between £0.4bn and £0.6bn. Note there is no central value reflecting the underlying uncertainty on deployment.
35. The monetised assessment presented here is subject to uncertainty. To reflect this uncertainty the following chart outlines how the NPV changes when the key inputs are changed. Specifically, these inputs are the levelised costs of FIT technologies (Levelised Cost of Electricity - LCOE), the long run variable cost of electricity supply (LRVC), and value of greenhouse gas emissions. Broadly speaking a higher FIT LCOE will increase the NPV, a higher LRVC will reduce the NPV, and higher carbon costs will reduce the NPV. These inputs are all assessed individually in the chart below before a highest and lowest NPV case is presented based upon a combination of the inputs.

**Figure 2: Changes to the NPV**



36. The sensitivity analysis has been updated since the consultation. There are now two scenarios which result in a negative NPV, both of which would occur if the technology costs (reflected in the levelised cost of electricity - LCOE) of small-scale low-carbon generation fell compared to the central estimate. These are the lowest NPV scenario<sup>13</sup> and the scenario where the levelised cost of electricity of FIT technologies is assumed at the low estimate. Overall, the majority of scenarios tested continue to result in positive economic benefits as a result of implementing the policy decision. However, should the costs of FIT technologies significantly reduce in a short timeframe then there may potentially be economic costs that result from implementing the policy decision.

## 5.5 Non-monetised costs

### *Impact on jobs*

37. Under policy options 1.a and 1.b the assumed reduction in deployment of FIT generators will likely result in decreased employment in the low-carbon generation sector. The 2017 REA KMMG report<sup>14</sup> said the renewable energy industry employed close to 126,000 people – anaerobic digestion (AD) 2,952, hydro 5,778, wind (including offshore) 41,766 and solar PV 13,687. The ONS low carbon survey<sup>15</sup> said solar employment in 2016 was 5,000 FTE and onshore wind 5,500 FTE.

<sup>13</sup> Low LCOE, high LRVC and high carbon prices

<sup>14</sup> [http://www.r-e-a.net/upload/final\\_low\\_res\\_renewable\\_energy\\_view\\_-\\_review\\_2017.pdf](http://www.r-e-a.net/upload/final_low_res_renewable_energy_view_-_review_2017.pdf)

<sup>15</sup> <https://www.ons.gov.uk/economy/environmentalaccounts/bulletins/finalesimates/2016>

38. BEIS did receive information on job impacts as part of the consultation which are discussed below, however, given the inherent uncertainty in relation to the number of jobs supported in small-scale low-carbon sector and the extent to which a reduction in deployment would lead to rises or falls in employment in related sectors, employment impacts have not been quantified in this assessment.
39. As part of the consultation response, the results of two solar industry surveys which covered job impacts were shared with BEIS. Both surveys<sup>16</sup> indicated that over 70% of respondents believed the closure of the FIT and export tariff would have a negative impact on employment. Responses in relation to other technologies also suggested similar impacts.

### ***Air quality impacts***

40. Under policy options 1.a and 1.b, small-scale low-carbon generation is replaced by power from the GB grid, which includes generation from thermal plants (such as gas) that can affect air quality. Conversely, a reduction in some FIT generation, such as AD, could lead to a small improvement in air quality. It has not been possible to quantify these impacts in this assessment.

### **5.6 Support costs and consumer bill impacts**

41. In the counterfactual scenario, option 0, generation payments would continue to be granted to eligible installations post March 2019. These payments are ultimately passed on to consumers bills through the levelisation process and would represent costs to consumers.
42. Table 5 shows the additional costs to consumers, above and beyond published OBR projections<sup>17</sup> from allowing generation tariffs to continue post 2019. For the purposes of this appraisal tariffs post March 2019 have been assumed to continue declining with default degeneration. Note additional in this context is defined as the cost of any supported deployment post 2019 and the end of the existing capped scheme. This does not capture any additional supplier administration costs.

<b>Table 5: Savings to consumers from options 1.a and 1.b (£m, 2011/12 prices)</b>			
	<b>2019</b>	<b>2020</b>	<b>2021</b>
Solar	6	11	16
Wind	4	9	13
Hydro	4	9	14
AD	1	1	2
mCHP	0	0	0
<b>Total</b>	<b>15</b>	<b>30</b>	<b>45</b>

43. The figures in table 6 show the corresponding additional impact on consumer bills from leaving the FIT scheme open post 2019, i.e. option 0. These figures can also be interpreted as the bill savings from implementing option 1.a and option 1.b. This analysis also takes into account the Government's decision to implement an exemption from FIT policy costs for energy intensive industries (EIIs) which will be implemented through the FIT closure legislation. This impact is included here to

<sup>16</sup> Stated to cover ~10% of the industry, which Government is unable to verify.

<sup>17</sup> See <http://obr.uk/efo/economic-fiscal-outlook-march-2018/>

present the impact of both changes included in the legislation. Refer to Annex C for more information on the EIs exemption and the impact on price and bills.

<b>Table 6: Estimated marginal impact of continuation of FIT post 2019 on average price and bills (2021) by illustrative group.</b> <sup>18 1920</sup> (annual average across 2019 – 2030, 2017 prices)			
	Marginal impact of FiTs and EII Exemption on end user's bill	Marginal Price Impact (£/MWh)	Percentage of total electricity bill
Average households (inc VAT)	£1	<£0.5	<0.5%
Businesses - small energy users (nearest £100)	£100	<£0.5	<0.5%
Business – medium energy users (nearest £1,000)	£3,000	<£0.5	<0.5%
Eligible Energy Intensive Industries	-£360,000	-£4	-3%
Ineligible Energy Intensive Industries (nearest £10,000)	£30,000	<£0.5	<0.5%

44. This appraisal does not monetise potential bill impacts from an export tariff only support option. This is due to the difficulty in estimating deployment under an export tariff only support regime and the difficulty in establishing what constitutes a subsidy. In its current form the FIT export tariff can potentially impact on energy bill payers. For example, the current fixed export tariff does not track the prevailing wholesale price. As such when the value of the export tariff exceeds the wholesale price, as is currently the case, generators may be overcompensated for their export. Indeed, with the increasing amounts of intermittent generation on the system the wholesale price may be a poor proxy of the true value of FIT export. Moreover a fixed and flat export tariff does not reflect many of the market signals such as local grid constraints, value varying by time of day or intra season values. Indeed, the current export tariff can disincentivise behaviour viewed as desirable for the purposes of alleviating grid constraints, such as self-consumption or the installation of storage.

<sup>18</sup> Over the period 2019-2030, an illustrative small business energy user has an assumed electricity consumption of between 230-240MWh per year. An illustrative medium business energy user has an assumed electricity consumption of between 9,800-10,000MWh per year. An illustrative EII has an assumed electricity consumption of 92,000-93,000MWh per year but EII consumption varies significantly from 2,000,000MWh per year to 2,000MWh per year. Assumed electricity consumption are adjusted to take into account policy derived reductions in consumption.

<sup>19</sup> The baseline scenario assumes that no form of relief is provided for EIs

<sup>20</sup> The impacts in Table 6 reflect additional payment to FITs recipients as indicated in the counterfactual scenario

## 5.7 Risks and Uncertainties

45. The largest single uncertainty in this analysis is the deployment of small-scale low-carbon generation with and without the FIT scheme. These underpin all the monetised costs, benefits and support costs presented in this assessment. To reflect this uncertainty this assessment does not present a single central scenario. Rather it considers a spectrum of deployment scenarios, and presents two specific scenarios in this appraisal.
46. Closely associated with deployment scenarios is future capital cost reductions. These are expected to decline alongside technological development; however, there is uncertainty in estimating at what level. If cost declines exceed those assumed in this analysis then the generation cost savings would be overestimated. Sensitivity analysis shows that at were low technology cost estimates to materialise over the period appraised here, a negative NPV is returned as the carbon costs from less small-scale low-carbon generation outweigh the associated resource benefit. Given the pace of cost reduction required, however, this is interpreted as a relatively low risk.
47. There is also uncertainty in estimating the value of greenhouse gas emissions associated with implementing option 1.a and option 1.b as this will depend on times of day and seasons that FIT technologies generate in. For example, if onshore wind under FIT would have generated (i.e. under option 0) at a similar time to when offshore wind under Contracts for Difference (CFD) is the marginal plant on the GB electricity grid, then the greenhouse gas impacts from closing the FIT scheme (i.e. option 1.a and option 1.b) would be zero. Whereas if a gas plant is the marginal plant there would be an increase in the cost of greenhouse gas emissions associated with closure of the FIT scheme. This level of granularity is not factored in to our analysis. The emissions factors would have to increase significantly from the central BEIS estimates for a negative NPV which gives confidence there is not a substantial risk around this uncertainty.
48. An additional area of uncertainty is the overall impact on the electricity system. The analysis has considered the impact of FIT on generation costs but at this stage it has not been possible to assess the wider impacts on the electricity system such as network, transmission and balancing costs.
49. Uncertainties have, where possible, been tested quantitatively through a broad range of sensitivity analysis. Although there are two scenarios which return a negative NPV, on balance, the sensitivity analysis indicates that there are positive economic benefits from implementing the policy decision. The non-quantified uncertainties are considered to be unlikely to be sufficient to alter this conclusion.

## Section 6: Additional impact of Option 1.b, introducing the net costs of metered export payments to levelisation

50. Levelisation is the mechanism by which the costs of the FIT scheme are apportioned across all licensed electricity suppliers according to their share of Great Britain's electricity market. Currently only the net costs of export tariffs for deemed exports<sup>21</sup> are included in the levelisation process.

<sup>21</sup> For installations below 30kW the amount exported is 'deemed' at 50% of generation for solar, wind and anaerobic digestion; and at 75% for hydro. Installations over 30kW must have an export meter.



51. The preferred policy under Option 1.b is that net metered export payments be included in the levelisation process.<sup>22</sup> These are the export payments to metered FIT generators less the value of the export to FIT licensees.<sup>23</sup> The current position is that the net costs of metered export payments are borne exclusively by the FIT licensee of each generator under metered export arrangements. FIT licenses making proportionally more metered export payments are thus currently unduly burdened. In practice, this administrative measure will not change how any payments are made to FIT generators but will ensure the costs of metered export payments are more efficiently proportioned amongst suppliers.

## **Section 7: Summary and preferred options**

52. The Government has decided to close the export tariff alongside the generation tariff. This means the scheme will close in full to new applications after 31 March 2019 subject to the time-limited extensions and grace period detailed in the Government response. The decision has also been taken to amend levelisation to include the net costs of metered exports. These decisions meet the stated objectives of reducing the cost to consumers and ensuring these costs are shared appropriately. Indeed, this analysis indicates that closure of the export tariff alongside the generation tariff would be associated with a NPV of £0.4bn to £0.6bn and ensure additional undue support costs are not levied on bill payers. The latter having been assessed quantifiably and qualitatively.

<sup>22</sup> Note that the levelisation fund consist of other scheme costs in addition to net deemed exports and generation cots. These are not discussed here.

<sup>23</sup> Consultation is seeking views on the value of metered export to be used if introduced into the levelisation process.

**Annexes**

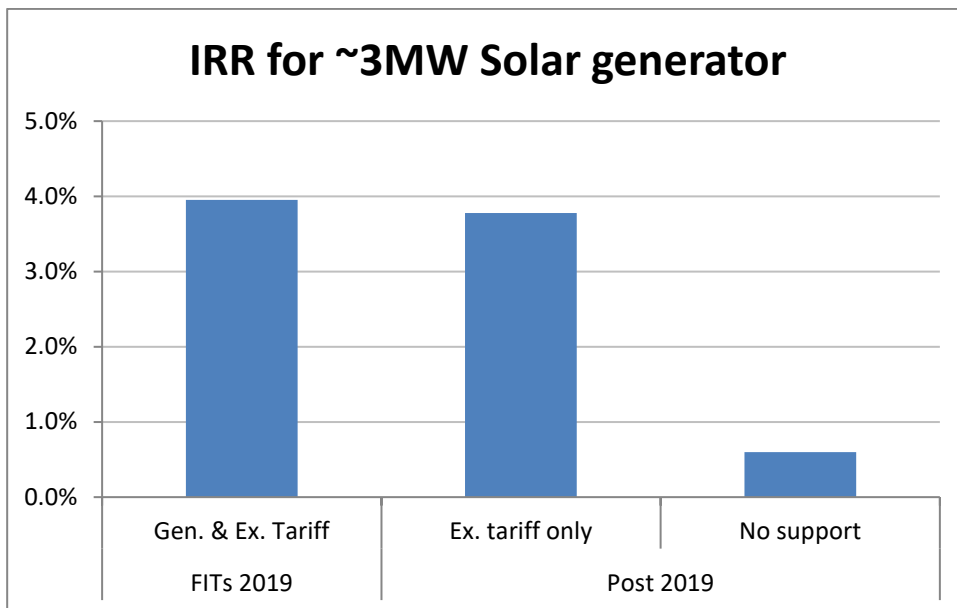
**Annex A: Internal Rate of Return (IRR) analysis**

53. The extent to which generators deploy under the baseline and policy options will depend heavily on how attractive it would be to an investor with and without FIT support. As a result, the first step taken in the choice of deployment scenarios has been to consider how the private economics for a representative generator could potentially change in the future. This assessment has considered how the IRR could change in the future following the removal of any FIT payments. Note an IRR represents the expected return on an investment in a specific generator type and size. All else being equal, a higher IRR would indicate a more profitable generator and a lower expected payback period, and therefore we would expect greater deployment of that type and size of generator.

54. This is also be considered alongside a hurdle rate – the financial return necessary for a positive investment decision– to determine if a representative project is economically viable. Hurdle rates vary by technology and are closely linked with the perceived risk to an investment. Broadly speaking an established technology that presents a lower risk to an investor would be associated with a lower hurdle rate than a less established or riskier investment. All else being equal a generator whose IRR matches a specific hurdle rate would be more likely to deploy than a generator whose IRR fell below a specific hurdle rate. Further deployment is likely to be possible for non-representative projects in particular circumstances (for example, with high onsite consumption or where pre-existing grid infrastructure can be utilised).

55. The following graph presents the IRR for a representative solar generators at the upper end of the FIT capacity limit. The impacts should be considered illustrative and many of the mechanisms in this analysis apply across the various FIT generator sizes and technologies.

**Figure 3: IRR for a representative 3MW solar**



56. The evidence presented here builds upon the evidence base set out in the 2015 FIT IA and as such should be treated as indicative. Inputs such as the avoided electricity price have been updated based upon BEIS's energy and emission projections.<sup>24</sup> Other inputs such as capex and opex are based upon the evidence base set out in the 2015 FIT IA. These were collected from industry stakeholders at the time and will have likely changed. Indeed, if the removal of support introduces greater perceived financial risk to projects there may be circumstances where hurdle rates increase.
57. Note that in some cases generators will be able to negotiate a power purchase agreement (PPA) at a value above that of the FIT export rate. However, evidence would suggest that the long term PPA market may only give revenue security for a few years, rather than revenue security over the lifetime of an asset. Thus even if the FIT export tariff is never called upon it can still provide a boost to the site specific economics of a generator by effectively working as a floor price. This analysis no longer assumes that generators receive a PPA under the no support scenario as the length of any PPA agreement is uncertain. However, if a PPA was secured, the IRR would most likely be greater than what is currently indicated.

<sup>24</sup> <https://www.gov.uk/government/collections/energy-and-emissions-projections>

## Annex B: Deployment assumptions

58. The annual capacity growth used in this assessment's deployment scenarios is set out in the following table. The unsupported-high scenario has been based on observed deployment trends under the current scheme. Specifically, applications submitted not applications granted have been used as this is assumed to be a better reflection of potential deployment volumes post 2019 if FIT continued with no caps. The unsupported-low growth assumption is based on evidence received from the 2018 consultation and is lower than in the consultation stage IA.

<b>Table 7: Annual capacity growth assumptions</b>			
	Counterfactual	"unsupported-high"	"unsupported-low"
Solar	4%	2%	0.7%
Wind	9%	5%	0.7%
Hydro	7%	3%	0.7%
AD	6%	3%	0.7%
mCHP	0.7%	0.3%	0.2%

59. Once growth rates have been applied to determine total technology deployment volumes, in additional MW per annum, this analysis takes the next step of breaking capacity between various sizes of installations. This is necessary as different size generators have different costs. Thus making a distinction between different size generators in any given technology is necessary in estimating the NPV and the potential subsidy costs. Specifically, this analysis assumes that observed averages continue in the future. The specific assumptions are outlined in the following table.

<b>Table 8: Assumed proportion of total capacity</b>		
Size	Technology	Proportion of capacity
0 - 10 kW	Solar	63%
10 to ≤ 50 kW	Solar	12%
50 kW to ≤ 5 MW	Solar	25%
<50kW	Wind	20%
50 - 1,500kW	Wind	63%
1,500 - 5000kW	Wind	17%
≤50kW	Hydro	7%
50-500kW	Hydro	31%
500-5MW	Hydro	63%
≤250kW	AD	5%
250-500kW	AD	27%
500-5MW	AD	68%

## Annex C: Energy Intensive Industries (EIs) – Policy Change and Impacts

60. As specified in the accompanying government response to the consultation on implementing an exemption for EIs for the indirect costs of the FIT scheme, Government intends to implement the exemption in Great Britain from 1 April 2019<sup>25</sup> if State aid approval is received by that date. Otherwise Government intends to implement the exemption on the first day of the first month following receipt of approval. Although the decision to implement the exemption from 1 April 2019 or as soon as possible after that point was published in July 2018, the introduction of the exemption for EIs from the indirect costs of the FIT scheme will be enacted in the same legislation as the closure of the FIT scheme.
61. The objective of changing the policy from compensation to exemption is twofold. Firstly, it ensures continued Government support for EIs in order to maintain competitiveness for these industries by providing relief from the costs they would otherwise face through their electricity bill for the FIT scheme. Secondly, it increases the effectiveness of this support, as an exemption provides real time support whereas compensation is paid in arrears, so an exemption allows production costs to be more responsive to changes in electricity use and improves the competitiveness of EIs.
62. Table 9 shows one-off costs and on-going costs and benefits for impacted groups due to moving from compensation to an exemption.

<b>Table 9</b>			
<b>Groups</b>	<b>Costs</b>		<b>Benefits</b>
	<b>One-off</b>	<b>On-going</b>	<b>On-going</b>
<b>EIs</b>	None.	None.	<p>Increased certainty from being exempt from FIT costs is intended to improve the competitiveness of exempt sectors due to lower production costs, which benefits producers and consumers of energy intensive goods.</p> <p>Increases the effectiveness of the support to EIs as it is provided in real time which in turn lowers production costs and maintains the competitiveness of EIs.</p>
<b>Non-exempt businesses</b>	None.	<p>Increase the level of FIT costs recovered through non-exempt electricity users leading to higher electricity bills.</p> <p>Increased production costs which could lead to decreased output or higher prices for</p>	None.

<sup>25</sup> For further detail, see: <https://www.gov.uk/government/consultations/implementing-an-exemption-for-energy-intensive-industries-from-the-indirect-costs-of-the-ro-and-the-fits>

		<p>goods and services produced by non-exempt businesses, or reduced demand for intermediary goods and services.</p> <p>Possible impact on decisions on employment, output and investment.</p>	
<b>Households</b>	None.	<p>Increase the level of FIT costs recovered through non-exempt electricity users leading to higher electricity bills.</p> <p>Potential risk of increase in depth of fuel poverty, however, analysis for the RO exemption found no significant impact on the number of fuel poor households. It can be assumed that as the FIT exemption is of a lower relative value, the risk of increased fuel poverty is even less likely.</p>	None.
<b>Energy suppliers</b>	Amending IT systems.	On-going administrative costs.	None.
<b>Government</b>	None.	None.	No longer have to fund and administer the compensation scheme (government resources required to administer an exemption scheme are lower than for the compensation scheme).
<b>Ofgem</b>	Amending systems.  Amending guidance.	IT  Validation of suppliers' electricity volumes.	None.