Title: **Fast-track review of Feed-in Tariffs for small scale low carbon electricity: Impact assessment accompanying Government response to consultation**	Impact Assessment (IA)
Lead department or agency: DECC	**IA No:** DECC0059
	Date: 01/06/11
	Stage: Development/Options
	Source of intervention: Domestic
Other departments or agencies:	**Type of measure:** Secondary Legislation
	Contact for enquiries: Lily Tang / Andrew Jones

Summary: Intervention and Options

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

Since the Feed-in Tariff scheme was launched in April 2010, the capital cost of solar PV has fallen substantially, with costs now approximately 30% lower than assumed at the time of scheme development. The modelling undertaken over a year ago predicted uptake of solar PV solely at the domestic scale for the first three years of the scheme and no large scale PV deployment. However, there is now evidence that uptake of large solar PV is likely to be significant if Government does not intervene to reduce tariffs. At the same time, deployment of farm-scale AD has been lower than expected, potentially as a result of higher than expected technology costs, but also due to non-tariff related reasons.

What are the policy objectives and the intended effects?

The objective of the fast track FITs review is to prevent a substantial increase in the subsidy costs of the FITs scheme as a result of unforeseen significant uptake of large scale (50kW-5MW) solar PV, including solar farms and industrial scale solar PV on rooftops. This in turn will limit the impact of the scheme on electricity bills and ensure that Government can deliver the 10% saving in 2014/15 as announced at the Spending Review. The review also looks at the reasons underlying slower than expected uptake of farm-scale AD. In addition, the tariff for AD up to 500kW will be increased to provide additional incentive for smaller AD.

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

The impacts of the 'Do-Nothing' have been assessed in this impact assessment. The fast track review proposal of reducing tariffs for large solar PV and increasing tariffs for farm-scale AD has also been assessed.

It should be noted that there is uncertainty about the impact in the Do-Nothing given the uncertainty about the level of large scale PV that might get built; there will also be inherent uncertainty on the impact of FITs on AD uptake. Estimates here do not take account of any changes that might be expected through the comprehensive review of FITs that is currently underway. The Do-Nothing case measures the cost of higher uptake of FITs by large scale solar PV and the cost of AD under current tariffs to 2020 with no assumed changes.

The analysis shows that the fast track proposal for PV and AD yields a significant positive NPV, justifying this as the preferred option.

Will the policy be reviewed? It will be reviewed. **If applicable, set review date:** 2011 **What is the basis for this review?** **If applicable, set sunset clause date:**	
Are there arrangements in place that will allow a systematic collection of monitoring information for future policy review?	Yes

SELECT SIGNATORY Sign-off For consultation stage Impact Assessments:

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 SELECT SIGNATORY: ______________________ Date: ______________

Summary: Analysis and Evidence

Fast track proposal

Description:

Price Base Year 2011	PV Base Year 2011	Time Period Years 10	Net Benefit (Present Value (PV)) (£m)		
			Low: £2.1bn	**High:£3.9bn**	**Best Estimate: £2.9bn**

COSTS (£m)	**Total Transition** (Constant Price)	Years	**Average Annual** (excl. Transition) (Constant Price)	**Total Cost** (Present Value)
Low	Optional		Optional	**Optional**
High	Optional		Optional	**Optional**
Best Estimate	n/a		£25m	**£230m**

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

The costs of the fast track proposal are in the form of 1) foregone carbon saving benefits as a result of reducing the amount of large PV deployment; and 2) the additional resource cost to the economy of enabling higher deployment of farm-scale AD.

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

BENEFITS (£m)	**Total Transition** (Constant Price)	Years	**Average Annual** (excl. Transition) (Constant Price)	**Total Benefit** (Present Value)
Low	Optional		Optional	**Optional**
High	Optional		Optional	**Optional**
Best Estimate	n/a		£375m	**£3.1bn**

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

The core benefit of the fast track proposal is the avoided resource costs associated with higher than expected uptake of large PV, together with the monetised carbon saving associated with enabling greater deployment of farm-scale AD.

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

Key non-monetised benefits include 1) the wider benefits of on-farm AD such as reduced methane and N20 emissions and 2) the prevention of significant sums of 'available FITs spend' being diverted away (as a result of higher than expected uptake of large PV) from more cost effective FIT technologies and/or from smaller scale installations which provide wider benefits of consumer engagement and behavioural change.

Key assumptions/sensitivities/risks **Discount rate (%)**

Assumptions on technology costs and potential deployment rates have been taken from a range of sources including industry and other stakeholders, independent research and evidence from the current FITs model. It should be noted that there will be an inherent level of uncertainty in estimating uptake and hence costs under the Feed-in Tariffs given that it is a demand-led scheme. There is uncertainty in particular over the level of large scale PV that might be incentivised and the impact of new tariffs on AD. The Do Nothing case gives the cost of large scale PV and AD on the assumption that there has not been any change in tariffs, but using higher than anticipated estimates of uptake for PV. It does not pre-empt any conclusions from the comprehensive review of FITs that is now underway.

Direct impact on business (Equivalent Annual) £m):			**In scope of OIOO?**	**Measure qualifies as**
Costs:	**Benefits:**	**Net:**	No	NA

Enforcement, Implementation and Wider Impacts

What is the geographic coverage of the policy/option?			Great Britain		
From what date will the policy be implemented?			01/08/2011		
Which organisation(s) will enforce the policy?			Ofgem		
What is the annual change in enforcement cost (£m)?			Unknown		
Does enforcement comply with Hampton principles?			Yes		
Does implementation go beyond minimum EU requirements?			Yes		
What is the CO_2 equivalent change in greenhouse gas emissions? (Million tonnes CO_2 equivalent)			**Traded:** -10Mt to 2020	**Non-traded:** n/a	
Does the proposal have an impact on competition?			No		
What proportion (%) of Total PV costs/benefits is directly attributable to primary legislation, if applicable?			**Costs:**	**Benefits:**	
Distribution of annual cost (%) by organisation size (excl. Transition) (Constant Price)	**Micro**	**< 20**	**Small**	**Medium**	**Large**
Are any of these organisations exempt?	Yes	Yes	No	No	No

Specific Impact Tests: Checklist

Set out in the table below where information on any SITs undertaken as part of the analysis of the policy options can be found in the evidence base. For guidance on how to complete each test, double-click on the link for the guidance provided by the relevant department.

Please note this checklist is not intended to list each and every statutory consideration that departments should take into account when deciding which policy option to follow. It is the responsibility of departments to make sure that their duties are complied with.

Does your policy option/proposal have an impact on…?	Impact	Page ref within IA
Statutory equality duties[1] Statutory Equality Duties Impact Test guidance	No	
Economic impacts		
Competition Competition Assessment Impact Test guidance	No	
Small firms Small Firms Impact Test guidance	No	
Environmental impacts		
Greenhouse gas assessment Greenhouse Gas Assessment Impact Test guidance	No	
Wider environmental issues Wider Environmental Issues Impact Test guidance	No	
Social impacts		
Health and well-being Health and Well-being Impact Test guidance	No	
Human rights Human Rights Impact Test guidance	No	
Justice system Justice Impact Test guidance	No	
Rural proofing Rural Proofing Impact Test guidance	No	
Sustainable development Sustainable Development Impact Test guidance	No	

The Final Impact Assessment for the Fast Track Review will consider further whether any of the above impacts are expected to arise as a result of the fast track proposals.

[1] Public bodies including Whitehall departments are required to consider the impact of their policies and measures on race, disability and gender. It is intended to extend this consideration requirement under the Equality Act 2010 to cover age, sexual orientation, religion or belief and gender reassignment from April 2011 (to Great Britain only). The Toolkit provides advice on statutory equality duties for public authorities with a remit in Northern Ireland.

Evidence Base (for summary sheets) – Notes

Use this space to set out the relevant references, evidence, analysis and detailed narrative from which you have generated your policy options or proposal. Please fill in **References** section.

References

Include the links to relevant legislation and publications, such as public impact assessments of earlier stages (e.g. Consultation, Final, Enactment) and those of the matching IN or OUTs measures.

No.	Legislation or publication
1	http://www.decc.gov.uk/en/content/cms/consultations/elec_financial/elec_financial.aspx
2	http://www.decc.gov.uk/en/content/cms/consultations/fit_review/fit_review.aspx
3	
4	

+ Add another row

Evidence Base

Ensure that the information in this section provides clear evidence of the information provided in the summary pages of this form (recommended maximum of 30 pages). Complete the **Annual profile of monetised costs and benefits** (transition and recurring) below over the life of the preferred policy (use the spreadsheet attached if the period is longer than 10 years).

The spreadsheet also contains an emission changes table that you will need to fill in if your measure has an impact on greenhouse gas emissions.

Annual profile of monetised costs and benefits* - (£2011m, discounted to 2011)

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Transition costs	0	0	0	0	0	0	0	0	0	0
Annual recurring cost	<5	<5	5	5	10	20	30	40	55	60
Total annual costs	<5	<5	5	5	10	20	30	40	55	60
Transition benefits	0	0	0	0	0	0	0	0	0	0
Annual recurring benefits	15	40	80	125	195	310	455	555	635	700
Total annual benefits	15	40	80	125	195	310	455	555	635	700

* For non-monetised benefits please see summary pages and main evidence base section

*Figures in the table are rounded.

Evidence Base (for summary sheets)

Having taken the views of respondents to the Fast Track review consultation into consideration, the Government considers that these reinforce concerns set out in the consultation paper about likely deployment of solar PV and anaerobic digestion. We will therefore proceed with amendments to the license conditions to implement the tariffs proposed for solar PV above 50kW (and ground mount schemes) and anaerobic digestion up to 500kW as set out in the consultation document.

<u>**As a result, the analysis in this Impact Assessment is unchanged from that published alongside the consultation document although we have updated some of the supporting evidence to reflect new information since publishing the consultation.**</u>

A. Strategic overview

1. A new system of feed-in tariffs (FITs) was introduced in Great Britain on 1 April 2010 to incentivise small scale (up to 5MW), low carbon electricity generation. These FITs work alongside the Renewables Obligation (RO), which is the primary mechanism to incentivise deployment of large-scale renewable electricity generation, and the Renewable Heat Incentive (RHI) which will incentivise generation of heat from renewable sources.

2. FITs are intended to encourage deployment of additional low carbon electricity generation, particularly by organisations, businesses, communities and individuals who are not traditionally engaged in the electricity market. This is on the basis that many people will be able to invest in small scale low carbon electricity, in return for the guaranteed payment provided by FITs - both for the electricity they generate and the electricity that they export.

3. On 7 February 2011, the Secretary of State for Energy and Climate Change announced the start of the first comprehensive review of the FITs scheme for small scale low carbon electricity generation. As confirmed by the Spending Review in October 2010, the review will determine how the efficiency of FITs will be improved to deliver £40 million of savings, around 10%, in 2014/15. The comprehensive review will consider all aspects of the scheme including:

    a. Tariff levels
    b. Degression rates and methods
    c. Eligible technologies
    d. Arrangements for exports
    e. Administrative and regulatory arrangements
    f. Interaction with other policies
    g. Accreditation and certification issues

4. The intention is that the comprehensive review will be completed by the end of 2011, with tariffs remaining unchanged until April 2012 (unless the review reveals a need for greater urgency).

5. The Secretary of State's announcement also confirmed that the review will include fast-track consideration of large scale solar photovoltaic (PV) projects (over 50kW) with a view to making any resulting changes to tariffs as soon as practical, subject to

consultation and Parliamentary scrutiny as required by the Energy Act 2008. And that, alongside the fast track review of large scale solar PV, a short study would be taken into the take-up of FITs for Anaerobic Digestion (AD) plants of up to 500kW (referred to hereafter as "farm-scale" plant). A consultation on proposals to reduce tariffs for large scale PV and increase tariffs for farm-scale AD was published on 18 March 2011 and closed on 6 May 2011. **This Impact Assessment focuses on the fast-track review of FITs for large-scale solar PV (over 50kW) and farm-scale AD plants (up to 500kW) and the outcome of the consultation exercise on this.**

B. Problem under consideration

6. As the Secretary of State's announcement on the FITs review made clear, it is crucial that we take a more responsible and efficient approach to public subsidy to ensure that consumers receive value for money. Last year's spending review, made clear for the first time that there are clear spending parameters within which the FITs scheme must operate and the need to make 10% savings in 2014/15 (£40 million). Further details on how the costs of the FITs scheme are managed via the Levy Control Framework can be found on the HMT website[1].

7. We are already aware of evidence suggesting that there is a real risk that uptake of FITs could soon exceed expectations. In particular, the deployment of large scale solar PV projects was not fully anticipated at the outset of the FITs scheme until 2013. This higher than expected deployment could push FITs uptake considerably above trajectory, make the Spending Review savings difficult to achieve, and substantially reduce the amount of money available to smaller PV installations and other FIT technologies. The unanticipated prospect of large-scale solar seems to have been driven by the costs of solar PV falling much faster than anticipated. The global investment in production, in response to previously high prices, has brought far lower prices. Emerging evidence earlier this year suggested that PV system costs are now approximately 30% lower than assumed in the original FITs modelling. Because of these concerns, February's announcement confirmed that the review would include fast-track consideration of large scale solar projects (over 50kW). Responses to the consultation confirmed that costs have fallen considerably, though few respondents provided actual evidence on current capital costs for large scale solar. Of the data that was provided, some mentioned higher/lower capital costs than the £2,800/kW estimate used in this impact assessment, whilst others confirmed the £2,800 figure.

8. Furthermore, there is evidence to suggest that the current tariffs for Anaerobic Digestion (AD) installations of up to 500kW, often described as "farm-scale" AD, are set too low and are not incentivising uptake and the associated benefits of AD. Consultation responses confirm this assessment. The current tariffs for farm-scale AD are 12.1p/kWh, and 9.4p/kWh for installations above 500kW (which would be expected to include larger, food waste based plants). The higher tariff for farm-scale AD was intended to reflect the higher costs that would be incurred by these generators. The tariffs were intended to deliver returns at the top end of the 5-8% return on capital envisaged for FITs. This reflected the higher assumed hurdle rates for investors in AD arising, for example, from the long lead in times, requirements for planning permission and grid connection. This was in contrast with the relative simplicity of deploying other FIT technologies such as solar PV.

9. The fast-track consultation sought views on proposed changes to tariffs designed to address these concerns. This Impact Assessment considers the costs and benefits of the tariffs announced in the Government response to the consultation.

[1] see http://hm-treasury.gov.uk/psr_controlframework_decc.htm

C. Rationale for intervention

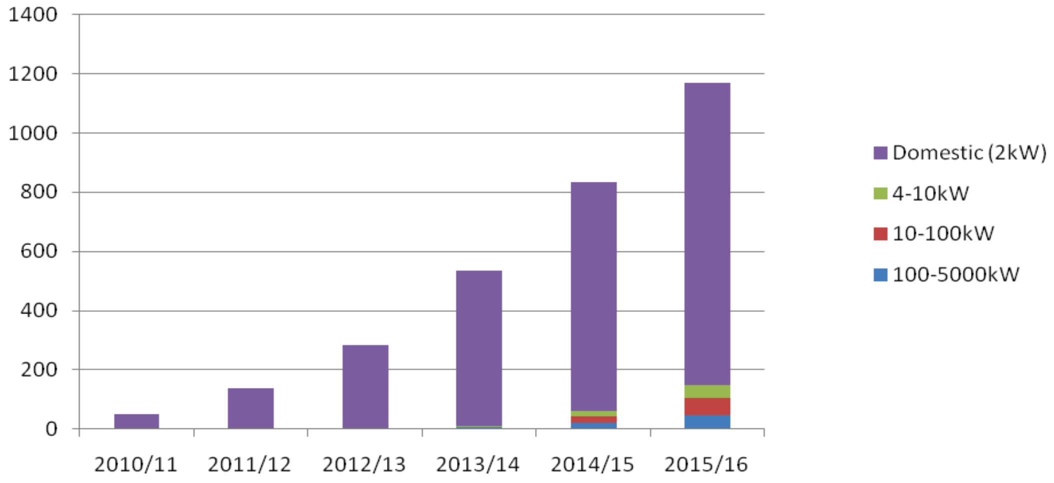
<u>Solar PV</u>

10. From its establishment in April 2010, the FITs scheme was intended to encourage deployment of additional small scale low carbon electricity generation, particularly by individuals, householders, organisations, businesses and communities who have not traditionally engaged in the electricity market. For these investors, delivering a mechanism which is easier to understand and more predictable than the Renewables Obligation, as well as delivering additional support required to incentivise smaller scale and more expensive technologies, were the main drivers behind the development of this policy.

11. In choosing the range of technologies supported by FITs, the focus was on small-scale low-carbon electricity with the primary intention of supporting the widespread deployment of proven technologies now and up to 2020, rather than to support development of unproven technologies. PV was seen as a well developed technology that could be deployed at scale in domestic, community and small business settings. While it is a relatively high cost technology, it has broad public acceptance, can be easily incorporated into the built environment and generally does not require expensive grid connection or reinforcement costs. PV was also seen as having the potential for significant cost reductions in the future, something that has already proved to be the case since the start of the FITs scheme.

12. The expected rates of return for the tariffs were set with all of these factors in mind. The tariffs for solar PV were set to provide a 5% rate of return on capital, which would be expected to provide reasonable returns to householders and small businesses who were interested in generating their own electricity, but not to provide sufficient incentive for speculative investors. The modelling undertaken prior to the start of the FITs scheme projected that the vast majority of PV incentivised by FITs would be at the domestic or small scale and did not predict any solar PV above 10kW in the early years of the scheme. This is shown by the figure below.

Cumulative MW uptake of PV (as projected prior to start of FITs)



Number of PV FIT installations above 10kW, as at 31st March 2011[2]

PV capacity	Projected	Actual
10-100kW [Of which 50-100kW]	0	104 5
100kW-5MW	0	1
Stand alone	0	42
Total	0	147

13. There is already growing evidence of installations which were not foreseen by the DECC modelling undertaken prior to the start of the scheme. As the table above shows, in the first year of the FITs scheme these included 104 PV installations of between 10kW and 100kW, 5 of which are above 50kW, there was also one additional installation above 100kW. There is though also evidence of many more large scale installations in the planning pipeline, which paints a picture of solar PV uptake under FITs that could rapidly exceed expectations.

14. This is why February's announcement confirmed that all PV over 50kW was in the scope of the fast-track review. 50kW is the threshold used in the statutory definition of Microgeneration. It is also the threshold for Permitted Development Rights for domestic PV i.e. domestic PV installations above 50kW will need to apply for planning permission. A variety of types of installation will be within the 50kW to 5MW range. At the smaller end of this scale, installations could include installations on community buildings such as schools or hospitals. At the larger end of this scale are large solar "farms" of anything from 250kW up to 5MW.

15. Evidence from the planning system underpins the concerns about solar PV at the larger end of the scale. Data obtained from various local planning authority databases suggests that approximately 40 ground-mounted solar PV projects (with a combined installed capacity of around 150MW, at a cost of around £260,000 per annum per MW at current tariffs) have already obtained planning permission. A further 100MW is pending planning permission – so a total of around 250MW of large scale solar is in the planning system. This is greater than the 169MW that was estimated to be in the planning system at the time of the consultation impact assessment.

16. These estimates have been compiled from published industry sources and are subject to the caveat that there will be an inherent level of uncertainty in uptake given that estimates may represent intentions and aspirations of market participants rather than actual uptake projections. There is also uncertainty as to the number of proposed schemes that would ultimately obtain financing, as well as planning and grid connection.

17. Whilst there is not currently precise pipeline information, even the existence of the expectations summarised above, together with the evidence from the planning system, points to a market that is at risk of overheating. This in turn suggests that there may be a number of factors that have changed since the original DECC modelling undertaken prior to the start of the FITs scheme. These may include:-

    a. technology costs that are lower, or that are reducing more quickly than modelled;
    b. economies of scale for larger installations that are greater than modelled;

[2] Installations transferred from the RO onto the Exgen (9p/kWh) tariff are excluded.

c. lower hurdle rates of return for large scale FITs development than modelled, e.g. driven by financing strategies; and/or

d. changes in economic circumstances that may favour the security of FITs investment over alternatives.

18. It is likely that all of these factors may be relevant. Indeed, factors such as falling technology costs appear to have prompted widely reported reductions in tariffs for PV elsewhere in Europe. For example, Germany, France, Spain, Italy and Belgium have all announced reductions in tariffs for solar PV in the last year.[3] Responses to the consultation also suggest that falling technology costs are the principal factor for higher than envisaged uptake of large scale solar.

19. Taken together, the risk of rapid expansion of large scale PV over the next few years could have a significant impact on whether the FITs scheme as a whole is able to deliver the savings committed to as part of the 2010 Spending Review and operate within the spending constraints that the Spending Review confirmed. This trend could potentially draw funding from other technologies and scales of generation, such as community and domestic installations, and undermine the value for money of the scheme as a whole.

AD

20. The rationale for the consultation proposals on AD were based on lower than envisaged uptake of farm-scale AD to date. At the end of the first year of the FITs scheme only 3 AD installations were accredited for FITs. One of these was a late transfer from the Renewables Obligation. Whilst we understand that both of the other two installations were on farms, only one of them was under 500kW (the current tariff band designed specifically with farm-based AD installations in mind). This is less than the uptake of farm-scale AD installations projected in the original FITs modelling (of around 5 to 10 plants below 500kW in 2010/11).

21. Uptake of AD is important as it can play a key part in delivering a zero waste to landfill society, one in which we reduce the amount of waste that we produce and reuse, recycle and produce energy from as much as possible. AD can play a key part in that strategy. Its ability to process wastes such as those from food production, animal husbandry and sewage treatment means that it can be used to deal with local and community waste management problems as well as producing renewable energy for local and community use. In addition, AD can bring further climate change benefits by capturing the methane normally produced when these wastes decay.

22. Use of AD on-farm also delivers further benefits: The digestate produced as a bi-product of the process, can provide a direct replacement to fertilizers, so helping to conserve critical resources such as phosphorus as well as reducing reliance on fertilizers requiring fossil fuels for their production. This brings benefits in terms of manure management and the control of diffuse water pollution. Compared to the raw slurry or manure, the AD process also reduces bacterial (including pathogen) numbers in the digestate.

C. Objectives

[3] See for example, p.319 of the International Energy Agency's "World Energy Outlook 2010" which is available from www.iea.org

23. The primary objective for the FITs fast-track review of large-scale PV is to ensure that DECC is able stay within the SR envelope for FITs spend. By way of illustration, the £40 million annual savings that the FITs scheme is required to deliver as a result of the 2010 Spending Review, would be cancelled out by around 150MW of large scale solar or only around 30 installations at the maximum capacity of 5MW. There is already around 250MW in the planning system (i.e. both schemes which have applied for planning permission, and those which have received planning permission). The objective is therefore to reduce long term pressure on FITs costs through higher than anticipated uptake of large scale solar PV, and to allow DECC to keep its commitment in the 2010 Spending Review that the FITs scheme will save £40 million in 2014/15.

24. This will reduce the risk of large scale PV potentially diverting funding away from community and domestic installations, and more cost-effective technologies currently supported under the FITs.

25. The fast track review is also intended to address the slower than expected uptake of farm-scale AD.

D. Options under consideration

26. Our analysis considers a Do-Nothing scenario, i.e. no fast-track review. The comprehensive review of FITs will be subject to a separate consultation and is due to be completed by the end of the year, with tariffs remaining unchanged until April 2012 (unless the review reveals a need for greater urgency). The other option considered is one fast-track review scenario consisting of adjusting the tariffs for large-scale solar PV and farm-scale AD. Our chosen/preferred scenario is policy option 2 i.e. introducing the fast-track review proposals.

Option 1: Do Nothing

27. The Do-Nothing scenario involves leaving tariffs unchanged for large scale (50kW-5MW) solar PV. The Do-Nothing also involves leaving tariffs unchanged for farm-scale (up to 500kW) AD. Table 1 below sets out the current generation tariffs for large PV and for farm-scale AD.

Table 1 – Unchanged tariffs for 2011/12

Do-Nothing			
PV		**AD**	
Scale	Tariff p/kWh	Scale	Tariff p/kWh
10-100kW	32.9	Up to 500kW	12.1
100kW-5MW	30.7		
Stand alone	30.7		

NB: Tariffs are for 2011/12 and are expressed in 2011/12 prices (as also published by Ofgem; please see: http://www.ofgem.gov.uk/Pages/MoreInformation.aspx?docid=16&refer=Sustainability/Environment/fits). These tariffs are equivalent to the 2010/11 tariffs in real terms. Installations also receive a 3.1p/kWh export tariff for any electricity exported back to the grid (in 2011/12 prices, equivalent to the 3p export tariff in 2010/11).

Tariffs for solar PV are assumed to degress at 8.5% per annum from 2012/13 till 2014/15 and then degress at 9% per annum from 2015/16 till 2020/21.

28. The costs and benefits of the Do-Nothing Option are set out in section E below.

29. It should be noted that the Do-Nothing scenario does not make any assumptions on what changes may be made to the scheme as a result of the Comprehensive FITs review i.e. this IA only assesses costs and benefits in relation to the fast track review.

Option 2: Fast Track Review

30. The fast track review will reduce the generation tariff for large scale (50kW-5MW) solar PV in order to reflect recent significant reductions in the capital cost of the technology and also involves a change to the tariff bands compared to the current tariff bands.

31. The new tariffs aim to provide an approximate 5% rate of return on capital for PV in the 50kW to 150kW band, and reduces support for 250kW to 5MW and stand alone PV installations to a level consistent with that for offshore wind under the RO. The tariff for 150kW-250kW installations is set to provide a smooth transition between these two tariff bands. The new tariff bands and generation tariff levels are set out in Table 2 below.

32. The fast track review will also marginally increase the generation tariff for farm-scale AD in the light of evidence that the current tariff is not providing the envisaged return on capital for these smaller, farm-scale installations. This also involves a change to the tariff bands compared to the current tariff bands

Table 2 – Tariff levels and tariff bands for 2011/12 under fast track review

Fast Track Proposal			
PV		AD	
Scale	Tariff p/kWh	Scale	Tariff p/kWh
50-150kW	19.0	Up to 250kW	14.0
150kW-250kW	15.0	250kW-500kW	13.0
250kW-5MW	8.5		
Stand alone	8.5		

NB: Tariffs are for 2011/12 and are expressed in 2011/12 prices; it should be noted that the 8.5p/kWh tariff for 250kW-5MW and stand alone solar PV plants is presented on the basis of ROC and LEC values expressed in 2010/11 prices. Installations also receive a 3.1p/kWh export tariff for any electricity exported back to the grid (in 2011/12 prices, equivalent to the 3p export tariff in 2010/11).

Degression will continue to apply to the 50kW-150kW and 150kW-250kW bands from April 2012 at the same rate as applies to other solar PV installations; the 250kW-5MW and stand-alone installations band will remain constant at 8.5p in real terms. Tariffs will be subject to annual adjustment to reflect changes in the RPI. However, it should be noted that all tariffs for installations entering the scheme after the planned comprehensive review will be subject to any revised tariffs introduced at that review.

33. The costs and benefits of these changes are set out in section E below.

34. All PV installations above 250 kW and stand-alone installations will receive a generation tariff which is broadly equivalent, in terms of financial support per unit energy output, to the level allocated to what is currently considered to be the marginal cost effective

technology required to deliver the UK's 15% renewable target, offshore wind. This results in a support level of 8.5p/kWh[4].

35. Whilst we consider that there is a case for reducing the level of support for all new PV installations above 50kW, we recognise that there is a distinction to be made between large industrial scale solar farms and large building integrated systems that could for example be installed on schools and hospitals. Therefore, we will introduce a further two new tariff bands for PV installations (i) between 50kW and 150kW, and (ii) between 150kW and 250kW. From the evidence received from the consultation, the majority of community, public and small industrial buildings are below 150kW.

36. The generation tariffs for these bands will be 19p/kWh and 15p/kWh respectively. The 19p/kWh tariff is based on emerging evidence of a steep drop in PV capital costs of around 30% from levels assumed in the original FITs modelling from both industry sources and from research undertaken by Mott Macdonald for the Committee on Climate Change[5]. The 19p/kWh tariff aims to provide an approximate 5% rate of return on capital for well sited installations between 50kW and 150kW. The 15p/kWh tariff for 150kW-250kW installations aims to provide a smooth transition between the 19p/kWh and 8.5p/kWh tariffs. A detailed explanation of the tariff setting methodology is provided at Annex 2.

37. Relatively few respondents to the fast track consultation provided evidence on solar PV capital costs for installations in the 50kW to150kW band. However, the £2,800/kW capital cost figure used to calculate the 19p/kWh tariff[6] falls within the range of cost data received (some respondents to the consultation mentioned lower/higher capital cost figures, whilst others corroborated the £2,800/kW figure for plant between 50kW and 150kW). Given that the main driver for reducing tariffs is the steep fall in capital costs, and given that the £2,800/kW capital cost figure falls within the range of data received from the consultation, there is no immediate evidence to suggest that the 19p/kWh tariff should be increased in order to provide an approximate 5% rate of return on capital for well sited installations in the 50kW to 150kW tariff band.

38. Evidence on the slower than expected uptake for farm-scale AD has been wide and varied. Reasons put forward by industry for lack of deployment range from current tariffs being insufficient to deliver a 5-8% return on capital, to wider issues (many of which aren't related to FITs) such as difficulties in accessing capital (because AD is still not well understood and is seen as a relatively 'risky' technology e.g. compared to PV). These views have been confirmed by feedback received from the consultation. It should be noted that the fast-track review of FITs and this Impact Assessment only focuses on the FITs issues. The wider issues are being considered through work on a joint industry/Government AD strategy and it is expected that information/evidence gathered from this will feed into the comprehensive review.

39. Since the start of the FITs scheme, the most frequently cited explanation for the current farm-scale AD tariffs not delivering a 5-8% return have centred on the original FITs modelling not accounting for the cost of energy crops as a feedstock. However more recent evidence from industry suggests that current tariffs may be too low because the original modelling underestimated the extent of capital and operating costs. Given that the range of evidence that we have received over recent months, including through consultation responses, has been varied, this suggests that there still remains a high

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[4] This is based on the assumptions of average expected ROC prices of approximately £40.69 and LEC value of approximately £5/MWh (all in 2010/2011 prices).

[5] May 2011, Committee on Climate Change, 'Costs of low-carbon generation technologies': http://www.theccc.org.uk/reports/renewable-energy-review

[6] See Annex 2 for detailed tariff setting methodology.

level of uncertainty over why uptake of farm-scale AD has been lower than expected. Part of the explanation for low uptake does appear to be related to tariffs being ‘insufficient’ to deliver an 8% return on capital. This is particularly the case for very small plant i.e. plant below 250kW, which have relatively higher capital costs (in £/kW terms) than larger plant The fast-track review will therefore split the current tariff band for ‘farm-scale’ AD into two separate bands, with a tariff of 13p/kWh for 250kW-500kW plants and a slightly higher tariff of 14p/kWh for plants up to 250kW (the proposed bandings and tariff levels should better target support accordingly to technology scale – with smaller plants requiring a higher p/kWh tariff to yield any given rate of return). The small additional tariff for small scale AD is intended to provide a small additional incentive for smaller AD. We consider that this adjustment is justified on the basis of the evidence we have seen to date that an increase to the tariffs is needed; and is cautious enough given the wide variety of evidence that has been received to date, including feedback received from the consultation which suggests that there are wider issues at play that may be affecting uptake (e.g. planning and permitting, access to capital, and feedstock supply). In the meantime, we will continue to monitor take-up of AD and will use the comprehensive review of FITs to further explore any other reasons for the apparent underperformance of the tariffs for farm-scale AD to date.

E. Costs and benefits: PV

(i) Do nothing

<u>Methodology – Large scale solar PV</u>

40. Two sources of information were used to estimate the level of deployment of large scale solar PV under FITs for the Do-nothing scenario:

    a. Industry estimates of large solar PV uptake, which are based on market information of what is currently in the pipeline, have been used to provide one set of estimates for this IA. The industry estimates were provided to DECC on the basis of current PV tariffs and current PV costs. The estimated uptake is higher than the levels projected under the original FITs modelling, and expected higher uptake has also been reinforced by consultation responses.

    b. Estimates of large PV uptake from the FITs model, based on current PV tariffs but adjusted to take account of new information on PV costs, have been used to provide a second set of estimations for this IA.

    Both estimation methodologies have their pros and cons as explained below, but using both approaches ensures that a robust range of estimates is provided, which reflects the uncertainty behind the assumptions.

41. The industry estimates are short term estimates of uptake until 2013 only (provided to DECC on the basis of current tariffs and current costs) – industry also provided DECC with an indicative figure for 2020. DECC has interpolated these figures to estimate annual uptake. These projections together with preliminary PV cost data received from industry sources and Mott Macdonald are then combined to produce overall cost/benefit estimates.

42. The FITs model has a fixed set of tariff bands, capturing the following installation sizes for large PV:

New build 10–100kW

Retrofit 10–100kW

New build 100–5000kW

Retrofit 100–5000kW

Stand alone system

43. This means that it has not been possible to precisely model the uptake and cost implications of a 30% reduction in costs for all >50kW installations. Instead we have modelled 2 cases, which should provide the range within which costs are expected to lie:

(1) 30% reduction in capex for all installations between 10kW and 5MW

(2) 30% reduction in capex for all installations between 100kW and 5MW

44. We have also changed the constraints within the model to provide a maximum estimate of the cost of large PV – this 'unconstrained scenario' loosens the constraints on PV build, resulting in significantly higher uptake (also shown in the table below). Without altering the constraints in the model, uptake would be lower. The range of results from the model are given in the tables below – the lower end of the range is from a constrained run, assuming a 30% reduction in capex for installations of 100kW to 5MW and the latter is an unconstrained run, assuming a 30% reduction in capex for all >10kW installations.

45. Table 3 below gives the potential range of estimates of cumulative PV uptake to 2014 under the different assumptions and also provides a figure in 2020, although estimated potential uptake for the second half of the decade will be particularly uncertain.

Table 3: Cumulative large PV MW uptake under current tariffs

	2011	2012	2013	2014	**2020**
Large scale PV only					
FITs central run *Large scale PV*	0	0	5	40	175
Industry estimate *Large scale PV* *(Buildings, Fields)*	230	620	1,115	*1,470*	*8,145*
Fits Model constrained/unconstrained range *Large scale PV*	110 to 155	235 to 325	445 to 610	815 to 1,095	7,540 to 11,380

Note 1: Figures in the table are rounded.

Note 2: This Impact Assessment only considers higher uptake of large scale solar PV. There could also be similarly higher than expected uptake of small solar PV as a result of the recent fall in solar system costs. PV below 50kW, together with all other elements of the FITs scheme, will be considered as part of the comprehensive review of FITs.

Note 3: Industry figures have been provided to 2013 and an indicative figure for 2020 also provided. DECC has interpolated these figures to estimate annual uptake.

Estimated costs and benefits

46. Estimates of the cost to consumers of large scale solar PV uptake under the 'Do-Nothing' option, based on the uptake assumptions above, are provided in Table 4 below. The table shows higher costs than those estimated for the *Impact Assessment of Feed-in Tariffs for Small-Scale, Low Carbon, Electricity Generation* (Feb 2010) (e.g. zero costs for

large PV were estimated under the previous IA because projected uptake was purely at the domestic scale - large scale PV uptake under the original IA is shown in Table 3 above {FITs central run}). Table 4 includes a range of costs from the FITs model based on assumptions explained in paragraphs 42 and 43 above. Estimated consumer costs under the industry uptake projections are also very significant and lie above the FITs model estimates for 2012 and 2013, but are within the range of the FITs model estimates in later years.

47. It needs to be noted that the evidence of falling PV costs means that there is also a risk of higher than anticipated uptake of small scale solar PV (i.e. below 50kW). However, this is outside the scope of this fast-track review but will be considered as part of the comprehensive FITs review.

Table 4: Solar PV costs to consumers under current tariffs (£m, 2011 prices, discounted to 2011)

	2011	2012	2013	2014	**2020**
Large scale PV only					
Costs based on industry uptake estimates *Large scale PV (Buildings, Fields)*	35	90	155	*195*	*890*
Fits Model constrained/unconstrained range *Large scale PV*	25 to 40	55 to 75	95 to 130	155 to 215	805 to 1,225

Note 1: Figures in the table are rounded

Note 2: a) FITs model costs are presented in net terms i.e. net of the value of electricity exported back to the grid; and b) costs are additional-to-BAU, where BAU impacts are impacts that would occur in the absence of FITs (i.e. under the RO). Subsidy costs are equivalent to the ONS definition of tax and spend.

Further costs and benefit considerations for large scale solar PV

48. In view of the high potential cost impact of large-scale solar PV and the associated risk that this could absorb a high proportion of funding from the FITs scheme as a whole, it is important to consider whether there is a wider policy justification for including support for these installations in the FITs scheme.

49. The primary focus of the FITs scheme is on non-energy professionals, especially householders and communities. This was reflected in the Impact Assessment supporting the introduction of FITs scheme which described the objectives of the scheme as being to "drive uptake of a range of small-scale low carbon electricity technologies by a range of target groups in order to deliver a higher rate of deployment; and to pursue broader aims of engaging the general public in low carbon electricity generation. This will enable broad participation of individuals and communities, as well as energy professionals, in the big energy shift to a low carbon economy."

50. Solar PV is one of the more costly technologies supported by FITs. Consequently, the broader engagement aims described above are particularly important in justifying support for PV under FITs in the first place. These benefits are more likely to arise at the domestic and community scale and to become less discernible as installations become larger, more commercial and more remote from individuals and communities.

51. Additionally, at the non-microgeneration scale, the other benefits of FITs such as simple deployment without the need for expensive grid connection costs, are less apparent.

Therefore, even though it is true that large scale PV can offer economies of scale and performs better in pure terms of cost effectiveness than PV at the microgeneration scale, it is generally considered to be less effective at delivering the wider benefits.

52. Another range of advantages cited for FITs include the technology and cost-reduction effects of deploying at scale, and the associated opportunities for jobs in manufacturing and installation. It can be argued that the demand for panels and installation expertise for large scale installations will lead to enhanced industrial capacity in the UK, a more mature market for imports, and lower costs. Developers at all scales would benefit from these. We consider however, that the industry expansion that would flow from domestic and community scale alone would deliver these benefits. There is also a limited range of skills that could be transferred from the large industrial-scale installations to the domestic scale where the individual installations are smaller by a factor of 2000 or more.

53. All in all, whilst supporting large scale solar PV through FITs does have benefits, these benefits would be lessened if delivering them meant distorting funding away from microgeneration PV, which is better placed to deliver the broader aims of FITs; and other FIT technologies which can produce renewable electricity more cost effectively.

Methodology – Anaerobic Digestion (AD)

54. We have used two methodologies/data sources to estimate the deployment of AD under FITs:

    a. Estimates of farm-scale (up to 500kW) AD uptake from the original FITs modelling, based on current FITs tariffs have been used to estimate Do-Nothing impacts. We have also used the FITs model to estimate lower bound impacts of the fast track proposal.

    b. Industry have provided initial high level projections for farm-scale (up to 500kW) AD uptake to 2014. These uptake projections are higher than those assumed under the original FIT modelling given that the figures have been provided to DECC based on tariffs being increased 'sufficiently' to drive investment. These figures have been used to estimate upper bound impacts of the fast track proposal.

55. As for solar PV, the industry estimates are short term estimates of potential uptake over the next few years – therefore an assumption has been made to extrapolate uptake out to 2020.

56. Table 5 below shows estimates of potential cumulative MW of AD uptake to 2014 under the "Do-Nothing" option and a cumulative total in 2020 using the FITs model central projections. The rounded up uptake figure for 2011 might imply a slight overestimate of uptake given evidence of AD installations currently in the pipeline. The model central projection has been used in the absence of alternative evidence on uptake over the next ten years under the Do-Nothing.

Table 5: Cumulative AD MW uptake under current tariffs

	2011	2012	2013	2014	**2020**
FITs central run *AD*	5	5	10	15	50

Note 1: Figures in the table are rounded.

Note 2: Uptake figures are additional-to-BAU, where BAU impacts are impacts that would occur in the absence of FITs (i.e. under the RO).

Estimated costs and benefits

57. The cost to consumers of AD uptake under the 'Do-Nothing' option, based on the uptake assumptions under the original FITs modelling, is provided in Table 6 below. As uptake is the same as estimated for the Impact Assessment of Feed-in Tariffs for Small-Scale, Low Carbon, Electricity Generation (Feb 2010), costs to consumers are also unchanged.

Table 6: AD costs to consumers under current tariffs (£m, 2011 prices, discounted to 2011)

	2011	2012	2013	2014	**2020**
FITs central run *AD*	5	5	10	10	30

Note 1: Figures in the table are rounded.

Note 2: a) FITs model costs are presented in net terms i.e. net of the value of electricity exported back to the grid; and b) costs are additional-to-BAU, where BAU impacts are impacts that would occur in the absence of FITs (i.e. under the RO). Subsidy costs are equivalent to the ONS definition of tax and spend.

(ii) Fast-track review

Methodology – Large scale solar PV

58. Under Option 2, it is proposed that tariffs for solar PV should be reduced as follows (please also refer to Table 2 above):

- 19p/kWh for 50kW to 150kW
- 15p/kWh for 150kW to 250kW and
- 8.5p/kWh for 250kW to 5MW

59. The impact of these reductions in tariffs have been estimated using 2 data sources, as explained above:

    a. Estimates of large scale PV in the pipeline provided by industry;

    b. Estimates from the FITs model.

60. Again there are pros and cons of each approach. The data from industry sources is based on uptake assuming current as opposed to reduced tariffs, and so will overstate build, particularly in the early years. The FITs model on the other hand does not necessarily reflect information on new schemes in the pipeline, and is not sufficiently disaggregated to make precise estimates of impacts by installation size.

61. As explained above the FITs model does not feature the same size breakdowns as the proposed tariffs. Therefore, we have modelled two different sets of reductions in tariffs, which provides a proxy for the uptake and costs that the above tariff bands and tariff levels would result in. The two sets of tariff reductions have been carried out as follows:

(A) Tariff for 10-100kW installations unchanged and 8.5p/kWh for 100kW-5MW installations

(B) 19p/kWh for 10-100kW installations and 8.5p/kWh for 100kW-5MW installations

62. These reduced tariff rates are combined with the constrained and unconstrained FITs model runs, above, which both assume a one-off drop in large scale PV costs of 30% from 2010 onwards. These assumptions result in the MW uptake estimates shown in Table 7 below.

Table 7: Cumulative PV MW uptake under proposed new tariffs

	2011	2012	2013	2014	**2020**
Large scale PV only					
Industry estimate *Large scale PV - (Buildings)*	80	210	455	*505*	*890*
Fits Model constrained/unconstrained range *Large scale PV*	35 to 60	35 to 60	40 to 60	60 to 75	330 to 965

Note 1: Figures in the table are rounded.

Note 2: For the industry figures, we have assumed that the 8.5p/kWh tariff for 250kW-5MW PV would result in no uptake of solar farms (although in reality there could be some level of uptake). Therefore only industry's uptake projections for buildings are used until 2013 and DECC has extrapolated uptake post 2013. It should be noted that the fast track review only considers higher than expected uptake of large PV. There could also be similarly higher than expected uptake of small solar PV as a result of falling PV costs. PV up to 50kW, together with all other elements of the FITs scheme, will be considered as part of the comprehensive review of FITs.

Note 3: Uptake figures from industry have only been provided to 2013 – an assumption has been made to extrapolate uptake figures out to 2020.

Note 4: Modelling has been simplified by assuming that fast track tariffs are implemented at the beginning of the 2011/12 financial year, when in reality the tariffs are set to come into effect on 1st August 2011.

63. Table 7 shows that lower than expected costs of large scale PV could result in significant uptake of large scale solar PV in the long term, even under proposed new tariffs. Industry estimates are higher than FITs model estimates in the short term but within the FITs model range by 2020. Industry uptake projections are assumed to reduce significantly under the proposed new tariffs (because solar farms are assumed to no longer be financially viable). Large building integrated solar PV is assumed to remain viable under the new tariffs, however given that projections have been held constant for building integrated PV between the Do-Nothing option and the fast track proposal, uptake is likely to be slightly over-estimated under the fast track assessment.

Estimated costs and benefits

64. Table 8 shows the corresponding impact on consumer costs. It can be seen that by reducing tariffs as outlined above, costs to consumers from large scale Solar PV come down substantially in the constrained and unconstrained FITs model runs, but also using industry's large scale Solar PV estimates.

Table 8: Solar PV costs to consumers with new tariffs (£2011m, discounted to 2011)

	2011	2012	2013	2014	**2020**
Large scale PV only					
Costs based on industry uptake estimates *Large scale PV* *(Buildings)*	10	25	50	55	75

Fits Model constrained/unconstrained range *Large scale PV*	10 to 15	10 to 15	10 to 15	10 to 15	20 to 110

Note 1: Figures in the table are rounded.

Note 2: a) FITs model costs are presented in net terms i.e. net of the value of electricity exported back to the grid; and b) costs are additional-to-BAU, where BAU impacts are impacts that would occur in the absence of FITs (i.e. under the RO). Subsidy costs are equivalent to the ONS definition of tax and spend.

Note 3: Uptake figures from industry have only been provided to 2013 – an assumption has been made to extrapolate uptake figures out to 2020.

Note 4: Modelling has been simplified by assuming that fast track tariffs are implemented at the beginning of the 2011/12 financial year, when in reality the tariffs are set to come into effect on 1st August 2011 (reducing estimated 2011 costs).

65. Comparing cost estimates in Table 4 and Table 8 above demonstrates that the fast track proposal of reduced tariffs for large PV should substantially reduce costs to consumers compared to leaving tariffs unchanged.

Methodology – Anaerobic Digestion (AD)

66. Table 9 below sets out high level estimates for farm-scale AD uptake under the new tariff proposals of 14p/kWh for 0-250kW plants and 13p/kWh for 250kW-500kW plants. The table shows a range of estimates, based on:

(a) preliminary figures from industry

(b) DECC's FITs model.

67. Industry information was provided on the basis of 'sufficiently' increased tariffs and was a projection to 2014 only. Early year estimates are therefore likely to overstate the cost of the new tariffs in the early years, as proposed tariffs are lower than those upon which the industry uptake estimates are based. DECC has applied a conservative 5% increase in annual build from 2014, in order to provide annual uptake figures to 2020. Estimates to 2014 are therefore uncertain, and are likely to provide an upper bound of AD uptake following the tariff changes – likewise our associated cost estimates (provided in Table 10) are also likely to be upper bound estimates. Increased tariffs in the FITs model do not change uptake in early years of the scheme due to uptake barriers in the model, but the model predicts an increase in uptake post 2015 when barriers reduce. FITs model estimates are likely to represent a lower bound on costs.

Table 9: Cumulative AD MW uptake under proposed new tariffs

	2011	2012	2013	2014	**2020**
Industry estimate *AD*	5	20	50	85	*115*
FITs model *AD - Higher tariffs*	5	5	10	15	75

Note 1: Figures in the table are rounded.

Note 2: Figures from industry have only been provided to 2014 – an assumption has been made to extrapolate uptake figures out to 2020.

Note 3: FITs model estimates are additional to BAU, where BAU impacts are impacts that would occur in the absence of FITs (i.e. under the RO).

Note 4: Modelling has been simplified by assuming that fast track tariffs are implemented at the beginning of the 2011/12 financial year, when in reality the tariffs are set to come into effect on 1st August 2011.

Estimated costs and benefits

68. The estimated costs in Table 10 show that the fast track proposal is expected to lead to higher costs to consumers than under the ‘Do-Nothing’ (Table 6). However, it should be noted that there will be additional CO_2 savings from the higher uptake and there are significant wider benefits associated with AD including abatement of fugitive methane emissions from manure handling, reduced N2O emissions from poorly-quantified application of manure to land, displacement of GHG emissions from mineral fertiliser manufacture, and incentivising better nutrient management and resource protection (reduced bacterial/nutrient pollution of watercourses).

Table 10: AD costs to consumers under proposed new (£2011m, discounted to 2011)

	2011	2012	2013	2014	**2020**
Costs based on industry estimates of uptake *AD*	5	20	40	70	*75*
FITs model *AD - Higher tariffs*	5	5	10	10	50

Note 1: Figures in the table are rounded.

Note 2: a) FITs model costs are presented in net terms i.e. net of the value of electricity exported back to the grid; and b) costs are additional-to-BAU, where BAU impacts are impacts that would occur in the absence of FITs (i.e. under the RO). Subsidy costs are equivalent to the ONS definition of tax and spend.

Note 3: Uptake figures from industry have only been provided to 2014 – an assumption has been made to extrapolate uptake figures out to 2020.

Note 4: Modelling has been simplified by assuming that fast track tariffs are implemented at the beginning of the 2011/12 financial year, when in reality the tariffs are set to come into effect on 1st August 2011.

Summary of impacts - Results

69. The table below provides a summary of the impacts under Option 1 “Do-Nothing” and Option 2 “Fast track proposal”. The table summarises the two sources considered, i.e. industry estimates and the FITs model. It gives information on resource costs, costs to consumers, tonnes of CO_2 saved, NPV and electricity generation in each case for the solar PV and AD proposals separately. These estimates have been used to complete the summary sheet for this Impact Assessment:

    a. In the IA summary sheet the ‘best’ estimate refers to our central NPV estimate, which is the benefit from solar PV estimated using the FITs model constrained run, and the cost of AD estimated using the FITs model: NPV (£2.9bn)

    b. The ‘high’ estimate refers to our high NPV estimate, which is the benefit from solar PV estimated using the FITs model unconstrained run, and the cost of AD estimated using the FITs model: NPV (£3.9bn)

    c. The ‘low’ estimate refers to our low NPV estimate, which is based on industry estimates both for PV and AD: NPV (£2.1bn)

70. To note that the ‘best estimate’ is the central estimate for the period 2010 to 2020, which is the unconstrained FITs model run, combined with the FITs model estimate of AD costs. This may not be consistent with the ‘best’ estimate for the period 2011 to 2014: it gives the lowest cost for that period. The central estimate of costs for this period is that consistent with the FITs unconstrained model run.

Key costs and benefits

	Do-nothing			Fast track proposal		
£2011, discounted to 2011	Large scale Solar PV (>10kW)		Farm-scale AD	Large scale Solar PV (>10kW)		Farm-scale AD
	FITs model	**Industry uptake estimates**	**FITs model uptake**	**FITs model**	**Industry uptake estimates**	**FITs model/ industry uptake estimates**
Annual resource cost in 2020	£735m to £1,065m	£870m	£25m	£35m to £70m	£140m	£35m to £50m
Resource cost in 2020	£80/MWh to £115/MWh	£125/MWh	£65/MWh	£85/MWh to £320/MWh	£185/MWh	£65/MWh
Cumulative resource cost to 2020	**£3.4bn to £4.9bn**	£3.5bn	**£130m**	**£0.28bn to £0.58bn**	£0.97bn	**£155m to £385m**
Annual cost to consumers in 2020	£805m to £1.2bn	£890m	£30m	£20m to £110m	£75m	£50m to £75m
Cumulative cost to consumers to 2020	**£3.7bn to £5.3bn**	**£3.6bn**	**£0.2bn**	**£0.16bn to £0.33bn**	**£0.5bn**	£230m to £580m
Cumulative tonnes CO2 saved to 2020	10.3m to 20.2m	11.0m	0.8m	0.3m to 0.9m	2.0m	1m to 2.3m
Value of Cumulative CO2 savings to 2020	**£205m to £405m**	**£220m**	**£15m**	**£5m to £15m**	**£40m**	**£20m to £45m**
Policy Net Present Value to 2020	**-£3.2bn to -£4.5bn**	**-£3.3bn**	**-£110m**	**-£0.27bn to -£0.56bn**	**-£0.93bn**	**-£135m to -£340m**
Electricity generation in 2020	**6.3TWh to 13.4TWh**	**6.9TWh**	**0.4TWh**	**0.1TWh to 0.8TWh**	**0.8TWh**	**0.5TWh to 0.8TWh**

Note 1: Figures in the table are rounded.
Note 2: The industry uptake figures for large solar PV under the “Fast track” proposal are based on the Do-Nothing uptake profile and therefore costs are likely to be overstated (i.e. estimates based on industry deployment figures yield an NPV of -£0.93bn cumulative to 2020 versus -£0.27bn to -£0.56bn under the FIT model runs). For this reason our best estimate for the NPV of the fast track proposal for large solar PV is represented by the lower bound FITs model estimate. A similar reasoning applies for the fast track proposal for AD where we use the FIT model to provide our central NPV estimate.

Annexes

Annex 1 should be used to set out the Post Implementation Review Plan as detailed below. Further annexes may be added where the Specific Impact Tests yield information relevant to an overall understanding of policy options.

Annex 1: Post Implementation Review (PIR) Plan

A PIR should be undertaken, usually three to five years after implementation of the policy, but exceptionally a longer period may be more appropriate. If the policy is subject to a sunset clause, the review should be carried out sufficiently early that any renewal or amendment to legislation can be enacted before the expiry date. A PIR should examine the extent to which the implemented regulations have achieved their objectives, assess their costs and benefits and identify whether they are having any unintended consequences. Please set out the PIR Plan as detailed below. If there is no plan to do a PIR please provide reasons below.

Basis of the review: This measure will be reviewed as part of the comprehensive review of FITs to be consulted on later this year.
Review objective: The review will assess costs and deployment of technologies supported through the FITs. It will also consider the cost effectiveness of the FITs scheme.
Review approach and rationale: This will involve reviewing monitoring data, consideration of technology costs and resource potential, and an assessment of uptake rates. Modelling of FIT tariff levels will also be undertaken to provide estimates for overall costs of the FITs scheme.
Baseline: Baseline is current FITs take up and costs, as produced by Ofgem and latest projections of the costs of FITs as set out in previous Impact Assessments.
Success criteria: That FITs supports technologies that contribute to meeting the renewable energy target, and that costs are projected to remain within the levy envelope.
Monitoring information arrangements: Ofgem data (3 monthly intervals) + data collated by DECC statisticians.
Reasons for not planning a review:

Add annexes here.

Annex 2

Fast-track review of Feed-in Tariffs: calculation methodology for solar PV generation tariffs above 50kW

1. This note explains the rationale for the generation tariffs proposed for installations above 50kW in the current consultation for the Fast-Track Review of Feed-in Tariffs.

2. The Feed-in Tariffs (FITs) scheme as introduced in April 2010 provided generation tariffs for solar PV that aimed to deliver an approximate 5% return on capital for all scales up to 5MW, i.e. approximately a 5% internal rate of return (IRR)) for well sited installations.

3. The generation tariff calculations are based on a ‘reference installation’ and so outturn IRRs may differ from project to project depending on the specific circumstances of each project e.g. level of generation, capital and operating costs, extent of onsite use versus exports to the grid, how the project is financed and so on.

4. In order to determine the generation tariff level required to deliver an approx 5% IRR for solar PV, the following information is taken into account:-

   - Revenue stream:
     - Generation tariff income
     - Export tariff income
     - Bill savings (from avoided electricity imports)

   - Cost stream:
     - Capital cost
     - Operating cost

   - Other key assumptions for reference installation:
     - Assumed technology lifetime (and hence assumed tariff lifetime)
     - % onsite use, % exports to grid
     - Value of bill savings (retail electricity price)

250kW-5MW

5. The 8.5p/kWh tariff for 250kW-5MW and stand alone installations is intended to provide a level of support broadly equivalent to 2 Renewable Obligation Certificates (ROCs) + 1 Levy Exemption Certificate (LEC) per MWh. This is the financial support per unit energy output allocated to what is currently considered to be the marginal cost effective technology required to deliver the UK’s 15% renewable target, offshore wind.[1]

150kW-250kW

6. The 15p/kWh tariff for 150kW-250kW installations was set to provide a smooth transition between the 19p/kWh (see below) and 8.5p/kWh tariffs. Outturn IRRs will vary from project to project and it is expected that the 15p/kWh tariff may still deliver a 5% IRR for some projects.

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[1] This is based on the assumption of average expected ROC (Renewables Obligation Certificate) price of approximately £40.69/MWh and LEC (Levy Exemption Certificate) value of approximately £5/MWh (all in 2010/2011 prices).

50kW-150kW

7. Table 1 below sets out the assumptions used in calculating the 19p/kWh generation tariff for 50kW to 150kW solar PV.

Table 1: assumptions / data sources

Metric	Assumption	Source
Capital cost (£/kW) This metric is assumed to have changed the most since original modelling was undertaken prior to the launch of FITs, and is the primary driver of lower tariff levels.	£2,800/kW (2011 capex, 2010 prices)	Mott Macdonald analysis undertaken for the Committee on Climate Change and published May 2011 (for further info, please see: http://www.theccc.org.uk/reports/renewable-energy-review). The data shows a 2010 capex for solar PV crystalline of £2,850/kW for a 2.5kW installation and £2,800/kW for a 10MW installation. We have therefore taken £2,800/kW as a suitable estimate of 2011 capex for 50kW-150kW plant. Although little data on capital costs was received through the consultation, the £2,800/kW estimate falls within the range of the cost data that was provided.
Operating cost (£/kW)	£20/kW (2011 opex, 2010 prices)	Element Energy (quantitative report, 2010). The data suggests that opex is approx 0.5% of capex. We have assumed here that opex is a slightly higher percentage (0.7%) of capex. This is based on the fact that capex has fallen by about 30% since the report was written (from around £4,000/kW to £2,800/kW) and a working assumption that opex has not fallen.
Load factor	850kWh/kWp/year	Element Energy (quantitative report, 2010). Load factor of 850kWh/kWp is stated as typical for well orientated UK PV installations.
Assumed use	50% onsite, 50% export	Element Energy (quantitative report, 2010)
Export tariff	3.1p/kWh in 2011/12	Ofgem
Commercial retail electricity price	12p/kWh (average for 2010-2020, 2010 prices)	DECC 'updated energy projections' model

IRR calculation – detail

Step 1

In order to deliver a 5% IRR, we first work out what the levelised (p/kWh) cost is of the project as follows:-

Levelised cost =

[Annuitized capital expenditure + Annual operating cost] ÷ Annual kWh generation
-> to convert this result from £/MWh into p/kWh, multiply by 100

In annuitizing capital expenditure (i.e. spreading capital expenditure evenly over the lifetime of the technology), a discount rate (equivalent to the target rate of return – in this case 5%) is used. The formula for calculating annuitized expenditure/costs is:

$$A = P(i + \frac{i}{(1+i)^n - 1})$$

Where A=Annuitized Payment, P=Capital Expenditure, i=discount rate, and n=years over which capital expenditure is annuitized. This is equivalent to the PMT function in Microsoft Excel.

Adding the annual operating cost to this gives the total annuitized cost (i.e. cost per year). Dividing through by the plant's annual generation provides the levelised cost in £/MWh. Multiplying through by 100 converts this into p/kWh.

Step 2

In order to deliver a 5% IRR, the generator/investor needs to receive a revenue stream equal to the levelised cost calculated in Step 1 above.

In order to calculate the required generation tariff, income from the export tariff and from bill savings needs to be deducted from the levelised cost, bearing in mind the % onsite use and % export to grid. The required generation tariff is therefore derived by calculating the following:-

Required generation tariff =
[levelised cost – (% onsite use x commercial retail electricity price) – (% export to grid x export tariff)]

Example

A 100kW plant generates 85,000kWh per year (50% of which is assumed to be used onsite and 50% exported back to grid), has a capital cost of £280,000 and an annual operating cost of £2,000. The plant lasts for 25 years and the target rate of return is 5%.

Step 1

Levelised cost =
[-PMT(0.05, 25, £280,000)[2] + £2,000] ÷ 85,000 = £0.26/MWh
-> to convert this result from £/MWh into p/kWh, multiply by 100
= approx 26p/kWh

Step 2

Required generation tariff =
[26 – (0.5 x 12) – (0.5 x 3.1)]
= approx 18.5p/kWh

NB: given that capex/opex costs used in the levelised cost calculation are stated in 2010 prices, the 18.5p/kWh is up-rated to 2011/12 prices to give **19p/kWh**.

It should also be noted that the above calculation methodology and derivation of IRR implicitly assumes that the project is 100% equity financed. In reality, individual returns to investors in particular projects may differ according to financing approach e.g. the debt/equity ratio.

[2] Annuitized capex can also be calculated using the formula $A = P(i + \frac{i}{(1+i)^n - 1})$ which is equivalent to the PMT function in Microsoft Excel.