
Perspective on Feed-in Tariffs

As of April 1st 2010, businesses, consumers and communities in Great Britain¹ will be able to claim feed-in tariffs (FIT) for electricity generated from small scale renewables and other low carbon generation technologies. FITs are higher than previous incentives and could yield returns of 5-8%. These returns are lower than many energy efficiency measures and energy efficiency should remain an organisation's top priority in cutting carbon and costs. Small scale renewables are complimentary and can generate additional returns in the right locations in particular with the new FIT incentive.

Summary points

- The Carbon Trust can help you look at the business case for both energy efficiency and renewables for your site/business.
- Feed-in tariffs (FITs) are being introduced in Great Britain¹ as part of the Government's effort to increase the amount of electricity generated from renewables; the Government is working to a scenario where 2% of electricity is generated from small scale renewables by 2020, with up to one in every 30 homes having solar PV on their roofs.
- FITs will be paid to small scale low carbon electricity generators (<5MW of generating capacity). They are being introduced to compliment the existing incentive mechanism, the Renewables Obligation (RO), which will continue to support large scale renewable generation.
 - FITs will be available across a range of technologies – solar PV, wind, hydro, anaerobic digestion, MicroCHP. An exception is biomass electricity, which will continue to be supported by the RO.
 - All micro generation (less than and including 50kW) will be supported by FITs. Small generation (above 50kW and below 5MW) will be able to choose between FITs and the RO.
- FITs offer a higher incentive than the RO in most cases and could yield returns of 5-8%, equivalent to paying back in 10-14 years (though this depends on specific installation conditions).
- FITs will provide small scale electricity generators (<5MW) two elements of payment: a generation tariff and an export tariff. The generation tariff is received for every unit (kWh) of electricity generated and varies from 4.5p/kWh to 41.3p/kWh depending on the technology and capacity size. Generators receive an additional payment for the electricity that is exported into the grid, rather than used on the premises, either choosing a guaranteed 3p/kWh export tariff or opting to sell this exported electricity on the open market.
- Businesses considering installing small scale generation should first make sure that all energy efficiency measures have been considered. Simple low and no cost energy efficiency measures save 10-20% off your energy bill and carbon footprint. 80% of energy efficiency measures payback within 3 years – much shorter than small scale renewables' even with FITs. Small scale renewables are complimentary and can generate additional returns in the right locations in particular with the new FIT incentive.
- FITs will make the market for small scale renewables more attractive for the supply chain, especially manufacturers and installers. Generation tariffs reduce each year, so the supply chain will need to drive down costs to continue to make small scale renewables an attractive proposition to prospective customers.

¹ The scheme applies to businesses, consumers in England, Scotland and Wales but not in Northern Ireland.

The Carbon Trust can help you look at the business case for both energy efficiency and renewables for your site/business

In general, the Carbon Trust recommends implementing energy efficiency first, then cost effective renewables. The most suitable measures for your site/business will depend on its energy usage, location, building and a host of other factors. The Carbon Trust can help you develop a business case that takes into account all these factors and identifies the most suitable measures.

FITs are being introduced as part of the Government's effort to increase the amount of electricity generated from renewables

The UK may need to generate up to 40% of its electricity from renewable sources by 2020 if it is to meet EU targets – a tenfold increase over the next decade. The vast majority of this should come from more cost-effective large scale renewable electricity; the Government is working to a scenario² where 2% of electricity is generated from small scale renewables by 2020. This scenario includes ~1 million solar PV installations³ (around one in every thirty households⁴) and more than 30 thousand small wind turbines⁵.

Small scale renewable generation technologies are currently less cost effective at reducing carbon emissions, costing more than £200/tCO₂, compared to less than £80/tCO₂ and £130/tCO₂ for large scale onshore and offshore wind power respectively⁶. Energy efficiency measures should be the first priority for a business as they will on average save more than £30/tCO₂ by 2020.

Beyond 2020, small scale renewables will become an even more important component of the energy mix. In particular significant capacity will be required to deliver zero carbon new non-domestic buildings from 2019 as will likely be required by building regulations by that point. It is important that the costs of renewables are brought down before this mass installation.

The Government also believes that small scale renewables engage individuals in tackling climate change and help bring about acceptance of the behavioural changes that we need to make.

FITs will be paid to small scale low carbon electricity generators (<5MW). They are being introduced to compliment the existing incentive mechanism, the Renewables Obligation (RO), which will continue to support large scale renewable generation

FITs will be paid to small scale low carbon electricity generation below 5GW in capacity. FITs will compliment the existing incentive mechanism, the Renewables Obligation (RO), which will continue to support large scale renewable generation. The RO was not designed with small scale projects in mind. It can be difficult to understand and often provides low levels of return for very small scale projects (see chart 2 later).

Eligibility

FITs will be available to support almost all small scale low carbon electricity generation technologies below 5MW in capacity except biomass electricity, which will continue to be supported by the RO.

Supported technologies

- Solar photovoltaic (PV)
- Wind
- Hydro
- Anaerobic digestion

² Source: DECC – “The UK Renewable Energy Strategy” (July 2009)

³ Assuming an average installation of 2.4kW at 850kWh/kW

⁴ Assuming take-up of PV is heavily weighted towards households

⁵ Assuming average size of 50kW and a capacity factor of 15%

⁶ 2020 values; Source: E&Y, Carbon Trust

- Micro Combined Heat and Power (MicroCHP) pilot – the first 30,000 MicroCHP installations with an electrical capacity of 2KW or less

All micro generation (less than and including 50kW) will only be supported by FITs. Small generation (above 50kW and below 5MW) will be able to choose between FITs and the RO. The rules for whether existing generators transfer to the FIT or stay with the RO are different for microgeneration and small scale generation. They are detailed in the FAQ section at the back of this document.

FITs offer a higher incentive than the RO in most cases and could yield returns of 5-8%, equivalent to paying back in 10-14 years

Suppliers⁷ will offer FITs to small scale electricity generators (<5MW). FITs will consist of two elements of payment: a generation tariff and an export tariff:

- FIT generators will receive a **generation tariff** for every unit of electricity that is generated, whether it is used by the generator or exported to the grid – this varies from 4.5p/kWh to 41.3p/kWh depending on the technology. All generation will need to be metered.
- For the electricity they export to the grid they will receive an additional payment - either opting for a guaranteed **export tariff** of 3p/kWh or opting to sell their electricity on the open market. In the future all exports will need to be metered. As an interim measure, export tariffs will be allowed to be deemed for very small generation (30kW or below – still to be confirmed by Government). See the FAQ for further details.

Both the generation tariff and export tariff will be linked to the Retail Price index (RPI) to alter with inflation, and FITs income for domestic properties generating electricity mainly for their own use will not be taxable income for the purposes of income tax.

Organisations or individuals that install this generation in their premises will receive an additional financial benefit – their electricity bills will be reduced. The Government has calculated that the combination of these financial benefits will give generators a 5-8% rate of return for well sited technologies. Rates of return depend significantly on the conditions of individual installations, both the amount of resource (e.g. wind, sun) and electricity demand. For small wind installations, you can use the Carbon Trust wind estimator tool to understand if this is a viable option:

<http://www.carbontrust.co.uk/cut-carbon-reduce-costs/products-services/technology-advice/renewables/Pages/small-scale-wind-energy.aspx>

To give a consistent rate of return, the generation tariff is different for different technologies and decreases over time for PV and wind. More detail follows.

⁷ Only the larger suppliers will be mandated to offer FITs – see FAQ ‘How do I find a supply of FITs?’ at the end of this document.

Generation tariff – different levels for different technologies and decreases over time

The generation tariff is set at different levels for different technologies. These technologies should reduce in cost over time, so the generation tariffs (for PV and wind) decrease from 2013 to 2020 to continue to provide the same rate of return. The generator is allocated the tariff level for the period it is installed in. The generator is then “locked into” this tariff level over the life of the installation or the life of the tariff (20-25 years), whichever is the shorter i.e. the allocated tariff does not reduce (indeed it will increase in nominal terms to reflect inflation/the RPI). For instance, a generator that installs in 2013 receives less than one that installs in 2010, but keeps the 2013 tariff level over its lifetime. The generation tariff levels are summarised in chart 1 below.

Chart 1: generation tariffs to 2020

Technology	Scale	Tariff level for new installations in period (p/kWh) (NB tariffs will be inflated annually)											Tariff lifetime (years)
		1 1/4/10 – 31/3/11	2 to 31/3/12	3 to 31/3/13	4 to 31/3/14	5 to 31/3/15	6 to 31/3/16	7 to 31/3/17	8 to 31/3/18	9 to 31/3/19	10 to 31/3/20	11 to 31/3/21	
Anaerobic digestion	≤500kW	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	20
Anaerobic digestion	>500kW	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	20
Hydro	≤15 kW	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9	20
Hydro	>15-100 kW	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	20
Hydro	>100 kW-2 MW	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	20
Hydro	>2 MW – 5 MW	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	20
MicroCHP pilot*	≤2 kW*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10*	10
PV	≤4 kW (new build**)	36.1	36.1	33.0	30.2	27.6	25.1	22.9	20.8	19.0	17.2	15.7	25
PV	≤4 kW (retrofit**)	41.3	41.3	37.8	34.6	31.6	28.8	26.2	23.8	21.7	19.7	18.0	25
PV	>4-10 kW	36.1	36.1	33.0	30.2	27.6	25.1	22.9	20.8	19.0	17.2	15.7	25
PV	>10-100 kW	31.4	31.4	28.7	26.3	24.0	21.9	19.9	18.1	16.5	15.0	13.6	25
PV	>100kW-5MW	29.3	29.3	26.8	24.5	22.4	20.4	18.6	16.9	15.4	14.0	12.7	25
PV	Stand alone system**	29.3	29.3	26.8	24.5	22.4	20.4	18.6	16.9	15.4	14.0	12.7	25
Wind	≤1.5kW	34.5	34.5	32.6	30.8	29.1	27.5	26.0	24.6	23.2	21.9	20.7	20
Wind	>1.5-15kW	26.7	26.7	25.5	24.3	23.2	22.2	21.2	20.2	19.3	18.4	17.6	20
Wind	>15-100kW	24.1	24.1	23.0	21.9	20.9	20.0	19.1	18.2	17.4	16.6	15.9	20
Wind	>100-500kW	18.8	18.8	18.8	18.8	18.8	18.8	18.8	18.8	18.8	18.8	18.8	20
Wind	>500kW-1.5MW	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	20
Wind	>1.5MW-5MW	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	20
Existing microgenerators transferred from the RO		9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	to 2027

* Note the microCHP pilot will support up to 30,000 installations with a review to start when the 12,000th installation has occurred

** "Retrofit" means installed on a building which is already occupied; "New Build" means where installed on a new building before first occupation; "Stand-alone" means not attached to a building and not wired to provide electricity to an occupied building

Source: "Feed-in Tariffs. Government's Response to the Summer 2009 Consultation", DECC

Comparison of incentives from the RO compared to FITs

The new generation tariffs are generally higher than the equivalent incentives through the RO, though this depends on the capacity size (as shown in chart 2 below) and the market value of the ROC. The incentive through the RO is the combination of the ROC value and the number of ROCs that technology receives ("ROC bands"). The ROC value is set by a market mechanism and therefore varies. ROC values at auction have varied from 3.8p/kWh to 5.2p/kWh; the ROC value at auction as of January 2010 was 4.6p/kWh⁸.

Chart 2: Comparison of RO and FIT values

Generation technology		RO		FIT generation tariffs (1/4/10-31/3/11)**
		ROC banding	RO incentive (p/kWh)*	
Microgeneration (less than and including 50kW)	Anaerobic digestion	2	9	11.5
	Hydro			17.8 – 19.9
	PV			31.4 – 36.1
	Wind			24.1 – 34.5
	Micro CHP pilot	N/A	N/A	10
Small generation (above 50kW and below 5MW)	Anaerobic digestion	2	9	9.0 – 11.5
	Hydro	1	4.5	4.5 – 17.8
	PV	2	9	29.3 – 31.4
	Wind	1	4.5	4.5 – 24.1
	Micro CHP pilot	N/A	N/A	10

* Assuming 4.5p/kWh and full value of ROC passed to generator

** Generation tariffs for PV and wind "degress" up to 2020. Ranges based on size of capacity – see chart 1 for breakdown.

Source: DECC, Carbon Trust analysis

Under both the RO and FIT schemes, generators can sell the electricity they export to the grid on the open market. Only the FIT provides the option of a guaranteed export tariff of 3p/kWh.

The lifetime for the RO is 20 years. The lifetime for FITs is 20 years for all technologies except PV (25 years) and the MicroCHP pilot (10 years).

Further information on the Renewables Obligation can be found at on the Carbon Trust website at <http://www.carbontrust.co.uk/policy-legislation/energy-supply/renewable-energy/pages/renewables-obligation.aspx>

The likely level of FIT take-up is unclear at this stage

Take-up of FITs will vary across homeowners, business owner-occupiers, landlords and tenants:

Homeowners: For businesses looking to serve this sector, the financial returns of FITs are likely to be of interest to homeowners – returns of 5-8% are competitive with similarly low-risk investments. Returns of greater than 8% may be possible⁹, particularly for PV installations in the South and South West regions of the UK. However, installations will require significant upfront capital. Furthermore this investment will be tied up for the lifetime of the installation, 20-25 years. There will need to be a mechanism to transfer value if the owner moves house within the lifetime of the renewable generation installation. Mechanisms could include incorporating the value of the renewable into the house price, or a 3rd party such as an Energy Service Company (ESCO) owning the installation and sharing the benefits with whoever occupies the building.

Business owner-occupiers: The attractiveness of FITs for business is unclear at this stage for two reasons. Firstly, businesses commonly apply rules of thumb, with investments usually requiring payback periods of 3 years or less. This is clearly much less than the 10-14 years provided by the FITs. Secondly, businesses also face non-financial barriers – similar to those that have hindered

⁸ Source: NFPA eROC online auction, 19th January 2010

⁹ Source: REF

implementation of (cost effective) energy efficiency measures. These include the fact that energy costs are often immaterial – only 2-3% of total costs for service companies.

Landlords: Landlords that pay the electricity bill will receive the full financial benefit of 5-8% which may be attractive, depending on their cost of capital. Landlords that do not pay the electricity bill will still receive the generation tariff and the export tariff, which makes up the majority of the financial benefit (at least 90% for solar PV). They could also benefit from the reduction in the electricity bill if enter into an agreement with the tenant (e.g. via a green lease).

Tenants: Tenants will usually not be able to install renewables in the buildings they occupy.

Organisations considering installing small scale generation should first make sure that all energy efficiency measures have been considered

In general, businesses considering installing small scale generation should first make sure that all energy efficiency measures have been considered. Simple low and no cost energy efficiency measures save 10-20% off your energy bill and carbon footprint. 80% of energy efficiency measures payback within 3 years – much shorter than small scale renewables even with FITs. Small scale renewables are complimentary should your organisation want to go further than this, and can generate additional returns in the right locations in particular with the new FIT incentive.

The business case will depend on the business and its location/s. The Carbon Trust can help you develop the business case for both energy efficiency and renewables for your sites/business.

FITs will make the market for small scale renewables more attractive for the supply chain

FITs will make the market for small scale renewables more attractive for the supply chain, especially manufacturers and installers. Generation tariffs reduce each year, so the supply chain will need to drive down costs to continue to make small scale renewables as attractive a proposition to prospective customers.

FAQ

Contents:

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- **I already generate, do I get the FIT?**
- **How do I find a supply of FITs?**
- **Who will pay for FITs?**
- **What needs to be metered?**
- **Who pays for the meter?**

How do I apply for a FIT?

The process depends on if you are installing microgeneration (50kW or less) of small scale generation.

Microgeneration

Wind, solar PV and hydro projects of 50kW or less, and microCHP projects supported through the pilot, will have to use Microgeneration Certification Scheme (MCS) eligible products installed by MCS accredited installers to be eligible for FITs support. This requirement does not apply to those microgenerators transferring to FITs having already gained accreditation under the RO. As part of the installation the MCS installer will lodge required information with the MCS and this will form the basis of their FITs registration.

Small scale generation

Any other technology (e.g. biomass electricity) and scale of project must register their installation through a process based on the existing Renewables Obligation process, known as the ROO-FIT process, in order to be eligible for FITs support.

I already generate, do I get the FIT?

The rules for whether existing generators get the FIT or stay with the RO are different for microgeneration (capacity of 50kW and below) and small scale generation (above 50kW up to and including 5MW).

Existing microgeneration (capacity of 50kW and below) – all eligible technologies move to FIT, tariff level depends on timing

As of 1 April 2010, microgenerators in the following technologies to be covered by FITs will not be eligible for support under the RO:

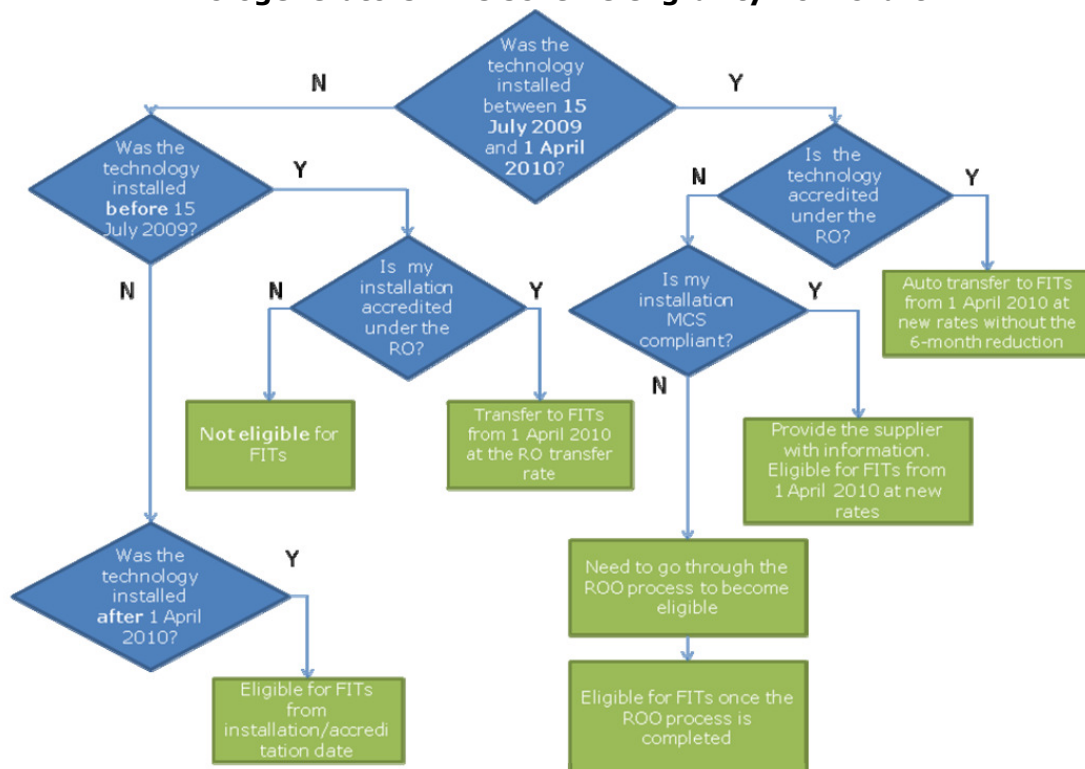
- AD
- Hydro
- Solar PV
- Wind

Microgenerators in these technologies who have applied for accreditation under the RO **on or before 31 March 2010** will have this accreditation transferred to the FITs scheme. In the case of wind, hydro and solar PV microgenerators transferring from the RO, they will not be required to meet the MCS accreditation requirements for new microgenerators in these technologies. **However, all microgenerators transferring from the RO will still need to find a supplier in order to access FITs.** Generators will need to find a supplier within 6 months of the start of the FITs scheme (i.e. before 1 October 2010) in order to avoid any interruption to their support.

Microgenerators that had applied for accreditation under the RO **before 15 July 2009** (the publication date of the Renewable Energy Strategy and the Consultation on Renewable Electricity Financial Incentives 2009) will transfer to FITs at a generation tariff of 9p/kWh and will receive support until 2027. This is an equivalent level and duration of support to that such generators would have received had they remained in the RO.

Microgenerators that commissioned and applied for accreditation under the RO **on or after 15 July 2009 and before 1 April 2010** will transfer to FITs at the appropriate tariff level for their scale and technology, and will receive support for 20 years (25 years for solar PV).

Microgenerators FITs scheme eligibility flow chart



Source: DECC

Existing small generation (capacity above 50kW up to and including 5MW)

Most existing small generators to stay in RO

Small generators who had applied for accreditation under the RO before 15 July 2009 will remain in the RO and will not be eligible to transfer to FITs.

Existing small generators since 15 July 2009 have a window of opportunity to transfer to FITs

Small generators that commissioned and applied for accreditation under the RO on or after 15 July 2009 and before 1 April 2010 will have a window of opportunity during which they can elect to transfer to FITs. If such generators wish to transfer to FITs with effect from 1 April 2010, they should notify Ofgem as soon as possible before this date, in order that the arrangements can be made in time. Generators wishing to transfer to FITs with effect from 1 April 2011 should provide Ofgem with written notification of their intention no later than 31 August 2010, in order that this can be taken into account in calculate the level of the Renewables Obligation for the 2011/12 obligation period. Unless small generators benefiting from this choice notify Ofgem of their intention to transfer to FITs, within the timescales above, they will remain in the RO.

All small generators transferring to FITs from the RO will need to find a supplier in order to be paid. They will need to do so within 6 months of the date they transfer to FITs in order to avoid any interruption to their support. They will receive the tariff level appropriate to their scale and technology, but the duration of their support will be reduced to reflect the support they will already have received under the RO. To reduce the administrative complexity, all small generators transferring to FITs with effect from 1 April 2010 will have a standard 6 months' reduction in support, and all small generators transferring to FITs with effect from 1 April 2011 will have a standard 18 months' reduction in support.

Small generators that commission on or after 15 July 2009 and who have not applied for accreditation under the RO before the FITs scheme comes into force will need to make a one-off choice as to which of the two schemes they join when applying for accreditation.

How do I find a supplier of FITs?

Suppliers with over 50,000 domestic customers are obliged to participate in FITs; they are obliged to make FITs available to generators on sites to which they supply electricity; they are also obliged to offer FITs to any generators on sites that are not served by a mandatory FITs supplier, including off-grid generators. Other suppliers may participate in FITs if they wish; they are obliged to make FITs available to generators of 50kW or less on sites to which they supply electricity, they will have the right, however, to decline provision of FITs to larger generators.

Generators will have to advise their chosen supplier of their intention to receive FITs and the supplier will register or confirm the generator's details with Ofgem and the installation will be entered on the Central FITs Register. The Register will include the relevant details of the installation and assign a tariff code – which will identify the generation tariff which the generator must be paid. The generator will also need to advise the supplier whether they intend to opt out of the guaranteed export tariff. If they do so, they will be required to forego any reward for export, or to negotiate their own arrangements for the sale of their exports e.g. through a power purchase agreement (PPA).

Who will pay for FITs?

All licensed suppliers will be required to make their fair contribution to the cost of the scheme through participation in the levelisation process so that all electricity consumers can make a contribution to the development of small scale low carbon electricity.

What needs to be metered?

All generation will need to be metered and FITs payments will be made to generators on the basis of generation in accordance with the strict requirements of existing regulation in the Electricity Act 1989 and subsequent legislation and regulations¹⁰.

As an interim measure, at the very small scale, the amount of exports for the payment of export tariffs (not generation tariffs) will be allowed to be deemed, subject to the following conditions:

- these arrangements will only apply until the finalising of specifications for smart meters;
- the payment of export tariffs for deemed exports will be included in the levelisation process, but the total payments to and from suppliers will be adjusted to reflect the benefit that they receive from the spilling of these unmetered exports onto distribution networks through GSP correction factors;
- these arrangements do not apply if export meters exist already, or are provided at the generator's expense.

The Government is currently working with suppliers to finalise the arrangements and procedures for deeming, including the threshold at which it will apply. It is their intention that it will apply at the very small scale, and the limit and technologies to which it applies will be decided on the basis of the economics of providing meters, and will be set at 30kW capacity or below.

Who pays for the meter?

The Government has announced its intention to mandate a roll out of electricity and gas smart meters to all homes in Great Britain with the aim of completing the roll out by the end of 2020. It has set out similar proposals for small and medium non-domestic sites. The Government has also stated that once rolled out these smart meters will support the metering requirements of FITs installations and the report of that data.

Suppliers are likely to need to pay for the equipment and installation cost of the smart meters under this mandated roll out. However, if a FIT generator needs a smart meter before this planned roll out, the generator may need to pay.

¹⁰ Schedule 7 of the Electricity Act 1989, The Meters (Approval of Pattern or Construction and Manner of Installation) Regulations 1998, The Meters (Certification) Regulations 1998, Measuring Instruments (Active Electrical Energy Meters) Regulations 2006, Balancing and Settlement Code

Further information

More detail on FITs can be found from DECC in "Feed-in Tariffs. Government's Response to the Summer 2009 Consultation". Click on:

http://www.decc.gov.uk/en/content/cms/consultations/elec_financial/elec_financial.aspx

For more general enquiries or for further information on FITs you can also contact the Department of Energy and Climate Change at enquiries@decc.gsi.gov.uk or by telephone on 0300 060 4000.

Ofgem provides information at

<http://www.ofgem.gov.uk/Sustainability/Environment/fits/Pages/fits.aspx>