FEED-IN TARIFFS FOR PV
– and smart meters

Germany pioneered Feed-In Tariffs with a scheme in 1990, and a better one in 2000. A FIT scheme was introduced into the UK in 2010. For PV systems, two payments are made: for electricity generated, and for electricity exported.

For domestic systems up to 4kWp the generation tariff for a new build system was originally very generous: 36p per kWh – and for a retrofitted system an even more generous 44p per kWh. Moreover, the payments go up in line with inflation, according to the Retail Price Index. The export tariff was 3p per kWh.

The scheme has been very successful. Nearly a million domestic PV systems have been installed, and, as was the intention, prices of PV systems tumbled.

As prices fell, the generation tariff being offered for new systems was reduced. But the solar industry was shocked at the beginning of this year when the government slashed the generation tariff by nearly two thirds. Currently, the generation tariff on offer is only 4.18p per kWh. (And in the future the tariff offered will decline every quarter, down to 3.55p in Quarter 1 of 2019.) Deployment caps have been introduced in order to limit the number of installations accepted into the scheme. (See Footnote 1: Deployment caps for the FIT scheme.)

The minor good news is that the export tariff has been increased to 4.9p per kWh.

Under FIT, the amount of PV electricity exported to the Local Distribution Network can be measured by an approved meter. But more commonly the assumption is made that the amount of electricity exported is simply half that generated. With this assumption, the total tariff payments amount to 6.65 pence for every kWh generated. [6.65 = 4.2 + (½ x 4.9)]

FIT payments are made to you by your electricity supplier – most but not all suppliers offer the FIT scheme. There is no income tax to pay on the payments. To be eligible, your PV products and installer must be approved by MCS (the MicroGeneration Certification scheme).

A monetary example

Let's consider a 4kWp system on a south facing roof without shading in the South of England – ie, a well situated array of perhaps 16 panels. In my September article about Solar Power, we saw that such a system can be expected to deliver about 4,000 kWh of electrical energy per year.

Yearly payment for generation	= 4,000 x 4.2p
	= £168
Yearly payment for export	= ½ x 4,000 x 4.9p
	= £98
Total FIT payment for year	= 176 + 98
	= £266

Or more simply: 4,000 x 6.65 = 266,

where 6.65 is the figure calculated previously.

There is, though, another financial benefit: the value of the PV electricity used in the home (self-consumption). The FIT assumption that half the PV output is exported implies that self-consumption accounts for the other half.

A typical price for domestic electricity is 12p per kWh (excluding the standing charge). For the example 4kWp system above:

Value of self consumption	= ½ x 4,000 x 12p = £240
Total yearly value of PV output	= 266 + 240 = £506

Earlier this year, Solar Century introduced their 'Sunstation' in-roof system. Their website gave a price of £6,300 for a 4kWp system. For such a system, the payback time would be 12½ years. But the lifespan of a string inverter is reckoned to be about 10 years, so during the payback period there would likely be the inverter's replacement cost. This could be about £1,000, increasing the payback time by 2 years, to 14½ years in total.

So in an era of low interest rates the financial case for fitting a PV system is sound enough. It can be further improved by boosting self-consumption (value 12p per kWh) and correspondingly cutting exports (value only 4.9p per kWh) – see next month's article about boosting self-consumption.

The bottom line

The 'bottom line' generally refers to financial matters, the bottom line of financial accounts often being a statement of profit or loss. When it comes to assessing the profitability of investing in a PV system, the numerous possibilities for the system make decision making complex:

- What capacity? (How many panels?)
- A single array facing south, or double arrays, facing east and west?
- Include a battery system? If so, what size?

In short, assessing the financial bottom line is difficult.

But the 'bottom line' can nowadays be taken to refer to whatever is most important. For some readers the bottom line may refer to carbon emissions, not money. Whether their PV electricity is consumed by themselves or by a neighbour is irrelevant – so there is no need for a battery system.

For them, assessing the bottom line is easy:

- Maximise PV generation, with a large array on a south facing roof.

Smart meters

Smart meters are replacing the dumb electric and gas meters of the past. Their prime advantage is that meter readings are sent automatically to the energy supplier – human meter readers become redundant. All meters throughout the UK are due to be replaced by 2020. More than three million smart meters have been installed so far.

A smart electric meter can incorporate an export meter too, enabling your exported electricity to be measured.

But do you want your exports to be measured? Currently, for most PV installations, only the amount generated is measured. The human meter reader records the reading so that your electricity provider can make the appropriate FIT payment to you (using the assumption that 50% of your PV electricity is exported). If

you have a high level of self-consumption, then your actual exports will be less – and you may not want exports to be measured.

But DECC has said it intends to

> *"end 'deemed' exports for all FITs installations and see the entire scheme moved to export tariff payments based on actual meter reads on the completion of the smart meter roll-out"* (ie, in 2020, maybe).

An accessory that comes with a smart meter is an in-home display that can be kept indoors; it is wirelessly connected to the smart meter. At half hour intervals the display shows the electricity and gas consumptions and the fuel prices, helping householders to monitor their use of the two fuels.

Further in the future, it is likely that electricity prices will vary somewhat with the weather and the overall demand at the time. When wind and sun are creating a lot of electricity, the price might be reduced to encourage consumption at that time. It is anticipated that householders will choose these periods of glut to use their washing machine, recharge their electric car, etc. Indeed, the intent is that smart meters will be able to communicate wirelessly with appliances like washing machines in order to switch them on when the electricity price is low. Well, that's the current thinking – no pun intended.

There is some scepticism about the value of the smart meter programme. The AECB submitted evidence to a House of Commons Select Committee about the matter, in which they suggested that the estimated cost of the programme, £12billion, could be better spent elsewhere.

(Here is a little test for the reader. We're all accustomed, nowadays, to hearing about billions of pounds. Does £12billion equal 1,200 million pounds, or 12,000 million pounds, or 12,000,000 million pounds? – According to my ancient Oxford English dictionary, a billion is a million million. But nowadays, we follow Franco/American usage, and a billion is a thousand million.)

A plea for higher taxes!

Am I the only person in the UK who thinks that a VAT rate of 5% for domestic electricity is scandalous? (And likewise for gas.)

The government wants us to reduce our use of domestic fuels – electricity and gas – and rightly so. The use of domestic fuels results in about a quarter of the country's carbon emissions. Yet the government allows householders to pay the reduced VAT rate of 5% for gas and electricity, rather than the 20% charged for almost all goods other than food.

Spending money on domestic fuels, whether gas or electricity, results in more carbon emissions than virtually any other way of spending money. It results in much more carbon emissions than those two other baddies, car and plane travel. (See Footnote 2: Costing your carbon footprint.)

I would say that by applying the 5% VAT to domestic fuels, the government is, in effect, subsidising the fuels. (The government denies this, and says that a favourable tax regime cannot be classed as 'subsidy'.) I regret to say that none of the main political parties, not even the Greens, are proposing to apply the standard VAT rate to domestic fuels.

'What about the fuel poor?', you may ask. There are currently three schemes to financially assist them: the Warm Home Discount Scheme, Cold Weather Payments,

and Winter Fuel Payments. Possibly the first two of these could be expanded. But not, please, the Winter Fuel Payment, made to everyone over 62. This is much too indiscriminate. Many pensioners have stacks of disposable income. Nowadays, the average income of a pensioner exceeds the average income of other adults.

There are ways to make fuel available to the poor, without making it cheaper for all by giving it a preferential tax rate.

The pricing of electricity

The unit price of electricity for domestic customers is about 12 p/kWh (standing charge excluded). Electricity retailers pay about 4p per kWh for high-carbon electricity, and about 10p per kWh for renewable electricity. The difference, 6p, is made up by charging consumers higher prices. (See also Footnote 3, The Cost of Nuclear Electricity.)

The Feed-in-Tariff scheme pays domestic generators only 4.9p per kWh for their exports of renewable electricity. Why is this only half of what commercial generators of renewable electricity get paid? (The domestic PV electricity will generally be used within the neighbourhood, so there are no costs in distributing it via the national grid.)

Doubling the FIT export tariff could allow the generation tariff to be greatly reduced, or even abolished.

FOOTNOTE 1: **Deployment caps for the FIT scheme**

The deployment cap for a quarter year is the maximum amount of new PV capacity that is allowed to enter the FIT scheme in that quarter. If the cap is reached, any further applications are deferred to the following quarter.

The purpose of the cap is to limit the financial obligations being placed on energy companies and their customers by the scheme. However, since the introduction of caps, the amount of new domestic PV capacity accredited each quarter has been substantially below its cap of 76,969 kW. It has reached only about a third of that figure – the result, no doubt, of the slashing of the FIT generation tariff. Unless circumstances change drastically, the cap for domestic PV installations need be of little concern to a would-be installer.

FOOTNOTE 2: **Costing your carbon footprint**

Q: What way of spending your money results in the worst carbon emissions?

A: Buying domestic electricity or gas.

The following figures show the carbon footprint of spending £100 on a range of products/activities. They have been derived from the carbon calculator on the website of Carbon Footprint Ltd. (I have assumed £100 can buy a single flight from London to Naples, a distance of 1,000 miles.)

The figures for CO_2e are the tonnage of carbon dioxide equivalent that results from spending £100:

	Tonnes of CO_2e
Domestic gas	0.54
Domestic electricity	0.48

Flying 1,000 miles	0.14	without 'radiative forcing'
,, ,,	0.27	with 'radiative forcing'
Driving 1,000 miles	0.24	(50 mpg, diesel price 110 p/litre)
Food	0.12	
Paper (books, etc)	0.08	
Furniture	0.06	
TV, radio, phone equipment	0.05	
Clothes, shoes	0.04	
Recreational activities	0.03	

Obviously, many of the figures are very rough estimates, but I say that having some figures is better than having none. Gas and electricity are the worst offenders by far.

FOOTNOTE 3: **Hinkley Point C**

After the recent Government approval for this project, the Hinkley Point C nuclear power station is due to be finished in 2025. Its builder and operator, the French company EDF, will be paid £92.50 per MWh, ie, 9.25 p per kWh – a figure fixed for 35 years. Time will eventually tell whether the government has made a shrewd or foolish contract.

FOOTNOTE 4: **A sunshine tariff in Cornwall**

WREN, the Wadebridge Renewable Energy Network, offers the Sunshine Tariff. In spring and summer, from 10am to 4pm their electricity costs householders only 5p / kWh.
(For Wadebridge customers only!)

FURTHER INFO:

Review of the Feed-in Tariffs Scheme
Published by the Department of Energy & Climate Change, December 2015.
Available as a free pdf:
www.gov.uk,

Summary of DECC Feed In Tariff Decisions
By the Solar Trade Association.
Go to their Resource Centre for a free download of their 4-page pdf.
www.solar-trade.org.uk.

Microgeneration Certification Scheme
Check that your PV components and installer are MCS registered – necessary for acceptance into the FIT scheme.
www.microgenerationcertification.org.

Ofgem – Office of Gas and Electricity Markets
Their website has details of the FIT scheme: tariff rates, making an application, etc.
(The 'Higher' tariff applies to PV on a new build.)
Also a pdf factsheet about smart metering.
www.ofgem.gov.uk.

Smart meters: a guide
www.gov.uk/guidance/smart-meters-how-they-work.

Smart Energy GB
"Smart Energy GB is the voice of the smart meter rollout."
www.smartenergygb.org

Carbon Footprint Ltd
Their website has carbon calculators for individuals/households and businesses.
www.carbonfootprint.com.

Words: 2232