

NATIONAL
ENERGY
FOUNDATION

*“Promoting the better use and supply of energy
to counter climate change”*

Feed-in-Tariff (FiT)

11th-12th May 2010, ESTA

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Head of Consultancy

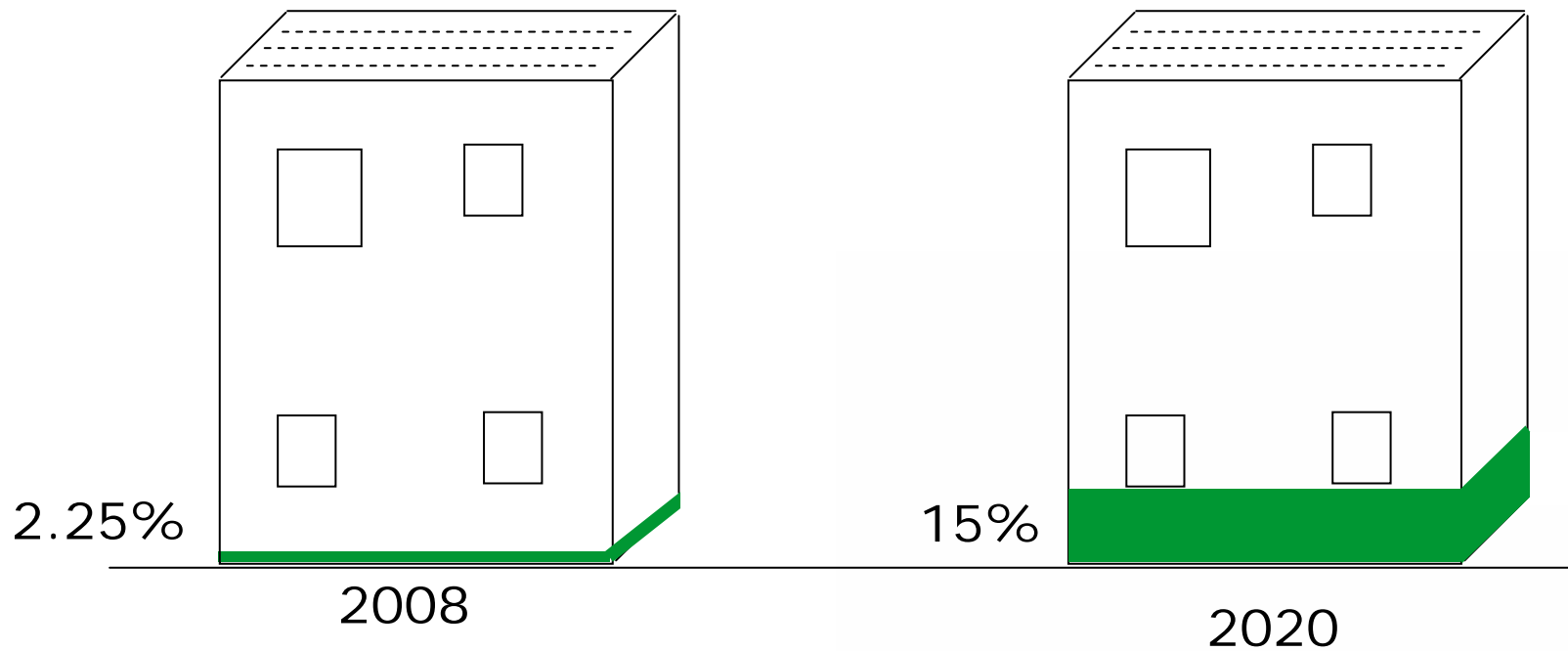
**ESTA**
energy services and technology association

Our targets

- Renewable Energy Target: 15% by 2020
- Renewable Energy Strategy: 30% electricity, 12% heat; 10% transport - road & rail by 2020
- Carbon Reduction Target: 80% by 2050

Current & Future Use

Proportion of UK energy from renewable sources:



Source: The UK Renewable Energy Strategy 2009

Main regulatory / fiscal incentives

- Building Regulations
- Code for Sustainable Homes (CSH)
- Clean energy cash-back: Feed-in-Tariff (FiT) and Renewable Heat Incentive (RHI)

Technologies Included

- The scheme covers the following electricity-generating technologies, up to 5 Mega Watts (MW):
 - Solar electricity (PV) (roof mounted or stand alone)
 - Wind turbine (building mounted or free standing)
 - Hydroelectricity
 - Anaerobic digestion
 - Micro combined heat and power (mCHP) (limited to a pilot at this stage)

Solar Photovoltaic Panels (PV)

- Monocrystalline
- Poly/multi crystalline
- Amorphous/thin film



Solar Photovoltaic Panels

- Electricity generation
 - Approx 800kWh per 1kWp / 10m²
 - 10 – 20% total electricity consumption
- Considerations
 - Roof orientation & pitch
 - Roof type
 - Inverter / DC connection



Small Wind Turbines

- Electricity generation

- 1.5kW = 3-4,000kWh
- 5kW = 13,000kWh
- 15kW = 40,000kWh

Figures from BWEA

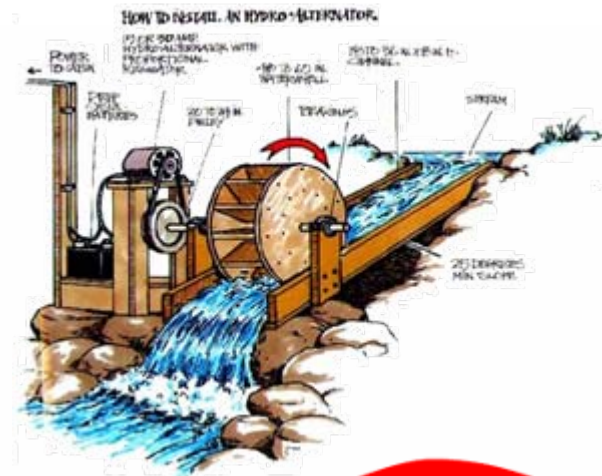
- Considerations

- Exposure to prevailing wind
- Surroundings / neighbours
- Roof type / land available

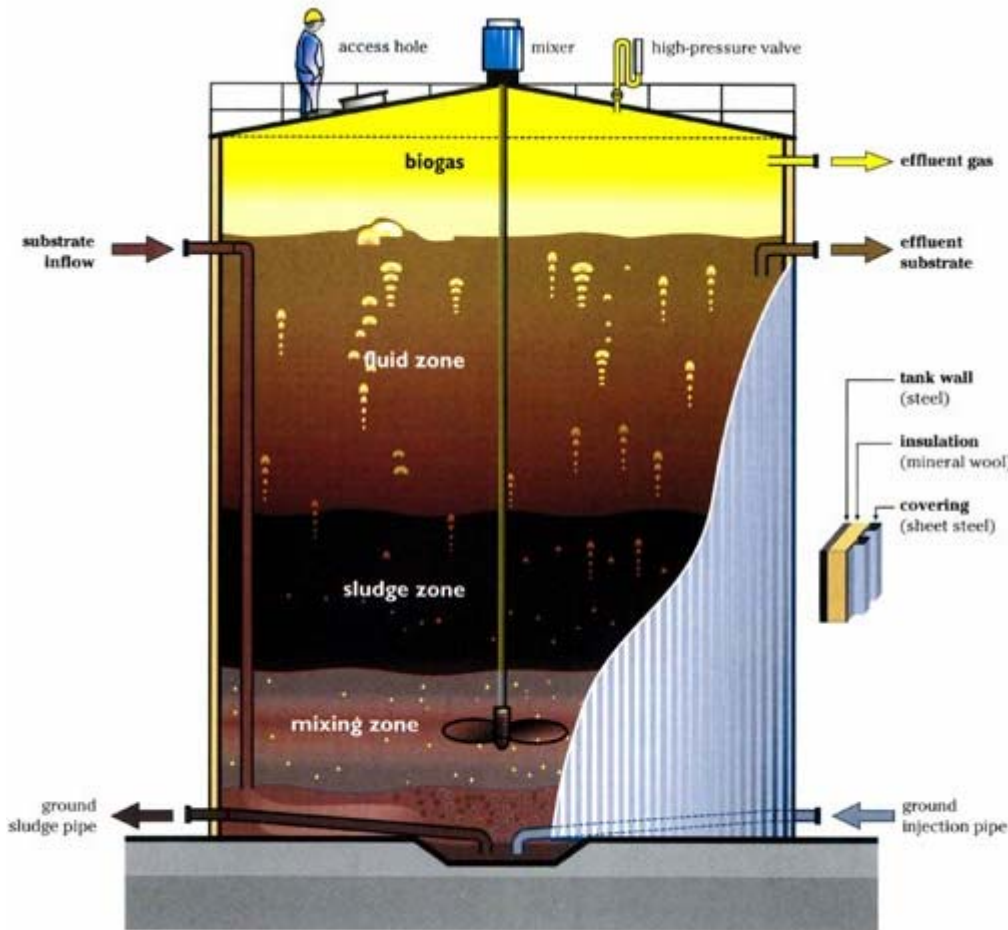


Hydro Electric Turbines

- Nearby water source
- Sufficient water flow
 - Speed
 - Volume
- Space
 - Turbine / Generator
 - Water channel

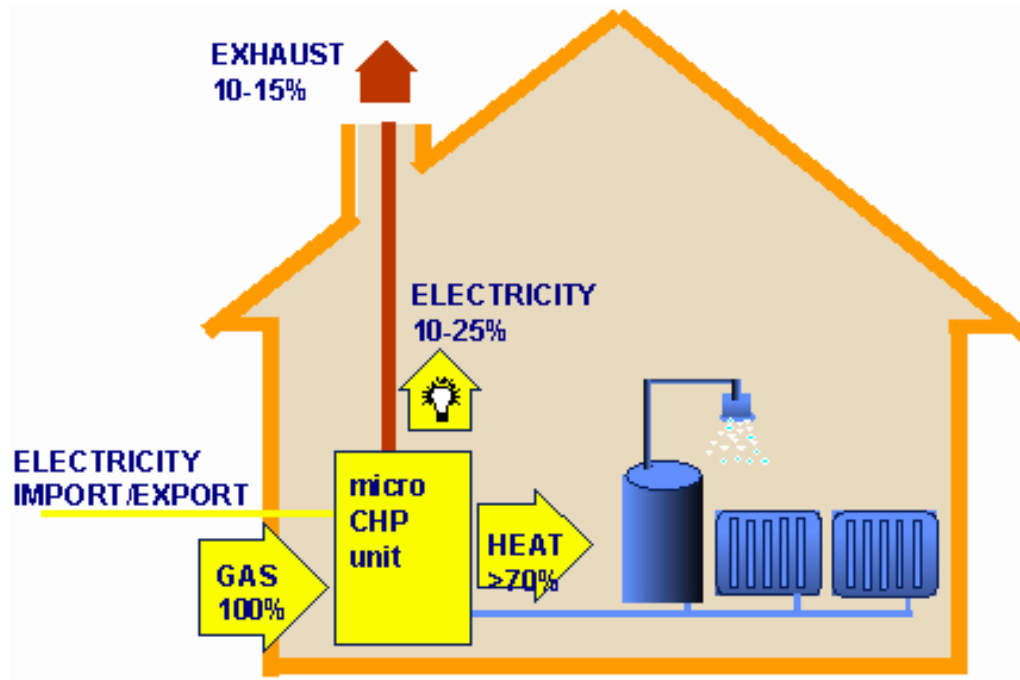


Anaerobic Digestion

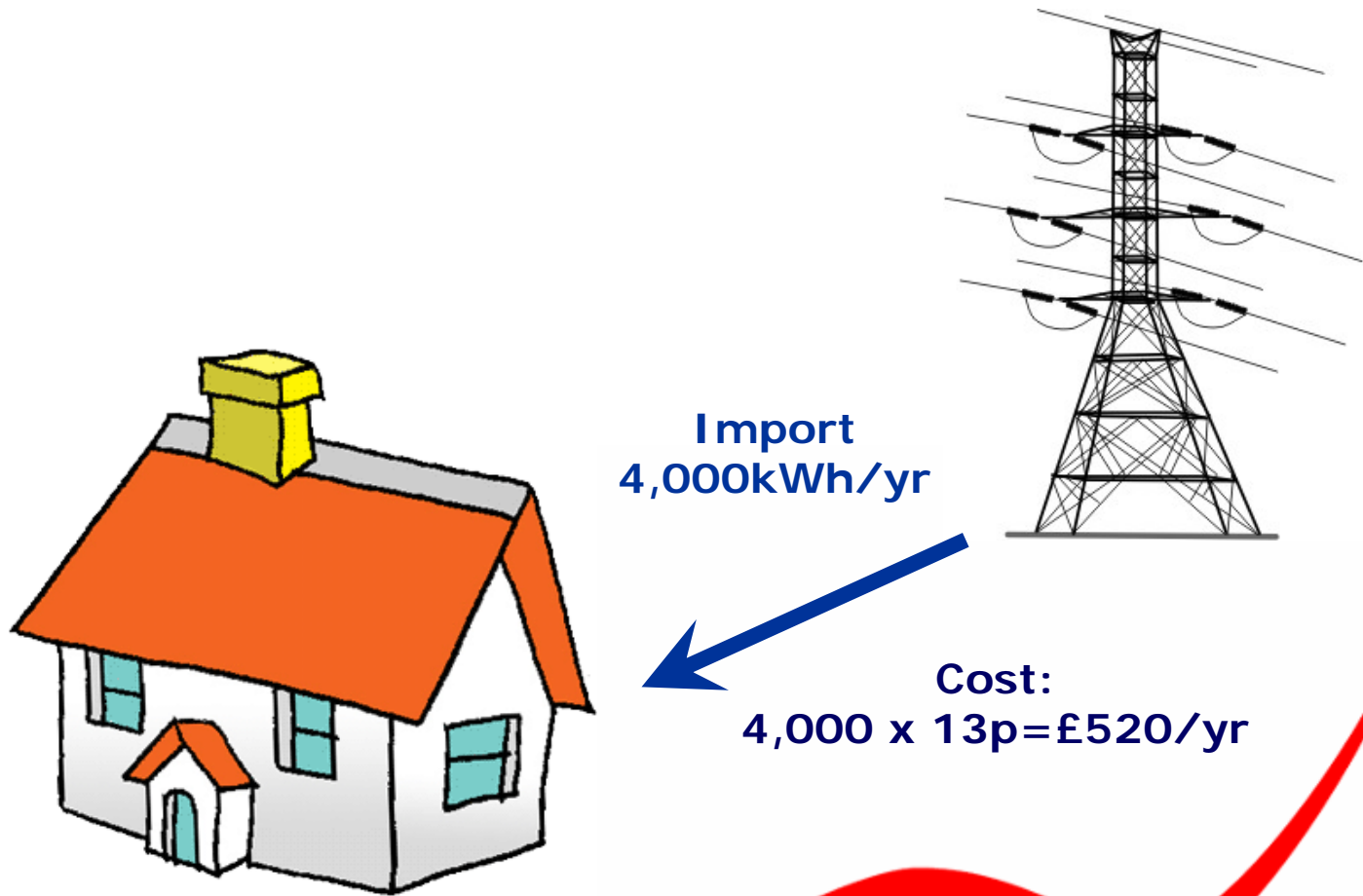


- Micro-organisms break down biodegradable material in absence of oxygen -> Biogas

Micro CHP

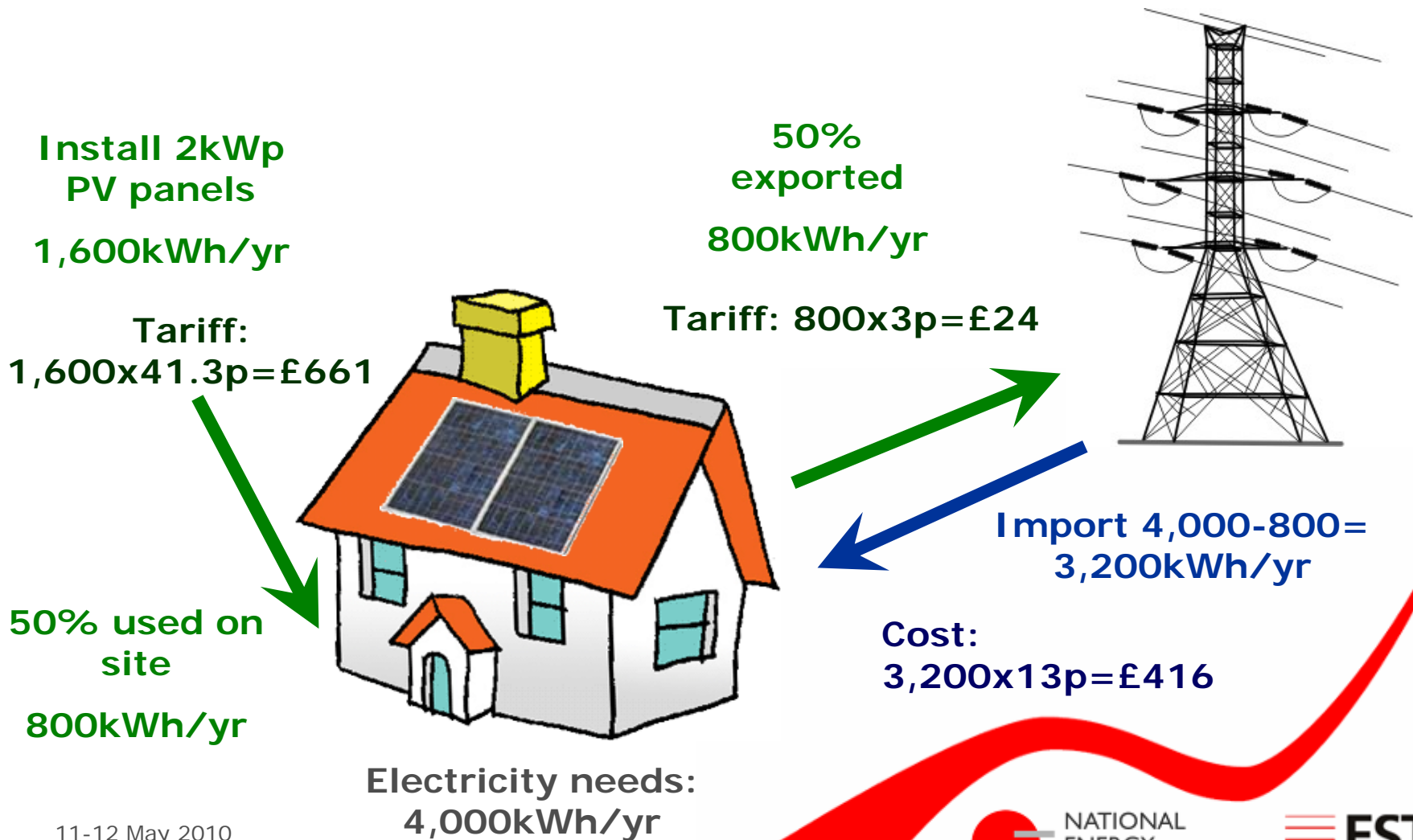


FiTs in practice



Electricity needs:
4,000kWh/yr

FiTs in practice



FiTs in practice

Element	No Generation	Generation
Import Costs	4,000 x 13p/kWh = £520/yr	3,200 x 13p/kWh = £416/yr (+£104/yr)
Generation tariff (<4kW PV retrofit)	0	1,600 x 41.3p/kWh = £661/yr
Export tariff	0	800 x 3p/kWh = £24/yr

Total: 104 + 661 + 24 = £789 or **£19,720** over 25 years

Technology	Scale	Tariff level for new installations in period (p/kWh) [nb tariffs will be inflated annually]			Tariff lifetime (years)
		Year 1: 1/4/10- 31/3/11	Year 2: 1/4/11- 31/3/12	Year 3: 1/4/12- 31/3/13	
Anaerobic digestion	=500kW	11.5	11.5	11.5	20
Anaerobic digestion	>500kW	9	9	9	20
Hydro	=15 kW	19.9	19.9	19.9	20
Hydro	>15-100 kW	17.8	17.8	17.8	20
Hydro	>100 kW-2 MW	11	11	11	20
Hydro	>2 MW – 5 MW	4.5	4.5	4.5	20
MicroCHP pilot*	=2 kW*	10*	10*	10*	10
PV	=4 kW (new build**)	36.1	36.1	33	25
PV	=4 kW (retrofit**)	41.3	41.3	37.8	25
PV	>4-10 kW	36.1	36.1	33	25
PV	>10-100 kW	31.4	31.4	28.7	25
PV	>100kW-5MW	29.3	29.3	26.8	25
PV	Stand alone system**	29.3	29.3	26.8	25
Wind	=1.5kW	34.5	34.5	32.6	20
Wind	>1.5-15kW	26.7	26.7	25.5	20
Wind	>15-100kW	24.1	24.1	23	20
Wind	>100-500kW	18.8	18.8	18.8	20
Wind	>500kW-1.5MW	9.4	9.4	9.4	20
Wind	>1.5MW-5MW	4.5	4.5	4.5	20
Existing microgenerators transferred from the RO		9	9	9	to 2027

10 p pilot scheme for 30,000 non-renewable micro combined heat and power (CHP) installations. Degression: solar PV & wind < 100kW degressed tariffs, starting from year 3 of the scheme

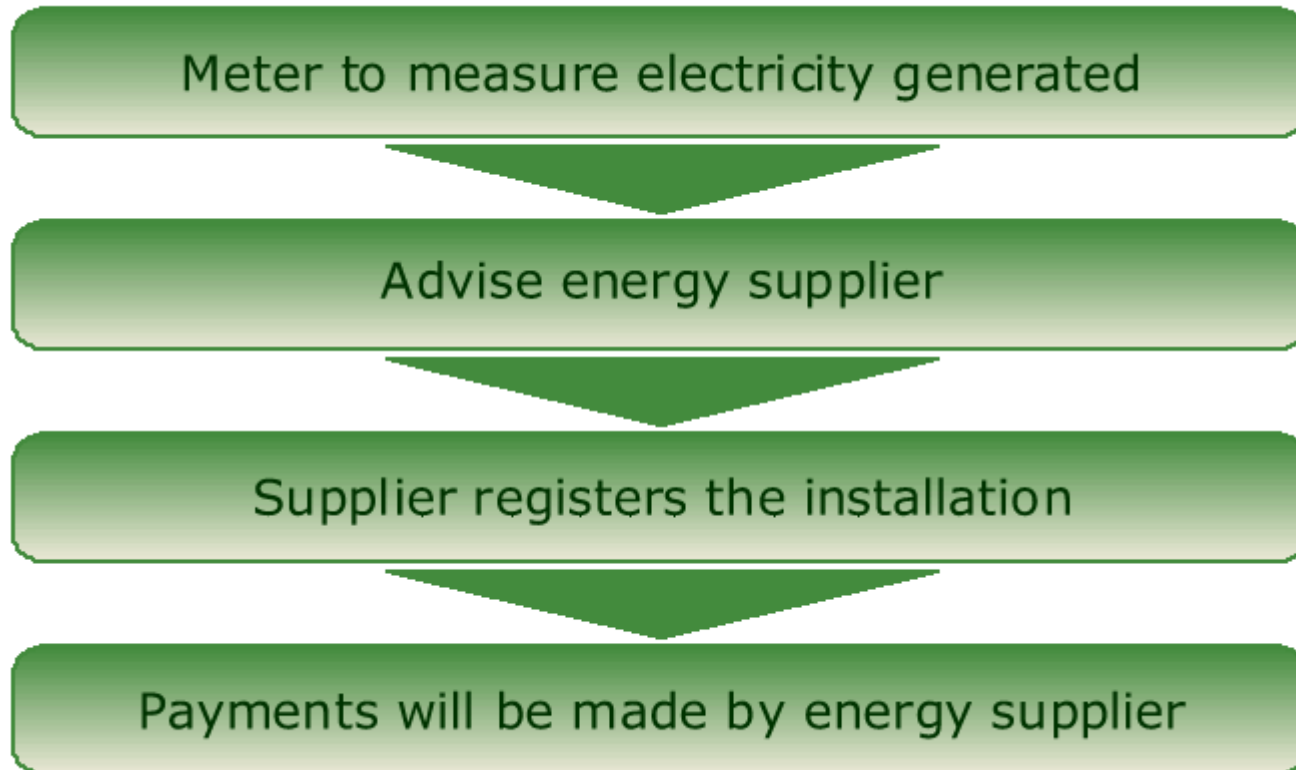
Tariffs Level

Technology	Scale	Tariff level (p/kWh)	Tariff lifetime (years)
Solar electricity (PV)	≤4 kW (retro fit)	41.3	25
Solar electricity (PV)	≤4 kW (new build)	36.1	25
Wind	≤1.5 kW	34.5	20
Wind	>1.5 - 15 kW	26.7	20
Micro CHP	≤2kW	10	10
Hydroelectricity	≤15 kW	19.9	20

Feed in Tariff – Degression

- Tariff lifetime – 20yrs for all, except PV 25yrs
- Degression of tariff levels for new installations is applied to some technologies/scales
 - Reflects, and to some extent encourages, cost reductions over time due to learning, scale of production, etc.
 - A feature of international best practice

Mechanism



Qualifying for the FIT

- The technology was installed between 15th July 2009 and 31st March 2010; OR
- It is installed on or after 1st April 2010 using an MCS certificated product and by an MCS* certificated installer;

* The Microgeneration Certification Scheme (MCS) is an independent scheme that certifies microgeneration products under 50kW and installers in accordance with consistent standards.

The Renewables Obligation (RO)

- Electricity suppliers must source a specified and annually increasing proportion of their electricity sales from renewable sources
 - < 50kW - FiT
 - Between 50kW and 5MW - FiT or RO
 - > 5MW - RO

Renewable Heat Incentive

- Useful heat
- Consultation stage until 26 April 2010
- Launch in April 2011
- First of its kind
- Equipment installed after 15th July 2009
- Grandfathered, open to at least 2020
- 12% ROI (6% solar thermal)

Renewable Heat Technologies

- Air source heat pumps
- Ground source heat pumps
- Solar thermal
- Biomass boilers
- Biogas
- Biomethane in the gas grid
- Bioliquids
- Renewable combined heat and power
- Renewable district or community heating



Criteria and payment

- Small and medium generators (< 45kW):
 - Microgeneration Certification Scheme
 - Annual payment
- Large-scale installations:
 - Register and seek accreditation directly from Ofgem
 - Quarterly payment

Calculations of tariffs

- Small scale: deemed
- Medium-scale: deemed, with option of metering for solid biomass installations
- Large-scale and process-heating: metered
- Biomethane injection and district heating: metered

Table of tariffs

Technology	Scale	Tariffs (pence/kWh)	Tariff lifetime (years)
Small installations			
Solid biomass	Up to 45kW	9	15
Biodiesel (restricted use)	Up to 45kW	6.5	15
Biogas on-site combustion	Up to 45kW	5.5	10
Ground source heat pumps	Up to 45kW	7	23
Air source heat pumps	Up to 45kW	7.5	18
Solar thermal	Up to 45kW	18	20
Medium installations			
Solid biomass	45kW-500kW	6.5	15
Biogas on-site combustion	45kW-500kW	5.5	10
Ground source heat pumps	45kW-500kW	5.5	20
Air source heat pumps	45kW-500kW	2	20
Solar thermal	45kW-500kW	17	20
Large installations			
Solid biomass	500kW and above	1.6-2.5	15
Ground source heat pumps	350kW and above	1.5	20
Biomethane injection	All scales	4	15

RHI in practice

- 15,000kWh per year
- Gas -> biomass and solar thermal
- Installer determines requirements:
 - 10,000kWh space heating
 - 3,700kWh hot water
- Solar thermal: 2,200kWh (@ 18p = £400/yr for 20 years)
- Biomass boiler: 11,500kWh (@ 9p = £1,035/yr for 15 years)

More information

- Sustainable energy training:
 - Introduction to renewables
 - MCS made easy
 - Energy in your organisation

www.nef.org.uk/energytraining

- Technical services:
 - Onsite EE & RE surveys
 - Energy modelling
 - Carbon reduction programmes
 - Energy strategies & targets
 - Behaviour change

enquiries@nef.org.uk or 01908 256901