

Renewable Energy

- A technology overview and the new Feed in Tariffs

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Overview

Renewable Technology Overview

- Generating electricity
- Generating heat

Feed in Tariffs

- Clean Energy Cashback – April 2010
- Renewable Heat Incentive – April 2011

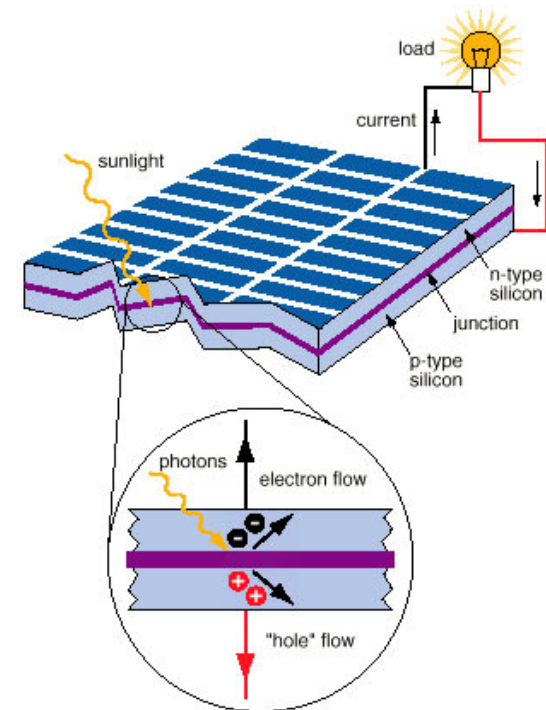
Business support

- Enhanced Capital Allowances
- 0% business loans from the Carbon Trust
- Co₂Sense Yorkshire

Renewable Technology Overview

Generating Electricity - Solar PV

- Solar photovoltaic (PV) uses energy from the sun to create electricity to run appliances and lighting. PV requires only daylight to generate electricity.
- PV systems use cells to convert solar radiation into electricity. The PV cell consists of one or two layers of a semi conducting material, usually silicon. When light shines on the cell it creates an electric field across the layers, causing electricity to flow.



Solar PV - Key issues to consider

- Need a south facing roof with little or no shading
- The ideal roof angle is 30 degrees
- Classed as a 'permitted development' under Planning Regulations for most domestic properties, need planning permission for commercial buildings



Generating Electricity - Wind

- Modern wind turbines use the wind's lift forces to turn aerodynamic blades that turn a rotor which creates electricity.
- Wind power is proportional to the cube of the wind's speed, so relatively minor increases in speed result in large changes in potential output. Individual turbines vary in size and power output from a few hundred watts to two or three megawatts



Wind - Key issues to consider

- Wind turbines work most efficiently when located in an area with unobstructed wind flow, and mounted on a pole or mast
- Planning issues such as visual impact, noise and conservation issues have to be considered.
- Installation normally requires permission from the local authority.



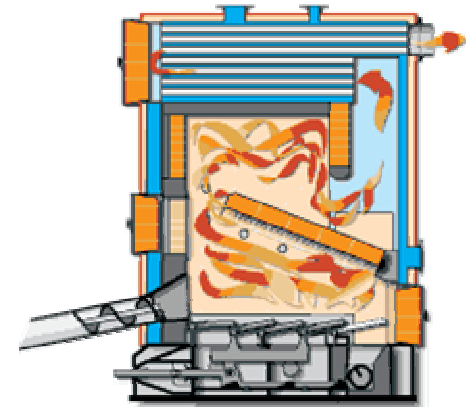
Generating Electricity - Hydro

- Hydro-power systems convert potential energy stored in water held at height to kinetic energy (or the energy used in movement) to turn a turbine to produce electricity.
- Improvements in small turbine and generator technology mean that micro hydro schemes are an attractive means of producing electricity. Useful power may be produced from even a small stream.



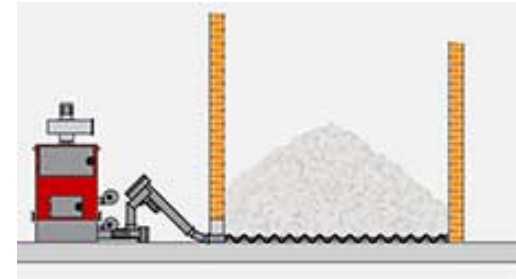
Generating heat - Biomass

- Stand-alone stoves providing space heating for a room. These can be fuelled by logs or pellets but only pellets are suitable for automatic feed. Generally they are 6-12 kW in output, and some models can be fitted with a back boiler to provide water heating.
- Boilers connected to central heating and hot water systems. These are suitable for pellets, logs or chips, and are generally larger than 15 kW.



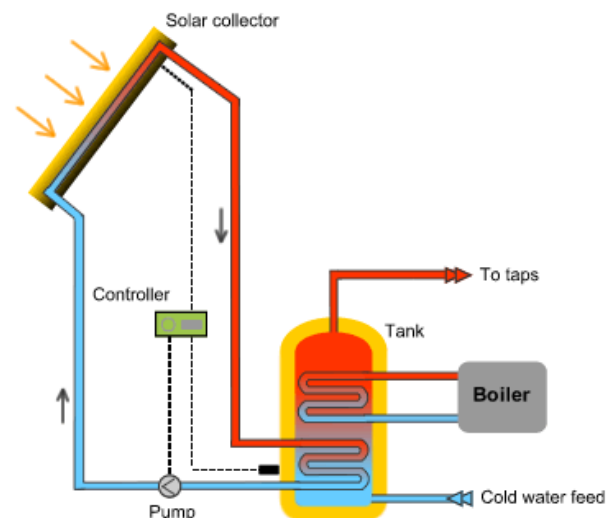
Biomass - Key issues to consider

- Fuel: It's important to have storage space for the fuel, appropriate access to the boiler for loading and a local fuel supplier.
- Flue: The vent material must be specifically designed for wood fuel appliances, chimneys can be fitted with a lined flue.
- Smokeless zone: Wood can only be burnt on exempted appliances, under the Clean Air Act.



Generating heat – Solar Thermal

For domestic hot water there are three main components: solar panels, a heat transfer system, and a hot water cylinder. Solar panels - or collectors - are fitted to your roof. They collect heat from the sun's radiation. The heat transfer system uses the collected heat to heat water. A hot water cylinder stores the hot water that is heated during the day and supplies it for use later.



Solar Thermal - Key issues to consider

- Need a south facing roofs with little or no shading
- The ideal roof angle is 30 degrees
- Need room for a hot water cylinder
- Classed as a 'permitted development' under Planning Regulations for most domestic properties, need planning permission for commercial buildings
- How much hot water is actually needed in the property?

Technology – Heat Pumps

Heat pumps are familiar to us - fridges and air conditioners are two examples. Ground source heat pumps (GSHP) transfer heat from the ground into a building to provide space heating and, in some cases, to pre-heat hot water.

For every unit of electricity used to pump the heat, 3-4 units of heat are produced. As well as ground source heat pumps, air source and water source heat pumps are also available.



Feed in Tariffs

Clean Energy Cashback - Key points

- This new feed in tariff rewards customers producing electricity from renewable technologies – Solar PV, Wind turbines, Micro-hydro and Micro-CHP.
- It does this by guaranteeing a minimum payment for the electricity generated as well as the electricity exported to grid.
- The new feed in tariffs are paid from 1st April 2010, and will apply to all new customers, and those who have installed eligible technologies since 15th July 2009.
- Applicable for all UK (except Northern Ireland) for Households, Communities and Businesses.

Clean Energy Cashback - Key points

- Tariff levels are index linked to the Retail Price Index (RPI) which ensures they rise (or fall) with inflation, and will last for 20 years, except for PV (25 years) and MicroCHP (10 years)
- Ofgem administer the Feed-In-Tariff scheme and suppliers will be responsible for paying their customers.
- Customers must use certified installers and products through the Microgeneration Certification Scheme (MCS) for all projects under 50kW

Clean Energy Cashback

- A payment for every kWh generated
 - **Generation tariff**
- An additional payment for every kWh exported to the local electricity network
 - **Export tariff**
- Additional benefit from usage of electricity “onsite”
 - **Avoided costs**

The tariff levels shown apply to installations that are completed between 15th July 2009 and 31st March 2012, after then the rates decrease.

Technology	Scale	Generation Tariff - pence per kWh	Export tariff – pence per kWh	Tariff lifetime in years
Solar PV – retrofit	< 4kW	41.3	3	25
Solar PV – new build	<4kW	36.1	3	25
Solar PV	4-10 kW	36.1	3	25
Wind	<1.5kW	34.5	3	20
Wind	1.5-15kW	26.7	3	20
Micro hydro	<15kW	19.9	3	20
Existing generators – installed pre-15/07/09	All	9	3	Up to 2027

All generation tariffs and export tariffs will be linked to the Retail Price Index (RPI) which ensures they rise (or fall) with inflation. Tariff levels vary depending on the scale of the installation - The full list (including Anaerobic Digestion and Micro-CHP) is available on the DECC website

Worked example - Annual financial benefit for an average 2kW Solar PV installation 2010

Generation Tariff – 41.3p/kWh	Expected performance 1,600kWh	1,600 kWh x 41.3p	£660
Export Tariff – 3p/kWh	Assume 50% exported	800 kWh x 3p	£24
Avoided Costs - 12p/kWh	Assume 50% used in the property	800 kWh x 12p	£96

Note - this doesn't take into account impact on house value or the rising costs of grid electricity which will both have an additional beneficial impact



Worked example 2 - 6kWp pole mounted wind turbine in a good location installed in 2010 – annual benefit

Generation Tariff – 26.7p/kWh	Expected performance 9,000kWh (annual output between 6,000 and 12,000kWh)	9,000 kWh x 26.7p	£2,403
Export Tariff – 3p/kWh	Assume 6,000kWh exported	6,000 kWh x 3p	£180
Avoided Costs - 12p/kWh	Assume 3,000kWh used in the property	3,000 kWh x 12p	£360
Note - this doesn't take into account impact on house value or the rising costs of grid electricity which will both have an additional beneficial impact			£2,943

Renewable Heat Incentive

- **The Renewable Heat Incentive (RHI) is a UK Government scheme currently under consultation which is likely to form the second part of the Clean Energy Cashback scheme (along with the Feed in Tariffs for electricity).**
- It is expected to commence on 1 April 2011, and will provide financial incentives for any individual or organisation to install renewable heat - generating technologies such as biomass boilers, heat pumps and solar thermal panels.
- Globally, it will be the first scheme of its type for renewable heat

Renewable Heat Incentive – key points



- Currently under Government consultation
- Should come into force April 2011
- Payments come annually from Ofgem
- Must use an MCS certified installer
- Systems installed after 15th July 2009 should be eligible

Eligible technologies

- Air, water and ground-source heat pumps,
- Solar thermal,
- Biomass boilers,
- Renewable combined heat and power,
- Use of biogas and bioliquids,
- Injection of biomethane into the natural gas grid.

The Renewable Heat Incentive (RHI)- Proposed tariffs

Technology	Scale	Proposed tariff (pence/kWh) (2)	Deemed or metered (3)	Tariff lifetime (years)
Solid biomass	Up to 45 kW	9	Deemed	15
Bioliquids (7)	Up to 45 kW	6.5	Deemed	15
Biogas on-site combustion (5)	Up to 45 kW	5.5	Deemed	10
Ground source heat pumps (8) (9)	Up to 45 kW	7	Deemed	23
Air source heat pumps (9)	Up to 45 kW	7.5	Deemed	18
Solar thermal	Up to 20 kW	18	Deemed	20

What the new Government have said;

The Government are committed to increasing the amount of renewable heat in the UK; this is a crucial part of ensuring we meet our renewable targets, cutting carbon and ensuring energy security.

We are currently looking at the renewable heat incentive (RHI) proposals. Clearly there are benefits to the scheme, but we must also consider the impact of the costs, particularly given the financial constraints we must work within and the potential impact that funding options could have on vulnerable people

We are aware that there is uncertainty in the renewable heating industry and want to provide certainty and clarity as quickly as possible, but must make sure that we make the right decision.

We will look to make an announcement on the future of the proposed scheme as soon as possible.

Greg Barker, Minister of State for Energy and Climate Change,
15th June 2010



Business support

Enhanced Capital Allowances

- The Enhanced Capital Allowances (ECA) scheme provides businesses with 100% first year tax relief on their qualifying capital expenditure. Put another way - the scheme allows businesses to write off the whole cost of the equipment against taxable profits in the year of purchase.
- This can provide a cash flow boost and an incentive to invest in energy saving and renewable energy which normally carry a price premium.
- The Energy Technology List (ETL) specifies the energy-saving technologies that are included in the ECA scheme;
 - it includes renewable heat generating technologies such as biomass, solar thermal and heat pumps
 - but excludes renewable electricity generating technologies such as wind, solar PV and micro hydro.
- The ECA scheme is managed by the Carbon Trust on behalf of Government.

Carbon Trust 0% Business loans

- 0% business loans of £3,000 - £100,000 are available from the Carbon Trust to help organisations finance and invest in energy saving and renewable energy projects.
- Anticipated energy savings offset the loan repayments. So new equipment should pay for itself and you should continue to make savings year on year
- The loans are government funded and unsecured with no arrangement fees
- Loans can be repaid over a period of up to 4 years
- The size of the loan offered and its repayment period is based on the projected carbon savings of the project, which will be assessed by the Carbon Trust.
- Eligible companies: Private sector / Trading for at least 12 months / For project sites based in England, Wales and Scotland: All Small or Medium-sized Enterprises (SME).

CO₂ Sense Yorkshire

- Administer a number of schemes and grants www.co2sense.org.uk/funding
 - Investment in low carbon electricity.
Large scale only, must be above 50kWp
 - Funding for producers and users of wood fuel
 - Woodfuel infrastructure grants
 - Loans for woodfuel suppliers
 - Funding to develop a woodfuel ESCO
 - Funding for boiler conversion


Farm Resource Efficiency Programme

- Capital grants programme from Yorkshire Forward, administered by CO2 Sense Yorkshire. Designed to help farmers improve the overall economic performance of their holdings. Includes the following renewable technologies;
 - Renewable power - such as hydro-electric and solar photovoltaic,
 - Renewable heat - such as heat exchange systems, biomass boilers; solar-heat and ground-source heat pumps
- Up to 60% of the cost of eligible expenditure
 - minimum of £1,500 and a maximum of £25,000.
- Full details at <http://www.yorkshire-forward.com/helping-businesses/rural-businesses/funding/frep>

Further information

- Energy Saving Trust 0800 512 012
 - Home Energy Generation Selector - www.energysavingtrust.org.uk/generate-your-own-energy
- Carbon Trust 0800 085 2005
www.carbontrust.co.uk
- Search for grants - www.greengrantsmachine.co.uk





Thank you for listening
Any questions?

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Approximate Installed costs

Technology	Approximate Cost – household scale
Solar PV – 2kWp	£10,000 - £13,000
Wind - roof mounted - pole mounted	£1,500 £11,000 - £19,000
Micro hydro	n/a
Biomass - stove - boiler	£3,000 £9,000
Solar Thermal	£3000 - £5,000
Ground Source Heat Pump	£7,000 - £12,000