

Renewable Energy Specialists Project

Country Briefing Sheet

United Kingdom

November 2010



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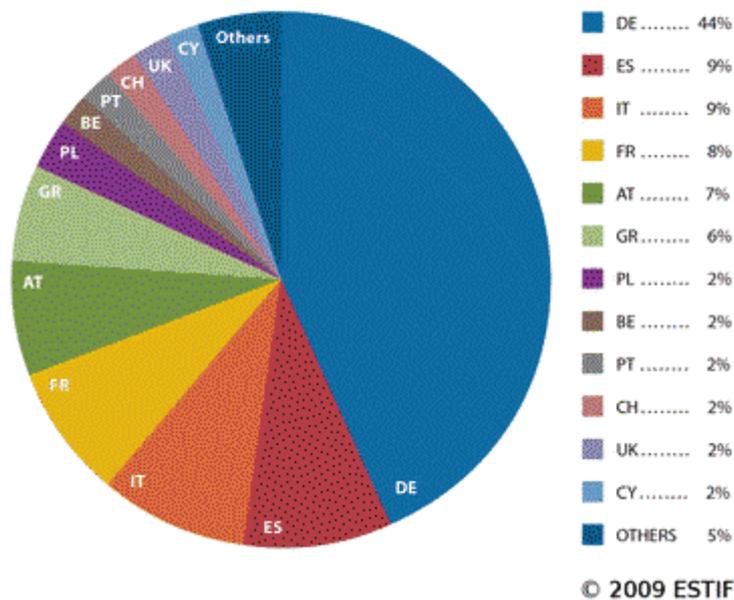
1 Market data in general

This section will outline the sources that provide market statistics of the different renewable energy technologies in the different European countries and the market growth.

1.1 Solar Thermal

ESTIF (European Solar Thermal Industry Federation) is the body that oversees the solar thermal market within the EU. The regularly produce [trends and market statistics](#).

Share of the European solar thermal market



1.2 Solar PV

The European Photovoltaic Industry Association oversees the European Solar PV market and publishes market data and statistics on its website.

The [Solar Generation V report](#) gives a good overview of the current market situation as well as the report on the [Global Market Outlook for Photovoltaic until 2013](#)

Installed capacity in 2007

Top installed capacity in 2007 (MW)		Top 5 capacity 2007 (MW)	
Germany	3.800	Germany	1.100
Spain	632	Spain	512
Japan	1.938	Japan	230
USA	814	USA	190
Italy	100	Italy	50
		Rest	310

(<http://www.epia.org/>)

1.3 Wind

The European Wind Energy Association oversees the European Wind Power market and publishes statistics on the [installed capacity](#) of wind on its website.

(cf. <http://www.ewea.org>)

1.4 Heat pumps

The European Heat Pump Association oversees the European Heat Pump market and publishes amongst other things [statistics](#) on its website.

(cf. <http://www.ehpa.org>)

1.5 Biomass

The European Biomass Association AEBIOM oversees the European Biomass market and publishes amongst other things [statistics](#) on its website.

(cf. <http://www.aebiom.org>)

2 UK Law/Relevant political infrastructure

The following sections will outline the legal aspects relevant to this project.

2.1 Renewable Energy Strategy (RES)

The RES was developed as a response to the EU Renewable Energy Directive. It is a strategy that outlines how the UK can reach its 2020 target which is 15 % of energy from renewables by 2020. This target is equivalent to a 7-fold increase in UK renewable energy consumption from 2008 levels.

(cf.

http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/renewable/res/res.aspx)

Starting from chapter 4.9 the RES outlines the training aspects necessary of making the RES successful. It underlines that a Skilled Workforce is vital. Sections relevant to this report are shown below:

- It is expected that the increase of renewables will create 500.000 new jobs in this sector.
(cf. RES ch. 4.9, p. 94)
- It is seen at a great challenge to develop the skilled workers to fill these jobs. The key issues are:
 - Attracting the right workers – and developing the right courses while building training capacity to train them (including capturing the knowledge and experience of older workers).
 - Ensuring that training is of good quality and that it is linked to National Occupational Standards and qualifications and that it builds up the necessary skills to handle new technologies.
 - Improving understanding of supply and demand – to foresee and mitigate future imbalances.(cf. RES ch. 4.91, p. 95)
- The UK renewables industry does not yet have a coherent approach to training. The skills the UK's renewables sector will need are covered by at least 9 different Sector Skills councils (SSCs), and training to date has mostly involved a variety of courses and accreditation schemes operated by manufacturers and trade associations (although some progress towards a national structure has been made, e.g. the development of National Occupational Standards for Microgeneration by Summit Skills).
(cf. RES ch. 4.92, p. 95)
- Energy & Utility Skills (the Sector Skills Council for the gas, power, waste management and water industries) has already begun to work with other SSCs to develop a skills strategy for renewable energy. However, the complex overlap across the SSCs has hindered effective leadership in skills development to date. Challenges include – in some sectors – fragmented and hard-to-reach workforces. Where significant progress has been made, it has generally been specific to a technology, business sector or particular region.
(cf. RES ch. 4.93, p. 95, <http://www.euskills.co.uk/home/about-us/>)
- Recognising that the new renewables sector requires a step change in the way skills are developed, ORED (Office for Renewable Energy Deployment) will support a comprehensive review of the renewables sector skills across the UK, to be led by EU Skills with input from the Devolved Administrations, the key SSCs and wider stakeholders. The initial focus will be a detailed understanding of the current state of skills provision for the renewables sector, together with models of supply and demand, by April 2010, which will enable the SSCs and employers to develop a

strategic approach to skills and training across the renewable energy footprint.
(cf. RES ch. 4.94, p. 95

http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/renewable/ored/ored.aspx ; ORED structure)

- ORED is working with EU Skills (Sector Skills Council for the gas, power, waste management and water industries) to assist the electricity sector to develop the National Skills Academy for Power. If this is approved, the Academy should be launched by the first quarter of 2010. It will develop the skills needed for the enhanced, smart networks needed to integrate renewable generation, including microgeneration and aims to ensure that the energy sector has a healthy inflow of skilled workers for the future. ORED will also work with the Academy to ensure that the UK has the skilled workers both to deliver our renewable energy systems and profit from the wider business opportunities of the global low-carbon market.

(cf. RES, ch. 4.95, p. 95,96;

<http://www.nationalskillsacademy.co.uk/academies/sectors/power/index.html>,

www.nationalskillsacademypower.co.uk)

- The wind industry, led by the British Wind Energy Association (BWEA) and with assistance from ORED, is developing a skills and training strategy for wind energy and marine renewables that will aim to ensure the industry is well positioned to recruit new workers and has an up to date training and qualifications framework. The BWEA plans to launch the first part of this strategy, an apprenticeship framework. The Biomass Energy Centre is working with its sector to provide updated and detailed information and guidance on biomass installation, as well as a biomass training course.

(cf. RES, ch. 4.96, p. 96; <http://www.bwea.com/media/news/articles/pr20091021-2.html>)

2.2 UK water and building regulations

This section outlines the UK's water and building regulations.

2.2.1 UK Water regulations

Funded by all the UK Water Suppliers there has been the Water Regulations Advisory Scheme developed to provide an advisory service for Water Regulations.

Quick Facts about the water supplier in the UK

- There are over 20 companies supplying water in England and Wales.
- Scotland has only one water authority.
- Northern Ireland has only one water authority and domestic customers do not have to pay water rates.
- There are water only companies and combined water and sewerage companies.
- You can pay a standing charge for water or have a meter.
- Water rates differ across the UK.
- You cannot switch your water supplier.

(cf. <http://www.water-guide.org.uk/companies.html>)

2.2.1.1 The Water Regulations Advisory Scheme (WRAS)

The Water Fittings Regulations apply to England, Wales, Northern Ireland and Scotland (called Byelaws in Scotland) and are national requirements for the design, installation and maintenance of plumbing systems, water fittings and water-using appliances.

Their purpose is to prevent misuse, waste, undue consumption or erroneous measurement of water and, most importantly, to prevent contamination of drinking water.

Owners and occupiers of premises and anyone who installs, plumbing systems or water fittings have the legal duty to ensure that the systems satisfy the regulations. Advanced notice must be given of proposed installations in most cases, so architects, building developers and plumbers have to follow the regulations on behalf of future owners or occupiers

Fittings which were installed before the regulations came into force don't have to comply with the current regulations nor is their removal, replacement, alteration or disconnection. However as there is a rise to a significant risk of contamination or waste of water, the water supplier can insist on improvement, using the Water Industry Acts.

The Government requires water suppliers to enforce the regulations. Water suppliers can provide copies of their Codes of Practice on Enforcement. As with the previous Supply Byelaws, water suppliers will undertake inspections of new and existing installations to check that the regulations are being met where breaches of the regulations are found, the water supplier will require them to be remedied as soon as practicable where breaches pose a risk to health, the water supply to the premises may be disconnected immediately to protect the health of occupants or others fed from the same public supply.

Installers' and homeowners have the following responsibilities regarding Water Regulations:

- To install and maintain the plumbing system in a way that it complies with the regulations
- Prevent the contamination of drinking water
- Give advanced notification of installation work

- ***Plumbing systems***

Plumbing systems must be designed, installed and maintained to meet the regulations' requirements. Plumbing materials and fittings must be of a suitable standard. It is not illegal to sell unsuitable fittings and appliances but to install one would be illegal, so check suitability before purchase. The regulations list the standards which fittings must meet and the Water Fittings and Materials Directory, published by the Water Regulations Advisory Scheme (WRAS), gives up-to-date details of a wide range of items which have been tested and proved to comply. Plumbing must be properly installed and maintained to protect water quality, to ensure safety, ease of access for maintenance, detection of leakage, protection against damage or freezing etc. If you are doing your own installation, ensure you know what requirements you must meet. If you are employing someone else, consider using an Approved Plumber who will guarantee compliance of the new installation. Application of the regulations is not back-dated. Any plumbing system or water fitting which was installed lawfully under the Water Supply Byelaws before the regulations came into force can still be used, even if it would be illegal to install it now.

- ***Prevention of backflow***

Where water or water-using equipment is used with fluids or materials which could contaminate it, there must be adequate protection to stop backflow of potentially contaminated water into other parts of the system, especially drinking water. The regulations define Fluid Risk Categories by the type of contaminants which are present and specify the appropriate type of prevention device which must be fitted to guard against backflow.

- ***Advanced Notification***

In most cases, before any proposed installation starts, the installer, owner or occupier must obtain the water supplier's consent by giving advanced notice of the work. This applies to water system installations in connection with any of the following:

- The erection of any new building or structure.
- The extension or alteration of the water system in any premises except a domestic dwelling.
- The material change in use of any premises.
- The installation of:
 - A bidet with an ascending spray or flexible hose;
 - A bath larger than 230 litres (measured to the centre of the overflow);*
 - A shower unit of a type specified by the Regulator (but none is currently specified);*
 - A pump or booster drawing more than 12 litres per minute;
 - A reverse osmosis unit;
 - A water treatment unit producing a waste water discharge or requiring water for regeneration or cleaning;
 - A reduced pressure zone (RPZ) valve or other mechanical device for protection against backflow in fluid category 4 or 5;
 - A garden watering system unless designed to be a hand-operated one;*
 - Any water system laid outside a building and either less than 750 mm or more than 1350 mm below ground level;
- Construction of an automatically-replenished pond or swimming pool of more than 10,000 litres.*
- In addition, for Northern Ireland only, notification is required for:
 - a WC with an ascending spray or flexible hose; #
 - a flexible shower hose or other flexible outlet for use in conjunction with a WC; #
 - a 'shower-toilet' or 'bidet- toilet' where, either as part of the WC itself or as an addition or adaptation of it, a stream of water is provided from below the spillover level of the WC pan for personal cleansing; #
 - a pump delivery pipe drawing water from a supply pipe;
 - greywater, recycled water, reclaimed water and rainwater harvesting systems;
- water systems for fire fighting, including domestic sprinklers

For notification, the following information must be sent to the local water supplier:

- The name and address of the person giving notice and, if different, of the person to whom the consent should be sent.
- A description of the proposed work and any related change of use of premises.
- The location of the premises and their use or intended use.
- Except for items marked (*) above, a plan of that part of the premises which relates to the proposed work and a diagram showing the pipework and fittings to be installed.
- The plumbing contractor's name and address, if an approved plumber is to do the work.
- Consent will not be withheld unreasonably, and may be granted subject to conditions, which must be followed. If consent is not given within ten working days, it is deemed to have been granted. This does not alter the obligation upon the installer and owner or occupier to see that the regulations are fully met.

- *Approved Plumbers*

An Approved Plumber will provide a certificate to state that his or her installation or maintenance work satisfies the regulations. If breaches of regulations are found in the certified work, the legal responsibility falls upon the Approved Plumber and not on the owner or occupier. Installation by an Approved Plumber of items marked (#) in the list above does not have to receive prior consent but on completion, compliance certificate copies must be sent to the water supplier, in addition to the person who asked for the work to be done. Details are available from the local water supplier of Approved Plumbers who have demonstrated their experience of plumbing work and knowledge of the regulations and have liability insurance cover.

For England and Wales, the Water Supply (Water Fittings) Regulations and their Schedules are Statutory Instruments (1999 No. 1148 and No. 1506) available from HMSO and via the hyperlink below.

[Water Supply \(Water Fittings\) Regulations 1999 \(England and Wales\)](#)

Copies of the Byelaws 2004 (Scotland) are available via the hyperlink below:

[Water Byelaws 2004 \(Scotland\)](#)

Copies of the Water Supply (Water Fittings) Regulations (Northern Ireland) 2009 are available via the internet link below.

[Water Supply \(Water Fittings\) Regulations \(Northern Ireland\) 2009](#)

The Government has also published on the Internet a Guidance Document relating to the Schedules, which is relevant to England, Wales, Scotland and Northern Ireland. This is available from the internet link below.

[Guidance document](#)

The text of all these documents is included with detailed Water Industry guidance and interpretation in the "[Water Regulations Guide](#)", available from the Water Regulations Advisory Scheme. Water Suppliers cannot provide a design service for installations, but they will try to answer individual queries from customers, designers, builders and installers about the interpretation of the regulations.

2.2.2 Building Regulations England and Wales

Communities and Local Government (DCLG) is responsible for national policy on building regulations, which exist principally to ensure the health, safety, welfare and convenience of people in and around buildings, and the water and energy efficiency of buildings. The regulations apply to most new buildings and many alterations of existing buildings in England and Wales, whether domestic, commercial or industrial. The building regulations are separated in Parts A, B, C, D, E, F, G, H, J, K, L, M, N and P. The complete collection of all building regs including individual amendments, research reports, determinations and appeals, consultations, regulatory impact assessments (RIA's) and FAQ's can be found at <http://www.planningportal.gov.uk/england/professionals/buildingregs/technicalguidance/bcaccesspartm/bcregulatoryimpactassessm241>

The links to the individual parts and their designation are shown below:

- [Part A: Structure](#)

- [Part B: Fire Safety](#) Volume 1: Dwellinghouses

- [Part B: Fire Safety](#) Volume 2: Buildings other than dwelling houses

- [Part C: Resistance to contaminants and moisture](#)

- [Part D: Toxic Substances](#)

- [Part E: Resistance to Sound](#)

- [Part F: Ventilation](#)

- [Part G: Hygiene](#)

- [Part G: Draft version of the 2009 edition \(Hygiene\)](#)
- [Part H: Drainage and waste disposal](#)
- [Part J: Combustion appliances and fuel storage](#)
(Heat producing appliances)
- [Part K: Protection from falling](#)
- [Part L: Conservation of fuel and power](#)
- [New Dwellings:](#)
- [Existing Dwellings:](#)
- [New buildings other than dwellings:](#)
- [Existing buildings other than dwellings:](#)
- [Part M: Access to and use of buildings](#)
- [Part N: Glazing safety](#)
- [Part P: Electrical Safety in relation of impact opening and cleaning](#)
- [Regulation 7: Material and workmanship](#)

2.2.3 Scotland

In Scotland ‘The Building Standards Division (BSD)’ which is integrated into the Scottish Government is responsible for writing the Scottish building regulations.

The Building (Scotland) Act 2003 gives Scottish Ministers the power to make building regulations.

(cf. <http://www.sbsa.gov.uk2003>

http://www.opsi.gov.uk/legislation/scotland/acts2003/asp_20030008_en_1)

There are two Technical Handbooks which give guidance on how to comply with the Scottish building regulations, one covering domestic buildings and the other non-domestic buildings. These Technical Handbooks have been issued by Scottish Ministers for the purpose of providing practical guidance with respect to the requirements of the provisions of the building regulations under a notice given in accordance with Section 4(2) of the Building (Scotland) Act 2003.

Each Handbook has seven sections. Section 0 is identical in both Handbooks. It covers general issues and sets out how and when the regulations apply to buildings and works. Sections 1 to 6 give guidance on how to achieve the standards set by the regulations, and there are different sets for domestic buildings and non-domestic buildings. The six sections each cover a number of related standards Each of the six sections consists of an introduction and then guidance on the standards within the section. At the end of the Handbook, after section 6, there are Appendices A (Defined Terms), B (List of Standards) and C (Full index). The sections in the handbook are shown in the table below:

Technical Handbook ‘Domestic Buildings’	Technical Handbook ‘Non-Domestic Buildings’
Section 0 General	
Section 1 Structure	Section 1 Structure
Section 2 Fire	Section 2 Fire
Section 3 Environment	Section 3 Environment
Section 4 Safety	Section 4 Safety
Section 5 Noise	Section 5 Noise
Section 6 Energy	Section 6 Energy
Appendix A: Defined Terms	Appendix A: Defined Terms
Appendix B:	Appendix B:

List of standards and other publications	List of standards and other publications
Appendix C : Full index	Appendix C : Full index

The Technical Handbooks are supported by a Procedural Handbook, published separately, which clarifies the intent of the Building (Scotland) Procedures Regulations 2004.

2.2.4 Northern Ireland

The Department of Finance and Personell (DFP) is responsible for the development and the implementation of policy and legislation relating to the Building Regulations for Northern Ireland. Technical Booklets are published by the Department in support of some of the technical parts of the regulations. They provide construction methods that, if followed, will be deemed-to-satisfy the requirements of the Building Regulations. They are:

- [DOE Technical Booklet C: 1994 - Site preparation and resistance to moisture](#) ⁽²⁾
- [DOE Technical Booklet D: 1994 - Structure](#) ^{(1) (2)}
- [DFP Technical Booklet E: 2005 - Fire Safety](#) ⁽³⁾
- [DFP Technical Booklet F1: 2006 - Conservation of fuel and power in dwellings](#) ⁽⁴⁾
- [DFP Technical Booklet F2: 2006 - Conservation of fuel and power in buildings other than dwellings](#) ⁽⁴⁾
- [DOE Technical Booklet G: 1990 - Sound](#) ^{(1) (2)}
- [DOE Technical Booklet G1: 1994 - Sound \(conversions\)](#) ⁽²⁾
- [DFP Technical Booklet H: 2006 - Stairs, ramps, guarding and protection from impact](#)
- [DOE Technical Booklet K: 1998 - Ventilation](#) ⁽²⁾
- [DFP Technical Booklet L: 2006 -Combustion appliances and fuel storage systems](#)
- [DOE Technical Booklets N: 1990 - Drainage](#) ^{(1) (2)}
- [DOE Technical Booklet P: 1994 - Unvented hot water storage systems](#) ⁽²⁾
- [DFP Technical Booklet R: 2006 - Access to and use of buildings](#)
- [DFP Technical Booklet V: 2000 - Glazing](#) ⁽³⁾

(1) This booklet should be read in conjunction with [DOE Amendments Booklet - AMD 1:1998](#)

(2) This booklet should be read in conjunction with [DFP Amendments Booklet - AMD2: 2000](#)

(3) This booklet should be read in conjunction with [DFP Amendment Booklet - AMD 3 2006](#)

(4) This booklet should be read in conjunction with [DFP Amendment Booklet - AMD 4 2008](#).

2.3 Governmental Incentives

The below mentioned incentives shall encourage individuals or organisations in the UK to install RE systems into their properties.

2.3.1 LCBP grant scheme(will be replaced)

The Low Carbon Building Programme (LCBP) is the UK's grant scheme individuals or organisations can apply for if they wish RE technology installed into their properties. The LCBP is divided in Phase 1 and Phase 2e. Applications can be received from properties located within England, Wales, Northern, Ireland or Scotland (excluding the Isle of Man and the Channel Islands).

2.3.1.1 Low Carbon Buildings Programme – Phase 1

Householders interested in generating their own heat or electricity, can apply online for a grant on the LCBP website. Grants are available for:

- Solar electricity (solar photovoltaic)
- Wind turbines
- Water turbines (small scale hydro)
- Solar hot water
- Ground source heat pumps
- Air source heat pumps
- Wood-fuelled boilers (biomass)
- Automatic pellet-feed wood burning stoves (biomass)

It will also be possible to apply for the following technologies when certified products and installers become available:

- Renewable combined heat and power (CHP)
- Micro CHP
- Fuel cells

Phase 1 of the Low Carbon Buildings Programme is managed for DECC by the Energy Saving Trust.

(cf. <http://www.lowcarbonbuildings.org.uk/>)

Grant amounts and grant offer validity periods

The following table shows funding levels available for each microgeneration technology and the grant offer validity periods within which claims must be submitted and received.

Technology	Maximum Amount of Grant	Grant Offer Validity Period
Solar PV	Maximum of £2,000 per kW of installed capacity, subject to an overall maximum of £2,500 or 50% of the relevant eligible costs, whichever is the lower	<ul style="list-style-type: none"> ▪ 4 months for existing buildings ▪ 6 months for buildings under construction
Wind turbines	Maximum of £1,000 per kW of installed capacity, subject to an overall maximum of £2,500 or 30% of the relevant eligible costs, whichever is the lower	<ul style="list-style-type: none"> ▪ 4 months for existing buildings ▪ 6 months for buildings under

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		construction
Small scale hydro	Maximum of £1,000 per kW of installed capacity, subject to an overall maximum of £2,500 or 30% of the relevant eligible costs, whichever is the lower	<ul style="list-style-type: none"> ▪ 12 months for existing buildings ▪ 12 months for buildings under construction
Solar thermal hot water	Overall maximum of £400 or 30% of the relevant eligible costs, whichever is the lower	<ul style="list-style-type: none"> ▪ 3 months for existing buildings ▪ 6 months for buildings under construction
Ground source heat pumps	Overall maximum of £1,200 or 30% of the relevant eligible costs, whichever is the lower	<ul style="list-style-type: none"> ▪ 6 months for existing buildings ▪ 6 months for buildings under construction
Air source heat pumps	Overall maximum of £900 or 30% of the relevant eligible costs, whichever is the lower	<ul style="list-style-type: none"> ▪ 6 months for existing buildings ▪ 6 months for buildings under construction
Automated wood pellet fed room heaters/stoves	Overall maximum of £600 or 20% of the relevant eligible costs, whichever is the lower	<ul style="list-style-type: none"> ▪ 6 months for existing buildings ▪ 6 months for buildings under construction
Wood fuelled boiler systems	Overall maximum of £1,500 or 30% of the relevant eligible costs, whichever is the lower	<ul style="list-style-type: none"> ▪ 6 months for existing buildings ▪ 6 months for buildings under construction

Please note: There is a £2,500 grant cap per household. Householders can apply for more than one technology but the funding will be limited up to a maximum of £2,500 per household depending on technologies involved and to one grant per technology type.

(cf. <http://www.lowcarbonbuildings.org.uk/Grants-for-your-home>)

2.3.1.2 Low Carbon Building Programme – Phase 2

LCBP Phase 2 is the current grant scheme for installations of microgeneration technologies in public sector buildings or charitable bodies.

Organisations can apply for a maximum of up to £200,000 in grant funds per site. A site may include more than one building and multiple applications from one organisation for different sites will be considered.

LCBP Phase 2 is managed by BRE (British Research Establishment) (cf. <http://www.bre.co.uk>). LCBP Phase 2 is part of the UK Environmental Transformation Fund (ETF), a joint DECC1/Defra2 fund to bring forward the demonstration and deployment of low carbon energy and energy efficiency technologies. Further information about the ETF is available from their respective websites DECC or Defra.

¹ Department for Energy and Climate Change

² Department of Environment, Food and Rural Affairs

2.3.1.3 Important Information:

- ***The actual householders who wish to have the renewable energy system installed into their property have to apply for the grant. The installer or manufacturer can not do this for them.***
(cf. <http://www.lowcarbonbuildings.org.uk/Information-for-Installers>)
- ***Householders can only apply for a grant when the installed product (renewable energy system) and the installer company is MCS accredited!!***
(cf. <http://www.lowcarbonbuildings.org.uk/Information-for-Installers>)
- ***The Low Carbon Building Programme Phase 1 and 2 will be replaced by the Feed-in-tariff which will become effective on 31st March 2010 and the Renewable Heat Incentive which will become effective on 31st April 2011 which is explained in further detail below.***

2.3.2 Feed-in tariff (2010)

The Feed-in Tariff (FiT) will provide a financial incentive for householders and businesses to install renewable electricity systems. This scheme will guarantee a minimum payment for the electricity your system generates and the electricity exported. The FiT will replace the LCBP from April 2010. The government consulted on this scheme during 2009 but since the outcome has not yet been published, the actual tariff could vary from the description below.

Under current proposals, there are three ways in which you can benefit if you have these technologies:

A fixed payment from your electricity supplier for every unit of energy or kilowatt hour (kWh) generated (the “generation tariff”) for a period of 20 years (except for solar PV which would be for 25 years).

If you do not use the electricity on-site you can export it to the grid. You will get a guaranteed minimum payment additional to the generation tariff for every kWh exported to the grid (the “export tariff”).

You will also benefit from on-site use of the electricity you generate: where you use the electricity on-site you will be able to offset this against electricity you would otherwise have had to buy.

If your renewable electricity system is eligible for the FiT and the installation is completed between 15th July 2009 and April 2010, you will receive FiT from when the FiT commences. This means that within this time window, you could receive both LCBP and FiT.

The proposed payment levels for FiT are given in the table below. If your system is installed during the first year of the FiT operation, you will receive the specified payment for the lifetime of the tariff. Systems installed the following year will receive the tariff amount less the degeneration percentage for the lifetime of the tariff. For example, electricity from a retrofit solar PV system of less than 4kWp will be paid at 36.5p/kWh for systems installed during 2010/11. Systems installed the following year will receive $(36.5 - 7\%) = 33.9\text{p/kWh}$.

The table below lists the FiT tariffs that we currently use to calculate potential savings of micro-generation recommendations.

Technology	Scale	Proposed initial tariff (p/kWh)	Annual degression (%)
PV	< 4kWp retrofit	36.5	7
PV	< 4kWp new build	31.0	7
PV	Stand alone	26.0	7
Wind	< 1.5kW	30.5	4
Wind	1.5 – 15 kW	23.0	3
Biomass-CHP	< 50kW	9.0	0
Hydro	< 10kW	17.0	0
Hydro	10 – 100kW	12.0	0

We have assumed a tariff of 4.5p/kWh for Gas fuelled Micro-CHP based on the assumption that it will be less than the proposed level for Biomass CHP. This and the other figures in the table above and info in this section have yet to be finalised by Government.

2.3.3 Renewable Heat Incentive (2011)

The Renewable Heat Incentive (RHI) is currently a pre-consultation policy instrument so this information is based on assumptions rather than concrete information. It is based on recent discussions with various civil servants and politicians and until it is confirmed in writing, is highly likely to significantly change.

The policy has been passed as an act of parliament and so government has a duty to implement the policy. We are informed that the RHI consultation will be published in January 2010 and that the scheme will be launched in April 2011. All current renewable heating installations, if fitted by an installer registered on the Micro-generation Certification scheme (MCS) using MCS or equivalent registered products should qualify for the RHI heat tariff and back payments should also be made similar to the Feed-in-Tariff back-payments. We expect the scheme will offer a 5 to 8% return on investment (i.e. around 12 to 15 year payback) and the money to fund the scheme is likely to be based on a charge from gas, oil or LPG charges.

For small scale Renewable Heat installations, the payments will probably be “deemed”. That is, they will be based on a calculated rather than metered return and also we expect the payments will be made on an annual basis rather than as an upfront “pre-capitalised” payment. We also understand that the tariffs will be paid on both new build and retrofit heat installations.

2.3.4 Merton Rule

The Merton Rule is named after the council in the United Kingdom that adopted the first prescriptive planning policy that required new commercial buildings over 1,000 square meters to generate at least 10% of their energy needs using on site renewable energy equipment. Merton developed the rule and adopted it in 2003, its impact was such that the Mayor of London and many councils have also implemented it.

In 2008, the UK government published its central planning guidance Planning Policy Statement - Planning and Climate Change - PPS1 that requires all UK local planning authorities to adopt a "Merton rule" policy. Receiving Royal Assent in November 2008, the Planning and Energy Act 2008 enables all councils in England and Wales to adopt a Merton Rule as well as specify energy efficiency standards over and above that of building regulations. Currently there are 60 local authorities which have adopted the Merton Rule.

The Merton Rule has been a regulation based driver for the adoption of Renewable Energy. In the longer term, this function is likely to be superseded by the Code for Sustainable Homes which is explained in further detail below.

(cf. <http://www.merton.gov.uk/living/planning/planningpolicy/mertonrule.htm>,
<http://www.merton.gov.uk/living/planning/planningpolicy/mertonrule.htm>)

2.3.5 Code for Sustainable Homes

The Code for Sustainable Homes is an environmental impact rating system for housing in England, setting new standards for energy efficiency (above those in current building regulations) and sustainability which are not mandatory under current building regulations but represent important developments towards limiting the environmental impact of housing.

The Code is the national standard for the sustainable design and construction of new homes. It aims to reduce carbon emissions and create homes that are more sustainable.

The Code measures the sustainability of a home against design categories, rating the 'whole home' as a complete package.

There are 6 different code levels:

Minimums Standards					
Code Level	Energy		Water		Other Points required
	Standard (% better Part L Building regs 2006)	Points Awarded	Standard	Points Awarded	
1*	10	1.2	120	1.5	33.3
2**	18	3.5	120	1.5	43.0
3***	25	5.8	105	4.5	46.7
4****	44	9.4	105	4.5	46.7
5*****	100	16.4	80	7.5	60.1
6*****	Zero Carbon Homes	17.6	80	7.5	64.9

The Code supports the government target that all new homes will be zero carbon from 2016 and the step changes in Building Regulations Part L leading to this.

The design categories included within the Code are:

- Energy/CO2
- Pollution
- Water

- Health and well-being
- Materials
- Management
- Surface water run-off
- Ecology
- Waste

In March 2008, the UK government announced a mandatory requirement for all new homes to be rated against the Code from May 2008. No specific star ratings or assessments are set, but the rating means that every new home owner will know whether their home was built to higher standards than building regulations and what standards had been met. The rating also acts as an incentive to home builders to consider building to the Code's higher standards, whilst making the information routinely available will encourage consumers to be more demanding.

(cf. <http://www.communities.gov.uk/publications/planningandbuilding/codeguide>)

2.3.6 GPDO – General Permitted Development Order

The Town and Country Planning (General Permitted Development) Order 1995 is a Statutory Instrument enacted in the United Kingdom and applying to planning law in England and Wales.

The Order sets out what is Permitted Development, which is to say what may be built without obtaining planning permission. It was made under powers granted by the Town and Country Planning Act 1990 and the Coal Industry Act 1994 and came into force on 3 June 1995. It has been amended several times since it was enacted.

The Order sets out 84 separate classes of development for which a grant of planning permission is not required (permission is deemed granted). The 84 classes are spread across 33 parts as set out in Schedule 2 to the Order.

The Order sets a number of broad heads of permitted development out. To each of these it applies more detailed definition and exceptions to the broad permission.

(cf. http://www.opsi.gov.uk/si/si1995/Uksi_19950418_en_1.htm, Statutory instruments)

Different to the Building regulations the General Permitted Development Order focuses rather on visibility and noise matters than on health and safety issues.

2.3.6.1 Planning permission for renewables

In England and Scotland, changes to permitted development rights for renewable technologies introduced on 6th April 2008 and 12th March 2009 respectively, have lifted the requirements for planning permission for most domestic microgeneration technologies.

The General Permitted Development Order (GPDO), or the Town and Country Planning (General Permitted Development) (Domestic Microgeneration) (Scotland) Amendment Order 2009 grants rights to carry out certain limited forms of development on the home, without the need to apply for planning permission. The scope of the GPDO in England and the TCP (GPD) in Scotland now extends to the following technologies:

- ***Solar PV and Solar Thermal (roof mounted):***

Permitted unless;

- panels when installed protrude more than 200mm.
- they would be placed on the principal elevation facing onto or visible from the highway in buildings in Conservation Areas and World Heritage Sites.

- ***Solar PV and Solar Thermal (stand alone):***

Permitted unless:

- more than 4 metres in height
- installed less than 5 metres away from any boundary
- above a maximum area of array of 9m²
- situated within any part of the curtilage of the dwelling house or would be visible from the highway in Conservations Areas and World Heritage Sites.

- ***Biomass Boilers and Stoves, and CHP:***

Permitted unless:

- flue exceeds 1m above the roof height
- installed on the principal elevation and visible from a road in buildings in Conservation Areas and World Heritage Sites.

- ***Ground Source Heat Pumps***

Permitted

- ***Water source heat pumps***

Permitted

- ***Micro Wind***

Due to legal technicalities the current statutory instrument (SI) does not cover micro wind. Once these issues have been resolved, it is expected that roof mounted and free standing micro wind turbines will be permitted at detached properties that are not in conservation areas. Further legislation is expected later this year.

Until then, you must consult with your local authority regarding planning permission.

- ***Air Source Heat Pumps (ASHP)***

ASHP is in a similar situation to micro wind. Once the legal technicalities have been resolved, it is expected that air source heat pumps will be permitted developments. Again, further legislation is expected later this year.

Until then, you must consult with your local authority regarding planning permission.

(Note that the permitted development rights are not extended to Listed Buildings which are covered by other planning regulations.)

- ***Wales and Northern Ireland***

Permitted Development and planning policy in general is a devolved responsibility. The Welsh Assembly Government and Northern Ireland Government are currently considering changes to their legislation on permitted developments, to facilitate installations of microgeneration technologies. Legislation is expected in both countries later this year.

Until then, householders in Wales and Northern Ireland must consult with their local authority regarding planning permission.

(cf. <http://www.lowcarbonbuildings.org.uk/Grants-for-your-home/Planning-permission>)

- *Future of General Permitted Development of small scale renewables*

There is currently a Consultation on Permitted Development Rights for Small Scale Renewable and Low Carbon Energy Technologies and Electric Vehicle Charging Infrastructure undergoing which will determine the permitted development for small scale renewables. The closing date of the Consultation will be the 9th February 2010.

(cf. <http://www.communities.gov.uk/publications/planningandbuilding/microgenelectriccars>, Consultation papers)

3 Standards, Accreditation and Certification

This section will outline the quality standards that apply in the UK to microgeneration organisations and their products and services.

3.1 The Microgeneration Certification Scheme (MCS)

The Microgeneration Certification Scheme (MCS) has been implemented to ensure quality on the renewable technology market. It is a very well developed third-party product and installer certification scheme to cover all microgeneration technologies. All companies dealing with renewables can apply to be MCS accredited. MCS is meant to help consumers by showing that both the microgeneration products as well as installers comply with strict quality and performance criteria. This is reached by on-site assessment of the companies by the MCS certification bodies and regular audits. Companies applying for MCS accreditation are assessed against strict standards which shall ensure that the individual companies have qualitative products, services and an appropriate QMS in place.

Incentive for the companies to join the MCS is a close link to the LCBP grant scheme. Householders who wish to have installed renewable technology into their properties can only access the grants if their products and services are MCS accredited.

3.1.1 MCS standards

The MCS standards against which companies applying for MCS accreditation are assessed have been developed by experts of the industry considering European standards.

The individual standards are the following:

- [MCS 001 - Installer Certification Scheme Requirements](#)
- [MCS 002 - Information on Building Regulations and Directives](#)

Standards:

- [Solar Thermal Standard - MIS 3001](#)
- [Solar Photovoltaic Standard - MIS 3002](#)
- [Micro and Small Wind Standard - MIS 3003](#)
- [Biomass Standard - MIS 3004](#)
- [Heat Pump Systems Standard - MIS 3005](#)
- [Micro CHP Standard - MIS 3007](#)

(cf. <http://www.microgenerationcertification.org/Product+Manufacturers+and+Installers/Installers>)

3.1.2 MCS Certification bodies

The assessment of the companies, which wish to be accredited, is carried out by certification bodies. Currently there are 10 different certification bodies. All of them have been accredited by UKAS under [EN45011](#) to undertake certification assessments under the MCS.

(cf. <http://www.microgenerationcertification.org/Certification+Bodies>)

3.2 Competent Person Schemes

Installers who are registered in a Competent Person Scheme are allowed to self-certify their work. This means once a CPS registered solar thermal system installer installed a solar thermal system into a property he is allowed to certify that his work meets all necessary health, safety and building regulation requirements. Competent Person Schemes have to be approved by The Department for Communities and Local Government (DCLG)³ to be allowed to act as CPS. Installers who want to become CPS registered will be approved by the CPS if they meet the membership criteria. Those criteria include criteria for a Business Operating System or Quality Management System and there will be also a number of previous jobs done by the applicant inspected. Once applicants have been approved successfully a certificate will be issued to them. It is hoped that moving towards self-certification will make more installations comply with building regulations and training and competence within the industry will be promoted.

Before CPSs were introduced it was necessary to notify installations in dwellings to a Building Control Surveyor⁴. The inspection of installations by a Building Control Surveyor is quite expensive, therefore, in the past many people acted illegally and did not notify the BCS of their installations to avoid costs. To prevent this, CPSs were set up by the government as self-certifying to reduce the costs to the installers and therefore also to the customer help elevate the occurrence of illegal activity.

To become a member of a CPS the applicants have to provide evidence that they have the Minimum Technical Competencies (MTC) in plumbing and heating engineering. MTCs in plumbing and heating engineering are minimum skill requirements which are based on the Plumbing NOS. They are developed by SummitSkills and shall ensure that an installer or organisation, working in the building services sector, has appropriate skills to install a solar thermal or other renewable energy system safely and properly. Beside MTC's there is also a certain knowledge in the United Kingdom's Building Regulations requested as well as compliance with European Standards like EN BS 45011 (and guidance 65).
(Cf.

<http://www.communities.gov.uk/planningandbuilding/buildingregulations/competentpersonsschemes>
and <http://www.competentperson.co.uk> perceived on 8th January 2010)

³ DCLGs responsibilities are amongst other things to ensure the observance of the building regulations.

⁴ A Building Control Surveyor or Building Control Officer is a person with the authority to control building work that is subject to the building regulations.

4 Education and Training

This section refers to the educational system in the UK and the renewable energy installer training currently available in the UK.

4.1 European qualification framework for life-long learning (EQF)

The EQF is a common European reference framework which links countries' qualifications systems together, acting as a translation device to make qualifications more readable and understandable across different countries and systems in Europe. It has two principal aims: to promote citizens' mobility between countries and to facilitate their lifelong learning.

The Recommendation (non-compulsory) formally entered into force in April 2008. It sets 2010 as the recommended target date for countries to relate their national qualifications systems to the EQF, and 2012 for countries to ensure that individual qualification certificates bear a reference to the appropriate EQF level.

The EQF will relate different countries' national qualifications systems and frameworks together around a common European reference – its eight reference levels. The levels span the full scale of qualifications, from basic (Level 1, for example school leaving certificates) to advanced (Level 8, for example Doctorates) levels (see below chart).



(Cf. <http://www.imiawards.org.uk/qualifications/qcf-qualifications-credit-framework.html> , perceived on 19.08.10)

The eight reference levels are described in terms of learning outcomes. The EQF recognises that Europe's education and training systems are so diverse that a shift to learning outcomes is necessary to make comparison and cooperation between countries and institutions possible.

In the EQF a learning outcome is defined as a statement of what a learner knows, understands and is able to do on completion of a learning process. The EQF therefore emphasises the results of learning rather than focusing on inputs such as length of study. Learning outcomes are specified in three categories – as knowledge, skills and

competence. This signals that qualifications – indifferent combinations – capture a broad scope of learning outcomes, including theoretical knowledge, practical and technical skills, and social competences where the ability to work with others will be crucial.

Most European countries have decided to develop National Qualifications Frameworks reflecting and responding to the EQF.

(Cf. http://ec.europa.eu/education/pub/pdf/general/eqf/broch_en.pdf, perceived on 19th August 2010)

4.2 Qualification and Credit Framework (QCF)

In the UK the EQF was implemented in the form of the Qualification and Credit Framework (QCF) and is replacing the National Vocational Qualification (NVQ) system.

The QCF is a system for recognising skills and qualifications. It does this by awarding credit for qualifications and units (small steps of learning) as recommended by the EQF. Each unit has a credit value. This value specifies the number of credits gained by learners who complete that unit. The flexibility of the system allows learners to gain qualifications at their own pace along routes that suit them best.

4.2.1 The QCF system

The QCF aims to provide for a simple yet flexible structure that allows for the maintenance and continuing development of a qualifications system that is:

- inclusive
- responsive
- accessible
- non-bureaucratic

The QCF allows achievements to be recognised and recorded through the award of credits and qualifications. One of the main benefits its support of accumulation and transfer of credits and the easy identification of each achievement's level and size. In this way, learners have maximum flexibility and range of opportunities and can be reliably recognised for their achievements.

4.2.2 Details of the QCF

Units are the building blocks of all qualifications. The development of units within the QCF is explicitly separated from the development of rules of combination, the accreditation of qualifications and the subsequent assessment of units and award of credits and qualifications.

The qualifications system has eight main elements:

- developing units
- placing units in the unit databank
- developing qualifications
- accrediting qualifications
- offering units and qualifications to learners
- assessing achievement
- awarding credits

- awarding qualifications

4.2.3 QCF units

Awarding organisations subsequently use agreed rules of combination to develop qualifications and submit these for accreditation. At this point the units included in the qualification are made available to learners and the qualification is offered for use. The awarding organisation (such as City and Guilds, AEA etc.) is responsible for carrying out assessments of units and awarding credits and qualifications.

4.2.4 Identifying QCF qualifications

Every unit and qualification has a credit value and a level. One credit represents ten notional hours of learning, showing how much time the average learner would take to complete the unit or qualification. Levels indicate difficulty and vary from entry (1) to level 8. There are three types of qualification:

Award

An award is the smallest type of qualification on the QCF. It is worth between one and 12 credits. This means it takes between 10 and 120 hours to complete.

Certificate

A certificate is worth between 13 and 36 credits. It takes between 130 and 360 hours to complete.

Diploma

A diploma is worth 37 credits or more, so takes at least 370 hours to complete.

Individuals can gain an award of any difficulty level from 1 to 8. This is because the type indicates the size of qualification, not its difficulty.

The title of a qualification should indicate its difficulty, how long it will take the average learner to complete, and its general content, using the following information:

- Qualification level (from lowest, entry level to level 8 at the top)
- Qualification size (award/certificate/diploma)
- Content of the qualification

Simply by looking at the title of a qualification individuals will be able to see how difficult it is, how long it will take the average learner to complete, and its general content. To understand the level of difficulty of the units and qualifications in the new framework it might be helpful to know that GCSEs (grade A*–C) are level 2, GCE A levels are level 3 and a PhD is a level 8. Knowing this can help to position the difficulty and challenge of each level in the framework.

4.2.5 QCF regulation

The regulatory requirements that apply to the organisations that operate within, and the qualifications that are accredited into, the QCF are set out in [*Regulatory arrangements for the Qualifications and Credit Framework*](#).

Alongside the regulatory arrangements Ofqual (The Office of Qualifications and Examinations Regulations) and its partner regulators have made available a range of other information to support the implementation of the regulatory arrangements. This includes:

- details of the requirements that must be met for qualifications that include 'NVQ' in the title - [Operating rules for using the term 'NVQ' in a QCF qualification title](#)
- [Identifying purposes for qualifications in the QCF](#), which sets out a list of possible purposes that can be selected for QCF qualifications and a set of rules
- [Guidance on qualifications titles within the Qualifications and Credit Framework](#), which considers consistency of titling and additional size descriptors within the QCF

4.2.6 Regulatory Processes

We have in place processes for recognising organisations and accrediting qualifications to ensure organisations meet the standards set out in the document. We also monitor the performance of recognised organisations and the quality of units and qualifications they develop and/or offer to ensure that the requirements and standards set out in the *Regulatory arrangements* are being maintained. Further details on our regulatory processes are detailed below.

- All of the organisations that operate in the QCF must be recognised to do so. Further details of this can be found here: <http://www.ofqual.gov.uk/for-awarding-organisations>
- A list of all qualifications accredited into the QCF can be found here: <http://www.accreditedqualifications.org.uk/index.aspx>
- Ofqual monitors all organisations and qualifications that are recognised in the QCF in line with our policy for all qualifications. Further details can be found here: <http://www.ofqual.gov.uk/how-we-regulate/90-articles/142-monitoring-and-auditing>
- A full list of [all organisations recognised to operate within the QCF](#) is available.

4.2.7 Evaluation

Together with regulatory partners, DCELLS in Wales and CCEA in Northern Ireland, Ofqual are currently one year into a two year evaluation of the QCF following on from the tests and trials. [Further details](#) are available.

(Cf. <http://www.ofqual.gov.uk/qualification-and-assessment-framework/89-articles/145-explaining-the-qualifications-and-credit-framework> , perceived on 19th August 2010)

4.3 Recognised training courses

The main training bodies to look at in terms of installer training in the UK to for solar hot water, solar PV, biomass and ground source heat pump system installation are:

- BPEC,
- Logic,
- NICEIC
- City&Guilds
- HETAS

The above 5 bodies have developed the training structure, course content and manuals. BPEC and Logic are delivering their training in their own training centres but also in many independent training centres as well as colleges. NICEIC, City&Guilds and HETAS do not actually deliver the training their training is delivered by colleges or private training centres.

The following sections outline their different training courses. As the skills gap in renewable energy training has been identified it is expected that more courses are developed in a short time by the above bodies or even by new competitors.

4.3.1 BPEC

BPEC is a private company that provides training and certification in certain areas. The courses relevant to renewable energy system installation are currently in woody biomass, domestic solar hot water, warm water underfloor heating installation & design and ground source heat pumps. A further description follows below:

BPEC	
Course name	Woody biomass
Content	<ul style="list-style-type: none"> - System costs, funding and government policy - Fuel Characteristics, Supply and Combustion - Biomass Heating Systems: Technical Overview - Determining system sizes - Hydraulic systems - Fuel storage systems - Chimney requirements - Conducting a site assessment - Installation of woody biomass systems - System commissioning and handover to client - Health & Safety and Fire prevention - Regulations and Standards - Operation and Maintenance
Duration	3 days.
Target Group, prerequisites	<p>Candidates who have a number of years' experience in plumbing or conventional heating engineering or hold a formal qualification such as NVQ Level 3 in plumbing or heating engineering and hold a pre-requisite HETAS 3 day Heating Engineers Certificate.</p> <p>For this course is also a train the trainer course available. There are also train the trainer courses available for course tutors who wish to teach these courses. The tutor courses are taught by highly experienced solid fuel and biomass heating installers who have a deep understanding of the course materials.</p> <p>(Interested centres should contact BPEC's Business Development Manager Paul</p>

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	Cullen on 0845 644 6558 or email services@bpec.org.uk .)	
Costs	For the BPEC manual £ 55,- including competency card ⁵ (individual training centres buy the material and will add their own fees)	
Delivery type (practical/theoretical)	Practical workshop and theory.	
Course name	Domestic Solar Hot Water	
Content	<ul style="list-style-type: none"> - Introduction to solar heating - Solar collectors - Hot water storage and key installation issues - Preparing to install a solar water heating system - Fitting solar collectors - Plumbing layout and design of solar water heating systems - Control and power requirements - System commissioning and handover to client <p>the course was developed in conjunction with the Solar Trade Association</p>	
Duration	3 – 4 days.	
Target Group, prerequisites	<ul style="list-style-type: none"> ○ a number of years' experience in plumbing or conventional heating engineering, ○ holding a formal qualification at NVQ Level 3 in plumbing or heating engineering or are ○ currently undertaking a course in plumbing or heating engineering, which will lead to a formal qualification such as NVQ Level 3 in plumbing or heating engineering. 	
Costs	For the BPEC manual £ 55,- including competency card	
Delivery type (practical/theoretical)		
Further information about the course	BPEC currently has around fifty approved centres throughout the UK to deliver the Domestic Solar Hot Water Heating course	
Course name	Warm Water Underfloor Heating and Design	
Content	<p>Installation course</p> <ul style="list-style-type: none"> ○ Warm Water Underfloor Heating – Introduction ○ About Underfloor Heating ○ Floor Systems and Finishes ○ UFH System Components ○ Installation Requirements ○ Post Installation <p>The training course covers all the topics in the training manual in more depth and includes practical work.</p>	<p>Design course</p> <ul style="list-style-type: none"> ○ Warm Water Underfloor Heating – Introduction ○ About Underfloor Heating ○ Design Considerations ○ Floor Systems and Finishes ○ Underfloor Heating Systems and Components ○ UFH System Components ○ Underfloor Heating Design Worksheet <p>The training course covers all the topics in the training manual in more depth and includes design work for various scenarios.</p>
Duration	pre-reading of training/reference manual and attendance at a 2 day practical training course and completion of written assessments	
Target Group	<ul style="list-style-type: none"> ○ candidates who have a number of years' experience in plumbing or conventional heating engineering, ○ hold a formal qualification at NVQ Level 3 in plumbing or heating engineering. <p>In particular the design course requires individuals to have a working knowledge of the design of traditional wet central heating systems.</p>	

* This is not the actual costs of the training. Training centres providing the training set their prices individually. Therefore the actual price can vary.

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Costs	<ul style="list-style-type: none"> ○ Warm Water Underfloor Heating Systems Installer training manual – £49.50 + competency card ○ Warm Water Underfloor Heating Systems Designer training manual – £49.50 + competency card
Delivery type (practical/theoretical)	Theoretical and practical
Course name	Ground Source Heat Pumps
Content	Install ground source heat pumps. <ul style="list-style-type: none"> ○ Ground source heat pumps in context ○ How a ground source heat pump works – principles and components ○ Insulation, heat losses and the effect of heating system design ○ Horizontal ground heat exchangers ○ Health and Safety ○ Ground source heat pump installation ○ Maintenance and fault finding ○ Glossary ○ Model answers
Duration	The package comprises pre-reading of training/reference manual and attendance at a 2 day practical training course and completion of a practical and written assessment.
Target Group, prerequisites	<ul style="list-style-type: none"> ○ candidates who have a number of years' experience in plumbing or conventional heating engineering, ○ hold a formal qualification at NVQ Level 3 in plumbing or heating engineering or are currently undertaking a course in plumbing or heating engineering, which will lead to a formal qualification such as NVQ Level 3 in plumbing or heating engineering.
Costs	Ground Source heat Pump Installer training manual – £55
Delivery type (practical/theoretical)	The package comprises pre-reading of training/reference manual and attendance at a 2 day practical training course and completion of a practical and written assessment.

(cf.

<http://www.bpec.org.uk/services/page.asp?PageID=220&SID=&Refresh=14%2F12%2F2009+17%3A37%3A50>)

4.3.2 Logic

Logic	
Course name	Photovoltaic Systems course
Content	<ul style="list-style-type: none"> ○ Designed to give an entry level qualification for experienced domestic/commercial electricians wishing to extend their work scope into Solar PV. ○ The course covers PV installations up to 5 KWp output and the predominant systems (grid connected)
Duration	3 days
Target Group, prerequisites	candidates must have: <ul style="list-style-type: none"> ○ Have experience in testing and issuing appropriate certificates as per BS7671 ○ Have a verifiable knowledge of the 17th Edition Wiring Regulations (2382 or 17th Edition Full Scope Part P)
Costs	£ 495.00* (Price includes the course manual and certification fee) * This is the course price if the training is delivered by a Logic training centre. If the logic training is delivered by a private training centre the price might vary.
Delivery type (practical/theoretical)	
Further course	

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information	
Course name	Solar Thermal Domestic Hot Water Course
Content	<ul style="list-style-type: none"> ○ Designed to give an entry level qualification for experienced domestic heating installers or plumbers, wishing to extend their work scope into solar heating.
Duration	2 days
Target Group, prerequisites	<p>candidates should hold:</p> <ul style="list-style-type: none"> ○ A G3 certificate in domestic unvented hot water systems. ○ It is essential that candidates hold one DCLG (Department for Community and Local Government) recognised competency in a conventional fuel i.e. gas, oil or solid fuel: ○ Or for those in the Plumbing field an NVQ level 2 or equivalent plumbing qualification.
Costs	<p>£ 375.00* (Price includes the course manual and certification fee)</p> <p>* This is the course price if the training is delivered by a Logic training centre. If the logic training is delivered by a private training centre the price might vary.</p>
Delivery type (practical/theoretical)	
Further course information	<ul style="list-style-type: none"> ○ The course is not intended to cover roof or access work in detail (other than to highlight legislative requirements)
Course name	Domestic Heat Pump Installer Course (Ground & Air Source)
Content	<p>The course is aimed at experienced heating installers who wish to install heat pumps in domestic properties and small commercial properties. The Heat Pump course covers both ground to water and air to water technologies</p> <p>The course will include the following areas</p> <ul style="list-style-type: none"> • Background to market • Regulations and Guidance • Principles of Operation • Collector types • Heat distribution • Pre-installation requirements • Installation Materials & Methods • Filling, Flushing and Testing • Setting to work, Commissioning • Servicing and fault finding
Duration	3 days
Target Group, prerequisites	<p>candidates should hold:</p> <ul style="list-style-type: none"> ○ Good working knowledge of heating/hot water systems and design with an NVQ level 3 qualification or equivalent experience.
Costs	<p>£ 495.00 * (Price includes the course manual and certification fee)</p> <p>* This is the course price if the training is delivered by a Logic training centre. If the logic training is delivered by a private training centre the price might vary.</p>
Delivery type (practical/theoretical)	
Further course information	

(cf. <http://www.logic4training.co.uk/course/renewable.php>)

4.3.3 NICEIC

NICEIC	
Course name	Solar Thermal Hot Water
Content	<p>Areas covered include:</p> <ul style="list-style-type: none"> ○ Basic Design ○ Relevant Regulations and Legislation ○ Collector Types ○ Design Layouts ○ Pre-survey Techniques and Installation Practices ○ Commissioning and Service ○ Fault Finding and Controls <p>The course has been developed for individuals who wish to demonstrate competence to work on the installation of Solar Thermal Systems. Successful candidates will be able to use the award to enable them to join a competent person's scheme and was designed to provide experienced heating and plumbing engineers the necessary skills for basic design, installation, commission and service of Solar Thermal Hot Water systems and deliver a certificate of competence to individuals who will self-certify installations through NICEIC (or other government scheme operators). All the NICEIC Environmental and Related Technologies courses have been developed around a modular approach.</p>
Duration	
Target Group, prerequisites	<p>Candidates will need to possess:</p> <ul style="list-style-type: none"> ○ A recognised competence in a conventional fuel i.e. gas, oil, or solid fuel or a relevant plumbing qualification such as an NVQ level 2 or equivalent experience ○ A certificate of competence under G3 for Unvented Hot water ○ A WRAS approved water regulations qualification ○ An energy efficiency qualification issued by a 17024 UKAS accredited body ○ NICEIC Working at Heights, CoSHH and Manual Handling qualifications
Costs	
Delivery type (practical/theoretical)	
Course name	Ground and Air Source Heat Pumps
Content	<p>The Ground and Air Source Heat Pumps qualification is designed to provide experienced heating and plumbing engineers the necessary skills for basic design, installation, commissioning and service of Ground and Air Source Heat Pump Systems and delivers a certificate of competence for individuals who wish to self-certify installations through NICEIC (or other government scheme operators).</p> <p>Areas covered include:</p> <ul style="list-style-type: none"> ○ Basic Design ○ Relevant Regulations and Legislation ○ Design Layouts

Renewable Energy Specialists project

	<ul style="list-style-type: none"> ○ Pre-survey Techniques and Installation Practices ○ Commissioning and Service ○ Fault Finding and Controls
Duration	
Target Group/prerequisites	To follow
Costs	
Delivery type (practical/theoretical)	
Further course information	

(cf. <http://niceic.org.uk/en/certification/article.asp?SECTION=24&ARTICLE=63>)

4.3.4 City and Guilds

City and Guilds	
Course name	Certificate in Installing and Testing Domestic Photovoltaic Systems - Vocational (No. 2372)
Content	The qualifications cover the range of competences in fitting, installing and testing the system components. The content covers health and safety, knowledge of regulations, PV systems and components, roofing, commissioning and testing and customer care
Duration	Teachers/assessors should familiarise themselves with the structure and content of the award before designing an appropriate course. City & Guilds does not itself provide course of instruction and teachers/assessors may design courses in any way that they feel best meets the needs of their candidates. It is recommended that 30 hours should be allocated to deliver the course.
Target Group, prerequisites	intended for qualified electricians who will be required to install grid connected domestic photovoltaic systems that are either integrated into, or retro onto, a domestic dwelling have appropriate qualifications related to electrical installation such as an NVQ at level 3, knowledge of the IEE Wiring Regulations and inspection and testing. They will need to be employed within the electrical contracting industry.
Costs	Depending on training centre
Delivery type (practical/theoretical)	The award is made of two units. The first unit describes the underpinning knowledge that is required to understand the theory behind PV systems, related Regulations, safety requirements and installation and testing. The second unit is concerned with the application of practical skills in carrying out installation and testing.
Further course information	Qualification Handbook Assesors Guide (password protected) Candidates Guide and Assignment (password protected)

(cf. <http://www.cityandguilds.com/18136.html> perceived on 11th January 2010)

4.3.5 HETAS

HETAS	
Course name	Biomass Training

Content	<ul style="list-style-type: none"> ○ 1 Course Introduction ○ 2 Introduction to Wood Heating ○ 3 Marketing Biomass Heating ○ 4 System Costs, Funding and Policy Support ○ 5 Fuel Characteristics, Supply and Combustion ○ 6 Biomass heating Systems: Technical Overview ○ 7 Determining System Sizes ○ 8 Hydraulic Systems ○ 9 Fuel Storage Systems ○ 10 Chimney Requirements ○ 11 Conducting a Site Assessment ○ 12 Installation ○ 13 Commissioning and customer handover ○ 14 Health, Safety and Fire Prevention ○ 15 Regulations and Standards ○ 16 Operation and Maintenance <p>The course covers appliances from a standard wood burning stove through log boilers and pellet appliances through to chip boilers and extends from 5kw up to 100kw. <i>(Note:- much of the detail also covers larger boilers but the HETAS scheme currently only extends upto 100kw).</i></p>
Duration	
Target Group, prerequisites	Delegates must have completed a 3 day HETAS Engineers course and a Part G un-vented hot water course before attending this course. Proof of this will be required when booking the course (or before attendance if it is intended to attend such courses between booking and attendance).
Costs	The fees will include course documentation, assessment, certification costs
Delivery type (practical/theoretical)	In addition to the theoretically elements there are practical sessions where appliances are present to be worked on, commissioned and operated as well as (if appropriate) site visits etc.
Further course information	0845 2600 166

(cf. <http://www.hetas.co.uk/installer/biomass-training.html>)

4.4 Training for trainers

Train the trainer courses in renewable energy technology installation are not yet very common. They do not take place on a regular basis. Usually they are the normal installation courses attended by trainers to enable them to provide the courses in their training centres.

4.5 Training centres in the UK

There is a search facility on the BPEC and Logic website to see in which training centres there training courses are provided. This cannot provide a complete list of training centres but can be used as an indicator.

(cf. <http://www.logiccertification.com/loc2.asp>)

(cf.

<http://www.bpec.org.uk/certification/centres.asp?PageID=68&SID=&Refresh=15%2F01%2F2010+16%3A11%3A34>)

4.6 Training material available

This section outlines the theoretical training material that exists.

4.6.1 Online tools

Online tools in the sustainable energy sector have been developed by a company called Skills2learn. This is an optimal resource to do the theoretical studies in the different renewable technologies. Currently there exists an e-solar programme which trains individuals in solar thermal technology. If there is demand online tools for other technologies could be developed.

4.6.2 Handbooks/manuals

BPEC, NICEIC and Logic have well developed course and examination material. There is also a huge amount of other training courses on renewable technology available which have their individual materials but those are not recognised yet.

4.7 Funding available for individuals

This section shall indicate where individuals who would like to undergo a training in renewable technology installation could seek for funding.

4.7.1 Business Link

[Business link](#) is a governmental funded business advice and guidance. It only operates in England. For Scotland, Northern Ireland and Wales are the following sister services available:

- Scotland: [Business Gateway](#) (run by Scottish Enterprise)
- Northern Ireland: [nibusiness.co.uk](#) (run by Invest Northern Ireland)
- Wales: [Flexible Support for Business](#)

Business link (and sister services) is meant to support employers to run successful businesses. The different areas of support are:

- **Starting Up** – information for people who are starting a business, or thinking of it
- **Finance & Grants** – information on managing business finances and on the support available
- **Tax, Returns & Payroll** – all essential information for businesses on the subject of tax
- **Employing People** – information on hiring and firing, handling disputes, minimum wages, flexible working and other relevant employee information
- **Health, Safety & Premises** – information on regulations relating to business premises, and health and safety
- **Environment & Efficiency** – information and advice on environmental regulations and how to make businesses greener
- **Exploit your Ideas** – advice and guidance on all areas of research, development and intellectual property
- **IT & eCommerce** – information on getting the right digital infrastructure for your business
- **Sales & Marketing** – information on how to market businesses on and offline, and relevant regulations

- **International Trade** – information on how to trade overseas, including commodity codes
- **Grow your Business** – advice and guidance on how to grow a business
- **Buy or Sell a Business** – information on how to buy or sell a business, including franchises
- **For Professional Advisers** – information for intermediary professionals such as accountants, tax advisers and HR professionals
- **Your Business Sector** – specific information tailored to sectors, such as farming and transport

4.7.2 Train to Gain

[Train to Gain](#) is the national skills service that supports employers of all sizes and in all sectors to improve the skills of their employees as a route to improving their business performance.

Train to Gain is a joint investment – The employers and the Government working together to boost their businesses by improving the skills of the individual staff members.

Train to gain is primarily targeted to those in 25+ age who do not already have a full level 2 Qualification. It was designed to improve the Skills deficiency in the UK market identified by the [Leitch review](#). The idea is to offer skills advice and match business needs with Further Education and training providers.

The service will also help to identify any funding or grants that can be used to offset the investment in training.

Advice from Train to Gain can be accessed via contacting the relevant regional service provider which can be found on the Train to Gain website. Advice will then be given by Business Link Advisors or Colleges and training centres contracted by the [LSC](#)⁶. The business will then be assessed which shall help to gain the skills and training needed to succeed and to access available funding and grants.

Train to Gain applies to England. There are the following sister organisations in Scotland Wales and Northern Ireland:

- [Scotland](#): Learn Direct
- [Wales](#): Information for employers
- [Northern Ireland](#) : Develop your employees skills

⁶ The Learning and Skills Council (LSC) is a non-departmental public body jointly sponsored by the Department for Business, Innovation and Skills and Department of Children, Schools and families in England.

5 UK specific facts

This section will point out relevant information about specific circumstances in the United Kingdom regarding the climate as well as the built environment.

5.1 Unvented cylinders

Britain increased in the early 80's the use of open vented cylinders and tanks (cisterns) in the loft to store water and gravity feed the hot and cold water supplies within the property. After this date, mains pressure water could be used in the property and so in came:

- Combi boilers and other instantaneous water heaters (n.b. instantaneous water heaters were around before this date but it simplifies the concept)
- Unvented cylinders that have some extra fitting requirements in the UK as compared to mainland Europe. These would include such features as 3 levels of control: thermostat, manual reset thermostat, TPRV. Also, stainless steel with some copper unvented cylinders tend to predominate in the UK whilst in many European markets vitreous enamel cylinders predominate.
- Thermal (primary) stores which are often popular in flats where it can be difficult to install some of the extra safety features associated with unvented cylinders

5.2 Ambient climate including wind regime

The UK's weather is very heavily influenced by the North Atlantic Drift (NAD) which tends to keep Britain up to 10 ° warmer than other locations on a similar latitude. Also, due to this NAD and the island location on the edge of a large ocean, the country also has very significant wind resources, especially in coastal and offshore areas. The main restriction in obtaining this wind energy is the lack of grid infrastructure in these rural locations to exploit this wind power and so the country is both installing turbines onshore and offshore and building grid infrastructure. The British climate should be described as temperate with mild, drizzly wet winters with the occasional cold snap when arctic weather blows in and fairly cool balmy summers with the occasional heat wave. The significant changes seem to occur when the NAD is not having its normal effect.

Sun radiation in the United Kingdom:

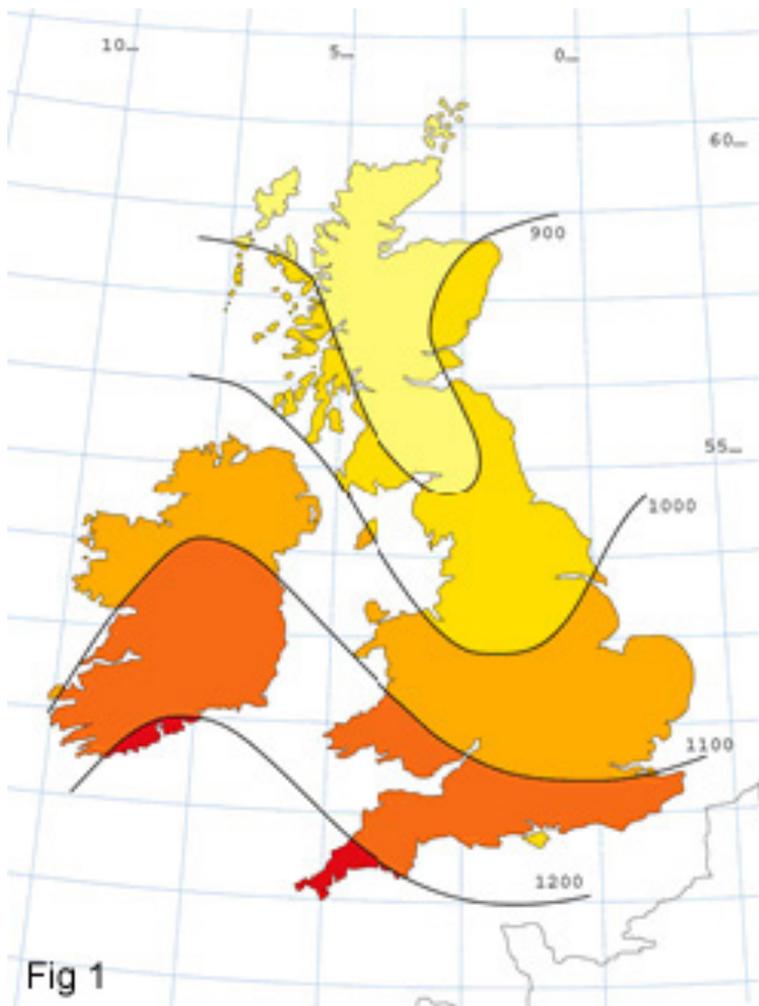


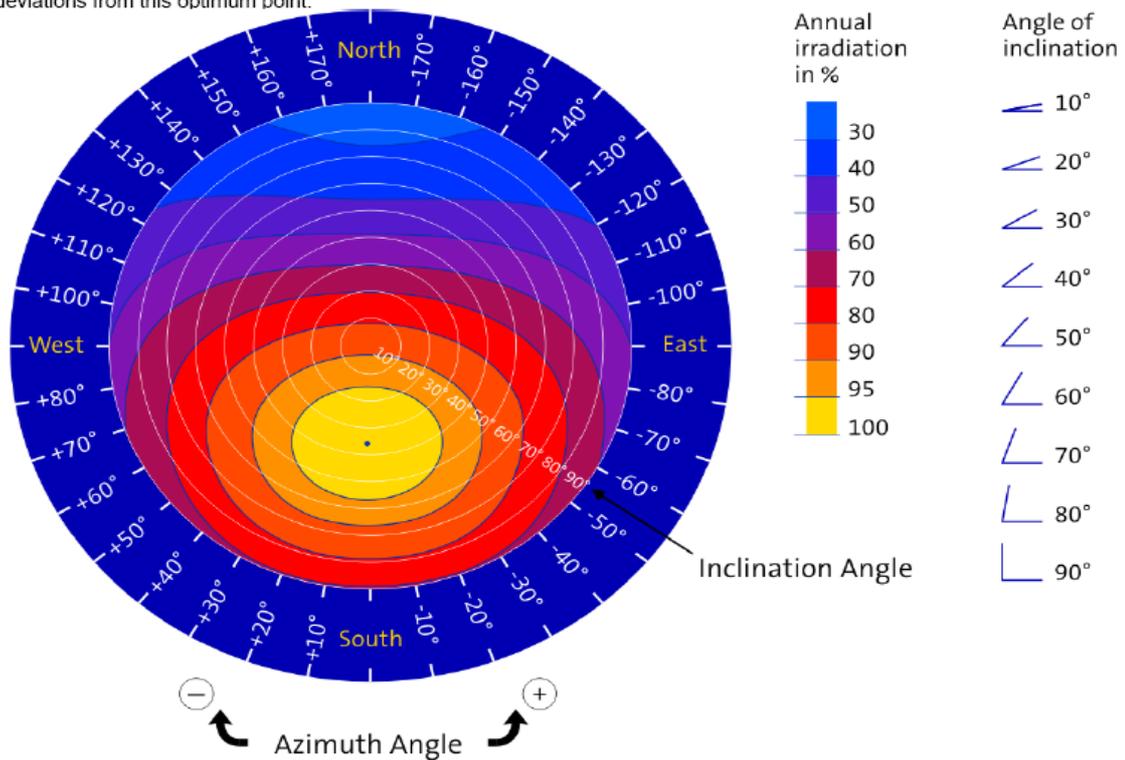
Figure 1 shows the total average solar irradiation falling on a one square metre surface on the horizontal, measured in kilo-watt hours (kwh). This shows that the sun's rays falling on the ground range from > 1200 kwh m² in the far south west of the UK, to < 900 kwh m² in central and northern Scotland.

By tilting a surface to an angle the amount of solar radiation falling on it will be greater than that falling on a flat surface, in this country. Fortunately, the average tilt of a UK house roof is about the optimum for receiving solar energy.

By using the Sun's abundant energy, we can reduce our consumption of conventional fuels thus reducing our emission of harmful greenhouse gases, as well as gaining enhanced fuel security and cost effective savings.

Today there are a range of high quality products, which enable us to use the Sun's energy very effectively in the UK.

The chart below shows the UK average optimum angle and orientation (yellow circle) and the likely performance reduction for deviations from this optimum point.



5.3 Unexploited Biomass

The United Kingdom has not been food secure since the 1930's onwards. With a population of 60 growing to 70 million people in such a small island, it is incredibly difficult to grow enough food to feed the whole population. So the country has relied on commerce, trade and finance to purchase food from abroad to feed its inhabitants. Similarly, there is not enough woody area available to heat anywhere near the 25 to 26 million properties and so biomass will only ever be one element in a portfolio of heating technologies. Some estimates from academics say that potentially it could be covered 10 to 15 % of Britains heating requirements from woodfuel and these estimates have then been later withdrawn as the work gets revisited and re-examined. Having said this, up to this moment in time, the UK has been mismanaging its woodfuel stocks with much of the surplus stocks being sent to landfill. There are still frequent stories from tree surgeons and other offering their surplus offcuts for virtually transport cost as they are now being charged for landfill disposal of wood offcuts. It is expected that this market will change somewhat in the next few years as the benefits of the Renewable Heat Incentive start to kick in and there is a predicted significant uptake in woodfuel technologies.

5.4 Housing stock – lots of roofs rather than flats

Typical estimates for number of individual properties in the UK tend to vary from 23 to 26 million units. What marks out this number from many of our European partner nations is the number of houses as compared to flats within the UK housing portfolio. In more recent times this has been starting to change as within urban areas, small blocks of flats are now frequently being constructed. However, there is still a large

number of Victorian era terraced, mid 20th century semi-detached and other detached houses that make up a very significant percentage of the total unitary total. Because of this large number of individual roofs, there is a significant opportunity for large scale penetration of solar thermal and PV technologies.

5.5 Cellars, airing cupboards

The Germanic and Scandinavian housing stock frequently sets aside a small room on the ground floor or cellar for all the heating system e.g. boiler, cylinder and ancillaries. The UK has typically taken a different approach to installation of heating equipment and within British properties, the boiler is often located in the kitchen and the hot water cylinder in a small airing cupboard on the first floor. Please note that these are generalisations and so this information should be used in an appropriate manner. However, it is useful to understand the cultural differences in attitudes and approaches to heating system installations.

Most houses in the United Kingdom do not have cellars. Therefore storage tanks cannot be placed in the cellar. Many airing cupboards are not big enough for large storage cylinders. Many loft spaces cannot accommodate the weight of large cylinders/tank hence space heating is difficult to install

5.6 Low quality housing stock

Because of the significantly colder climates, the Germanic and Scandinavian housing stock has traditionally been built to a higher standard than the UK housing stock. Well constructed properties with significant levels of insulation and double or even triple glazing have been employed in these environments for many years. However, the UK with its far more temperate climate has in the past built properties with limited levels of insulation and many single glazed windows. Whilst the latest building codes (Code of Sustainable Homes) require very similar standards to other northern European countries, there is still a very significant number of British homes which are built to the old standards and it will be many years before these properties are modernised.

6 Conclusions

It is expected that the UK's renewable energy market will grow rapidly in the near future as the feed-in-tariff and the renewable heat incentive will be implemented soon. The lack of properly trained installers has already been identified. Current UK courses focus on short term training of installers, electricians, technicians and individuals from related industries. As the courses usually do not last longer than a few days there are shortcomings in the practical part of the training and the demand for more qualitative training exists.

Together with the market growth it is very likely that the competition between the different training bodies will grow and that other training providers arise.

To have a strong training course it is from high importance that this course will be recognised and accepted by relevant industrial and governmental bodies. Accreditation, such as City and Guilds accreditation is therefore recommended and also the mapping to SummitSkills Environmental NOS which has been developed by the Sector Skills Council Summit skills is essential.

7 Recommendations

In terms of more qualified renewable energy system installers it is recommended to increase the practical part of the training.

As there can be expected a high level of competition it is advisable to provide a well recognised certificate once a participant has the course completed successfully and also the marketing for the course will play a major role and should not be underestimated.

It needs to be considered that trainees are probably most interested in the certificate as well as in cost and time saving. A possible approach to tackle this 'problem' would be to look into funding streams for the course participants. There might be ways to help them to get their courses at least partially funded. This would be a service that would certainly be highly appreciated by potential trainees and would make a difference to the existing courses.