

Microgeneration Strategy for Scotland



The Scottish
Government

Microgeneration Strategy for Scotland

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The Scottish Government
St Andrew's House
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EH1 3DG

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Ministerial Foreword



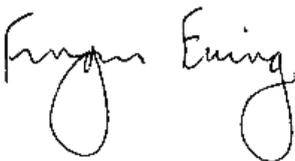
I am delighted to present for publication the Microgeneration Strategy for Scotland. The Strategy sets out our aims and ambitions for the growth of microgeneration in Scotland, building on what has been achieved.

In Scotland, we are blessed with a wealth of natural resource that can be harnessed to power our nation. Technologies such as solar panels, heat pumps and biomass mean that we can harness this energy in our own homes, schools, offices and businesses.

The Scottish Government has the most ambitious renewable energy targets in the world. However, the growth of microgeneration is not solely about meeting targets. It can also contribute to Scotland's transition to a low carbon economy, it is part of our drive towards energy efficiency to reduce energy costs and take more households out of fuel poverty, and, crucially, the microgeneration market can support existing jobs in Scotland and create new opportunities too.

I recognise that this has been a turbulent year for the sector and acknowledge and recognise that there are challenges in front of us. I believe that none of these challenges are insurmountable and we have much to celebrate in what has been achieved by Scottish industry, the work of our colleges and Universities and most of all the communities and people of Scotland.

We cannot do this alone, and I am grateful for the contribution that the Microgeneration Strategy Stakeholder Group has provided to the Strategy and the work of industry groups such as the Scottish Energy Installers Alliance to create a coordinated voice for the sector and developing the skilled workforce needed to meet the growing demand for microgeneration and energy efficiency. I also welcome the innovations in technologies being developed in Scotland and the growth in our manufacturing capacity for microgeneration. We all have a part to play in building a cleaner, greener Scotland and this strategy shows how microgeneration can contribute to that aim.

A handwritten signature in black ink that reads "Fergus Ewing". The signature is written in a cursive style with a large loop at the end of the last name.

Fergus Ewing
Minister for Energy, Enterprise and Tourism

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Overview and Summary of Actions

In our Microgeneration Strategy for Scotland, the Scottish Government sets out its support for microgeneration and its ambitions for the sector. It showcases what has been achieved by national and local government, industry, communities, householders, the skills sector and other stakeholders across Scotland to grow the market for microgeneration.

The following sections set out our aims and ambitions for the growth of microgeneration in Scotland. We set out the successes and key actions we have taken to date to address barriers which could constrain uptake, across a range of policies: planning, building regulation, skills, housing and fuel poverty. The Strategy also outlines the work done by a range of organisations including the Scottish Energy Installers Alliance, the Colleges Energy Industry Partnership, Community Energy Scotland and the Energy Savings Trust.

Deployment: This section highlights what has been achieved both nationally and regionally across Scotland. It highlights the current installation rates and considers scenarios for future growth, taking into account the rapid changes in the market over the last year. It outlines the range of measures in place to support growth of the market and further actions.

Technologies: This section outlines the most common technologies currently being deployed and highlights technologies made in Scotland such as Gaia Wind and Kingspan wind turbines, Mitsubishi Ecodan Heat Pumps, and Sustainable Technologies and AES solar thermal panels. We also look to the future, with investment and innovation in Scotland through initiatives such as the Energy Technology Partnership (ETP).

Planning and Regulation: The section outlines current planning and regulation, including the Scottish Government's updated online planning advice for microgeneration and other guidance. We also highlight the strong links between planning and energy efficiency, embedded in our Planning and Building Standards.

Skills: This section outlines the employment and training opportunities in Scotland. It highlights the work of Scottish industry, including the development by SummitSkills of industry qualification, and by the skills sector, such as the role of the Colleges Energy Skills Partnership in coordinating microgeneration training across Scotland's colleges and information on training provision for microgeneration.

Communication: This section demonstrates the range of advice, information and support that is available, for example the integrated renewable energy and energy efficiency advice supported by the Scottish Government through the Energy Saving Scotland advice centres, the Energy Saving Trust's Green Homes Network and online information. This section also identifies key target audiences and considers the options to improve awareness raising.

Summary of Actions

- Action 1** Scottish Government to convene a **Microgeneration Task Group**, reporting to the Renewables Industry Leadership Group of the Energy Advisory Board to take forward the recommendations, monitor deployment, review progress against benchmarks and consider further actions, as required, in 6 months following the outcome of the Comprehensive Review of the Feed in Tariff and in the run up to implementation of the Green Deal. The Task Group will expand the Microgeneration Strategy Stakeholder Group to include representation from end users such as consumer groups, Registered Social Landlords and the construction sector. To report by end of 2012
- Action 2** The Scottish Government will boost its **Home Renewables Loans Scheme**, delivered by the Energy Savings Trust, to provide additional support for renewable heat. August 2012
- Action 3** **Energy Savings Trust** will build on its successful solar PV hotspot campaign on behalf of the Scottish Government, to deliver discounted offers in each local authority area. Ongoing
- Action 4** The Collaborative and Scottish Government Procurement Division, **Scottish Procurement**, will put in place a Framework to facilitate public body access to renewable technologies. Ongoing
- Action 5** **The Scottish Energy Installers Alliance** will continue to work with MCS to strengthen links between existing industry competencies and microgeneration standards. Ongoing
- Action 6** The collaborative working group comprising the Scottish Government, community groups and the Scottish distribution network owners (DNOs - Scottish Hydro and Scottish Power) will work together to identify innovative ways of maximising existing grid capacity. Ongoing
- Action 7** The Scottish Government will continue to engage with Heads of Planning Scotland and planning authorities on a regular basis to identify key actions that could support effective decision making on wind turbine planning applications.
- Action 8** The Scottish Government's Building Standards Division will extend its Technical Guides for Low Carbon Equipment to include solar PV and consider other technologies for future guides, where appropriate. Ongoing
- Action 9** The Scottish Government is reviewing the energy standards for buildings, examining the potential for further emissions reductions in 2013 and will consult on its proposals later this year. Consultation by end of 2012
- Action 10** Skills Development Scotland will work stakeholders including Scottish Colleges to build on the audit of training provision to provide a searchable database, including Further Education and Higher Education provision. Immediate

- | | |
|---|----------------|
| Action 11 The Microgeneration Task Group will map current research into existing housing stock, and identify gaps and future research needs. | By end of 2012 |
| Action 12 Scottish Government will continue to support the Energy Saving Scotland advice centres' advice service for householders and small businesses on microgeneration, including Home Renewables Visits from specialist advisors where appropriate. | Ongoing |
| Action 13 Scottish Government will work with the Microgeneration Task Group and Energy Saving Trust to provide comprehensive and coordinated advice and awareness raising on the financial mechanisms to support renewable energy and energy efficiency. | August 2012 |

1 Introduction

The overarching aim of the Microgeneration Strategy is to grow the market for microgeneration, in conjunction with our targets for energy efficiency, to contribute towards a low carbon economy for Scotland.

Households, businesses, communities and the public sector across Scotland are helping to build a cleaner, greener Scotland. Homes, offices, schools and many other buildings are now being heated by biomass, heat pumps and solar thermal panels and generating their own electricity from wind turbines and solar photovoltaic (PV) panels. New businesses are being set up to manufacture and install equipment and fuel, such as wind turbines and wood pellets. Existing businesses are taking advantage of the new opportunities offered by the growth of the sector to upskill their workforce and bring in new income.

The Scottish Government's aim is to see the market for microgeneration continue to grow, as set out in its sectoral routemap for microgeneration in the [Renewables Routemap](#), published in June 2011. Here, the Government sets out its intention to publish a Microgeneration Strategy to support the sector move from a niche market to the mainstream.

Microgeneration covers a range of technologies which can be used to fit the specific energy needs and availability of resources at each site: biomass; biofuels; fuel cells; photovoltaics; water (including waves and tides); wind; solar power; geothermal sources; combined heat and power systems; and air. Microgeneration is legally defined as covering devices with a generation capacity of the device no greater than 50 kilowatts (kWe) for electricity generation and no greater than 45 kilowatts (45 kWth) for heat as set by the Electricity Act 2004.

1.1 A Strategy for Market Growth

The Microgeneration Strategy for Scotland focuses on how the Scottish Government, industry and other stakeholders can work together to remove barriers to uptake, raise awareness and ensure we have a skilled workforce to deploy microgeneration.

The growth of the market for microgeneration will contribute the [Scottish Government's Low Carbon Economy Strategy](#) and [Government Economic Strategy](#). The key aims of the strategy are:

1. To contribute to Scotland's transition to a low carbon economy by delivering carbon emissions reductions.
2. As part of the overall drive for energy efficiency, to provide the opportunity for householders, businesses and communities to participate in the low carbon economy, and in particular contribute to taking more households out of fuel poverty and reducing energy costs overall.
3. To support and create jobs in Scotland, by creating new markets for businesses, particularly small and medium enterprises, and supporting business growth.

Financial incentives are an important tool to drive uptake of microgeneration technologies. We must however recognise that budgets are constrained, with limits set on the [Feed in Tariff](#) (FIT) and [Renewable Heat Incentive](#) (RHI) at UK level. We must also reduce costs through market growth and innovation, and build consumer confidence.

Households use more than a third of the electricity and more than half of the heat consumed in Scotland. This is the largest market for microgeneration, both for individual households and larger social housing renewable schemes to help tenants out of fuel poverty. But microgeneration can also help businesses, particularly in rural areas off the gas-grid, where increases in heating bills have a big impact on business viability. In addition, small-scale wind and hydro also give rural businesses and communities the opportunity to generate their own energy and additional income. The actions set out in the Strategy will help maximise uptake across all these sectors.

1.2 Scotland's Targets for Renewable Energy

The Scottish Government has set ambitious targets for renewable energy. [The Renewables Routemap](#) published in June 2011 set a target of **the equivalent of 100% of electricity demand** to be met by renewables by 2020, along with **the 11% target for renewable heat**.

As set out in the Renewables Routemap, microgeneration is an important part of the strategy to deliver those targets, providing the opportunity for householders, businesses and communities to participate in the low carbon economy. The [Low Carbon Scotland](#) report published in 2011 sets a milestone **for at least 100,000 homes to have adopted some form of individual or community renewable heat technology for space and/or water heating by 2020** to contribute to our world leading carbon emissions reductions target. The importance of community and locally owned renewable energy is also recognised by **the new target of 500 MW of community and locally owned renewable energy by 2020**.

1.3 The UK Government's Microgeneration Strategy

In June 2011, the UK Government published its [Microgeneration Strategy](#) along with the [Microgeneration Industry Contact Group Action Plan](#). The Strategy focuses on non-financial barriers to microgeneration which must be tackled to maximise the effectiveness of the financial incentives that have been put in place. The Strategy is restricted to England only, although some proposals are relevant to Scotland, particularly ensuring quality and standards and improving consumer protection through the [Microgeneration Certification Scheme](#) and [REAL Assurance](#).

The main financial incentives for microgeneration are the [FIT RHI](#) and [Renewable Heat Premium Payment \(RHPP\)](#), which are reserved to the UK Government with the agreement of the Scottish Government. The Scottish Government works closely with the UK Government to ensure that Scottish issues are taken in to consideration. We are also engaged with the UK Government on development of the **Green Deal** which includes microgeneration amongst the various measures it can support.

1.4 Microgeneration and Energy Efficiency

Microgeneration is integrally linked to energy efficiency as part of our overall policy to move towards a low carbon economy. Microgeneration technologies are most effective in terms of cost effectiveness, carbon emissions reduction and reduced energy bills only when combined with energy efficiency measures, such as insulation. Uptake of microgeneration will be strongly linked to the headline target set out in [Conserve and Save to reduce Scottish final energy consumption by 12% by 2020](#). This approach is reflected in Scottish Government planning policy and building standards which set out a holistic framework for carbon emissions reductions from buildings, taking a 'fabric first' approach.

By helping to reduce energy bills, energy efficiency and microgeneration will also help us tackle fuel poverty. We will consult on a **Sustainable Housing Strategy** which will set out our vision for warm, high quality, affordable, low carbon homes and a housing sector that helps to establish a successful low carbon economy across Scotland.

1.5 Microgeneration for Renewable Heat

Small-scale renewable heat for households, businesses and communities has an important role to play in delivering our heat targets, alongside larger scale industrial heat. Consumer Focus¹ estimate that nearly 25% of Scottish households are not connected to gas and many are in fuel poverty. More than 14% of the total value of vouchers under the RHPP has been issued to Scottish households. Businesses in Scotland have already started to take advantage of the RHI.

Scotland's potential for deployment of renewable heat is highlighted by the success of previous Scottish Government grant and loan schemes, over 80% of which were for renewable heat installations. With a higher proportion of households in Scotland off the gas grid and the Scottish Government priority to reduce fuel poverty, a key aim of the Strategy is to ensure that Scotland maximises uptake of RHI and RHPP.

1.6 Microgeneration for Renewable Electricity

Technology such as solar PV, wind and hydro can generate electricity at a small scale. Since introduction of the FIT, the predominant technology has been solar PV with almost 15,000 installations in Scotland. Combined Heat and Power (CHP) is used to generate both electricity and heat. Gas-fired micro-CHP for domestic use, although not renewable can also deliver significant energy efficiency benefits and carbon savings

1.7 Challenges

The development of the microgeneration sector has taken place in the face of a number of challenges. The landscape is rapidly changing, particularly in light of recent changes to UK-wide financial incentives and the timetable for introduction of the RHI for households and the Green Deal. The rapid uptake of solar PV demonstrates that industry has the ability to respond quickly to demand, but this may itself bring additional challenges, for example in ensuring quality and standards are maintained.

The Strategy sets out actions to be implemented by a partnership of Scottish Government, industry and other stakeholders. Given the significant programmes of support to be implemented at a UK level and the need to assess impact of recent changes to financial support, the Strategy must be a working document which can be updated to reflect the changing landscape.

¹ Consumer Focus 2011, *Off-gas consumers: Information on households without mains gas heating*

1.8 Taking the Strategy Forward

A clear conclusion from the Stakeholder Group has also been the need for improved communication and coordination between all stakeholders to maximise the impact of actions set out in the Strategy. A Task Group will therefore be set up to take forward a number of the actions set out in the Strategy, to monitor and review impact of the Strategy and make further recommendations to adapt to rapidly growing sector.

1.9 Key Actions

Action 1 Scottish Government to convene a **Microgeneration Task Group**, reporting to the Renewables Industry Leadership Group of the Energy Advisory Board to take forward the recommendations, monitor deployment, review progress against benchmarks and consider further actions, as required, in 6 months following the outcome of the Comprehensive Review of the Feed in Tariff (FIT) and in the run up to implementation of the Green Deal. The Task Group will expand the Microgeneration Strategy Stakeholder Group to include representation from end users such as consumer groups, Registered Social Landlords and the construction sector.

2 Deployment

Successes and Actions To Date

- Energy Saving Trust [Renewable Heat in Scotland Report](#) estimates that in 2010, microgeneration accounted for 53 MW of capacity, generating 151,000 MWh of heat, the equivalent of the average heat use of over **10,000 Scottish homes**.
- Since 2007, the Scottish Government has provided **nearly £13 million in grants and loans direct to householders** to help install microgeneration and continues to fund interest free loans for householders through the [Home Renewables](#) and [Home Loans schemes](#) to help them benefit from the Feed in Tariff (FIT) and Renewable Heat Premium Payments (RHPP).
- Over **17,000 installations** registered under the FIT in Scotland with 59 MW capacity installed on houses, out of total 72 MW.
- **283 community microgeneration installations** have been supported by the Scottish Government's [Community and Renewable Energy Scheme \(CARES\)](#) managed by [Community Energy Scotland](#).
- [Community Energy Scotland](#) advised just under 50 community organisations in deprived, urban areas on energy efficiency and renewable technologies through the [Urban Development Grant Scheme](#) and of these 24 urban projects in deprived areas were match funded from CARES of just over £300,000.
- A searchable database and map of [exemplar projects](#) is available on Community Energy Scotland's website.
- The Scottish Government funds [Small Business Loans](#) for **Small-Medium Sized Enterprises (SMEs)** for energy efficiency and renewable energy. A total of **143 loans worth £5.4 million** have been paid to SMEs for renewable installations, and a further 39 loans worth £1,482 for combined renewables and energy efficiency measures.
- The [Woodfuel Usage Study 2011](#) reports an increasing number of small-scale woodfuel systems, 230 in 2010, including microgeneration installations heating primary schools, village halls, offices, and small businesses.
- Scottish Government has worked with local authorities and registered social landlords to develop solar PV projects, with installation on around 800 homes in Scotland, including 500 installed by **Glasgow Housing Association**.

2.1 Growing the market for microgeneration

Electricity generation

The Feed in Tariff (FIT) has driven rapid growth, with **over 17,000 FIT-registered installations in Scotland (see Table 1)**. Solar PV is the most popular technology making up 94% of the installations and 73% of installed capacity, mainly on individual homes with an average capacity of around 3 kW. Scotland is also benefitting from its wind and hydro resources, which make up a larger proportion of installed capacity. Domestic wind turbines generally range between 4 to 15 kW and the average size of a domestic hydro scheme is 10 kW.

Businesses and communities are also taking up microgeneration. Loans from the Scottish Government's **Community and Renewable Energy Schemes (CARES)**, managed by Community Energy Scotland, have helped communities benefit from the FIT, with 39 community wind projects up and running and more in the pipeline. Micro-hydro schemes range from smaller domestic schemes to larger community and commercial projects. An update on the [2008 Hydro Resource Study](#) estimates there could be 1.2 Gigawatts of potential hydro capacity across 7,043 schemes, largely micro-hydro.

Camphill workshop, Blair Drummond

Through a CARES grant, Camphill now have a large, light and airy workspace built specifically around the needs of the adults supported by Camphill. Camphill provides meaningful daily activities for people with learning disabilities.

Ground Source Heat Pumps have made a huge contribution to the success of the newly named Eastwood workshop. They ensure the workshop remains at a comfortable temperature for working all the year 'round. The charity also prides itself in minimising their impact on the environment and always source organic and 'green' options where possible, the GSHPs have fitted perfectly with this ethos.

More information on community projects is available on the online database and map of exemplar projects on the Community Energy Scotland website.

Table 1: Total number and capacity of installation registered in Scotland under the Feed in Tariff, including microgeneration

Technology	Domestic Installations	Commercial Installations	Industrial Installations	Community Installations	Total Installations	
Hydro	63	10	0	1	74	0.4%
Micro CHP	21	0	0	0	21	0.1%
Photovoltaic	15,995	237	6	23	16,261	93.8%
Wind	782	154	9	39	984	5.7%
Total Installations	16,861	401	15	63	17,340	
	Installed capacity (MW)	Installed capacity (MW)	Installed capacity (MW)	Installed capacity (MW)	Installed capacity (MW)	
Hydro	0.855	3.113	0	0.015	3.983	5.5%
Micro CHP	0.021	0	0	0	0.021	0.0%
Photovoltaic	50.749	2.274	0.052	0.156	52.961	72.9%
Wind	7.878	6.431	0.173	1.201	15.684	21.6%
Total Installed Capacity (MW)	59.23	11.818	0.225	1.372	72.649	

(Source: [Ofgem Renewables and CHP Register](#) as at 15 June 2012)

The installation rate for solar PV peaked in the run up to the 12 December 2012 reference date proposed by the UK Government to reduce eligibility for the existing tariffs, under its consultation on the Comprehensive Review of the FIT. The UK Government have now proposed long-term tariff setting mechanisms to provide greater certainty for installers and consumers. The mechanism will lead to further reductions in order to keep the FIT scheme in line with the budget, but should provide a clearer framework within which businesses can operate.

The UK Government has also set out its [proposed tariffs for non-PV technologies](#), in its Phase 2B consultation on the Comprehensive Review, including wind, hydro, anaerobic digestion and micro-CHP (now closed). The consultation also looks at various administration issues and examines the potential of options for community developments that would give greater certainty in respect of tariffs.

Scenarios for growth

Solar PV dominates the number of FIT-eligible installations and is likely to continue to do so. Wind and hydro will make a more significant contribution to capacity, and while there is the potential for significant growth in micro-CHP by 2020, if the technology can be commercialised in the near future, the scenarios below are based on the current deployment proportions.

[Solar Cities Scotland](#) aims to develop and promote the use of renewable energy in all its forms and offer practical advice on low carbon living for urban communities across Scotland. Their demonstration Eco House in Dundee serves as a base for their staff to operate and as source for inspiration for the public to see renewables and Eco living in action.

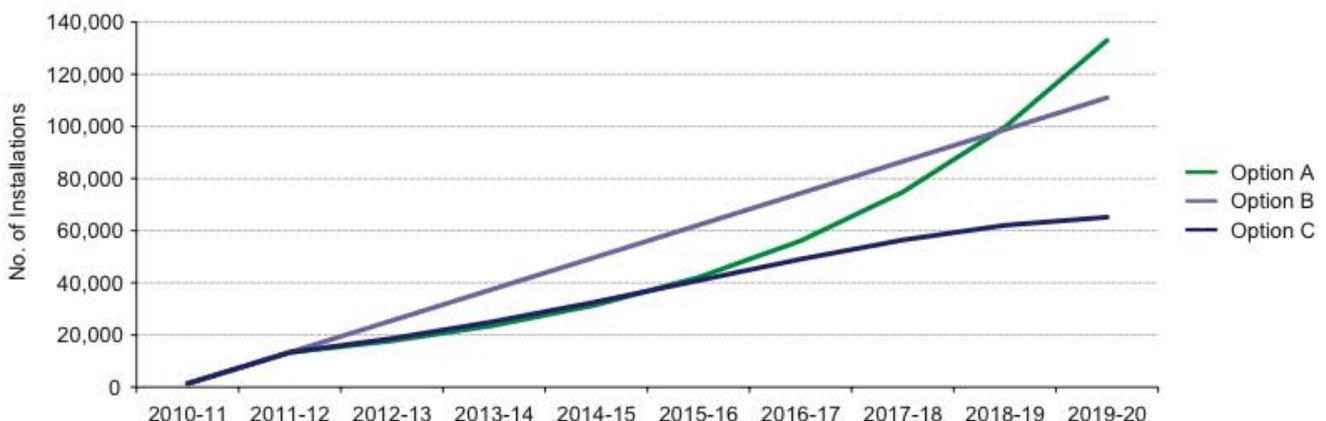
As the rapid changes in the last year work through the market and the future landscape becomes clearer, we have looked at a number of scenarios for continued uptake of microgeneration, in discussion with our Stakeholder group. Option A and Option C, illustrated in Figure 1, show the potential variations around a baseline of based on installations rates in 2011.

Option A shows an ambitious, but sustainable, trajectory, delivering around 130,000 installations by 2020. The growth of solar PV under a high FIT tariff demonstrates the potential for much higher market rates, but in discussions with stakeholders, we believe Option A represents a level at which the market can grow sustainably.

Option C presents a worst case scenario with a decline in uptake, assuming the growth rate experienced prior to the FIT review was unsustainable. While there is a risk that this is the case, we believe that we have seen the development of a robust sector for microgeneration, particularly solar PV, and the actions in this Strategy aim to ensure that we do not see such a decline.

Our actions, along with greater certainty over the FIT tariffs, should allow the market to rebuild confidence in the coming months and get back on track. As set out in **Action 1**, we will work with the Microgeneration Task Group to review the scenarios by the end of the year.

Figure 1: Uptake of microgeneration – scenarios for growth



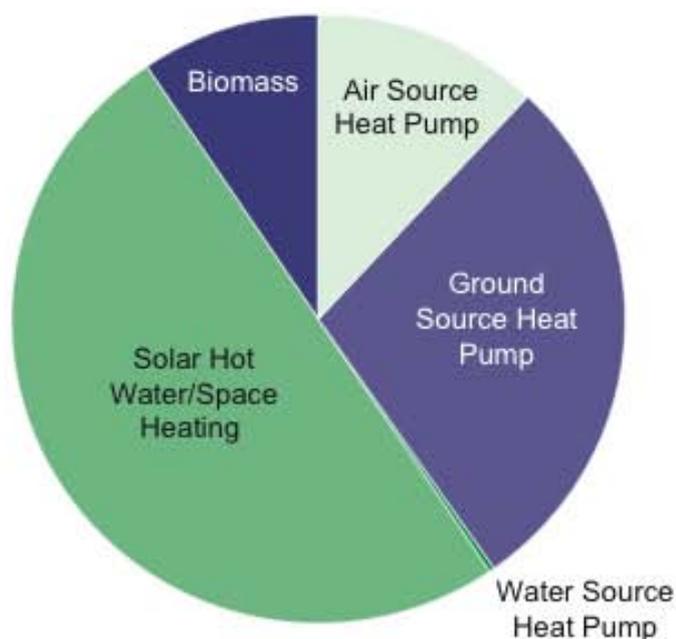
- Deployment projection based upon an increase of approximately 33% annually from February 2012 reported levels. Assumes the growth rate estimated post 2014/15 is observed over the whole period.
- Deployment projection based upon the annual increase observed in 2011. This projection assumes that the total demand for microgeneration is constrained at approximately the number of installations in 2011.
- Deployment projection based upon a Q1 2012 growth rate, declining annually by 5%. Assumes a higher than expected installation cost for microgeneration and lower than expected uptake.

2.2 Renewable heat

Since 2003, the Scottish Government through its Home Renewables Loans and previous grant scheme has paid £13 million to 5,000 householders to install renewable technology to heat their homes. Since the RHPP was introduced in August 2011, nearly 1,000 vouchers worth around £789,000 have been issued to households in Scotland, representing 14% of the total value of vouchers issued under Phase 1 of the scheme.

Figure 2 shows the breakdown of installations for heat by technology. Solar thermal and heat pumps have been the most popular technologies. Biomass has also made up a significant proportion, particularly in rural areas and we have seen major investment in manufacturing of high grade wood pellets in Scotland.

Figure 2: Scottish Government funded domestic renewable heat installations by technology



Increasing fossil fuel costs can have a big impact on businesses, particularly in rural areas. As a result farms, estates, hotels and B&Bs have benefitted from targeted grant schemes such as the [Scottish Biomass Heat Scheme](#) to switch to renewable heat. Around 143 businesses have taken advantage of our Small Business Loans Scheme, managed by EST, to install a range of renewable heat technologies.

Case Studies – Biomass for Business

[Cloud House Café](#) – pellet boiler
[Culfail Hotel](#) – log boiler
[Woodfuel in Practice - the Hospitality Industry in Scotland](#) – woodfuel installations

Since its launch in November 2011, businesses have been able to take advantage of the RHI and our Small Business Loans which can help business overcome the capital barriers. We will be taking action, as set out in Section 4, to look at how we improve awareness of the RHI to maximise the opportunities for businesses to invest in renewable heat, to deliver both cost savings and reduce their carbon footprint

Affordable Warmth

Our ambition to see more homes heated with renewable energy is strongly linked to our objectives to improve Scotland's housing stock. We will consult on a **Sustainable Housing Strategy** which will set out our vision for warm, high quality, affordable, low carbon homes and a housing sector that helps to establish a successful low carbon economy across Scotland. This includes plans for a National Retrofit programme which will feature area-based schemes focused on tackling fuel poverty with a leading role for local councils, using Scottish Government funding to bring together a range of funding streams and lever maximum investment by the energy companies into Scotland.

Scenarios for growth

To support these objectives, the [Low Carbon Scotland report](#) set a target of 100,000 homes to have some form of renewable heat by 2020. To achieve this milestone, there needs to be a significant increase in the uptake of renewable heat technologies by individual households, matched by a growth in the number of households on district heating. If microgeneration is to deliver half of this milestone - 50,000 installations - by 2020, the uptake in renewable heat technologies would need to increase to at least 5,000 per year. The development of the domestic market will create economies of scale which will benefit business and community installations.

2.3 Growing demand

Scottish Government Support for Microgeneration

A key action in the Scottish Government's Sectoral Routemap for Microgeneration is to maximise the uptake of the RHPP, RHI and FIT in Scotland. The Scottish Government provides financial support to assist householders install renewables through its [Home Renewables Loans Scheme](#), for communities through the [Community and Renewable Energy Scheme](#) (CARES) and for small businesses through its [Small Business Loans](#).

The **Warm Homes Fund** (£50m over five years) will support communities in areas with high levels of fuel poverty, to help them to set up projects providing lower-cost energy generated from renewable sources, reducing fuel bills for individual households, and/or creating new funding streams through the RHI and similar incentive payments. The Fund will open in 2012/13 with funding of £3.25m available, and will take the form of loans for actual installations, and grants for feasibility studies and options appraisals.

These support mechanisms are designed to help households, businesses and communities access UK-wide incentives schemes. Figure 3 sets out how Scottish Government support provides access to the capital needed to allow everyone in Scotland to benefit from microgeneration.

Figure 3: Scottish Government and UK Government Financial Incentives for Microgeneration and Energy Efficiency

		Micro-electricity		Micro-heat		Energy Efficiency
Householders	All	Home Renewables Loans +	Feed in Tariff	Home Renewables Loans +	RHPP (domestic RHI due 2013)	Green Deal due autumn 2012
	Registered social landlords	Warm Homes Fund due autumn 2012 +		Warm Homes Fund due autumn 2012 +		ECO due 2013
	Locally-based development trusts					
Businesses	Small-medium sized enterprises	SME Loans +		SME Loans +	RHI	SME Loans
	Rural business	(where organisation qualifies as a Small-Medium Size Enterprise)	(where organisation qualifies as a Small-Medium Size Enterprise)			
Communities	Community groups				(where organisation qualifies as a Small-Medium Size Enterprise)	
	Charitable bodies					
	Urban Communities					
		CARES Urban Grants		CARES Urban Grants		

Reducing Technology Costs

The Energy Saving Trust’s **solar PV ‘hotspot’** campaign in Scotland delivered big cost savings for households and community organisations for solar PV by identifying the best deals available. Following on from that campaign, EST are putting in place, local, regional and national discount offers; discounts being obtained in return for publicising these offers through the [Energy Saving Scotland advice centres](#) (ESSac) and on the EST website. Any willing installer will be able to put forward an offer and all credible offers will be promoted, to ensure transparency and maintain customer choice.

Currently the discounts will be focused on solar PV but installers will also be asked for offers for other technologies. The aim is to make sure that in every local authority area there is at least one offer available to Scottish householders.

Customer confidence is critical, so the campaign will be backed up a web-based review site to allow customers to provide feedback on installers. This will provide an incentive for installers not only to offer best value taking into account service quality as well as price, to the benefit of the sector as a whole. The list will provide links to the Microgeneration Certification Scheme ([MCS database](#)) so will provide significantly improved information giving consumers greater support and confidence in their choices.

Public Sector Procurement

This Strategy complements the work of the Collaborative and Scottish Government Procurement Division. Scottish Procurement are currently developing a **Framework to facilitate public body access to renewable technology**. This framework seeks to ensure that the public sector in Scotland leads by example in utilising microgeneration technologies for supply of renewable electricity. In addition the Scottish Government’s electricity supply contract tendered and managed by Scottish Procurement, facilitates the uptake of renewable and microgeneration technologies by the public sector.

UK Government Incentives

The [Feed in Tariff \(FIT\)](#) has driven rapid growth over the last two years by providing a financial incentive for electricity generation technologies. The rapid growth in demand, mainly as a result of reduced technology costs for solar PV, has led to major cuts in the tariff for solar PV. The tariff for other technologies is also being reduced, but the growth in market is leading to greater availability and lower costs.

The [Renewable Heat Incentive \(RHI\)](#) was introduced by the UK Government in November 2011 to provide a similar incentive for businesses, communities and the public sector. The RHI for households will be introduced in 2013 and, in the meantime, the [Renewable Heat Premium Payment \(RHPP\)](#) provides interim funding for households to install renewable heat technologies. The Scottish Government will continue to work closely with the UK Government to ensure Scottish issues in particular are taken in to consideration.

- Further information on the FIT and RHI for households and small business is available from the [Energy Saving Trust \(EST\)](#).
- [Community Energy Scotland](#) provides advice to communities on the opportunities to install renewables.

The [Green Deal](#), will also include microgeneration technologies, subject to meeting the 'golden rule': that estimated savings on bills should always equal or exceed the cost of the work. The Green Deal is an entirely new finance mechanism to enable individuals and organisations to install energy efficiency improvements at no upfront capital cost and to pay for them, over a period of years, through a charge on their energy bill.

The [Energy Company Obligation \(ECO\)](#) will work alongside the Green Deal for domestic properties. It will involve three obligations for energy companies, relating to Affordable Warmth, Carbon Saving and an area-based Carbon Saving Communities obligation supporting a range of measures in low income areas. The UK Government hopes to drive the market in solid wall insulation through the carbon saving target while the affordable warmth obligation will be directed towards vulnerable low-income households in the private sector with entitlement to defined benefits, which will be particularly important for rural Scotland.

2.4 Key Actions

Action 2 The Scottish Government will boost its [Home Renewables Loans Scheme](#), delivered by the Energy Saving Trust, to provide additional support for renewable heat.

Action 3 Energy Saving Trust will build on its successful solar PV **hotspot campaign** on behalf of the Scottish Government, to deliver discounted offers in each local authority area.

Action 4 The Collaborative and Scottish Government Procurement Division, **Scottish Procurement**, will put in place a Framework to facilitate public body access to renewable technologies.

3 Technologies

Successes and Actions To Date

- The Scottish Government's support for renewables has created the right environment to encourage investment in manufacturing of microgeneration. Small-scale wind, air source heat pumps and solar thermal technologies are being made in Scotland, creating new jobs.
- Increasing demand for biomass for heat has led to a growing [list of suppliers](#) delivering to local heat markets, particularly in rural areas, and significant investment in manufacturing of high grade wood pellet by companies such as Hot Stovies, Puffin Pellets, Balcas and Verdo Renewables.
- The **Energy Technology Partnership (ETP)**, with £3m funding from Scottish Government, Scottish Funding Council, European Regional Development Fund, Scottish Enterprise and ETP Member Universities, has established a **Knowledge Exchange Network** which, *inter alia*, will support Scottish microgeneration SMEs by linking them with the world class research being carried out in Scottish universities.
- **RenewNet** is an industry engagement platform funded by the Scottish Funding Council and European Regional Development Fund, and Member Universities. RenewNet offers specialist electrical power engineering advice and guidance to Scottish microgeneration SMEs, enabling these companies to gain access to University expertise and facilities and accelerate their technology.
- The **Scottish Energy Installers Alliance** is represented on the Steering Group for the Microgeneration Certification Scheme, to strengthen links between existing industry competencies and microgeneration standards.

Microgeneration covers a wide range of technologies which generate heat or electricity. Choosing the right technology best suited to a particular property and application depends on a number of factors. Some technologies such as air source heat pumps can be used on most properties while others such as micro-hydro depend on a suitable site being available.

Key determinants are likely to be the location and design of the building for which the energy is being generated and its existing energy demand. Design encompasses both how the technology is integrates with the building's energy system, how it will be used and, as well as its appearance, with some microgeneration technologies introducing new features, shapes and height into the landscape.

We set out below the most common technologies in use and also look at Scottish investment and innovation in the future of microgeneration and home energy systems.

3.1 Today's Microgeneration Technologies

To generate electricity



Solar panels (PV)

Solar electricity systems, commonly known as solar photovoltaics (PV) capture the sun's energy using photovoltaic cells. The cells convert the sunlight into electricity, which can be used to run household appliances and lighting.



Wind turbines

Wind turbines harness the power of the wind and use it to generate electricity. Small systems known as 'microwind' or 'small-wind' turbines can produce electricity to help power the lights and electrical appliances in a typical home.



Hydroelectricity

Here, running water is used to generate electricity, whether it's a small stream or a larger river. Small or micro hydroelectricity systems can produce enough electricity for lighting and electrical appliances in an average home.

To generate heat



Wood-fuelled heating

Heat and hot water from wood-fuelled stoves and boilers. Wood-fuelled or biomass heating systems burn wood pellets, chips or logs to power central heating and hot water boilers or to provide warmth in a single room.



Solar water heating

Solar water heating systems use free heat from the sun to warm domestic hot water, with a conventional boiler or immersion heater as backup, to make the water hotter or provide hot water when solar energy is unavailable.

Ground source heat pumps

Ground source heat pumps use pipes buried in the garden to extract heat from the ground. This is usually used to heat radiators or underfloor heating systems and hot water.



Air source heat pumps

Air source heat pumps absorb heat from the outside air. This heat is usually used to heat radiators, underfloor heating systems, or warm air convectors and hot water in your home.

To generate electricity and heat

Micro-CHP (micro combined heat and power)

'Micro-CHP' stands for micro combined heat and power. This refers to a heating technology which generates heat and electricity simultaneously, from the same energy source, in individual homes or buildings.

More info:

- [The EST's Home Energy Selector](#) can help select the most suitable technology for your property and the EST's website has real life examples of the technologies in use in Scotland.
- Scottish Government Building Standards [Low Carbon Technical Guides](#) provide details on the technical aspects of the installation, operation and maintenance of microgeneration technologies.

3.2 Quality and Standards

The [Microgeneration Certification Scheme \(MCS\)](#): This is an industry-led scheme focussing on ensuring the quality of micro-renewable technology and installations.

The UK Government's Microgeneration Industry Contact Group Action Plan sets up working groups to look at a number of key areas including:

- The Microgeneration Certification Scheme: This taskgroup aims to maximise the effectiveness of the MCS scheme in ensuring high-quality design and installation of microgeneration systems and improve consumer confidence. MCS is working with SummitSkills and other stakeholders to include formally the national competency framework for environmental technologies in the MCS installation standards.
- Insurance and Warranties: This taskgroup aims to ensure that effective consumer protection schemes are identified and fully communicated to the market and is providing input to the UK Government on the development of consumer protection mechanisms under Green Deal

The Scottish Government liaises with the Microgeneration Government Industry Contact Group and the Scottish Energy Installers Alliance is represented on the MCS Steering Group and working groups.

3.3 Design

As with any energy systems, good design is essential for the efficient and effective operation of microgeneration. The Scottish Government supported the Energy Saving Trust's **field trials of domestic wind turbines, heat pumps, and solar water heating systems**. These field trials were on a scale never undertaken before in Scotland and the rest of the UK, and investigated how well these systems worked in real homes and how householders interacted with the systems. The findings have helped to improve industry standards, consumer guidance and government policy, for example Microgeneration Certification Scheme standards for heat pumps and wind turbines have been updated in light of the findings and improved consumer guidance on making the most of these systems has been rolled out through the Energy Saving Scotland advice centres and on the EST's website.

3.4 Investing in Scotland

Business support

The Business Gateway, Scottish Enterprise and Highlands & Islands Enterprise offer a range of business development services to companies engaged in the microgeneration sector.

- [The Business Gateway](#) provides a 'one stop shop' facility for individuals seeking to start a new business as well as a broad range of advisory and support services for existing businesses seeking to improve their performance.
- **Scottish Enterprise and [Highlands & Island Enterprise](#)** support companies in Scotland that have significant growth potential and aspirations through providing access to advice and funding for innovation, investment, training and infrastructure development. As well as supporting existing companies, the Enterprise agencies also work to enable new businesses to break into microgeneration supply chains. Examples of companies assisted include Gaia Wind, Kingspan and Solar Energy Scotland.
- One particular speciality is the [Scottish Manufacturing Advisory Service](#) which provides specific and direct support for businesses seeking to expand and/or improve their manufacturing operations.

Tomorrow's Microgeneration Technologies

Scotland has a world-class reputation in energy research. [The Energy Technology Partnership \(ETP\)](#) is an alliance of independent Scottish Universities, engaged in world class energy-related Research, Development and Demonstration (RD&D), and is the largest research partnership of its kind in Europe. Currently the ETP is:

- supporting 10 PhD studentships developing innovative approaches to microgeneration, including the use of advanced thermoelectric technologies for generating electricity from waste heat; energy storage techniques to allow greater penetration of intermittent energy generation into the grid; use of microgeneration to power water treatment plants; and improvement to the effectiveness and integration of microgeneration in the built environment.
- offering support to several SMEs developing next generation, horizontal axis wind turbines for use in the built environment – a potential very large market – to overcome the technical challenges of previous models.

The [Scottish Institute for Solar Energy Research \(SISER\)](#) is an alliance of solar energy researchers, over 100 academics, research assistants and PhD students, across 10 Scottish universities. SISER was set up to enhance solar technology development collaborations within Scotland and between Scotland and the wider global community. SISER provides expertise and facilities to support up-and-coming R&D and future commercialisation in the field and is particularly interested in developing solar technologies that are relevant to Scotland and Northern Europe.

Other research and development on solar technologies in Scotland includes

- [Power Textiles](#) develop and optimise textile fabrics on which solar (photovoltaic) cells have been directly integrated. Such fabrics have a wide variety of applications, including agricultural, disaster relief, architectural and military uses.
- [Sunamp](#) are currently focused on research and development of an integrated heat store and processor, incorporating heat batteries with heat pumps. The technology is highly adaptable, able to be rapidly scaled and tuned to many different applications, including solar.
- [The Scottish Solar Energy Group \(SSEG\)](#) promotes the use of solar in Scotland, Membership is open to all with an interest in solar energy.

Work is also being carried out by a number of Universities in operational environments where microgeneration technology can be brought together and tested in real scenarios. Integration of microgeneration technology would allow a building to use these technologies in an intelligent, sustainable and efficient operational manner. For example the Autonomous Building Research Programme led by **Dundee University School of Architecture** is constructing a Live/Work building operating independently any electrical energy grid connections, which will be monitored to review and refine the operational effectiveness of these technologies.

Micro-FC CHP (Micro Fuel Cell Combined Heat and Power)

Micro-FC CHP is a promising alternative to a wide variety of power generation appliances, promising high efficiency and extremely low environmental impact. They convert hydrogen to electrical and thermal energy, free off emissions - the only output by-product is pure water. Micro FC CHP is in a pre-commercial state, with 15,000 fuel cells under test in Japan. About 1,600 fuel cells CHP have been deployed in Europe and full commercial deployment is expected in 2015.

Micro Fuel Cell Combined Heat and Power on Shetland

A pioneer project on Fuel cell CHP is currently under development in collaboration between the [Pure Energy® Centre](#) based on Unst (Shetland), **Lews Castle College** in Stornoway (Western Isles) and **KTP** (knowledge Transfer Partnership). It aims to develop an innovative high efficient Fuel Cell system for the production of electricity, heat and cooling.

Scotland has significant experience of fuel cell micro-CHP. **Berwickshire Housing Association** installed Europe's first natural gas fuel cell CHP into a domestic property in Eyemouth in 2005. Companies such as **Burdens Energy**, **Intelligent Energy CHP**, **Logan Energy**, and the [Pure Energy® Centre](#) (see Box) are based in Scotland and work with a rapidly widening range of suppliers and technology developers to deliver cost-effective micro-generation solutions at domestic and industrial scale.

3.5 Grid

We fully recognise that there are challenges in respect of grid. These challenges are not unique to microgeneration technologies, as all forms of renewable energy generation present challenges in accommodating intermittency on the grid, and in connection to the grid in the first place. The Scottish Government will continue to work with key stakeholders to address these issues so that Scotland can benefit from a flexible electricity system that will securely deal with the increased penetration of renewables.

To take this forward, we have launched a collaborative working group comprising the Scottish Government, community groups and the Scottish distribution network owners (DNOs). This group will identify pilot projects that will allow the DNOs and local communities to work together to test innovative ways of maximising existing grid capacity, incorporating community-owned renewable energy and influencing customer behaviour in terms of use of electricity.

3.6 Key Actions

Action 5 The [Scottish Energy Installers Alliance](#) will continue to work with MCS to strengthen links between existing industry competencies and microgeneration standards.

Action 6 The collaborative working group comprising the Scottish Government, community groups and the Scottish distribution network owners will work together to identify innovative ways of maximising existing grid capacity.

MADE IN SCOTLAND

Scotland is well placed to become a European leader in harnessing the energy from a diverse mix of renewable energy resources. Here are examples of renewable energy technologies being manufactured in Scotland.

Sustainable Technologies



Sustainable technologies is a young company that were established 2 years ago. The company spent the first two years developing their own solar panel. They began production in 2012 and currently employ 4 members of staff. The company is run from a rural location, where they source all materials as locally as possible and operates from a zero-emission factory.



AES Solar



AES Solar was established in 1979 and was the first UK solar system designers and manufacturers in Scotland. They currently employ 9 staff and are involved in both small domestic scale systems and large commercial developments. Installations are carried out throughout the UK.



AES installed solar thermal collectors on the roofs of seven B listed Georgian tenements for Edinburgh Housing Co-operative delivering CO₂ emissions savings of between 14,159 – 32,043 kg CO₂/year

Mitsubishi



Mitsubishi have a factory based in Livingston where they produce their air sourced heat pumps. The air conditioning factory was set up in 1993 and they now employ over 460 people at that site and also have a training facility, opened in 2004, providing engineers with the qualification to install their range of Ecodan air source heat pumps. These have already been fitted to a block of flats in Glasgow.



Kingspan Wind

Kingspan Wind was established in 2011 - a branch of Kingspan Renewables & Environmental – and they manufacture small scale wind turbines from their production and technical facility in Stewarton, Ayrshire. The turbines that they manufacture were designed, developed and certified in Scotland, with Kingspan operating globally to newly accredited installer networks in a number of continents with countries ranging from New Zealand, Hong Kong, North America and Europe. The facility employs 14 full time members of staff and offers graduates undertaking their MSC studies the opportunity to gain further insight and experience within the sector. In addition to manufacturing and installer support operating from the Scottish facility – 90% of the companies supply chain are also based in Scotland.



Gaia Wind



Gaia wind is a manufacturer of small wind turbines and employ 40 staff in their Glasgow location after moving their headquarters to Scotland from Denmark. They also operate internationally with offices in Denmark and Italy and distributors in England, Ireland, France and USA. The employee skill set ranges from manufacturing, distribution and engineering to R&D, sales, marketing and administration.



4 Planning and Regulation

Successes and Actions To Date

- The Scottish Government has:
 - introduced permitted development rights for most microgeneration technologies for domestic and non-domestic properties.
 - provided updated online planning advice for microgeneration.
 - published low carbon technical guides for solar PV, solar thermal, air source heat pumps, and biomass.
- SNH has provided **new guidance on small-medium scale wind turbines** alongside its [guidance on micro-renewables and the natural heritage](#)
- SEPA has provided [guidance for Run of River Hydro](#)

[Scottish Planning Policy \(SPP\)](#) supports investment in renewable energy projects at all scales of development, including microgeneration. The Scottish Government aims to remove barriers to the uptake of renewable energy and promote an ethos where the Government provides proportionate advice where there is a genuine need, allowing local solutions and avoiding duplication.

Planning and building standards take a holistic approach to improving the carbon footprint of buildings. Energy efficiency measures are usually the easiest and most cost effective way of reducing emissions. Microgeneration technologies will work best on well insulated homes, an approach supported by the advice and guidance available on planning and building regulations.

4.1 Planning Advice for Microgeneration

The existing established online format of renewables planning advice, which offers scope for regular updates, offers numerous advantages including keeping pace with the frequent changes in the renewables sector, particularly in terms of new technologies, innovations, new national policy initiatives, targets, incentives and planning practice. This approach has met with a favourable response from stakeholders.

In 2012, we carried out a review and replaced 'Annex 1: Planning for Micro renewables', with input from a targeted core reference group, including SNH, SEPA, Historic Scotland, Scottish Renewables, Energy Saving Trust, and the Microgeneration Strategy Stakeholder Group.

The launch of this updated [online planning advice](#) supplements the Directorate's existing suite of online renewables planning advice and it is intended to follow the established preferred format. This takes the form of the following:-

- a 'snapshot' on where microgeneration lies and the dynamics which are influencing change;
- 'suggested areas of focus' where Planning Authorities are expected to be focussing their effort;
- 'opportunities within the planning processes' which provides practical tips chronologically at each stage of the planning process to maximise opportunities for microgeneration;
- sections on technical information, typical planning considerations and useful references.

Typical planning considerations in determining planning applications for microgeneration include:

- landscape and visual impact including the scale and number of installations. A landscape and visual assessment may be requested, but planning authorities must be alert to impacts

on scheme viability in terms of time and cost and therefore all such requests should be proportionate to the proposal.

- impacts on wildlife and habitat, ecosystems and biodiversity: Micro-hydro schemes require consent by SEPA under the Controlled Activities (Scotland) Regulations 2011, and there is guidance available on SEPA's website for information requirements needed to support an application. SNH's guidance note on ['Micro-renewables and the Natural Heritage'](#) also provides further guidance to applicants.
- impact on communities and other third parties - common issues to be addressed generally relate to siting, design/ appearance, amenity, public safety, and noise.
- the historic environment: Permitted Development Rights do not apply to buildings that are listed or located in Conservation Areas, or sites of archaeological interest.
- Aviation and Defence: It is recognised that all scales of wind energy, even micro-turbines, have potential to adversely impact on both civilian and military aviation interests.
- Cumulative Impact: Assessing the cumulative impact of a range of technologies installed close to each other requires consideration of their effects in combination. As the number of microgeneration installations increases, so also does the need for cumulative impact to be assessed. In relation to microgeneration technologies however this is likely to be relatively localised and any cumulative impact assessment should not therefore be required to be extensive.

Small-scale wind

The level of interest from rural businesses, especially farmers, communities and individuals in small-scale wind means that cumulative impacts have the potential to increase in some areas. In March 2012, SNH provided additional guidance for small scale wind turbines to add to its suite of guidance on onshore wind, to assist planning authorities deal with the growing number of enquiries in particular:

- [Assessing the Impact of Small-scale Wind Energy Proposals on the Natural Heritage](#)
- [Siting and Design of Small Scale Wind Turbines of between 15 and 50 metres in height](#)
- [Assessing the Cumulative Impact of Onshore Wind Energy Developments](#) (although aimed at large scale windfarm, some of the guidance is pertinent to microgeneration)

This guidance will help planning authorities to assess individual proposals and the overall cumulative impact in an area, at a proportionate level to the scale of the impact. The Scottish Government and planning authorities have set up the Small Wind and Planning group to provide a forum where we can sit down with representatives of Heads of Planning to hear their concerns and identify key actions that could support effective decision making on wind turbine planning applications.

Micro-hydro

SEPA is supportive of renewable energy developments and has a hydro team focussing on streamlining and assessing applications for hydro developments. It is SEPA's duty to license hydro schemes and to make sure that the benefits delivered from renewable energy generation balance against any environmental impact. With this in mind, SEPA has designed screening guidance for hydro schemes that allow developers to tell at the scoping stage whether a development is potentially consentable. This is particularly tailored for smaller schemes. SEPA has also revisited the information requirements needed to support an application for a small scheme, and a developer should not have to carry out expensive survey work. In fact, in most cases for small schemes, developers will only need a walk over of the site, with photographs, if they can demonstrate their scheme passes the guidance.

All the guidance documents can be found on [SEPA's website](#) including

- [Guide to Hydropower Construction Best Practice](#)

- Guidance for applicants on [Supporting Information Requirements for Hydropower Applications](#)
- SEPA [Guidance for developers of run-of-river hydropower schemes](#)

4.2 Permitted Development Rights

The Scottish Government introduced permitted development rights for most micro renewables on domestic properties in 2009 and 2010. This lifted or reduced the requirements for planning permission for most domestic microgeneration technologies:

- installation of solar PV and solar thermal equipment that would be attached to a wall or roof of a dwelling house or a flat.
- installation of free-standing solar PV and solar thermal equipment for a dwelling house
- the installation, alteration or replacement of a Ground source heat pump or water source heat pump within the curtilage of a dwelling house or a building containing a flat.
- Installation of free-standing wind turbines and air source heat pumps, subject to some restrictions such as the installation being not less than 100 m from the curtilage of another property.
- Installation of flues for biomass and CHP systems, subject to some restrictions such as if the installation is in an Air Quality Management Area.

Permitted development rights were given to some technologies for use on non domestic buildings in March 2011.

4.3 Legislation

[Section 72 of the Climate Change \(Scotland\) Act 2009 \(CCSA 2009\)](#) is for implementation by Planning Authorities through their local development plans. As of 1 April 2010, Section 72 of the Climate Change (Scotland) Act 2009 inserted a new section (3F) into the Town and Country Planning (Scotland) Act 1997:

There is also a notable opportunity for Planning Authorities to discharge all or part of their Section 3F responsibilities for low and zero carbon generating technologies through microgeneration. There is particular reference to how Development Plans can identify potential for microgeneration developments in order to assist in reducing greenhouse gas emissions and address Planning Authorities' obligations in relation to low and zero carbon generating technologies.

Sustainability labelling was introduced to the building standards system on 1 May 2011 to reward new buildings that meet the 2010 standards with a Bronze level label. Further optional upper levels of sustainability are defined as Silver and Gold and these build on improvements to energy use and reducing carbon dioxide emissions. The Bronze Active level and Silver Active level require the use of a low and zero carbon generating technology. This level of sustainability can assist local authorities to meet their obligations under Section 72 of the Climate Change (Scotland) Act 2009 by identifying the use of LZCGT.

4.4 Building Standards

The Scottish building standards system allows for wide range of work to be done to new or in existing buildings without first gaining a building warrant. Routine or low risk work to one or two storey houses is exempt from requiring a warrant when the existing structure of the house is

sufficient for the equipment loadings. Exempting these installations from the warrant process will remove unnecessary bureaucracy and assist with the achievement of carbon reduction targets.

Building standards promote the use of energy from renewable sources to meet Scotland's targets in relation to reducing the emission of greenhouse gases and energy demand in buildings. In 2007, "[The Sullivan Report – A Low Carbon Building Standards Strategy for Scotland](#)" recommended staged improvements in energy standards in 2010 and 2013, with the aim of net zero carbon buildings in 2016/17 if practical. The current standards published in October 2010 require a 30% reduction of carbon dioxide emissions from new buildings compared to the 2007 standards. The improvements made by the 2010 standards support the use of localised or building-integrated low carbon equipment as part of cost-effective solutions to meeting the standards. The review of energy standards for 2013 is currently underway, examining the potential for further emissions reduction.

The Scottish Government's Building Standards Division has produced a range of technical guides for low carbon equipment² including solar thermal, air and ground source heat pumps and biomass. A further guide on solar PV is under development.

4.5 Energy Performance Certificates

Renewable technologies will work best on well insulated, energy efficient houses. Under the Energy Performance of Buildings Directive, an [Energy Performance Certificate \(EPC\)](#) is required on construction, sale or rental of a building. This is a document which states the energy efficiency of a building based on an established UK methodology which includes a standardised way the building is used, allowing comparison between different buildings, and also provides the building owner with advice on a number of ways in which the efficiency could be improved in a cost-effective manner. The EPC is also used to support a range of Scottish and UK carbon and energy saving policies.

Under the FIT, it is now a requirement for buildings – both domestic and non-domestic - to have an EPC of Band D or better to be eligible for the full tariff for solar PV. More information on EPCs can be found on the [Scottish Government's website](#).

From October 2012, the Scottish Government will record all EPCs produced for existing buildings on a single, central register, with lodgement of EPCs for new buildings following suit in 2013. In addition to enabling a more efficient implementation of the EU Directive, this central source of information will support a wide range of Scottish and UK policies on carbon and energy reduction, many of which are identified within this document.

4.6 Key Actions

Action 7 The Scottish Government will continue to engage with Heads of Planning Scotland and planning authorities on a regular basis to identify key actions that could support effective decision making on wind turbine planning applications.

Action 8 The Scottish Government's Building Standards Division will extend its Technical Guides for Low Carbon Equipment to include solar PV and consider other technologies for future guides, where appropriate.

Action 9 The Scottish Government is reviewing the energy standards for buildings, examining the potential for further emissions reductions in 2013 and will consult on its proposals later this year.

² Available at: <http://www.scotland.gov.uk/Topics/Built-Environment/Building/Building-standards/publications/pubtech/thbksupguide>

5 Skills

Successes and Actions To Date

- The establishment of Scotland's **Colleges Energy Skills Partnership (ESP)** - a network of Scottish colleges supported by the Scottish Funding Council to meet the skills needs of Scotland's rapidly developing energy sector.
- The [SEAM Centre](#) is a new training, information and research facility for Sustainable Energy and Micro-renewables based at Inverness College UHI.
- The industry developed a new [Environmental Technology Certificate](#), accredited by SQA, now the recognised competency standards for microgeneration.
- Microrenewables are a core part of the Modern Apprenticeships, ensuring that new apprentices have an awareness of microgeneration technologies and the opportunity to train in their installation.
- The industry-led Scottish Environmental Technologies Training Centre set up by SELECT, offers courses in solar PV, solar thermal and heat pumps systems in conjunction with [SNIPEF](#) and B&ES .
- The creation of the [Scottish Energy Installers Alliance](#) (previously the Scottish Microrenewables Working Group), representing the Scottish construction sector, to ensure skilled operatives and apprentices.
- There are now 532 installers operating in Scotland, 311 with headquarters here, creating jobs in the design, installation and support services for microgeneration technologies.

The [Skills Investment Plan for the Energy Sector](#) published in 2011 by Skills Development Scotland, looked at the employment opportunities in the energy sector, including microgeneration, and put forward an action plan to ensure Scotland can meet its ambitious energy targets.

Many new and existing businesses have taken advantage of the growth in microgeneration to diversify. There are now 311 Scottish-based installers registered under the Microgeneration Certification Scheme and more companies which operate across the UK. The Scottish Government's commitment to renewables has encouraged manufacturers of wind turbines, solar thermal and heat pumps to create jobs in Scotland.

5.1 Employment Opportunities

In 2011, ConstructionSkills carried out research for the Scottish Government on the skills needed for Energy Efficiency and Microgeneration in the Built Environment. Many of the skills needed already exist in the competencies needed by the electrical, plumbing, heating, ventilation and air conditioning trades.

The role of energy advisors and energy assessors will become increasingly important as the Green Deal is rolled out. They will have an important role to play in providing initial advice and guidance, as well as Energy Performance Certificates. The research indicates that over the next few years, publicly funded investment programmes for energy efficiency and microgeneration will help to retain over 4,000 FTEs per year across the Scottish construction industry as well as acting as a catalyst for additional investment.

5.2 Microgeneration Training

Microgeneration offers opportunities to new and existing businesses. The skilled workforce in construction sector already has many of the key competencies to deliver good quality installations and most employers view microgeneration as an addition to their business, developing the existing skill sets of experienced employees. Scottish Government, training providers and industry are

working together to ensure that we have the right training for the additional specialist skills to help employers upskill their workforce.

As the Sector Skills Council with responsibility for microgeneration, SummitSkills has developed two sets of **National Occupational Standards (NOS)** for microgeneration under the title Environmental Technologies:

- The Operative level covers installation, service and maintenance of a range of microgeneration systems
- The Higher level covers the design aspects

In partnership with SQA and the industry in Scotland, SummitSkills has developed a competence based qualification known as [The Certificate in Environmental Technology Systems \(Microgeneration\)](#) jointly awarded between SQA and the industry partnership of SELECT/SNIPEF and the Building & Engineering Services Association (B&ES), formerly HVCA. This is the only industry recognised competence qualification for microgeneration in Scotland and is the add-on to the pre-existing qualifications of the trade.

SummitSkills intends to use the Certificate to upskill the existing workforce, and to ensure the correct competence levels are achieved, the entry level will be limited to operatives who have already achieved a Level 3 qualification in their discipline. SummitSkills has also revised all of its building engineering services (BSE) SVQ's to include elements of Environmental Technology Microgeneration Systems appropriate to each discipline, and revised Modern Apprenticeship Frameworks will ensure microgeneration skills are embedded into training provision for new entrants.

Training providers have, in the main, anticipated growth within microgeneration, and many have already begun to address their own organisations capability and a need for developing 'train the trainer' initiatives. Scotland's colleges have responded positively to the growing need for skilled operatives, setting up new provision and coordination through **Scotland's Colleges Energy Skills Partnership (ESP)**, with a number of dedicated renewable and microgeneration training centres including:

- the **SEAM Centre** in Inverness is an important knowledge hub for microrenewables and sustainable energy technology within the Highlands and Islands and Scotland.
- **South Lanarkshire College** has worked with Dawn Homes and more than 50 private sector partners to design and build create the Aurora, an affordable low-energy low-carbon house. Aurora showcases a range of microgeneration and energy efficiency technologies.

Industry is also taking the initiative to upskill its workforce. SELECT, in conjunction with SNIPEF and B&ES have set up the **Scottish Environmental Technology Centre** at their headquarters in Roslin, offering courses in solar PV, solar thermal and heat pumps systems.

SCOTLAND'S COLLEGES ENERGY SKILLS PARTNERSHIP (ESP)



The ESP is a new network of Scottish colleges with an established track record in the energy sector, aims to meet the skills needs of Scotland's rapidly developing energy sector.

The ESP, comprising core members and supporting associates, aims to respond quickly to changing skills requirements from employers, pool expertise and resources, and reduce unnecessary duplication.

It will work with industry, stakeholders and the university sector across geographical groups covering all of Scotland. A sample of the training provision available through the ESP is included in Annex 2

5.3 Development of Partnerships and Networks

Two developments in particular have been set up to ensure that Universities and Colleges work across the sector in an effective and joined up way:

- The **Energy Technology Partnership (ETP)** – this consists of around 250 academics and 600 researchers and is considered to be the largest, most broad based power and energy research partnership in Europe.
- The Scottish Funding Council (SFC) announced last summer (2011) that it would invest £300,000 over three years in the **Scotland's Colleges Energy Skills Partnership (ESP)**, to co-ordinate energy activity across the FE sector (see box opposite).

The liaison across these two strands is important to ensure businesses and learners are able to readily find their way to the right part of the wide range of provision that is in place.

5.4 Awareness Raising

Careers Information

My World of Work is Skills Development Scotland's (SDS) new web service and aims to help people plan, build and direct their career throughout their lives. Providing information on skills, learning and employment, it supports the Scottish Government's ambitions for the improved delivery of an all age, universal careers service. Including a section on Energy, customers can see jobs in action; build their CVs; search for vacancies and explore training opportunities in a way that is personal to them. There is a wide range of video clips of people talking about their job roles and a significant magazine element with exciting, current content that is relevant to the world of work.

Industry

Innovation in microgeneration means that skill development must be kept up to date with latest developments. Industry groups such as the SummitSkills' Manufacturers Group ensure that training provision is prepared to meet both current and future needs, and there are several websites carrying useful information for businesses including Cut the Carbon (www.cutcarbon.info). The Low Carbon Skills Fund, administered by Skills Development Scotland, currently assists employers to upskill staff in carbon reduction and microgeneration techniques.

Awareness of training provision

In order to deliver against the microgeneration skills challenge it is essential for people to easily access information on what training is needed for jobs in the sector and also where that training is delivered. An **Energy Skills Training Database** is currently being developed through a partnership of Energy&Utility Skills, the National Skills Academy of Power, SummitSkills and OPITO to provide a repository of all the appropriate training for the sector to enable learners to search for appropriate courses of study to support their needs. Microgeneration training provision is being included in this database.

LOW CARBON SKILLS FUND

The Low Carbon Skills Fund, provides access to sector specific training to help improve business performance, efficiency, and the adoption of improvement processes relating to low carbon. It provides Scottish businesses the opportunity to apply for assistance towards employee training costs. It provides funding for up to 25 'episodes' of training; and provides 50% of training costs, up to a maximum of £12,500 per business.

- The type of training/qualifications that are eligible for support include:
- Renewable energy, low carbon technologies and microgeneration
- Energy efficiency, environmental and clean technologies
- Waste management and reuse
- Reducing carbon in supply and energy management.

5.5 Key Actions

Action 10 Skills Development Scotland will work with Scottish Colleges to build on the audit of training provision to provide a searchable database, including Further Education and Higher Education provision.

Action 11 The Microgeneration Task Group will map current research into existing housing stock, and identify gaps and future research needs.

6 Communication

- EST launched the **Green Homes Network**, supported by Scottish Government, giving householders the chance to visit other householders in their area who are already using microgeneration technologies. To date 600 householders have joined the Network.
- In the last 4 years, over 7,500 householders have received a **Home Renewables Visit** from a specialist advisor through the Energy Saving Scotland advice centres, supported by the Scottish Government, and over 30,000 have received advice on renewables by phone or email.
- Two thirds of households receiving Home Renewables Visits undertake energy efficiency measures and around **40% install a renewables system within 2 years of the visit**.
- EST's online resources include the **Home Energy Generation Selector** which helps householders pick the technology which will best suit their home and lifestyle, and EST's online **Solar Calculator** and **Cashback Calculator** help householders work out how much they could save and earn through the FIT scheme.
- **SELECT** have developed a programme of **microgeneration CPD seminars** aimed at architects, surveyors and other professional services in the construction sector to raise awareness and support the design and specification of microgeneration technologies.
- The Scottish Government launched its national campaign, **Greener Together**. The supporting website Greenerscotland.org provides all sorts of advice on how individuals and communities can help make Scotland a greener place to live, including how they can generate their own energy.

The Scottish Government's [Public Engagement Strategy](#), launched in 2010, sets out actions people in Scotland can make to contribute to reducing carbon emissions. It highlights the opportunity to reduce the carbon emissions and costs of heating our homes by using renewable sources such as solar heating, biomass and heat pumps systems.

Our aim is to make clear and consistent information available on microgeneration and energy efficiency to householders, communities and businesses. Over 30,000 householders have received information on renewables through the Energy Savings Scotland advice centres and over 7,500 have received a Home Renewables Visit. Other major initiatives we have put in place are:

The **Green Homes Network** gives homeowners the chance to see the technologies in use in real homes, to find out first hand how different renewables systems they work, hear about actual costs and savings, and get tips and advice that could help them on their way.

The **Greener Together** campaign is being delivered in partnership with a range of public, private and voluntary organisations. It seeks to improve Scotland's natural and built environment and the sustainable use and enjoyment of it. The national drive will be supported by TV advertising, social media and digital activity and a one-stop website www.greenerscotland.org, which provides the support and tools required to help people take positive action. It will also take to the streets with a national information roadshow that will visit towns and cities across Scotland.

6.1 Focus

Householders make up the biggest market for microgeneration technologies, with over 80% of FIT installations on individual homes. Tackling fuel poverty means focussing on how we heat our homes. In areas with access to gas, condensing gas boilers have significantly improved the energy efficiency of households and in high density urban areas, gas-fired Combined Heat and Power

GREEN HOMES NETWORK – AIR SOURCE HEAT PUMPS



Since installing a renewable heating system in their home two years ago, David and his wife have made their four-bedroom detached property near Aviemore much more self-sufficient.

As the couple do not have access to natural gas, they researched different ways to heat their home and decided to install an air source heat pump.

“The only other option for us would have been an oil-fired central heating system which would have taken up far too much space on our fairly small site. We also wanted to make sure the system we chose was ‘green’”, says David.

The heat generated by the air-to-water pump is used to provide space heating through their under-floor heating system. “The system functions efficiently at a lower temperature than a standard boiler and so is more suitable for underfloor heating systems” he explains.

For David, the system has proved to be a welcome addition to their home: “I can say I’m doing my bit without having to compromise on comfort...Plus I’m not lumbered with a smelly oil-burner!”

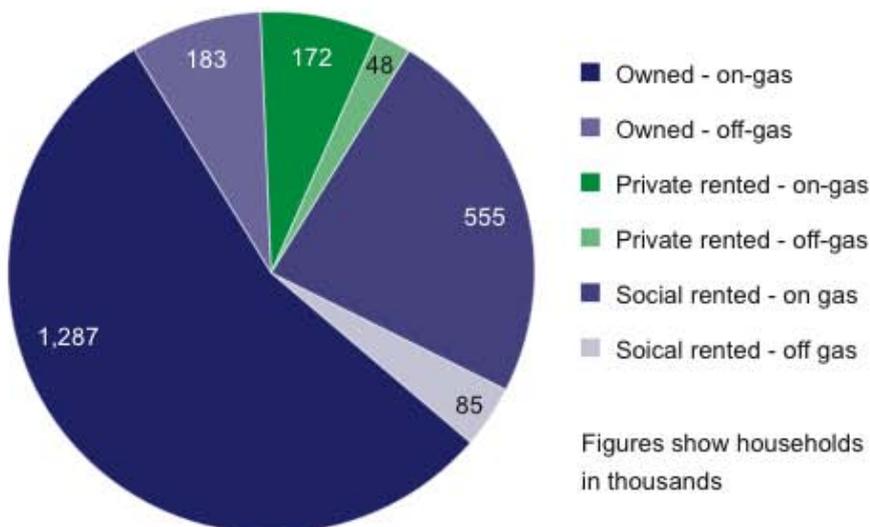
To find a Green Home near you, visit the EST’s [Green Home Network](#).

(CHP) or renewable district heating networks are helping to reduce emissions and tackle fuel poverty. For less densely populated areas, off the gas grid, technologies such as solar thermal, biomass and heat pumps fitted to individual homes can deliver the biggest benefits in reducing carbon emissions and heating costs.

Households without access to gas have to rely on more expensive and carbon intensive fossil fuels such as oil and solid fossil fuels, often in lower density rural areas where district heating would not be practicable. Around 25% of Scotland’s households are without mains gas, and a substantial number – over 300,000 – at least 2 km from a connection. The number of houses without a gas connection offers a significant market for renewable heat as shown in Figure 2

This is a significant market and our Warm Homes Fund and our increase in the loans available for renewable heat through the Home Renewables Loan Scheme will provide the widest possible boost for that market.

Figure 2: Breakdown of on-gas and off-gas grid households by tenure (based on figures from Consumer Focus Scotland)



6.2 Working with Others

The Scottish Government already supports the provision of core information and advice for householders and small businesses through the Energy Saving Trust and for communities through Community Energy Scotland.

We also recognise that much of the engagement will be led and delivered by others, building on existing networks and activities wherever possible and avoiding duplication. Through the Microgeneration Task Group, we will work more closely with consumer groups, installers, trade bodies, professional advisors, community organisations and the public sector.

The Scottish Government is funding the Energy Saving Trust to run a pilot project with the property industry and home buyers. The project will test how best to increase understanding and valuation of microgeneration and energy efficiency amongst the property industry and to explore the impact of this on home buyers. Part of the project will also involve sending information to those who have bought a property with a microgeneration system already installed, informing the new home owner how they can make the most of the system and where they can get further support.

Some of the priorities the Stakeholder Group identified:

- Explore options to improve coordinating of signposting to relevant information for consumers, installers, communities and professional advisors.
- To review the various market segments and develop targeted awareness-raising information and events.
- To target strategic communications with community groups
- To target promotion of renewable heat in off-gas grid areas with local promotional events involving local installers

In addition, our boost to the Home Renewables Loans scheme for renewable heat technologies will allow us to provide a comprehensive package of support, linked to other Scottish Government initiatives such as the Warm Homes Fund. A coordinated approach to public engagement will allow us to maximise the opportunities in Scotland from UK-wide incentives for renewable energy and energy efficiency through the FIT, RHI and Green Deal.

Key Actions

Action 12 Scottish Government will continue to support the Energy Savings Scotland advice centres advice service for householders and small businesses on microgeneration, including Home Renewables Visits from specialist advisors where appropriate.

Action 13 Scottish Government will work with Microgeneration Task Group and Energy Savings Trust to provide comprehensive and coordinated advice and awareness raising on the financial mechanisms to support renewable energy and energy efficiency.

7 Next Steps

This Strategy sets out how far we have come in moving microgeneration from a niche market into the mainstream, where we see the future for microgeneration and how we will continue to support its development.

We live in a rapidly changing landscape for energy, where we have seen market growth deliver the rapid reduction in costs of technologies such as solar PV, where rising fuel prices are driving improvements in the efficiency of our homes, communities and businesses and where we see constant innovation in technology and how we manage energy. We recognise that we must continue to work closely with stakeholders, through the Microgeneration Task Group and other groups, to deliver the actions set out the Strategy.

The Strategy is focussed on deployment of microgeneration, demonstrating how the technology is being used now by people across Scotland. Our next step is to work the Task Group to monitor deployment and review against the scenarios set out in the Strategy, to ensure the package of incentives available and supporting actions are meeting our aim to continue to growth the market.

The Strategy also focuses on the development of a strong market base by 2020. Beyond 2020, we wish to see a sustainable and viable market to help us deliver the transition to a Low Carbon Economy.

ANNEX 1: MEMBERSHIP OF MICROGENERATION STRATEGY STAKEHOLDER GROUP

Paul Wedgwood	Carbon Trust Scotland
Linda McPhillie	CLE
Mo Cloonan	Community Energy Scotland
Anthony Kyriakides	Energy Savings Trust
Mike Thornton	Energy Savings Trust
Douglas Taylor	Davidson Chalmers
Andrew Patience	Highlands & Islands Enterprise
Neil Ferguson	Scottish Enterprise
David McKenzie	Scottish Energy Installers Alliance
Alan Wilson	SNIPEF / Scottish Energy Installers Alliance
Daniel Borisewitz	Scottish Renewables
Tom Mitchell	SELECT
Robert Orr	Skills Development Scotland
Catherine Cooper	SSE
Rebecca Carr	Scottish Government

ANNEX 2: EXTRACT FROM THE ENERGY SKILLS TRAINING DATABASE FOR MICROGENERATION TRAINING PROVISION THROUGH THE ENERGY SKILLS PARTNERSHIP

Training Centre	Contact	Course	Details
Adam Smith College www.adamsmith.ac.uk	Alice Kinnaird Alicekinnaird@adamsmith.ac.uk Tel: 01592 223400	BPEC Solar Domestic Hot Water Introduction to Renewables	Installer Course General introduction to technologies
Carnegie College www.carnegiecollege.ac.uk	Contact: Pat Barrett pbarrett@carnegiecollege.ac.uk Tel: 01383 845076	BPEC Solar Thermal (3 Day) BPEC Solar PV (4 Day) Introduction to Renewables	Installer course Installer course General introduction to technologies
Dundee College, The Sustainable Industries Institute S1 ² www.dundeecollege.ac.uk	Contact: Scott Warden s.warden@dundeecollege.ac.uk Tel: 01382 834834	BPEC Renewable Energy Awareness BPEC Solar PV BPEC Solar Hot Water BPEC Heat Pumps	General introduction to technologies Installer course Installer course Installer course
Edinburgh's Telford College www.ed-coll.ac.uk	Contact: John Laing john.laing@ed-coll.ac.uk Tel: 0131 559 4335	Level 3 Diploma for Domestic Energy Assessor (DEA) Level 3 Certificate in Green Deal Domestic Assessor (Advice) Training Course Diploma in Green Deal Non-Domestic Assessor (Advice) Training Course Level 3 Certificate In Green Deal Remote Advice Course Level 3 Award In Domestic Energy Assessment Professional Development Update Course MCS Quality Assurance Manual And Training NICEIC Solar Photovoltaic (Solar PV) Course Accredited Photovoltaic Sales and Surveyors Course Accredited Installation of Photovoltaic (PV) Panels BPEC Solar Domestic Hot Water BPEC Heat Pumps Course Onsite Renewable Energy and Health & Safety Courses	
Inverness College UHI, SEAM Centre www.seamcentre.org.uk	Contact: Peter Dennis peter.dennis@inverness.uhi.ac.uk Tel: 01463 273650	Understanding Sustainable Energy Efficiency Course BPEC Renewable Energy Awareness BPEC Solar PV BPEC Solar Hot Water BPEC Woody Biomass BPEC Heat Pumps	For Green Deal installers General introduction to technologies Installer course Installer course Installer course Installer course

Training Centre	Contact	Course	Details
Reid Kerr College www.reidkerr.ac.uk	Contact: Andrew Fogarty afogarty@reidkerr.ac.uk Tel: 0141 587 3379	BPEC Renewable Energy Awareness BPEC Solar PV BPEC Solar Hot Water BPEC G59/2 Large Scale Solar PV City and Guilds 2372 Installing Domestic PV Systems MCS Route to Approval Course Sustainable Energy Awareness	General introduction to technologies Installer course Installer course Design and installation course Design and installation course MCS Quality Management Systems course Fully online introductory course

There's also a range of undergraduate degrees in Energy Science, Engineering with Renewable Energy, Environmental Design and other related subjects at:

- Heriot-Watt University
- Robert Gordon University
- University of Strathclyde
- Napier University
- University of Dundee
- University of Edinburgh
- University of Glasgow
- The Open University in Scotland
- The Scottish Agricultural College
- Lews Castle College UHI

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Scottish Enterprise

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Highlands and Islands Enterprise

< <http://www.hie.co.uk/>>

Solar Cities Scotland

<<http://www.solarcityscotland.org.uk>>

Energy Technology Partnership

<<http://www.etp-scotland.ac.uk>>

Scottish Institute for Solar Energy Research

<<http://www.siser.ac.uk>>

Scottish Energy Installers Alliance

<<http://www.scottisheia.org>>

Scottish Environment Protection Agency

<<http://www.sepa.org.uk/>>

My World of Work

<<http://www.myworldofwork.co.uk/>>

Independent Advice Bodies

EST, Energy Saving Scotland Advice Centres

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ANNEX 5 GLOSSARY OF TERMS

B&ES – Building and Engineering Services Association
CARES – Community and Renewables Loan Scheme
CCSA 2009 – Climate Change Scotland Act 2009
CEIP – Colleges Energy Industry Partnership
CES – Community Energy Scotland
CHP – Combined Heat and Power
CLE – Construction Licensing Executive
CPD – Continuing Professional Development
DECC – UK Department of Energy and Climate Change
DNO – Distribution Network Operator
ECO – Energy Company Obligation
EPC – Energy Performance Certificate
EST – Energy Savings Trust
ETP – Energy Technology Partnership
FIT – Feed-In Tariff
GSHP – Ground Source Heat Pump
LZCGT – Low and Zero Carbon Generating Technology
MCS – Microgeneration Certification Scheme
PV – Photovoltaic
RHI – Renewable heat Incentive
RHPP – Renewable Heat Premium Payment
SEAM Centre – Sustainable Energy and Micro-renewables Centre
SEPA – Scottish Environmental Protection Agency
SEIA – Scottish Energy Installers Alliance
SG – Scottish Government
SME – Small and Medium size Enterprises
SNH – Scottish Natural Heritage
SNIPEF – Scotland and Northern Ireland Plumbing Employers Federation
SPP – Scottish Planning Policy



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