



# Agri-renewables Strategy for Scotland

# Agri-renewables Strategy for Scotland

The Scottish Government, Edinburgh 2014

© Crown copyright 2014

You may re-use this information (excluding logos and images) free of charge in any format or medium, under the terms of the Open Government Licence. To view this licence, visit <http://www.nationalarchives.gov.uk/doc/open-government-licence/> or e-mail: [psi@nationalarchives.gsi.gov.uk](mailto:psi@nationalarchives.gsi.gov.uk).

Where we have identified any third party copyright information you will need to obtain permission from the copyright holders concerned.

This document is also available from our website at [www.scotland.gov.uk](http://www.scotland.gov.uk).

ISBN: 978-1-78256-939-8

The Scottish Government  
St Andrew's House  
Edinburgh  
EH1 3DG

Produced for the Scottish Government by APS Group Scotland  
DPPAS14737 (02/14)

Published by the Scottish Government, February 2014



# Contents

	Page
<b>Executive Summary</b>	1
<b>Ministerial Foreword</b>	2
<b>Chapter 1. Introduction</b>	3
<b>Chapter 2. Aims and Objectives</b>	6
<b>Chapter 3. Scotland's Energy Targets</b>	8
<b>Chapter 4. Opportunities and Technologies</b>	12
<b>Chapter 5. Agri-renewables Deployment</b>	16
<b>Chapter 6. Progress and Actions</b>	19
<b>Chapter 7. Taking the Strategy Forward</b>	41
<b>Annex A: Summary of Actions</b>	45
<b>Annex B: Consultative Process</b>	51
<b>Annex C: Sources of Useful Information</b>	53
<b>Annex D: Photograph Acknowledgements</b>	56





# Executive Summary

The Agri-renewables Strategy for Scotland is a sectoral Routemap which sits alongside the **2020 Routemap for Renewable Energy in Scotland** and the **Microgeneration Strategy for Scotland**. The Strategy outlines the Scottish Government's aims and ambitions for the growth of agri-renewables in Scotland, building on what has already been achieved.

This Strategy shows how agri-renewables can contribute to the aim of building a cleaner, greener Scotland. It also sets out how far we have come in capitalising on the opportunities offered and where we see the future for agri-renewables.

It demonstrates how the Scottish Government, working in collaboration with industry and other stakeholders, will continue to support development to achieve a sustainable and viable market for agri-renewables to help us deliver the transition to a low carbon economy.

The Strategy identifies six Focus Areas which are of key importance for development of renewables on farms. Under each Focus Area, actions have been identified to mitigate barriers to uptake. Monitoring and reporting on progress is arranged through consultative groups and wider stakeholder engagement.

**1. Community involvement and benefits:** actions in this area seek to ensure that local communities share in the advantages of on-farm renewable energy. These include increased community cohesion and confidence, skills development and support for local economic development.

**2. Skills and advice:** this section outlines the support available to land managers in considering a renewables development and the initiatives that are underway to increase confidence in the sector.

**3. Planning and consents:** planning is an important consideration in developing any renewables project. This section explains the actions being taking to streamline the planning system, including online planning advice and guidance.

**4. Grid connection:** we fully recognise that there are challenges to obtaining a grid connection. The actions here ratify our long term aim to ensure that Scotland can benefit from a flexible system that can accommodate the increased penetration of renewables.

**5. Finance and technology costs:** this section outlines the range of support in place to encourage growth in the agri-renewables market. We also look to the future with investment and innovation in Scotland through initiatives such as the Energy Technology Partnership.

**6. Research and innovation:** the Scottish Government is committed to innovation and research aimed at driving the development and deployment of renewable energy generation. We highlight achievements and activity in this field.

# Ministerial Foreword



Scotland has massive green energy potential. Farmers, crofters and land managers have access to our nation's abundance of natural resources and are ideally placed to contribute towards growing Scotland's low carbon economy.

There has been a great deal of enthusiasm for renewables within the farming sector and there are some excellent examples of land managers capturing the benefits from green energy generation both for their businesses and their local communities.

I recognise that recent years have been turbulent for the sector and acknowledge and recognise that there are challenges in front of us. I believe our goals are within reach and that we have much to celebrate in what has been achieved by Scottish agriculture in relation to renewables.

I am grateful for the contribution that the Agri-renewables Strategy Consultative Group has made to the development of the Strategy by providing a coordinated voice for the sector. In particular, I thank those farmers who agreed to their renewables projects being featured as case studies in the Strategy. These case studies prove that renewable generation is a realistic, sustainable and financially viable option into which farm businesses can invest.

We all have a part to play in building a cleaner, greener Scotland and this Strategy shows how agri-renewables can contribute to that aim. The Scottish Government has the most ambitious renewable energy targets in the world. However, the growth of agri-renewables is not solely about meeting targets. Renewable energy sits at the heart of our efforts to increase Scotland's sustainable economic growth.

I look forward to seeing farmers, crofters and land managers across Scotland making the most of our natural resources and helping us transform the way Scotland produces and uses its energy.

A handwritten signature in black ink that reads "Richard Lochhead". The signature is written in a cursive, slightly slanted style.

**Richard Lochhead**

Cabinet Secretary for Rural Affairs and the Environment

# Chapter 1

## Introduction

- 1.1 The Scottish Government is committed to a greener, low carbon Scotland. Ministers have put the challenges and opportunities of tackling climate change at the heart of their ambition. This is a key priority in our **Government Economic Strategy**. We have used our existing powers under the devolution settlement to work towards this vision, working with stakeholders to support them in the sustainable management of natural resources, and supporting renewable energy development.
- 1.2 In June 2013, the Scottish Government published the report **Low Carbon Scotland: Meeting our Emissions Reduction Targets 2013-2027**. Energy production has an impact on emissions of greenhouse gases that are contributing to climate change. Reducing the carbon impact of energy supply will help ensure that Scotland's economic growth is sustainable.
- 1.3 Our **2020 Routemap for Renewable Energy in Scotland**, published in June 2011 and its updates published in October 2012 and December 2013, set out our commitment to publish an Agri-renewables Strategy to support the uptake of renewable energy generation by agricultural businesses in Scotland. This Strategy brings together successes to date and progress on actions to realise the renewables potential of the sector whilst protecting Scotland's landscape and residential amenity.
- 1.4 Recognising the role of agricultural business in realising our commitment to renewable forms of energy generation is also outlined in **Getting The Best from Our Land: a Land Use Strategy for Scotland** and its **Action Plan**. It is essential that the agricultural industry play their part to continue to ensure responsible development while maximising engagement with and benefits to local communities. We must maintain the momentum of local ownership particularly through ensuring access to finance and through encouraging new forms of benefit such as investment prospects.
- 1.5 Farm scale renewable energy generation offers opportunities for Scotland's land managers at a time when farm incomes are under pressure due to escalating input costs and changing weather patterns. Like any other enterprise, farm based renewables carry some risks. Prior planning can help minimise their impact as can giving consideration to collaborative projects and joint ventures.
- 1.6 Much of the focus from agricultural businesses thus far has been on generating electricity from onshore wind. By comparison, the opportunities that exist from areas such as hydro, solar and biomass remain largely untapped by farmers. The experience and expertise that already exists within the sector can help to provide a platform to increase the uptake of a greater mix of renewable technologies.





- 1.7 Whilst seeking to maximise the productivity of our renewable resources, it is important that the introduction of renewables installations should be integrally linked to energy efficiency as part of the overall shift towards a low carbon economy. Increasing energy prices have a large impact on the viability of agricultural businesses. Renewable technologies are most effective in terms of cost, carbon emissions reduction and reduced energy bills when combined with energy efficiency measures.



## Skills and Advice: Farming For a Better Climate



All farmers want to hand on the farm to future generations in a stronger condition than when they received it. Farming For a Better Climate (FFBC) is helping Scottish farms thrive in a carbon conscious future by providing practical support to help reduce agriculture's impact on the climate.

FFBC is delivered by Scotland's Rural College (SRUC) on behalf of the Scottish Government. Our aim is to raise awareness of actions that can be taken to reduce greenhouse gas emissions while strengthening farm businesses to make them more resilient to climate change.

Farming For a Better Climate's five Key Action Areas are:

1. Using energy and fuels efficiently;
2. Developing renewable energy;
3. Locking carbon into the soil and vegetation;
4. Optimising the application of fertiliser and manures; and
5. Optimising livestock management and storage of waste.

As part of FFBC, four Climate Change Focus Farms have carried out energy and renewables audits to assess energy savings to current practices plus the most appropriate renewable technology or technologies for their farm; these findings have also formed the basis for meetings with farmer discussion groups.

Along with notes from the Climate Change Focus Farm meetings, information is available to all farmers and land managers on the **Farming For a Better Climate website**. This includes:

- Practical guides highlight a range of technologies and give an overview of funding support along with suggesting other sources of information;
- Written farmer case studies are used to show what other farmers have done on their farm and some of the costs and benefits for utilising renewable technology; and
- An e-newsletter summarises the findings, plus information is disseminated via the FFBC twitter feed.

# Chapter 2

## Aims and Objectives

- 2.1 The overarching aim of the Agri-renewables Strategy is to support the uptake of renewable energy generation by agricultural businesses in Scotland. The Strategy sets out the successes we have achieved and the key actions we are progressing to address barriers which could constrain uptake of on-farm renewables.
- 2.2 The objectives of the Agri-renewables Strategy are:
1. to promote community involvement, community benefits and the advantages of partnership working;
  2. to ensure that the development of farm scale renewable energy installations minimises the impact on Scotland's environment and landscapes and respects residential amenity;
  3. to raise awareness of the opportunities provided by the full range of renewable technologies;
  4. to strengthen links between renewable energy generation and uptake of energy efficiency measures on farm; and
  5. to demonstrate the range of advice, information and support that is available to agri-businesses in considering their energy needs.



## Hydro Case Study: Innerhadden Estate

**Farm:** Innerhadden Estate is situated on the hills surrounding Kinloch Rannoch near Pitlochry, Perthshire. It is a managed family estate which covers some 5,500 acres of hill.

**Project:** A 'run of river' scheme where excess water from two rivers on the estate is siphoned off before being transported through 6.5 km of underground pipe to a buried power plant. The water falls 310 m to drive a turbine, with 1.4 MW of energy produced (enough to supply about 1,000 houses nearby) being fed into the national grid.

**Costs:** The installation cost in the region of £1.6 million; the scheme will pay off in 10 years and within this time will also fund additional estate investment.

**Why install a hydro scheme?** The estate was struggling to make an income from 850 sheep and 30 cows when, in 1985, a mixture of bad weather and entrepreneurial spirit led to diversification into smoked venison. Rannoch Smokery is still a successful business today but doesn't create enough income to run itself and the estate - which the family wish to maintain as traditionally as possible. A hydro scheme was considered to be the best and most environmentally friendly way to generate more income and safeguard the future of the estate.

**With thanks to Richard Barclay, Rannoch Smokery.**



# Chapter 3

## Scotland's Energy Targets

3.1 The **Routemap for Renewable Energy in Scotland** defines clear targets for meeting Scotland's energy need for electricity, heat and transport from renewable sources by 2020. Our **Energy Efficiency Action Plan** sets out the direction for Scotland's energy efficiency policy in the years taking us up to 2020.

These targets are:

- **At least 30% overall energy demand from renewables by 2020**
- **100% electricity demand equivalent from renewables by 2020**
- **11% heat demand to be met from renewables by 2020**
- **A reduction in end use energy consumption of 12% by 2020 (on 2005-2007 baseline)**
- **500 MW community and locally owned renewable energy by 2020**

3.2 Agri-renewables are encompassed in the target for local and community ownership of 500 MW by 2020. Scottish Ministers are determined to see the benefits from our indigenous energy resources flow through to the people of Scotland. In particular there is an opportunity for a transformation in the level of local ownership of energy.

3.3 This level of energy generation in community hands can make a significant contribution both to energy security and the achievement of our renewable electricity and heat targets. The scale of potential local benefit is unprecedented and such revenue streams could play an important part in developing wider community asset ownership – which is a priority for the Scottish Government.

3.4 We are now also setting the benchmark for rates of community benefit offered in commercial schemes through our expectations of commercial developments on the public estate.



## **Policy: Electricity Market Reform**

The Scottish Government continues to work with the UK Government on Electricity Market Reform (EMR) as proposed in the UK Energy Bill and in changes to the relationship between governments and the UK energy regulator Ofgem contained in the UK Energy Bill.

We have also made it clear to the UK Government that Scottish Ministers should have a statutory role in the accountability and governance arrangements of the System Operator (National Grid).

EMR is fundamental to the energy sector, both for Scotland and for the rest of the UK. EMR should work for those investing in Scotland, delivering our full energy potential and maintaining the significant and tangible industry, investor and developer confidence that we have worked hard to establish.

Further details are available on the **Scottish Government EMR webpages**.





## Skills and Advice: Energy Efficiency

### Farm Energy Auditing

Practical advice on carrying out a farm energy and fuel audit and developing an action plan is available on the **Farming For a Better Climate website**. This aims to ensure that farm equipment, vehicles and buildings are using energy and fuel as efficiently as possible in order to reduce greenhouse gas emissions and provide cost savings for farm businesses. Advice on zero and low cost options that can be implemented immediately and bring about noticeable savings is also available.

### Resource Efficient Scotland

Advice and support in relation to energy and water efficiency, as well as waste, is available to farmers and agricultural businesses through the Scottish Government funded **Resource Efficient Scotland** programme. Resource efficiency and energy audits provided through the programme are only available for diversified activities of a farm operation, such as processing activities for retail ready produce, as well as farm shops and cafés and farm visitor centres.

### Energy Saving Trust: Business Loans

The Energy Saving Trust provides, on behalf of the Scottish Government, loans of £1,000–£100,000 to small and medium enterprises (SMEs) to install renewable energy technologies or fund measures that reduce energy and resource consumption. These loans are currently provided at 5% and 0% interest respectively. Please visit the **Energy Saving Trust website** for more details.

### Energy Saving Trust: Green Deal and Network for Green Business

The Energy Saving Trust also provide advice on non-domestic **Green Deal** for farmers and the agricultural sector through their advice centres. In addition, the Energy Saving Trust operate a **Network for Green Businesses** in which farm businesses are participating. Through this scheme they help build confidence in new technologies by sharing experience between organisations which have already installed measures and those potentially interested in doing similar. Farmers and other agricultural businesses can access case studies and potentially visit organisations on this network.

As with all programmes, we have to ensure that state aid requirements are met. In this respect, small business loans for renewables are interest bearing and so are not regarded as state aid. The interest foregone on any interest free loans for related energy efficiency measures would however be regarded as state aid. Any assistance provided through Resource Efficient Scotland is subject to state aid restrictions. Please refer to the Scottish Government web pages on **Agricultural State Aid and de minimis** for further information.



## Energy Efficiency Case Study: Dairy Sector

Dairy farms today face challenges fuelled by rapidly rising energy costs and concerns about environmental impacts. Dairy farms are significant users of energy, which is used in the milking process, for cooling and storing milk, heating water, lighting and ventilation.

Scottish dairy farms have changed noticeably over the past 20 years with a move towards larger farms with bigger herds. This change presents an opportunity to improve energy efficiency by changing management practices and investing in new technology. There are many different options that can be considered; monitoring and recording energy use is a good starting point, identifying scope for energy savings and highlighting efficiency measures. It is also helpful to benchmark energy use against similar businesses to see how the farm compares.

There are a range of cost effective measures that can be considered within the dairy, including using energy efficient lighting, insulating water tanks and pipes, utilising heat from milk cooling, improving plate cooler function and installing a variable speed drive. Often it can be a number of smaller things that can add up to a large saving on energy use, especially if these tasks are carried out on a daily basis.

### Ross Paton, Organic Dairy Farmer, near Castle Douglas

After benchmarking energy use in the dairy, Ross Paton identified a number of ways to reduce electricity use. One of the measures, retrofitting a variable speed drive to the vacuum pump on the dairy, could save around £5,500 over 10 years based on current energy prices.

### Alistair Marshall, Dairy farmer, near Dumfries

Looking at current equipment in the dairy, Alistair Marshall identified some practical ideas for cutting energy use. For example, improving the plate cooler function by 5°C could lead to energy savings of around £600 per year. A 50°C heat uplift through installing a heat recovery unit could save around £800 per year.





# Chapter 4

## Opportunities and Technologies

- 4.1 The installation of renewable technologies offers land-based industries an opportunity to cut energy costs and generate new income whilst contributing to Scotland's low carbon future. Scotland has established itself as a net exporter of electricity for the past decade and has the potential to export even more clean, green energy.
- 4.2 Energy is a high value product and its generation may help to smooth the financial volatility of the traditional farming business cycle. Reducing the dependency of farms on fossil fuel derived inputs by investing in energy saving and generating systems can make businesses more resilient to changes in external factors.
- 4.3 As well as improving the resource efficiency of the farming industry, it can also provide supply chain and marketing opportunities and contribute to delivering the aims of **Scotland's Food and Drink Policy**. Many produce buyers are now asking farmers and growers to demonstrate their green credentials. There are environmental and reputational advantages to reducing energy consumption and using renewables to reduce carbon footprints.
- 4.4 The uptake of renewables within farming and rural businesses should not stop at the farm gate. Collaboration between agri-businesses and communities makes economic as well as social sense. It can give the whole community a stake in the success of a renewable project and can help to build community wide resilience which will support long term sustainability of our rural and island communities.
- 4.5 Agri-renewables covers a range of technologies which can be used to fit the specific energy needs and availability of resources on farms, crofts and estates. Scotland is the windiest country in Europe and onshore wind turbines now generate a significant proportion of Scotland's electricity needs. However, there are substantial opportunities offered by other energy generation sources which are suitable at both farm and community level.

### Renewable Electricity

- Solar photovoltaic (PV) systems use silicon semi-conductors to convert energy from the sun into electricity. Solar PV panels can make good use of existing farm roofs, so no additional space is needed to site equipment.
- Hydropower schemes harness the energy from flowing water using a turbine or generator. Key factors affecting viability are the fall distance of the water, the head, and the flow rate of the water course.
- Wind power can be harnessed by the installation of a wind turbine or turbines that will generate a clean and renewable source of electricity to be used either on-farm or sold to the Grid.



### **Renewable Heat**

- Solar panels for heating and hot water use different technology to solar PV. These systems rely on the heat in sunlight to warm water in special panels or tubes. The system consists of a roof mounted collector plate, a hot water storage tank and a pumped circulation system. The most common type of collector units are either a flat plate or evacuated tube design.
- Biomass boilers use either woodfuel or straw to generate heat, which can be used for almost any heating need on the farm. Available systems include domestic log burning stoves and stoves with back-boilers to much larger pellet or woodchip burners that can provide space and water heating for larger farm buildings.
- Heat pumps are heating mechanisms that can acquire low temperature heat and upgrade it to a higher, more useful, temperature by using a simple refrigeration process. The low temperature heat can come from many sources including soil, water or outside air.

### **District Heating**

- District heating is the supply of heat by hot water to a number of buildings through a heat network of underground pipes. It is an effective way of reducing the carbon intensity of heat and reducing fuel costs.
- A heat network can use heat from a range of renewable sources including biomass, heat pumps and solar thermal. A growing number of farms and estates have woodfuelled heat networks supplying steadings, offices, cottages and agricultural buildings.

### **Biogas**

- Anaerobic digestion produces biogas which can be burned to create electricity and heat or can be processed to produce bio-methane which can be injected directly into the gas network. Anaerobic digestion also produces a rich bio-fertiliser known as digestate, which is high in valuable nutrients such as nitrogen and phosphorus which are beneficial for healthy plant growth and fertile soil.

### **Fuel Cells**

- Fuel cells offer the potential to be used in conjunction with many energy technologies to deliver additional efficiency and power recovery.



## Skills and Advice: Woodfuel Scotland

The use of woodfuel to produce energy is growing rapidly across Scotland, as people realise the financial and environmental benefits of this natural fuel source. Woodfuel is most cost effective and low carbon when sourced and supplied locally, it is particularly beneficial in off-gas grid areas and where end users have access to their own supply of wood.

Forestry Commission Scotland provides advice and guidance on woodfuel via the **Use Woodfuel website**. This includes information for those who are interested in using wood as a source of energy, as well as for those who are interested in becoming woodfuel suppliers.

Specific guidance aimed at farmers and estate owners thinking of utilising their own woodlands for woodfuel is available, as well as case studies on farm woodlands. A Business Guide for Cooperative Working in the Woodfuel Supply Chain provides step by step information on collaboration for mutual benefit.

Regional woodfuel forums also exist across Scotland, providing a valuable opportunity for networking between local woodfuel users and suppliers. Groups are active in the Borders, Dumfries and Galloway, Grampian, East of Scotland, Ayrshire, Central Scotland, Highlands and Islands and Argyll.

Informative wood fuel events designed to encourage the expansion of the woodfuel industry, organised by both Forestry Commission Scotland and other external agencies are held at national and international levels.





## **Biomass Case Study: Henderston Farms**

**Farm:** Henderston Farms is a 600 acre mixed arable, sheep and cattle farm with around 500 acres of forestry, located near Dundee.

**Installation:** The 50 kW woodchip ETA boiler was installed in July 2012. The boiler heats a five bedroom farmhouse and also provides hot water, at 60°C, to the barn. The system includes a 1000 litre Akvaterm accumulator tank to assist with efficient running of the boiler and heating system, as well as a 300 litre pressured water store for the barn.

**Fuel source:** Around 31 tonnes of sub-30% moisture woodchip are required per year. For the first year, chip has been bought in from various local suppliers, at around £110 per tonne. As the farm has its own woodlands, the intention is to self-supply in the future. It is expected that the self-supplied chip will be approximately half the cost of bought in chip.

**Costs and savings:** The total installed cost of the boiler, including the building work needed, was around £50,000. It is expected that annual Renewable Heat Incentive (RHI) payments will be in the region of £5,000. The farmhouse was previously not heated to a comfortable level due to the cost of running the oil and electric storage heating systems that were in place. It is therefore difficult to assess the exact fuel bill savings the boiler will deliver at Henderston Farms, but it is thought to be around £2,000 a year. There is a small labour cost associated with the management and maintenance of the system, for filling the hopper and emptying the ash, plus the cost of the annual service.

**With thanks to Andrew McCall, Henderston Farms.**

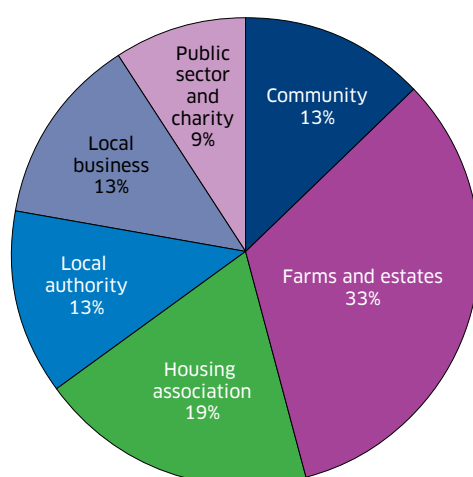


# Chapter 5

## Agri-renewables Deployment

- 5.1 We are powering towards our 2020 target for 500 MW of community and locally owned renewables. A **Scottish Government report** published in April 2013, prepared by the Energy Saving Trust, shows that – as of June 2012 – there was more than 200 MW of community and locally owned renewable generating capacity across Scotland. This is an increase of 39% on the previous year, and comprises 88 MW electrical and 117 MW heat capacity.
- 5.2 These directly-owned schemes are already helping to bring local benefits such as savings on community heating costs. With increased scale of ambition, these schemes are starting to promise significant additional revenue to local communities.
- 5.3 Figures 1 and 2 below show the capacity of operational installations at June 2012 by ownership and the estimated number of capacity of installations.

**Figure 1: Capacity of operational installations at June 2012 by ownership**



**Figure 2: Estimated number and capacity of installation as at June 2012**

	Number of operating installations	% of operating installations	Operating capacity	% of operating capacity
Community	366	7%	26 MW	13%
Farms and estates	166	3%	68 MW	33%
Housing association	3,351	65%	40 MW	19%
Local authority	830	16%	26 MW	13%
Local business	266	5%	27 MW	13%
Public sector and charity	169	3%	18 MW	9%
<b>Grand Total</b>	<b>5,148</b>	<b>100%</b>	<b>204 MW</b>	<b>100%</b>



## **Finance and Technology Costs: Community and Renewable Energy Scheme**

The **Community and Renewable Energy Scheme** (CARES) has been established by the Scottish Government. CARES is a one stop shop which provides support, advice and loans to community groups and rural businesses who wish to generate renewable energy or gain benefit from local commercial renewable energy schemes.

CARES loans are available to farmers and crofters, estate owners and rural businesses who want to put a renewable energy generation project on land they own or lease. Joint ventures between community groups and farmers, crofters and landowners are also eligible. There is a competitive application system. Eligible technology includes wind, hydro and anaerobic digestion.

CARES provides loans of up to £150,000 for pre-development costs, such as technical feasibility studies and environmental impact assessments. Applicants must contribute a minimum of 5% and fund any recoverable VAT. There are no loan arrangement fees and security is not required. Interest is charged at 10% per annum from drawdown on each instalment.

If the project is prevented from proceeding for an insurmountable reason, the loan drawn down to that point can be written off, subject to state aid. If the project proceeds, the developer must make an annual payment of £10,000 per MW of installed capacity to a local community organisation for 20 years. The community group will use the use funds for community development.

From August 2013, CARES has been delivered by a consortium of social enterprises led by Energy Saving Trust, under a banner of Local Energy Scotland. The consortium consists of Changeworks, the Energy Agency, SCARF and the Wise Group. Ricardo-AEA will also support delivery.

CARES has recently been recognised by the Organisation for Economic Cooperation and Development (OECD) as an exemplar of good practice in bottom up approaches to renewable energy.

### **CARES PROVIDES**

free, impartial advice to communities, rural businesses and land managers, including support to access grant and loan funding, so that they can benefit from local renewable energy generation.

**LOCALENERGYSCOTLAND.ORG**

**0808 808 2288**

**FUNDED BY THE SCOTTISH GOVERNMENT**



## **CARES Case Study: Draffan Marshall**

**Farm:** Draffan Marshall, Lesmahagow, South Lanarkshire. The business farms around 280 hectares over 3 steadings.

**Project:** The farmer secured a CARES loan to cover the pre-development costs of a planning application for one 2.3 MW turbine. The loan was used to fund environmental consultancy costs. This included a feasibility study and environmental studies to accompany the planning application document; costs of legal and financial advice were also funded by the loan. Without the CARES loan the pre-development costs would have been prohibitive and the farmer would not have pursued this option.

**Farmer Benefits:** Planning permission has been granted and a grid connection agreed. The project is planned to go to construction in Summer 2014. After payback the turnover resulting from the installation of the turbine will represent the single biggest chance for economic growth the farm business has.

**Community Benefits:** The number of livestock markets, feed companies and large animal vets has declined in the area recently due to the reduction in the number of farmers. The family are one of the last few dairy farms in the area and they hope to continue supporting the local economy and community by generating economic growth and employment.

As per the CARES loan fund terms and conditions, the family will give £10,000 per MW of installed capacity per annum. With the current layout this is estimated as £23,000 per year for the 20 years lifespan of the project to the South Lanarkshire Renewable Energy Fund.

**With thanks to Andrew Stewart and Family, Marshall Farm.**



# Chapter 6

## Progress and Actions

### Focus Area 1: Community Involvement and Benefits

- 6.1 The Scottish Government believes that there is so much more a community can gain from renewables projects over and above energy generation and financial benefits. This includes increased community cohesion and confidence, skills development and support for local economic development.
- 6.2 Moving forward, we must ensure community involvement is considered at an early stage in the development of agri-renewable projects and that progress towards meeting energy targets minimises the cumulative impacts of wind projects on the environment and local residents.

### Recent Successes

- Our **Community Benefits Register** opened for business in April 2012. This will encourage transparency and consistency in the community benefits process and help communities to negotiate with developers and understand better what can be achieved. Community benefits relating to over 2,800 MW of developments were registered by Summer 2013.
- To date, rural businesses have been offered loans totalling £3.7 million under CARES which, if all schemes are built, will be worth up to £14 million of community benefits over 20 years. £3 million per financial year has been committed for rural businesses under CARES in the current spending review period.
- The Scottish Government is leading the way in terms of the community benefit rate for renewable developments on the public estate. The £5,000 per MW rate negotiated by Forestry Commission Scotland is encouraged as good practice across the sector. CARES provides advice on community benefit from developments of wind and hydro schemes on the **National Forest Estate**.
- Our recommended baseline community benefit rate of £5,000 per MW and encouragement of the opportunity for direct community investment has now been adopted by Scottish Renewables in a new protocol.
- Up to June 2012, an estimated 204 MW of community and locally owned renewable energy generation was operational in Scotland across 5,000 individual sites. The largest proportion of operational capacity is on Scottish farms and estates (68 MW, or 33%).
- **Guidance on community engagement** in the renewable energy development process has been integrated into Scottish Planning Policy (SPP).
- The Scottish Government published **Good Practice Principles for Community Benefits from Onshore Renewable Energy Developments** for public consultation between November 2013 and January 2014.





## Key Actions

- Make significant progress towards our 500 MW target through continuing with CARES support to help land managers and rural enterprises progress projects.
- The Scottish Government will promote the development of renewable energy projects on Scottish Ministers' Crofting Estate which maximise opportunities for community ownership and benefits.
- Agricultural businesses to continue to lead the way on engagement and identifying benefits with their local community through early collaboration to offer community benefits, including identifying local opportunities to fund energy efficiency schemes and measures to mitigate fuel poverty.
- Our Community Benefits Register is gaining momentum, with nearly 100 individual projects now featured. Agricultural businesses to build on this momentum by providing community benefits and registering these on the Community Benefits Register.
- Through CARES, we will promote the **Good Practice Principles for Community Benefits from Onshore Renewable Energy Developments** to a wide range of stakeholders and interested groups, targeting onshore technologies that currently have a lesser association with community benefits such as biomass, hydro and solar PV. We will also encourage community benefits from all scales of development, notably single wind turbine developments in rural areas.
- Scotland's Rural College and other delivery partners to promote best practice in community involvement and benefits, as well as CARES, through their farming advisory activity.
- CARES Conference to take place in March 2014.
- Renewables developers are beginning to respond to the call to link local energy generation directly to local energy costs. The Scottish Government will continue to encourage local energy developers to consider schemes that offer discounts to local electricity consumers.



## **Solar Photo Voltaic Case Study: Sandystones Farm**

**Farm:** Sandystones Farm is a mixed arable and stock farm near St. Boswells in the Scottish Borders.

**Technology:** 50 kW ground mounted photo voltaic array, purchased and installed through the Borders Machinery Ring, which had negotiated bulk purchase discounts with a supplier.

Some of the energy generated is used on the farm, for example for the electricity demand for the game hatching sheds.

**Resource:** In order to optimise the output of the PV panels, a ground mounted array was chosen as this allowed the optimal orientation of the panels. In addition, there was no roof space available that was large enough for a 50 kW array. To date the output of the PV panels has been above the predictions.

**Project economics:** The total installed cost of the system was £75,000, with an expected Feed in Tariff income of £8,000 per year. Including expected savings on electricity bills, the payback is anticipated to be 8 years.

**Why was PV installed?** The business wanted to invest in renewables and PV was the least contentious option with no barriers to installation. Planning consent was straight forward and the system was up and running fairly quickly. The system has been easy to maintain and monitor. As well as the improved output, a ground mounted array has the advantage over a roof mounted array in that cleaning is simpler and there is no risk from snow loading.

**With thanks to Guy and Philippa Lee, Sandystones Farm.**





## Focus Area 2: Skills and Advice

- 6.3 The provision of trustworthy independent advice is key to help farmers and crofters assess the feasibility of potential renewables developments and increase understanding of the processes involved.
- 6.4 The range of technology options, along with advancing support mechanisms, has meant that there is a need to develop the skills of land managers to increase their confidence to invest in renewables.

## Recent Successes

- **Farming For a Better Climate** provides on farm demonstration events and workshops to allow farmers to see renewables in action on a host farm, hear from other farmers about their experiences and explore how renewables could work on their farm.
- The Scottish Government funds Scotland's Rural College to provide impartial expertise on farm scale renewables through their **Rural Diversification Advisory Activity**. This includes web based advice, along with a telephone and e-mail service. Renewable energy practical guides highlight a range of technologies and give an overview of funding support along with suggesting other sources of information.
- Renewables feature as a strong theme of Scotland Rural Development Programme (SRDP) funded projects **Future Proofing Scotland's Farming** and **Scotland's Farming Innovation Network**. In particular, practical events on biomass and anaerobic digestion are offered. The programme provides on going advice and support through training events, farm walks, fact sheets and case studies.
- **Forestry Commission Scotland** (FCS) provides advice to farmers and estate owners thinking of utilising their own woodlands for fuel. Regional woodfuel forums also exist to provide valuable networking opportunities for local woodfuel users and suppliers.
- **CARES Renewables Handbook** provides community groups and rural businesses with information on the various renewable energy technologies available on the market, ways of maximising community involvement, and how to benefit from renewable energy.



## Key Actions

- National Farmers Union Scotland and Smiths Gore to deliver a new Renewables Development Initiative that was launched in Autumn 2013. This programme, funded by SRDP, aims to provide a platform for skills development based on farmers' experiences with renewables developments.
- CARES consortium to further develop the practical help and expert guidance available through CARES and update the guidance to land managers to reduce the barriers to community or local rural business entrepreneurs who want to develop renewable energy generation projects.
- **Zero Waste Scotland** to provide support for those working within agriculture on waste management, anaerobic digestion and composting. The **Zero Waste Plan for Scotland** highlights the role of anaerobic digestion and where appropriate, energy from waste.
- Scotland's Rural College to further expand the web resource on farm scale renewables and develop technology tool kits to help farmers through the process of planning and implementing a renewables installation.



## Advice and Skills: Renewables Development Initiative

### Scotland Rural Development Programme: Skills Development Scheme

The **Skills Development Scheme**, which is part of the **Scotland Rural Development Programme** (SRDP), provides financial support towards the organisation and delivery of group skills development initiatives for land managers, including farmers, crofters and foresters. It aims to build on the success of industry-led or inspired initiatives that promote the development of land and business management skills.

### Renewables Development Initiative

This Skills Development Scheme project is led by National Farmers Union Scotland (NFUS) and facilitated by Smiths Gore. It aims to provide practical knowledge to land managers and farmers interested in pursuing on farm renewable technologies through a series of on farm demonstration events.

The three year programme provides a platform for knowledge exchange based on farmer's experiences with renewables developments. It aims to follow the development of renewable energy generation at a total of fifteen farms across Scotland, providing an opportunity to discuss and explore some of the key issues surrounding the sector.

The selected farms will demonstrate the challenges faced and solutions adopted as a renewables installation progresses from preparation to operation. The project, which commenced in Autumn 2013, aims to achieve an in-depth exchange of the knowledge and experience that already exists amongst farmers, as well as providing guidance from industry experts.



**The European Agricultural Fund for Rural Development:** Europe Investing in Rural Areas. The funding is made available through the SRDP Skills Development Scheme, which is jointly funded by the Scottish Government and the European Union.



## Focus Area 3: Planning and Consents

- 6.5 Our National Planning Framework (NPF) sets out a long term strategy for the spatial development of Scotland. Scottish Planning Policy (SPP) is a statement of the Scottish Government's policy on how nationally important land use planning matters should be addressed across the country.
- 6.6 Our modernised planning system has sought to improve the efficiency and effectiveness of planning and consents procedures. Planning policies are in place which encourage appropriate siting and good design for new developments. An increase in the number of applications for large and small wind farms means that great care must be taken to ensure that adverse cumulative impacts on communities and the environment are mitigated.

## Recent Successes

- The Scottish Government commenced the review of NPF and SPP in Autumn 2012. We have undertaken extensive engagement and consultation on both documents.
- The intention is that the revised SPP will continue to provide clarity on matters to be taken into account by planning authorities when considering the impacts of individual development proposals. The revised SPP aims to promote consistency in the preparation of development plan onshore wind spatial frameworks, which help guide wind turbine developments to appropriate locations.
- In 2013, the Scottish Government provided £725,000 to fund 17 bids for planning authorities to assist in dealing with high volumes of applications for wind turbines. The impact of these funds will be assessed.
- The Scottish Government **planning advice** on renewables is available online. It is updated as necessary to include advances in new technology, incentives and planning practice. This approach has met with a favourable response from stakeholders.
- In March 2012, Scottish Natural Heritage (SNH) added additional **guidance for small scale wind turbines** to its suite of guidance to assist planning authorities in processing the growing number of enquiries in this field.
- SNH have introduced a simplified approach to assessment of small schemes of three wind turbines or fewer. SNH only provides comments where a scheme requires an **Environmental Impact Assessment** (EIA) or a Habitats Regulation Appraisal.



- SNH have also issued improved guidance on EIA requirements for renewables planning applications. They have also developed a **screening checklist** to help developers provide better quality assessments and to support effective decision making at planning authority level.
- In 2010, Scottish Ministers published a **Policy Statement** on optimising the potential for hydropower generation and protecting the water environment.
- Following that, Scottish Environment Protection Agency (SEPA) published **guidance for run of river hydro schemes** that allows developers to identify which developments are likely to be acceptable. This allows developers to tell at the scoping stage whether a development is potentially consentable.

## Key Actions

- The Scottish Government will reflect carefully on the responses to the consultation on NPF and SPP in finalising the policy documents. Both documents are due to be published in June 2014.
- The Scottish Government will promote partnership working with developers, consultees and communities on pre-application engagement and discussions to promote the value of thorough scoping. This is aimed at generating better applications which progress more smoothly through the planning system and have community support.
- Developers continue to have a responsibility to make use of the available guidance and improve the quality of information provided in planning applications. The Scottish Government promotes the use of pre-application discussions between planning authorities, applicants and other consultees. These should ensure that applications coming forward have the necessary supporting information required to allow authorities to progress applications, this in turn should reduce delays due to requests for additional information.
- The Scottish Government continues to work with both civil and military aviation stakeholders and industry to promote solutions to mitigate the impact of wind turbines on aviation radar in Scotland.
- The Scottish Government's Eskdalemuir Working Group, is making significant progress re-examining the scientific model which underpins the constraints around the Ministry of Defence seismic array, with a view to allowing further development in the area.
- In response to Public Petition 1469 on the neighbour notification of wind turbine applications, we have advised the Public Petitions Committee of the Scottish Parliament that we will produce good practice guidance in relation to public engagement on proposals for wind turbines. There will be a public consultation in due course on a draft of this guidance before it is finalised.



## Planning and Consents: Permitted Development

Certain forms of renewable energy generation installation may be carried out as 'permitted development', when the impacts do not warrant the scrutiny of the planning application process.

Provided the development meets criteria set out in legislation, it does not require a specific grant of planning permission.

The Scottish Government has introduced permitted development rights for a range of non-domestic energy generation developments, such as:

- Ground and water source heat pump pipes;
- Solar photo voltaic and solar thermal panels;
- Structures for generating energy from burning biomass; and
- Structures for generating energy from anaerobic digestion of biomass.

The types of development that can be considered as 'permitted development', and the qualifying criteria, are set out in **Planning Circular 2/2011**.







## Focus Area 4: Grid Connection

- 6.7 The growth in distributed energy generation has brought a number of challenges both in connecting to the grid and accommodating intermittency on the grid. There is a need to continue to understand the challenges faced by all parties in connecting to a network, bearing in mind that farmers often do not have a choice of location.
- 6.8 All connections are subject to the ability of the system to absorb the load placed on it, and that depends upon the local conditions, including the number of generators seeking connection. The increased level of applications for embedded generation over recent years, along with the diversity of projects, has resulted in increased pressure to find grid capacity.

## Recent Successes

- We welcome the implementation of the **Connect and Manage** scheme. This has seen many projects in Scotland connected to the grid in a much shorter timescale than under Ofgem's previous connection policy.
- In 2012, Ofgem announced up to £7 billion of investment from the Scottish Transmission Network Owners (TOs), Scottish Power and Scottish and Southern Energy, to upgrade Scotland's electricity infrastructure. This investment will remove many constraints to the wider export of electricity and allow a great deal of generation to connect to the distribution network.
- Scottish Distribution Network Operators (DNOs) have worked with stakeholders to produce a Distributed Generation Workplan, a standard application form and connection guide. They have also submitted their business plans for the next distribution price control period (2015-2023) to the regulator (Ofgem), for approval and will submit revised plans in March 2014. These business plans include proposals for maintaining and upgrading infrastructure, smarter energy management and other improvements for distribution connection customers.
- In October 2012, the Scottish Government, along with the UK Government, formed the Steering Group of the Scottish Islands Renewables Project which is working to identify options to mitigate the charges being faced by renewable energy generators in the Scottish Islands. The project has recently commissioned a grid access study to examine the challenges and consider associated policy and investment barriers to help overcome these barriers. This work will be completed in the first half of 2014.



- The Scottish Government has welcomed the review of the Transmission Charging methodology launched by Ofgem in Project TransmiT and recognises that the new approach to charges suggested in August 2013 by Ofgem may go some way to reducing long term discrimination against some Scottish generators. We also note their view that government is best placed to determine a preference or subsidy for one form of generation or one area of the country over another. However, there remains significant transmission charge discrimination which is inhibiting electricity generation in Central Scotland and we will continue to press for a fair solution.
- In May 2013, the Scottish Smart Grid Action Plan was launched by Scottish Enterprise at the opening of the Power Networks Demonstration Centre. Both new initiatives fulfil key objectives of the industry led Smart Grid Sector Strategy introduced in 2012 to capitalise on Scotland's smart grid expertise. Smart grids are digitally enabled grids that can accommodate changing pattern of demand and generation of electricity.

## **Key Actions**

- The Scottish Government, along with the Scottish energy sector, will continue to press for a fair solution to transmission charge discrimination which is inhibiting electricity generation, particularly in our Island communities which have some of the best renewable energy resources in Europe.
- We have set up a Community Energy Grid Networks Working Group in partnership with the Scottish DNOs and Community Energy Scotland. This will identify and fund pilot projects that will get maximum use and value from the existing network around communities interested in generating their own renewable energy, potentially saving money on expensive upgrades.
- The Scottish Government will investigate access for agricultural businesses who offer community benefits to the CARES Infrastructure and Innovation Grant Fund, subject to European Commission State Aid rules. This is a limited grant fund available to investigate and develop projects that link local energy generation with local energy use, or projects that wish to develop innovative distribution network connections.



## **Grid Connection: Smarter Energy Management**

Many locally-owned projects are faced with difficult and costly grid connections when trying to progress a renewables installation, with many wishing to take forward projects that use locally produced renewable energy to its best benefit - offsetting grid imported electricity, fossil fuel energy or transport energy.

- Wind2Heat is an example of using and storing locally produced energy more efficiently. In this system wind turbines can be linked into storage heating systems including both electric heating and water based systems.
- The registered power zone in Orkney is an example of using active network management for maximising connection potential on a rural network which can make a big difference to local energy generators.
- The Northern Isles New Energy Solutions research project in Shetland is an example of where active grid management and novel energy storage is being used to make the best use of local energy resources.





## **Community Involvement: Collaborative Working**

The land use sector is already very familiar with collaborative working through ventures such as machinery rings and agricultural cooperatives. We are encouraging developers to adapt their business models to allow direct community investment in schemes as joint ventures or to provide community turbines as a form of benefits.

Joint ventures can include a number of farms sharing the costs, risks and benefits; or working in partnership with local community groups. CARES can provide advice to communities interested in entering into a joint venture, with funding available through REIF to invest in commercial schemes.

The Renewable Energy Investment Fund (REIF) was set up in October 2012 following agreement with Treasury to draw down the Fossil Fuel Levy. REIF is a £103 million fund operated by Scottish Enterprise's Scottish Investment Bank. It offers loans and equity investments for renewable energy projects to fill funding gaps, with initial priorities for investment identified as marine energy (wave & tidal), community energy and district heating.

On the community energy REIF priority, Scottish Investment Bank staff work closely with Local Energy Scotland, the contractor for the Scottish Government's Community and Renewable Energy Scheme (CARES). Indeed CARES has been refocused to act as the first stage of REIF for prospective community applicants, thus providing joined-up support to communities on the ground, as well as streamlining public sector resources.





## Community Case Study: Corrimony Wind Farm

**Name:** Corrimony Wind Farm, Glen Urquhart, Inverness-shire.

**Installation:** Five 2.3 MW turbines, commissioned in March 2013. The site is located at the head of Glen Urquhart on farmland owned by the Girvan family.

**Project:** Joint venture between Corrimony Energy, a local firm under the direction of the Girvan family who have run the family farm since 1941, and Soirbheas, a community charity for Glen Urquhart and Strathglass who invested in the project to earn revenue equivalent to the income from one of the turbines for the local community.

**Community involvements and benefits:** From the outset of the project, the Girvan family envisaged significant community involvement and offered the community the chance to have a financial interest in the wind farm.

Soirbheas are not involved in the running of the wind farm. However, their long term interests are protected through a formal agreement with Corrimony Energy.

The project will provide a number of social and economic benefits for the community. Soirbheas has recently appointed a part time Community Development Officer to support them in developing and consulting on the approach for spending and investing the revenue. Community members have suggested affordable housing, public hall upgrades, play areas, GP surgery, sheltered housing, community mini bus, recycling initiative, and a youth shelter.

**With thanks to the Girvan family and the communities of Glen Urquhart and Strathglass.**





## **Finance and Technology Costs: District Heating Loan Fund**

The District Heating Loan Fund offers loans to support the development of district heating networks in Scotland. The scheme can provide loans for both low carbon and renewable technologies in order to overcome a range of infrastructural issues and costs of developing heat networks.

Low interest loans of up to £400,000 per project are made available to be repaid over a period of up to 10 years. The scheme is open to small and medium sized enterprises, energy services companies (ESCOs), local authorities and registered social landlords.

The scheme was designed to help address the financial barriers to district heating schemes, as the high start-up costs can mean schemes fail to get off the ground because commercial finance is not available. The loans are helping businesses and communities, particularly in rural areas, to develop affordable, green and locally produced heat.

To date, 13 projects have taken up £2.4 million in District Heating Loans, with more projects in the pipeline. The Scottish Government has committed a further £5 million to the District Heating Loan Fund, delivered by the Energy Saving Trust.

A number of farms and estates have received loans for installation of farm-scale biomass heat networks. This not only contributes to our renewable heat targets, but is encouraging farm businesses to develop woodfuel supply chains and ESCOs to supply heat and benefit from the Renewable Heat Incentive (RHI).





## Focus Area 5: Finance and Technology Costs

- 6.9 In order to continue on course for 2020 renewables targets in electricity, heat and community and locally-owned renewables, we will need first and foremost to maintain developer and investor confidence. Access to finance for community and locally owned projects can create a barrier, as can high capital costs for some installations.
- 6.10 The main financial incentives for farm scale renewables are the Feed in Tariff (FiT) and Renewable Heat Incentive (RHI), which are reserved to the UK Government. These financial incentives are an important tool to drive uptake of renewable technologies. We must, however, recognise that budgets are constrained. Following the latest review, the UK Government has adopted long term tariff settling mechanisms in line with calendar or national installed capacity.

## Recent Successes

- The FiT and non-domestic RHI have driven rapid growth in uptake by providing financial incentives for low carbon energy generation technologies. This has resulted in market growth, greater availability of micro-renewables technology and, in some instances, reduced technology costs. The Scottish Government works closely with UK Government to ensure Scotland benefits from low carbon support schemes.
- The Scottish Government, along with stakeholders, successfully influenced the FiTs review to ensure that remote hydro installations can access the FiT on an individual basis as well as securing preliminary accreditation for projects and a new support band for hydro schemes.
- We also successfully encouraged the increase in FiT for anaerobic digestion schemes of 250 kW or less or those not exceeding 500 kW to provide greater certainty for installers.
- CARES is providing loans of up to £150,000 to communities and rural businesses to support the high risk pre-planning stage of project development.
- The District Heating Loan Fund is providing low-interest loans of up to £400,000 for small-medium scale businesses to install renewable and low carbon district heating, helping them to access the Renewable Heat Incentive.



- A new package of support for communities has been announced under the Renewable Energy Investment Fund (REIF) to provide community renewables projects with access to loan and equity finance for projects that have secured the right to develop their site and have a grid connection confirmed.
- SRDP 2007-2013 has supported the uptake of agri-renewables through providing grant funding for the purchase and installation of renewable energy systems, cultivation of energy crops and forestry planting. Grants for local renewables projects with a wide community benefit, such as wind energy cooperatives, have been supported through LEADER.

### **Key Actions**

- The Scottish Government will continue to work constructively with the UK Government to ensure a strong and effective framework to support our renewable energy priorities and provide a clearer framework within which businesses can operate.
- Our delivery partners will continue to lead the way in maximising uptake of FiT and RHI through our farming advisory activity.
- The Scottish Government is continuing to work with financial institutions to identify sustainable funding arrangements for agri-renewable developments. This includes the provision of loans for the post planning and implementation stages of projects.
- Under CARES, the Scottish Government will consult the Tenant Farming Forum (TFF) in the development of good practice guidance for tenant farmer/owner partnership for renewable energy schemes.
- The Scottish Government, along with stakeholders, will consider how the new SRDP from 2015 can support the uptake of agri-renewables.
- Scottish Agricultural Organisation Society (SAOS) will work with the sector to develop models for collaborative working and joint ventures and encourage rural businesses to pursue cooperative approaches to renewables projects.





## Finance and Technology Costs: Feed in Tariff and Renewable Heat Incentive

The Feed-in Tariffs (FiTs), introduced in 2010, incentivise small-scale energy production under 5 MW. The FiTs are available for renewable energy generation from wind, solar, hydro, anaerobic digestion and domestic scale micro combined heat and power.

The Non-Domestic Renewable Heat Incentive (RHI) was launched in 2011. It offers funding to support heat and bio-methane from anaerobic digestion produced from renewable sources. It has been designed to encourage the use of low carbon heating technologies such as wood fuelled boilers and ground source heat pumps.

The Domestic Renewable Heat Incentive is expected to be launched in Summer 2014. The Renewable Heat Premium Payment (RHPP) is providing interim funding for the installation of renewable heat technologies.

Grant funding is incompatible with access to the UK regulatory incentives. Therefore, those who receive a grant which contributes to the direct costs of an installation will not be eligible to apply for the FiT or RHI for that installation.

Further information and eligibility criteria are available on the **UK Government Department of Energy and Climate Change (DECC) website** or the **Energy Saving Trust website**.





## Finance and Technology Costs: Renewables Obligation (Scotland)

The Renewables Obligation (Scotland) is an obligation on electricity suppliers to source an increasing proportion of electricity from renewable sources. The Renewables Obligation (Scotland) is designed to encourage the installation of large scale renewable electricity production and works alongside the other UK Renewables Obligations. Further details can be found on the **Ofgem website**.

Whilst the Renewables Obligation (Scotland) is currently the key incentive for the build of new, larger scale renewable electricity generating capacity across Scotland, its future beyond 2017 depends very much on the outcome of the current electricity market reform proposals.

- Accredited renewable electricity installations are issued with Scottish Renewable Obligation Certificates (ROCs) for the electricity generated on a monthly basis.
- Electricity suppliers have an obligation to generate a given number of ROCs. If they do not meet their obligation, they must buy ROCs from other parties.
- Renewable electricity suppliers can then trade their ROCs with these energy suppliers.
- For the majority of farm-scale renewable electricity installations the FiT will be the preferred option.





## Focus Area 6: Research and Innovation

6.11 Research and innovation is a fundamental requirement to inform the future development of farm scale renewables. It is important that research outputs are accessible and used to inform future policy development and advisory activity targeted at farmers. The Scottish Government encourages innovative approaches to drive the sector forward.

### Recent Successes

- As part of the **Scottish Government's Strategic Research Portfolio 2011-2016** some £150,000 is being invested in projects that directly apply to the on farm production of energy, and as part of the wider programme, improving our understanding of the associated issues relating to land use, the natural environment and rural communities, and associated links with climate change adaptation and mitigation.
- The Renewable Energy Consultative Group (RECG) provides advice on the overall direction of the energy component of the Strategic Research Programmes where they relates to renewable energy, knowledge exchange opportunities, and the application of research findings. Its membership is drawn from relevant Scottish Government policy teams, public agencies, local authorities, community groups and other stakeholders.
- As part of the FarmPath (Farming Transitions: Pathways towards regional sustainability of agriculture in Europe) collaborative research project, on farm renewable energy production in Scotland is being studied. The programme runs from 2011-2014 and is funded through the European Commission's Seventh Framework Programme and co-funded by the Land Use Theme of the Scottish Government Environmental Change Research Programme. Further details and research findings can be found on the **FarmPath website**.
- The Scottish Government led and managed the **GP Wind** project which was set up to address barriers to the deployment of wind energy generation, by recording and sharing good practice in reconciling renewable energy objectives with wider environmental objectives and actively involving communities in planning and implementation.
- In April 2013, the Scottish Government's **Climate Change Centre of Expertise** (ClimateXChange) published a report on the health impacts of wind turbines. This report analysed UK and international academic literature published in the last four years on the effects of wind turbines on human health.



## Key Actions

- A programme of communications is being developed by the Scottish Government's **Main Research Providers** in order to disseminate on-farm energy research findings to inform advisory services and support policy needs.
- The Scottish Government recognises the increasingly important role energy storage could play in Scotland, enabling us to harness our renewables resources effectively and efficiently for a wide range of uses. We are working with key partners to better understand the specific opportunities for Scotland.
- Scottish Enterprise is currently undertaking a feasibility study to assess the potential for using renewable energy, particularly wind and solar power to produce hydrogen and subsequently ammonia, at an appropriate scale in rural Scotland. The study will be completed in Spring 2014.
- The **DC-Agri project** is a four year research project looking at the use of quality anaerobic digestate and compost in agriculture, integrated with an extensive knowledge exchange network. The project is funded jointly by Zero Waste Scotland, Defra, WRAP and WRAP Cymru.
- The Scottish Government has commissioned ClimateXChange to carry out a number of research projects to inform energy policy development. Topics include, the social factors for success of community energy in Scotland, a study of the impacts of wind farms and a literature review of recent papers on energy storage.
- The Scottish Government recently established the **Scottish Biofuels Taskforce**, which reports to the Scottish Energy Advisory Board. Its remit is to assess the potential for the development of a biofuels industry in Scotland. It is chaired by Scottish Enterprise, and includes representatives from Transport Scotland, the Scottish Government, Highlands and Islands Enterprise (HIE) and industry.



## Anaerobic Digestion Case Study: Rainton Farm

**Farm:** Rainton Farm is an organic mixed livestock farm near Gatehouse of Fleet. The farm is also home of luxury ice cream maker Cream o' Galloway and a popular visitor destination.

**Technology:** The 'AgriDigestore' is fitted to the slurry tower on the new state of the art dairy unit. The system includes a 25 kWe CHP, floating roof gas holder and gas mixing system. The system is an experimental design, which is hoped will provide an economically viable model for small scale farm AD that can be rolled out across Scotland. Due to the experimental nature of the project, modifications were needed to the roof. This meant that final completion took longer than expected with work ending in Autumn 2013. Depending on how much gas the system yields, there is potential to add a second CHP unit.

**Fuel source:** The feedstocks for the digester includes slurry from 140 cows and young stock and 250 tonnes of low grade silage as well as waste from cheese and ice cream production.

**Funding:** The estimated total cost is in the region of £210,000 including the slurry tank. The project will receive a 60% grant from SRDP. Including the SRDP grant and the expected income from Renewable Obligation Certificates and energy bill savings, the project is expected to pay back in 3.5 years.

### Why install an Anaerobic Digester?

The business has strong green credentials and their aim is to maximise outputs whilst minimising bought in resources. Putting the slurry through the anaerobic digester will not only improve its value as a fertiliser but also reduce its toxicity to invertebrates and greenhouse gas emissions. And it will produce lots of electricity and hot water too which will be used in the dairy and if the biogas yield is good, it could also provide energy for the ice cream business.

**With thanks to David and Wilma Finlay, Rainton Farm.**



# Chapter 7

## Taking the Strategy Forward

- 7.1 The Agri-Renewables Strategy was developed in cooperation with industry and other stakeholders and in looking ahead we aim to continue to work together closely.
- 7.2 Under each of the Focus Areas in Chapter 6, a number of actions have been identified, aimed at supporting the uptake of renewables on farms. Reporting on progress will be undertaken annually as part of the update of the 2020 Routemap For Renewable Energy in Scotland, which is made available through the Scottish Government website.
- 7.3 For the development of this annual update report, the Scottish Government aims to reconvene members of the Agri-renewables Strategy Consultative Group (Annex B), seeking feedback on progress in implementing the actions, as well as wider aspects of the promotion of on-farm renewables. The Agriculture and Climate Change Stakeholder Group, specifically tasked with developing low carbon approaches in agriculture, will also act as a platform to discuss the growth of the sector.
- 7.4 Following the success of the Agri-renewables workshop in 2012, the Scottish Government will organise a follow up event in 2014. This will provide an opportunity for farmers to engage directly with the Scottish Government on the policy framework relevant for agri-renewables.



## **Advice and Skills: Low Carbon Skills Fund**

Financial support is available to Scottish businesses through the Low Carbon Skills Fund (LCSF) managed by Skills Development Scotland. This fund has been established to enable employers to have access to funding to undertake training to support sustainable development and growth. This includes learning and training to improve resource and energy efficiency; to adopt innovative technologies or new sustainable practices and processes; and to identify new market opportunities.

LCSF allows Scottish Businesses with up to 250 employees to apply for up to £12,500 towards employee training and can provide 50% of training costs (to a maximum of £500 per episode) for up to 25 episodes of training. Eligible training includes:

- Renewable energy, low carbon technologies and microgeneration
- Energy efficiency, environmental and clean technologies
- Waste management and re-use
- Reducing carbon in supply and energy management

Since the launch of the scheme in October 2010, the LCSF has supported over 2,100 episodes of training. We have asked Skills Development Scotland to provide at least 500 episodes of training in 2013-14 through the Low Carbon Skills Fund Programme.

Further information is available on the **Skills Development Scotland website**.





## Wind Energy Case Study: West Adamston Farm

**Farm:** West Adamston Farm is situated in Muirhead, Dundee. It is farmed by John Brown & Son.

**Installation:** A Northwind 100 wind turbine was installed in June 2011; this has a rated power of 100 kW. The turbine has a hub height of 37 m and a tip height of 47.5 m.

**Resource:** The site has a good wind resource of approximately 7.2 m/s at hub height.

**Economics:** The total installed cost of the project was about £330,000. In its first year of operation the turbine generated about 180,000 kWh of energy, of which about 40% was used on farm, thus reducing the farm's bought electricity costs.

**Why install a wind turbine?** The business of John Brown & Son includes a potato enterprise with associated storage. The average annual energy usage is 180,000 kWh and the demand can be considerably higher during milder years. A wind turbine was the only renewable energy solution which could feasibly offset a proportion of the energy usage and in turn reduce costs associated with the business.

The business looked at renewable energy generation on farm as a way of reducing their dependency on fossil fuel electricity. Generating their own wind energy ensures that the farm business is more sustainable. In addition, this improves the carbon footprint of the farm and with consumers and retailers becoming more concerned with the carbon footprint of producers; the turbine will improve the marketability of the farm's produce.

**With thanks to John Brown & Son,  
West Adamston Farm.**







## Research and Innovation: Technology Development

The Scottish Government is committed to innovation and research aimed at driving the development and deployment of renewable energy generation.

- The Scottish Government's support for renewables has created the right environment to encourage investment in manufacturing of technology. 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 and Verdo Renewables.
- The **Energy Technology Partnership (ETP)**, with £3 million funding from the 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 **Microgeneration Certification Scheme** is an industry led scheme operating to ensure the quality of small scale renewable technology and installations.



# Annex A

## Summary of Actions

### 1. Community Involvement and Benefits

- 1.1 Make significant progress towards our 500 MW target through continuing with CARES support to help land managers and rural enterprises progress projects.
- 1.2 The Scottish Government will promote the development of renewable energy projects on Scottish Ministers' Crofting Estate which maximise opportunities for community ownership and benefits.
- 1.3 Agricultural businesses to continue to lead the way on engagement and identifying benefits with their local community through early collaboration to offer community benefits, including identifying local opportunities to fund energy efficiency schemes and measures to mitigate fuel poverty.
- 1.4 Our Community Benefits Register is gaining momentum, with nearly 100 individual projects now featured. Agricultural businesses to build on this momentum by providing community benefits and registering these on the Community Benefits Register.
- 1.5 Through CARES, we will promote the Good Practice Principles for Community Benefits from Onshore Renewable Energy Developments to a wide range of stakeholders and interested groups, targeting onshore technologies that currently have a lesser association with community benefits such as biomass, hydro and solar PV. We will also encourage community benefits from all scales of development, notably single wind turbine developments in rural areas.
- 1.6 Scotland's Rural College and other delivery partners to promote best practice in community involvement and benefits, as well as CARES, through their farming advisory activity.
- 1.7 CARES conference to take place in March 2014.
- 1.8 Renewables developers are beginning to respond to the call to link local energy generation directly to local energy costs. The Scottish Government will continue to encourage local energy developers to consider schemes that offer discounts to local electricity consumers.



## 2. Skills and Advice

- 2.1 National Farmers Union Scotland and Smiths Gore to deliver a new Renewables Development Initiative that was launched in Autumn 2013. This programme, funded by SRDP, aims to provide a platform for skills development based on farmers' experiences with renewables developments.
- 2.2 CARES consortium to further develop the practical help and expert guidance available through CARES and update the guidance to land managers to reduce the barriers to community or local rural business entrepreneurs who want to develop renewable energy generation projects.
- 2.3 Zero Waste Scotland to provide support for those working within agriculture on waste management, anaerobic digestion and composting. The Zero Waste Plan for Scotland highlights the role of anaerobic digestion and where appropriate, energy from waste.
- 2.4 Scotland's Rural College to further expand the web resource on farm scale renewables and develop technology tool kits to help farmers through the process of planning and implementing a renewables installation.



### 3. Planning and Consents

- 3.1 The Scottish Government will reflect carefully on the responses to the consultation on NPF and SPP in finalising the policy documents. Both documents are due to be published in June 2014.
- 3.2 The Scottish Government will promote partnership working with developers, consultees and communities on pre-application engagement to promote the value of thorough scoping. This is aimed at generating better applications which progress more smoothly through the planning system and have community support.
- 3.3 Developers continue to have a responsibility to make use of the available guidance and improve the quality of information provided in planning applications. The Scottish Government promotes the use of pre-application discussions between planning authorities, applicants and other consultees. These should ensure that applications coming forward have the necessary supporting information required to allow authorities to progress applications, this in turn should reduce delays due to requests for additional information.
- 3.4 The Scottish Government continues to work with both civil and military aviation stakeholders and industry to promote solutions to mitigate the impact of wind turbines on aviation radar in Scotland.
- 3.5 The Scottish Government's Eskdalemuir Working Group, is making significant progress re-examining the scientific model which underpins the constraints around the Ministry of Defence seismic array, with a view to allowing further development in the area.
- 3.6 In response to Public Petition 1469 on the neighbour notification of wind turbine applications, we have advised the Public Petitions Committee of the Scottish Parliament that we will produce good practice guidance in relation to public engagement on proposals for wind turbines. There will be a public consultation in due course on a draft of this guidance before it is finalised.



## 4. Grid Connection

- 4.1 The Scottish Government, along with the Scottish energy sector, will continue to press for a fair solution to transmission charge discrimination which is inhibiting electricity generation, particularly in our Island communities which have some of the best renewable energy resources in Europe.
- 4.2 We have set up a Community Energy Grid Networks Working Group in partnership with the Scottish DNOs and Community Energy Scotland. This will identify and fund pilot projects that will get maximum use and value from the existing network around communities interested in generating their own renewable energy, potentially saving money on expensive upgrades.
- 4.3 The Scottish Government will investigate access for agricultural businesses who offer community benefits to the CARES Infrastructure and Innovation Grant Fund, subject to European Commission State Aid rules. This is a limited grant fund available to investigate and develop projects that link local energy generation with local energy use, or projects that wish to develop innovative distribution network connections.



## 5. Finance and Technology Costs

- 5.1 The Scottish Government will continue to work constructively with UK Government to ensure a strong and effective framework to support our renewable energy priorities and provide a clearer framework within which businesses can operate.
- 5.2 Our delivery partners will continue to lead the way in maximising uptake of FiT and RHI through our farming advisory activity.
- 5.3 The Scottish Government is continuing to work with financial institutions to identify sustainable funding arrangements for agri-renewable developments. This includes the provision of loans for the post planning and implementation stages of projects.
- 5.4 Under CARES, the Scottish Government will consult the Tenant Farming Forum (TFF) in the development of good practice guidance for tenant farmer/owner partnership for renewable energy schemes.
- 5.5 The Scottish Government, along with stakeholders, will consider how the new SRDP from 2015 can support the uptake of agri-renewables.
- 5.6 Scottish Agricultural Organisation Society (SAOS) will work with the sector to develop models for collaborative working and joint ventures and encourage rural businesses to pursue cooperative approaches to renewables projects.



## 6. Research and Innovation

- 6.1 A programme of communications is being developed by the Scottish Government's Main Research Providers in order to disseminate on-farm energy research findings to inform advisory services and support policy needs.
- 6.2 The Scottish Government recognises the increasingly important role energy storage could play in Scotland, enabling us to harness our renewables resources effectively and efficiently for a wide range of uses. We are working with key partners to better understand the specific opportunities for Scotland.
- 6.3 Scottish Enterprise is currently undertaking a feasibility study to assess the potential for using renewable energy, particularly wind and solar power to produce hydrogen and subsequently ammonia, at an appropriate scale in rural Scotland. The study will be completed in Spring 2014.
- 6.4 The DC-Agri project is a four year research project looking at the use of quality anaerobic digestate and compost in agriculture, integrated with an extensive knowledge exchange network. The project is funded jointly by Zero Waste Scotland, Defra, WRAP and WRAP Cymru.
- 6.5 The Scottish Government has commissioned ClimateXChange to carry out a number of research projects to inform energy policy development. Topics include, the social factors for success of community energy in Scotland, a study of the impact of wind farms and a literature review of recent papers on energy storage.
- 6.6 The Scottish Government recently established the Scottish Biofuels Taskforce, which reports to the Scottish Energy Advisory Board. Its remit is to assess the potential for the development of a biofuels industry in Scotland. It is chaired by Scottish Enterprise, and includes representatives from Transport Scotland, the Scottish Government, Highlands and Islands Enterprise (HIE) and industry.

# Annex B

## Consultative Process

The Agri-Renewables Strategy Consultative Group was established to advise on the development of the Strategy. The Groups remit was to:

- Identify the key opportunities for agri-renewables in Scotland, including renewable electricity, renewable heat, technology and skills;
- Identify gaps and barriers to uptake of agri-renewables and development of the agri-renewables sector;
- Make recommendations to the Scottish Government and industry to support development of the agri-renewables sector.

Membership of the group included a sub set of the existing Agriculture & Climate Change Stakeholder Group as well as representatives from other interested organisations:

- Scotland's Rural College;
- Scottish Land and Estates;
- Quality Meat Scotland;
- Scottish Natural Heritage;
- Scottish Environment Protection Agency;
- Forestry Commission Scotland;
- Scottish Environment Link;
- James Hutton Institute;
- Soil Association Scotland;
- National Farmers Union Scotland;
- Scottish Tenant Farmers Association;
- Community Energy Scotland;
- Scottish Agricultural Organisations Scotland;
- Crofting Commission;
- Scottish Crofters Federation;
- Development Trusts Association Scotland;
- Scottish Renewables; and
- CoSLA.





Scottish Government Policy Officials from Agriculture and Rural Development, Renewables Routemap, Strategy and Constitution, Planning, Energy Markets, Grid and Regulation were also part of the Agri-renewables Consultative Group.

As well as meetings of the Consultative Group, a workshop for farmers, crofters, land managers and wider renewable energy stakeholders was held in May 2012. A report of the workshop can be found on the **SRUC website**.

# Annex C

## Sources of Useful Information

### **The Scottish Government Publications**

The Scottish Government, Low Carbon Scotland: Meeting the Emissions Reduction Targets 2013 - 2027

<http://www.scotland.gov.uk/Topics/Environment/climatechange/scotlands-action/lowcarbon/meetingthetargets>

The Scottish Government, Energy Web Pages

<http://www.scotland.gov.uk/Topics/Business-Industry/Energy>

The Scottish Government, 2020 Routemap for Renewable Energy in Scotland,

<http://www.scotland.gov.uk/Resource/Doc/917/0120033.pdf>

The Scottish Government, Microgeneration Strategy for Scotland

<http://www.scotland.gov.uk/Publications/2012/06/9678>

The Scottish Government, A Low Carbon Economic Strategy for Scotland

<http://www.scotland.gov.uk/Resource/Doc/331364/0107855.pdf>

The Scottish Government, The Government Economic Strategy

<http://www.scotland.gov.uk/Resource/Doc/357756/0120893.pdf>

The Scottish Government, Conserve and Save:

The Energy Efficiency Action Plan for Scotland

<http://www.scotland.gov.uk/Resource/Doc/288409/0088187.pdf>

The Scottish Government, Scottish Planning Policy

<http://www.scotland.gov.uk/Resource/Doc/300760/0093908.pdf>

The Scottish Government, Microgeneration Online Planning Advice

<http://www.scotland.gov.uk/Resource/0039/00393275.pdf>

The Scottish Government, Low Carbon Scotland: Public Engagement Strategy

<http://www.scotland.gov.uk/Resource/Doc/336432/0110100.pdf>

The Scottish Government, Land Use Strategy and Action Plan

<http://www.scotland.gov.uk/Topics/Environment/Countryside/Landusestrategy>



## **UK Government Publications**

UK Government Department for Energy and Climate Change, Web Pages

**<http://www.decc.gov.uk/>**

UK Government Department of Energy and Climate Change, Feed In Tariff

**[http://www.decc.gov.uk/en/content/cms/meeting\\_energy/renewable\\_ener/feedin\\_tariff/feedin\\_tariff.aspx](http://www.decc.gov.uk/en/content/cms/meeting_energy/renewable_ener/feedin_tariff/feedin_tariff.aspx)**

UK Government Department of Energy and Climate Change,  
Renewable Heat Incentive

**[http://www.decc.gov.uk/en/content/cms/meeting\\_energy/renewable\\_ener/incentive/incentive.aspx](http://www.decc.gov.uk/en/content/cms/meeting_energy/renewable_ener/incentive/incentive.aspx)**

UK Government Department for Energy and Climate Change,  
Renewable Heat Premium Payment

**[http://www.decc.gov.uk/en/content/cms/meeting\\_energy/renewable\\_ener/premium\\_pay/premium\\_pay.aspx](http://www.decc.gov.uk/en/content/cms/meeting_energy/renewable_ener/premium_pay/premium_pay.aspx)**

UK Government Department for Energy and Climate Change, Green Deal

**[http://www.decc.gov.uk/en/content/cms/tackling/green\\_deal/green\\_deal.aspx](http://www.decc.gov.uk/en/content/cms/tackling/green_deal/green_deal.aspx)**

## **Advice and Guidance**

Community and Renewable Energy Scheme

**<http://www.localenergyscotland.org/>**

Farming For a Better Climate

**[http://www.sruc.ac.uk/info/120175/farming\\_for\\_a\\_better\\_climate](http://www.sruc.ac.uk/info/120175/farming_for_a_better_climate)**

Scotland's Rural College Renewables Advisory Activity

**[http://www.sruc.ac.uk/info/120182/farm\\_diversification](http://www.sruc.ac.uk/info/120182/farm_diversification)**

Resource Efficient Scotland

**<http://www.resourceefficientscotland.com/>**

Energy Saving Trust Scotland

**<http://www.energysavingtrust.org.uk/scotland/Take-action/Home-Energy-Scotland>**

Wood Energy Training Network

**<http://www.eduforest.eu/progMindex.php?index=3>**

Woodfuel Scotland

**<http://www.scottishwoodfuelnews.org.uk/index.html>**

Forestry Commission Scotland Energy Forestry

**<http://www.forestry.gov.uk/forestry/INFD-85UFMB>**

Community Energy Scotland

**<http://www.communityenergyscotland.org.uk/>**



Scottish Enterprise

<http://www.scottish-enterprise.com/>

Highlands and Islands Enterprise

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

Energy Technology Partnership

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

Scottish Institute for Solar Energy Research

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

Scottish Energy Installers Alliance

<http://www.scottisheia.org>

Soil Association Scotland, Future Proofing Scotland's Farming

<http://www.soilassociation.org/innovativefarming/futurefarminginscotland/futureproofingscotlandsfarming>

Scottish Natural Heritage Guidance

<http://www.snh.gov.uk/planning-and-development/renewable-energy/>

Scottish Environment Protection Agency Guidance

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

Carbon Trust

<http://www.carbontrust.com/resources/guides/sector-based-advice/agriculture-and-horticulture>

Scottish Renewables

<http://www.scottishrenewables.com/>

Anaerobic Digestion/Biogas Portal

<http://www.biogas-info.co.uk/>

Skills Development Scotland, Skills Investment Plan for the Energy Sector

[http://www.skillsdevelopmentscotland.co.uk/media/256998/sds\\_energysip\\_final.pdf](http://www.skillsdevelopmentscotland.co.uk/media/256998/sds_energysip_final.pdf)

Zero Waste Scotland

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

Ofgem

<https://www.ofgem.gov.uk/>

Climate XChange

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

Heat Network Partnership

<http://www.districtheatingscotland.com>

NFUS Renewables Development Initiative

<http://renewableenergyonfarms.co.uk>

# Annex D

## Photograph Acknowledgements

Front Cover	Biomass Boiler	Neil Harrison, re:heat
Front Cover	Solar Panels	Copyright Photoexpress, supplied by SRUC
Front Cover	Skelmonae Turbines	John Moisey, SAC Consulting
Front Cover	Torr Cows and Grass	Rebecca Audsley, SAC Consulting
Page 7	Innerhadden Hydro Scheme	Richard Barclay
Page 9	Micro-hydro Scheme	Rebecca Audsley, SAC Consulting
Page 11	Torr Calves	Rebecca Audsley, SAC Consulting
Page 15	Henderston Firewood	SAC Consulting
Page 18	Skelmonae Turbine	David Smith, Cloffrickford
Page 21	Sandystones Solar Arrays	Borders Machinery Ring
Page 27	Auger Mechanism	SAC Consulting
Page 30	Cononsyth Turbine	John Moisey, SAC Consulting
Page 31	Farmers Group	Rebecca Audsley, SAC Consulting
Page 32	Corrimony Wind Farm	Soirbheas
Page 33	Henderston Firewood	SAC Consulting
Page 36	Micro-renewables	Rebecca Audsley, SAC Consulting
Page 37	Micro-hydro	Jim Campbell, SAC Consulting
Page 40	Rainton Anaerobic Digester	David Finlay
Page 42	Biogas Plant	Copyright Photoexpress, supplied by SRUC
Page 43	West Adamston Turbine	SAC Consulting
Page 44	Distant Turbines	Lee-ann Sutherland, James Hutton Institute



© Crown copyright 2014

ISBN: 978-1-78256-939-8

This document is also available on the Scottish Government website:  
[www.scotland.gov.uk](http://www.scotland.gov.uk)

APS Group Scotland  
DPPAS14737 (02/14)

w w w . s c o t l a n d . g o v . u k