

The Scottish Government's New Entrants to Farming Programme



Guidance Note: Renewable Energy Opportunities



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Renewable Energy – the opportunities?

The main incentive for new and young entrants is a profitable business which provides good opportunities for business growth. Whilst there has been interest in, and uptake of, farm diversification opportunities for some time, there has, in recent years, been significant growth in interest in renewable energy opportunities and the potential for growing non-food crops.

The range of type and scale of possible diversification, renewable energy and non-food crop projects is extensive and tends to be limited by the market opportunity and natural resources of the business. Estimates suggest that almost 50% of farm businesses have diversified and there has been significant growth in renewable energy (small and large scale) across Scotland's land based business in recent years, particularly since the introduction of Feed-in Tariffs and Renewable Heat Incentive.

As a new entrant to farming, this guidance note will help you start to identify which technology will best fit with your farm and your objectives. Confirming whether or not a renewable technology will be economically and technically viable on your farm will require a detailed and thorough appraisal. You may find independent expert advice useful in this process; for complex projects this will be essential.

Renewable energy offers an excellent opportunity but only if it is carefully planned to fit with your business and your farm! Firstly, there are three important questions for you to consider:

1. Why should you invest in renewable energy?

Renewable energy can be an excellent choice for farmers seeking a diversification opportunity. The key benefits of renewable energy to your business are:

- An opportunity to generate a sustainable income for up to 20 years through Government incentives;
- Makes use of on-farm resources;
- Energy generated can be used to reduce electricity and heating bills on-farm, and the excess can be sold to generate additional income; and
- Reduction in emissions of carbon dioxide.

2. Which renewable energy technologies are suitable for farms?

The renewable energy technologies which offer the best diversification opportunities for farms are:

- Wind energy
- Hydropower
- Biomass
- Solar photovoltaic

3. What are your objectives for considering renewable energy?

Each renewable energy technology has different characteristics which will influence whether or not it is suitable for your farm. You need to carefully consider what your objectives are and

what you want out of a renewable energy installation. The following factors are important to consider before deciding which renewable energy technology option(s) you wish to investigate:

- How much capital do you have access to for investment?
- What is the scale and pattern of your energy demand?
- What resources do you have available on your farm?
- How much risk are you willing to take?
- How important is it to you to purchase locally?

More in-depth information can be found at www.sruc.ac.uk/renewableenergy.

Incentives for Renewable Energy

Feed-in Tariff

- Designed to encourage the installation of small scale (up to 5 MW), low carbon electricity production.
- Makes a payment of every unit of renewable electricity produced. The FIT Scheme pays two types of tariffs:
 - Generation tariff: Payment made for every unit of electricity you generate.
 - Export tariff: Payment for every unit exported to the electricity grid.

Scottish Renewable Obligation Certificates

- Designed to encourage the installation of large scale renewable electricity production.
- 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 tariff will be the preferred option.

Non-domestic Renewable Heat Incentive

- Designed to encourage the installation of renewable heat technologies. It makes a payment of every unit of renewable heat produced.
- The scheme is open to non-domestic properties or domestic properties on district heating schemes (it is not open to single domestic premises).
- A farmhouse on its own would be classed as domestic, unless business rates are paid on all or part of the property (e.g. because it is substantially used as a B&B).

A Domestic RHI for single domestic premises is expected to open in summer 2014!

Technologies – Summary Comparison

Wind Energy

Key benefits	<p>High financial returns with little input once operational.</p> <p>Long-lasting and robust technology; turbines will last in excess of 20 years.</p> <p>Require a small footprint of land which means that agricultural land loss is minimal.</p>
Main issues	<p>High risk – upfront costs can be considerable with no guarantee of gaining planning consent, i.e. submission of a planning application for a single medium to large scale wind turbine can cost upwards of £25,000.</p> <p>Grid connection costs may be significant and are dependent on the distance to the nearest connection point, line capacity and any upgrades needed. This cost may result in a project not being economically viable.</p> <p>Adverse impacts on the surrounding environment – careful assessment needs to be conducted to ensure any impacts are minimal and this would be addressed through the planning process.</p> <p>Wind flow is not constant and varies in force and with the seasons. There will be times when no electricity is produced at all.</p> <p>Wind energy may be a controversial option depending on the location and opinion of local communities.</p>

Hydropower

Types of technology	<p><i>Storage based:</i> rainfall and surface drainage water is stored behind a man-made dam and then released to provide a constant, or demand-based, flow of water to the turbines to generate electricity.</p> <p><i>Run-of-river:</i> water is taken out of a stream, then fed downhill in a pipe and returned to lower down river via a turbine.</p>
Key benefits	<p>Annual energy output and seasonal variation is relatively predictable, varying with annual rainfall patterns.</p> <p>Slow rate of change e.g. the output power varies more gradually following a rainfall event than output from a wind turbine does as wind speed changes.</p> <p>Good correlation with demand i.e. output is maximum in winter.</p> <p>Low environmental impact when installed on a suitable site.</p> <p>Long-lasting and robust technology</p>

Main issues	<p>Environmental impact – storage based systems can have a significant ecological impact due to the effect of the dammed water course on the surrounding environment. SEPA guidance requires the quantity of energy produced to be sufficient to justify any negative environmental effect to the watercourse and therefore sites with shallow falls may not be suitable.</p> <p>Locating a suitable site – it can be difficult to find a site with all required characteristics, including both sufficient head and year-round water flow.</p> <p>Grid connection costs may be significant and are dependent on the distance to the nearest connection point, line capacity and any upgrades needed. This cost may result in a project not being economically viable.</p>
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Biomass

Types of technology	<p>There are several types of biomass boiler:</p> <ul style="list-style-type: none"> • Woodchip boilers. • Pellet boilers. • Log boilers. • Straw boilers. • Multi-fuel (e.g. straw and logs, log and pellet).
Key benefits	<p>Fuel bill savings – price per kWh for biomass fuels is usually significantly lower than oil, LPG or electricity</p> <p>Biomass boilers produce water at the same temperature as conventional fossil fuel boilers, so there is no need to change your existing wet heating systems.</p> <p>Technically and financially viable on almost any farm.</p> <p>Generally no external barriers to installation e.g. if required obtaining planning permission is usually relatively straight forward.</p> <p>Tried, tested and efficient technology.</p> <p>No specific resources are required on-farm, only a heat demand.</p>
Main issues	<p>Poor design and installation – can lead to systems which do not function efficiently.</p> <p>Poor design of the fuel store – can lead to inefficient and expensive deliveries.</p> <p>Mismatch of boiler fuel requirements to the type and quality fuel available locally.</p> <p>Poor fuel quality – issues such as high moisture content, contaminants or out of specification particles, will lead to a variety of problems.</p>

Solar Photovoltaic

Types of technology	<p>There are several PV systems that can be used:</p> <ul style="list-style-type: none">• Solar panels retrofitted onto building roofs.• Solar tiles and slates integrated into roofs (usually new build).• Ground mounted solar panels.
Key benefits	<p>Easy to install and can be retrofitted to existing infrastructures.</p> <p>Require minimal maintenance.</p> <p>Very few external barriers to installation.</p> <p>Short lead time from feasibility to installation.</p>
Main issues	<p>Intermittent electricity generation – entirely dependent on weather and seasons. Times of electricity generation may not match the times of your electricity demand.</p>

For further information on renewable opportunities please go to:

www.scotland.gov.uk/energy

www.sruc.ac.uk/renewableenergy.