# Renewable Energy - Towards net zero

Nearly 40% of farmers and growers are using solar, wind, farm by-products and bioenergy crops to produce clean, low-carbon energy. This is a huge rise from only 5% in 2010[1]. The energy produced from renewable resources generates at least 10% of UK's electricity needs, which is equivalent to roughly the electricity use of 10 million households[2].

## Emission challenges

### Energy use

Agricultural and horticultural industries are energy and fuel intensive[3]. Many farm businesses are considering investing in renewable energy, however the reliability of supply from these systems needs to be improved. Fossil fuels are being continually used in the medium term to support the integration of intermittent renewable sources of energy.

### Land use change for bioenergy crops

There are concerns about the type, quality, and availability of land used in the UK for all renewable energy schemes including bioenergy, wind and solar. This is as a result of productive (food producing) land being lost to energy generation. Land can be multi-function, but balancing food, carbon sequestration and energy generation need to be appropriate to land which is most suitable.

### Cost of deployment

Cash flow is essential to new renewable and bioenergy projects and support is essential if reducing fossil fuel energy use is to be achieved. With Feed in Tariffs (FiT) now closed and Renewable Heat Incentive (RHI) reducing, displacing current energy costs is critical as margins can be unattractive for investing farms. The cost of exporting energy into the distribution network combined with issues such as capacity, confidence, cash flow, and technology compatibility all need to be overcome.

### Solar power

Farmers and growers own or host about 70% of UK solar power – over 1,200 solar farms and more than 19,000 solar rooftops[4].

### Bioenergy

Bioenergy contributed 4.4% of Scotland's energy demand in 2016[5].

BANK OF SCOTLAND

## Short term solutions to reduce emissions

### Reduce farm energy use and implement energy-efficiency technology

- Appraise energy demand and consumption needs across the farm business to pinpoint risk areas and prioritise which energy efficiency can be implemented.
- Sub sector energy efficiency optimisation options:
  - Livestock – motion sensor LED lighting, variable speed vacuum pumps/drives, and heat recovery systems to conserve energy.
  - Arable – focusing on crop storage and drying and reducing fuel use from machinery.
  - Horticulture – focusing on thermal screens (to retain heat), low power fans, and space heating.

### Install renewable energy and heat technology

- Explore grid connection and smart energy management options to feed energy to/from the grid.
- Invest in cost-effective solar and wind technology. A 100kW scheme is likely to cost £120K and will payback in approximately 9-15 years.
- Install renewable heat technologies such as ground source heat and air source heat, and biomass boiler systems. A 70kW scheme is likely to cost £80K and will payback in approximately 5 - 7 years.

Farmers and growers own or host about 70% of UK solar power – over 1,200 solar farms and more than 19,000 solar rooftops[4].

## Longer term investments

### Install bioenergy technology

- Explore grid connection and smart energy management options to feed energy to/from the grid.
- Invest in bioenergy solutions including anaerobic digestion to avoid use of fossil fuels. A small-scale scheme (c. 45-50kW) is likely to cost £250-300K and payback between 9-13 years. A larger 250kW scheme is likely to cost around £1 million and payback around 7-10 years.
- Maximise available resources including livestock manures/slurries, wood and appropriate energy crops.
- Consider the installation of on farm battery storage to assist in meeting energy demands and supply control.

In 2018, agricultural land provided 94,000 hectares of land for bioenergy crops[6].

### Carbon capture through biomass planting

Bioenergy provides around 7% of UK primary energy demand[7]. The growth of the bioenergy sector can provide two key benefits to deliver net zero:

1. Its growth removes carbon dioxide from the atmosphere and stores it for long periods of time in soils, trees and other plants.
2. When managed and harvested in a sustainable way, bioenergy crops can also be used to reduce fossil fuels emissions to the atmosphere by directly displacing oil, coals and natural gas.

Increasing the hectarage of bioenergy crops can benefit the capture and storage of carbon in the soil but effective supply chains, local markets and energy crop management is needed to negate risks[8]. Achieving these higher levels of afforestation could remove around 5% of current UK emissions.



**bankofscotland.co.uk/sustainable-agriculture**

**To find out how we can help your business, please speak to your relationship manager.**

Please contact us if you would like this information in an alternative format such as Braille, large print or audio.

Bank of Scotland plc Registered Office: The Mound, Edinburgh EH1 1YZ. Registered in Scotland no. SC327000.

References
1. Defra. Farming statistics -Diversification and Renewable Energy Production on Farms in England 2010. Published online 2013. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/226310/structure-diversification2010-02aug13.pdf
2. NFU. Achieving net zero: Farming's 2040 goal. Published online 2019. https://www.nfuonline.com/nfu-online/business/regulation/achieving-net-zero-farmings-2040-goal/
3. The Carbon Trust. Agriculture and Horticulture - Sector overview. Published online 2012. https://www.carbontrust.com/media/39180/ctv009_agriculture_and_horticulture.pdf
4. Countryside Online. What is renewable energy and how do farms help produce it? Published online 2019. https://www.countrysideonline.co.uk/food-and-farming/protecting-the-environment/what-is-renewable-energy-and-how-do-farmers-help-to-produce-it/
5. Bates J. The potential contribution of bioenergy to Scotland's energy system. Published online 2019. https://www.climatexchange.org.uk/media/3609/the-potential-contribution-of-bioenergy-to-scotland-s-energy-system.pdf
6. Defra. Crops grown for bioenergy in the UK: 2018. Published online 2019. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/856695/nonfood-statsnotice2018-08jan20.pdf
7. CCC. Biomass in a low-carbon economy. Published online 2018. https://www.theccc.org.uk/publication/biomass-in-a-low-carbon-economy/
8. NNFCC. Anaerobic digestion deployment in the United Kingdom. Published online 2019. https://www.nnfcc.co.uk/publications/report-anaerobic-digestion-deployment-in-the-uk

BANK OF SCOTLAND

SUSAGRRNW_BOS_0620