

Working towards net zero carbon emissions

How do we reduce emissions from dairy ?



Practical Guide

The dairy sector has a key role to play in reducing greenhouse gas (GHG) emissions from agriculture, helping Scotland work towards net zero carbon emissions by 2045. Increasing production efficiency by producing more milk from fewer and more targeted inputs will lead to less emissions per litre of milk output. There is also a corresponding reduction in the cost of production per litre of milk sold.



Farming practices that focus on nutrient management for maximising soil health and productivity will also help lock carbon into the farm, helping to offset emissions. While reducing GHG emissions is a challenge, there are clear opportunities within all dairy farms and financial benefits for the business.



This practical guide suggests some ideas to improve efficiency and profitability, while reducing the carbon footprint of the dairy enterprise.

So what practical measures can we consider?

There are a number of actions that could be implemented or adapted to suit different dairy farming systems to reduce environmental impact and improve production efficiency. General areas to target include:

- ✓ **Herd health and disease management** - to ensure the whole herd is as healthy as possible. A healthy herd is a productive herd and more efficient at producing milk.
- ✓ **Nutrition and feeding management** – well balanced rations to optimise performance and feed conversion efficiency.
- ✓ **Age at first calving** – calving earlier at the target 22-24 months helps offset GHG emissions with earlier milk production.
- ✓ **Breeding and fertility management** – getting cows back in calf before 100 days to maximise litres of milk sold annually.
- ✓ **Nutrient management** – appropriate and timely application of manure and fertiliser can save on costs and lower GHG losses.
- ✓ **Grassland management** – improved grazing and pasture management to maximise nutritional quality of grass and silage to drive more milk from forage.
- ✓ **Investing in soil health** – as well as improving grass yields, healthy soils can help extend the grazing season.



Some of these topics are covered in more detail in other practical guides, with some examples discussed overleaf:

This practical guide is part of a series looking at steps you can consider to reduce emissions whilst maintaining a profitable farm business. For more information, tips and ideas and to read what other farmers have done, visit www.farmingforabetterclimate.org. Find us on [Facebook](#) and follow us on [Twitter](#) @SACFarm4Climate.

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How do we reduce emissions from dairy?

Practical ideas to consider

While most farmers have no control over milk price, they can control how efficient their dairy enterprise is and can take measures to reduce emissions and improve profit. Even farms that are already technically efficient can make improvements, with lower GHG emissions being positively correlated with profit, as shown by our Climate Change Focus Farms.

Example efficiency measure 1 – Age at first calving

The target age at first calving is 22-24 months for optimal fertility and lifetime milk production, helping to pay back rearing costs quicker. Lowering the age at first calving, as well as the herds' replacement rate, means less heifers are required to maintain herd size and less non-productive animals need to be kept. The use of sexed semen will also improve output as more animals can be bred to beef. The genetics and therefore productivity of the herd should also improve as the most fertile and genetically superior animals are bred to sexed semen.

Example efficiency measure 2 – Milk from forage

Increasing the amount of milk produced from forage will help reduce bought in feed costs. Focus on improving forage quality through measures to improve soil health, with better drainage and less compaction. Use of newer grass varieties will also benefit grass crop quality without compromising yield. Cutting grass earlier is also a key part of increasing the nutritional value of silage. An improvement in silage energy content by 0.5MJ/kg DM will equate to an extra 1 litre of milk/cow/day from forage (depending on how much silage is fed) and a saving of 90kg concentrate per cow over a six-month period for the same level of milk output.

Example efficiency measure 3 – Lighting

Replacing fluorescent lights with LED lights can reduce energy costs and increase milk output. LED lighting is of superior quality, being more similar to natural daylight which benefits cow wellbeing and can increase milk yields by up to 8% (research by Michigan State University). They also require less maintenance and use up to 70% less energy than conventional lighting. As they do not emit UV light, they do not attract flies, helping to reduce irritation to cows.

Next steps?

- ✓ Get to know your farm's carbon footprint with a carbon audit. This allows you to benchmark your dairy farm against other similar businesses to see how you compare and highlight areas to improve efficiency and where savings on inputs can be made.
- ✓ Look at the practical guides in this series on the Farming For a Better Climate webpages which provide more specific information in areas such as nutrition, fertility and herd management on the FFBC webpages. The case studies provide ideas on what you could do differently to benefit your farm and reduce GHG emissions.
- ✓ Review your carbon footprint every year and produce an action plan for areas to target based on key performance indicators, with the aim of moving towards a lower cost system with a lower carbon footprint. This helps demonstrate that the business is contributing towards Scotland's climate change goals, something that will be looked on favourably by milk buyers, lenders and consumers.

What are the main emissions from farms and where do they come from?

The three GHG emissions of concern from livestock farms include:

Carbon dioxide (CO₂) from power and fuel use (e.g. tractor operations, shed lighting and milk cooling equipment).

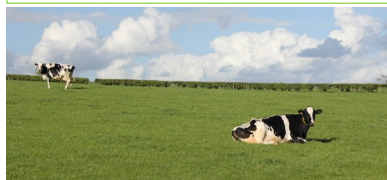
Methane (CH₄) from enteric fermentation in the rumen and released from stored manures. A dairy cow can produce up to 650 litres of CH₄ a day!

Nitrous oxide (N₂O) released from soils, manures and other fertilisers.

CH₄ and N₂O are 25 and 298 times more potent than CO₂ respectively, and steps to reduce their emissions can positively impact on climate change. Locking more carbon into the soil can also have an impact and is called *carbon sequestration*. This can be achieved by changing land use e.g. converting arable into grassland and planting trees to improve soil structure and organic matter content.

Find out more in our

[Practical Guide: Green House Gas Emissions](#)



Carbon footprinting

A carbon footprint (CFP) highlights GHG emissions across the business and can benchmark performance against similar enterprises, indicating where emissions are high. This may reflect poor utilisation of costly inputs. Reducing the CFP not only benefits the environment but usually results in cost savings as well, making the business more profitable. Agrecalc is the CFP tool developed by SAC Consulting and is free to farmers. Find out more at www.agrecalc.com/