

Factsheet – Energy Efficiency & Rooftop Solar PV

This factsheet is part of a series that examines factors influencing the sustainability of the dairy industry. We look at how installing solar photovoltaic (PV) systems, alongside energy efficiency measures, can offer significant advantages including cost savings on energy bills, enhanced business resilience against supply shocks, and a reduced carbon footprint.

What are the advantages to installing renewables on my farm?

As energy prices are set to stay high for some time, the business case for installing small scale renewables on farm, alongside energy efficiency measures, has never been stronger, even without subsidies. It will also reduce your carbon footprint.

Agricultural and horticultural barns, sheds and stores with a south-east or south-west aspect present ideal platforms for solar PV, which is the most widely and easily applicable form of on-farm electricity generation. Small to medium sized roof-mounted systems offer significantly **more than 10% simple return** on capital, as the cost of the equipment has fallen over recent years while electricity prices have soared. Solar panels can supply power to the farm or, if feasible, sell surplus energy to the grid. Unlike wind turbines and anaerobic digester plants, most rooftop solar PV installations do not require planning consent since they are allowed under Permitted Development Rights.

Finance is readily available as solar is regarded as fairly low-risk by banks and accessible for secured-loan borrowing. Costs of commercial solar PV installations have fallen to about £800-1000 per kilowatt. Electricity transformers or grid connections may add an extra 5-20% to these costs. In some cases, adding battery storage may be cost effective to better match electricity generation to usage.

Task: Run an audit on your energy usage to identify where and how much energy you are using. A typical electricity bill for running vacuum pumps, chilling milk and heating washdown water may have increased from £400/month to £1000/month. Contact NFU Energy's 'Renewable Energy Solutions' team or your own trusted contractor to carry out an energy efficiency/solar PV feasibility assessment for your site.

Example:

Target = reduction on total energy bills

Key Performance Indicator (KPI) = **% energy bill saving**

KPI - Red 10% Amber 15% Green 20% Blue 25%

Benefit For a medium-sized dairy unit, a 50 kilowatt solar array on a 300-350sq m shed, costing between £40,000 and £55,000, could save as much as £10-13,000/year at today's prices, guarding against supply side shocks and increasing business resilience.

The sustainability benefit is an enhanced degree of self-sufficiency and a significant reduction in your carbon footprint, saving 4.4 tonnes CO₂/year if the entire output of 50 kW solar PV (est. 100 gCO₂/kWh) replaces grid electricity (est. 200 gCO₂/kWh).

Savings through energy efficiency may show the highest rate of return on investment, such as making adjustments to business practices or minor changes to lighting, sensors and controls. More costly upgrading of heaters, heat exchangers, fans and insulation to the latest standards is still likely to achieve better than a 4-year payback time.

Numerous studies suggest that on average UK dairy farms consume electricity equivalent to around 1 kWh/cow/day over the course of a year, so a herd of median UK size (120 head) uses 43,800 kWh/year – coincidentally, this is the annual output expected from 50 kW of rooftop solar PV under typical UK conditions. Larger dairy farms are therefore reasonably likely to consume all their self-generated electricity from an installation of this size, achieving the maximum return suggested here.

Funding

There is a limited range of Government support measures for small scale on-farm renewables and energy efficiency, but today's attractive payback times should enable finance from banks and non-traditional lenders. Defra's 2024 'Improving Farm Productivity' grant scheme (Round 2) included 25% funding towards rooftop solar PV systems and ancillary connection equipment, and a similar level of support was available for solar PV on buildings funded under the Calf Housing for Health and Welfare scheme.

Case study

<https://www.nfuenergy.co.uk/case-study/energy-efficiency-farms-energy-audits-and-renewable-energy-assessments>

Where to go for more information

- NFU Energy's Renewable Energy Solutions gives you one-stop-shop access to leading installers, finance, and insurance - <https://www.nfuenergy.co.uk/services/renewable-energy-solutions-generate-your-own>
- Scotland's Farm Advisory Service provide useful advice about reducing energy bills - www.fas.scot/downloads/reducing-your-energy-bills-on-farm-a-practical-guide/
- The Carbon Trust have produced an energy efficiency guide for agriculture - <https://www.carbontrust.com/our-work-and-impact/guides-reports-and-tools/energy-efficiency-guide-agriculture>
- AHDB provide energy efficiency advice for dairy farmers - <https://ahdb.org.uk/knowledge-library/improving-energy-efficiency-on-dairy-farms>

The Dairy Roadmap

The Dairy Roadmap aims to improve the environmental sustainability of the UK dairy sector whilst ensuring the continued prosperity of the industry, and the provision of safe, affordable, nutritious and sustainable produce for years to come.

The Dairy Roadmap is brought to you by:

