

Introduction to Energy Auditing

Practical Guide



Each litre of diesel consumed releases around 2.675 kg of CO₂ into the atmosphere. Similarly, each kWh of electricity recorded on the farm meter results in 0.181 kg of CO₂.

Savings of 10% - 20% can often be achieved through simple actions. By following a step by step approach, an energy audit can help to identify a range of CO₂ savings and reduce energy and fuel bills.

Quantify existing energy usage:

In order to target savings you need to know where energy is being used:

- Keep records of fuel and electricity usage.
- Install additional meters to provide usage data for individual buildings or pieces of equipment.
- Match fuel use to equipment and task.

Benchmark:

- Calculate usage per livestock unit or per tonne of grain or hectare of land or litre of milk and compare with industry standard figures.

Identify savings and actions:

- Involve farm staff - identify 'Energy Champions.'
- Consider working practices as well as equipment efficiency.
- Prioritise energy saving options.

Implement:

- Zero and low cost options can be implemented immediately.
- Plan forward where investment in capital or time is required.

Monitor:

- Continue to monitor and review progress regularly.
- Assess new and emerging options that may benefit you.

This Practical Guide highlights how to assess and optimize farm energy and fuel use.

Top Tips for EVERY farm . . .

A good starting point is to carry out an energy walk round:

- Ask farm staff to help to identify where energy is being wasted.
- Increase awareness of energy issues.
- Identify your most likely areas for savings - see the list of typical wastage situations overleaf.
- Identify repair or maintenance work that will reduce energy costs.
- Identify where there is a need for capital investment to reduce energy costs - "spend to save."

Repeat "walk round" at different times of day and different times of year.

Our Practical Guides cover five useful topics:

1. Use energy and fuels efficiently
2. Renewable energy
3. Lock carbon into soils and vegetation
4. Making the best use of nutrients
5. Optimise livestock management

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www.farmingforabetterclimate.org

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www.ipcc.ch

www.soilassociation.org

www.energysavingtrust.org.uk

www.carbontrust.co.uk

www.agrecalc.com

www.fas.scot/energy/



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Did you know?

A 10% reduction in the consumption of fuel & electricity on Scotland's farms would result in 48,000 tonnes less CO₂ being released as well as reducing fuel and energy bills by 10%.



Typical Energy Figures

- On average, an arable unit of 150 ha will use 10,500 kWh of electricity and 8500 litres of diesel purely to dry grain even in a relatively dry year. This equates to around 24 tonnes of CO₂.
- On average, a 100 cow dairy will use 30,000 kWh of electricity annually, resulting in the release of 3.5 tonnes of CO₂.
- On average, a pig unit will use 36 kWh of electricity per pig (from farrowing through to finishing) – 4.212 kg of CO₂.

For each of these enterprise types the least efficient farms will use up to half as much energy again. **The most efficient will use 50% to 75% of the typical usage.**

Where to look for savings

Buildings

- Where buildings are heated or cooled it is important to ensure that air leakage is kept to a minimum. **Drafts should be eliminated** by sealing up gaps. Automatic door closers or strip curtains should be considered for frequently used openings.
- Heating and refrigeration systems should be regularly **serviced to maintain efficiency**. Setting and function of controllers should be regularly checked to prevent over heating or cooling.
- Recirculation of air within a building should be considered to redistribute heat to where it is needed.

Lighting

- Compact fluorescent bulbs will use **80% less energy** than conventional bulbs LED lighting is even more efficient and can have a very long lifespan.
- High intensity discharge lamps will use much less energy than incandescent lamps for lighting large areas. LED lighting is again the most efficient solution and there are a range of design options available.

Motors, fans and pumps

- Motors, especially those driving fans and pumps, often don't need to run at full speed all of the time. Fitting **variable speed drives** can result in substantial savings for motors that run for long hours.

Vehicles

Fuel performance of vehicles will be influenced by the following factors:

- tyre pressures, lubricant levels.
- regular maintenance.
- correct matching of tractors and equipment.
- equipment set-up.
- driver training.

Energy waste 'hot-spots'

- Poorly matched tractors and implements.
- Heating or cooling of poorly insulated buildings.
- Badly maintained vehicles and equipment.
- Incorrectly set controls for heaters and refrigeration plant.
- Failure to turn off lighting, heaters, fans etc due to careless working practices.
- Inefficient, outdated lighting.
- Poorly insulated hot water tanks and service pipes.
- Double handling of produce.
- Over-drying of grain.
- Leakage in compressed air or vacuum systems.
- Dirty grilles, ducts and fans in ventilation systems causing unnecessary back pressure.