

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 0.117 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 ha of land or litre of milk and compare with industry standard figures

Identify savings and actions:

- Involve 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

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 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 times of year.



There are five sets of Practical Guides covering :

Use energy and fuels efficiently

Develop renewable energy

Lock carbon into soils and vegetation

Optimise the application of fertilisers and manures

Optimise livestock management and the storage of manure and slurry

Find further information, including links to other Practical Guides and Case Studies, at

www.farmingforabetterclimate.org



Funded by the Scottish Government as part of their Climate Change Advisory Activity

Websites

www.farmingforabetterclimate.org

www.farmingfutures.org.uk

www.dairyco.org.uk

www.ipcc.ch

www.soilassociation.org.uk

www.renewableenergyonfarms.co.uk

www.agrecalc.com

www.calu.bangor.ac.uk/energybooklet.php.en

www.energysavingtrust.org.uk

www.carbontrust.co.uk



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Riaghaltas na h-Alba

Introduction to Energy Auditing

Key fact:

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 and should be used where lights are regularly switched on for more than a few minutes.

High intensity discharge lamps will use much less energy than

incandescent lamps for lighting large areas.

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.

Bill

Emergencies Call free on 0800 000 000 24 hours a day 7 days a week.

Any questions? Call us on 0800 096 9696

Account number 441 234 567 8910

ESTIMATED Electricity bill

Please pay **£76.82**

Payment to be made within 14 days.

THIS IS AN ESTIMATED BILL

Page 1 of 2
1 March 2005

Estimated bill	£63.61
Payment to date	£65.00
Estimated bill total	£1.61
Account balance	£1.39
Electricity charges	£74.48
VAT @ 5%	£3.73
Total	£78.21

Details of electricity charges THIS BILL IS ESTIMATED. PLEASE SEE ABOVE.

Meter number	00000 on Standard Credit tariff	unit	price	charges
Electricity used	4412345678910	25378	1232	£19.29
Standing charge	£11.14	£11.14	£11.14	£11.14
Total electricity charges for this meter				£74.48

Payment Slip: 4412345678910, 543 8003, £76.82

Signature: J. J., date: 6332060017000011900342

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