

DAIRY FARM ENERGY

Introduction

Farm businesses are under increasing pressure to become more energy efficient. Milk cooling, water heating and vacuum pumps amount for the biggest proportion of energy use on dairy farms. It is these areas that offer scope for the greatest savings. Each of these

three areas accounts for 20-30% of electricity consumption on a typical farm. There is a massive range in total energy use (electric and fuel) across farms. Electricity costs vary from €15-€45 per cow per year. The variation is due to many factors, from fuel use to the

proportion of the more expensive day tariff (normally 9.00am until midnight) electricity used, and the unit cost. With profit margins under pressure, there is an urgent need to review all business costs, including electricity and diesel.

Cutting costs

The first step any farmer can take to improve efficiency is to identify the main consumers of electricity. Record consumption, collect data from bills, read meters regularly or install a smart meter. Next ensure that the business is on the best tariff and maximise the use of off-peak electricity. Basic measures such as using timer switches, lagging pipes (hot and cold) and water tanks, replacing halogen floodlights with sodium lights, and ensuring that equipment such as condensers are clean and well maintained, also make a big difference. Condenser maintenance is a common problem. Half an hour spent cleaning condensers with a low-pressure hose and a soft brush will pay off instantly. Make sure condensers are well located to avoid recirculating warm exhaust air. Installing energy-efficient equipment such as bulk tanks, variable drive vacuum pumps, or heat recovery



Analyse your energy costs to see where savings can be made.

units can make a big difference to energy use. However, the high capital costs often mean that the scale of energy savings is unlikely to warrant replacement. Working out the simple payback for energy efficiency projects is a good way to prioritise cost-saving measures. Electricity only accounts for 4% of the variable cost of producing milk (about €0.05 cent per litre). This needs to be kept in context before investing heavily in new equipment. At present, the Department of Agriculture, Food and the

Marine (DAFM)-funded Targeted Agricultural Modernisation Scheme (TAMS) is in operation and will cover 40% of the cost of many upgrades, including new milk cooling tanks and compressors, plate coolers, water heaters and heat recovery units. Up to 60% of the cost will be covered for young farmers. For more information on this Scheme consult the website of the DAFM at: <https://www.agriculture.gov.ie/farmerschemes/payments/tams/tamsiidairyequipmentscheme/>.

05: DAIRY FARM ENERGY

Breakdown of energy consumption

Costs of electricity on Irish dairy farms:

- Average costs are €5 per 1,000 litres of milk produced – there is large variation in energy costs on dairy farms from €2.60 to €8.70 per 1,000 litres of milk, or from €1,500 to €4,500 on a 100-cow farm;
- the main drivers of energy consumption on dairy farms are milk cooling (31%), the milking machine (20%), and water heating (23%); and,
- the average farm could save €1,800 per year through a combination of altered management strategies and energy-efficient technology.

Energy audits

Energy audits are an effective tool to reveal areas where savings can be made. These results were obtained from energy audits carried out on 22 commercial dairy farms over 12 months. The average herd size was 118 cows, but the study included farms ranging from 47 to 290 cows. Further results from this study are presented in **Table 1**.

Table 1: Results from an energy efficiency audit of 22 dairy farms.

	Percentage consumed Wh per litre ¹	Cost of electricity €c/kWh ²	Percentage day tariff ³
Milk cooling	13.02	0.16	60
Water heating	9.83	0.11	45
Milking	8.44	0.11	71
Lighting	1.37	0.02	89
Other	7.54	0.10	69
Pumping	2.13	0.03	38
Total	42.34	0.51	62

¹ Wh/L = watt hours/litre. ² €c/L = Euro cent per litre of milk. ³ Percentage of electricity consumed from 9.00am to 12 midnight.

Calculate your energy costs

A simple calculation can be made to approximate on-farm electricity costs. Firstly, add up the total electricity charges over a year excluding standing charges, VAT and Public Service Obligation (PSO) levy, these figures can be found on the electricity bill. Multiply by 100 to convert from Euro to cents. Next, add up the total number of litres of milk sold to the processor over the same period. Dividing the electricity cost in cents by the number of litres

will give the cost in cent per litre. The average three-bedroom house in Ireland uses approximately 5,000 units of electricity per year; this could be deducted to account for domestic usage if the dwelling house is on the same meter as the farm. Checking your pricing and tariff structure against the best available rates can also yield significant savings. This can be done using a pricing comparison website such as www.bonkers.ie. All you need is

information about your present tariff, annual usage, and night rate usage in order to make comparisons and calculate possible savings. If you decide to switch suppliers it is important to read the small print. Check the standing charges and termination charges. For further information see the Teagasc Dairy Farm Infrastructure Workbook: <https://www.teagasc.ie/publications/2019/dairy-farm-infrastructure-workbook.php>.

Table 2: Energy-saving investments, possible savings and payback period. Figures excluding grand aid or capital allowances.

Action	Cost of action	Annual saving	Simple payback
Move to cheapest supplier	None	€500	Immediate
Milk pre-cooling (installing a plate cooler)	€3,200	€1,000	Three years
Install night rate electricity	None	€1,000	Immediate
Synchronise water heater with night rate	€50	€170	<1 year
Variable speed drive (VSD) on the vacuum pumps	€3,300	€460	7 years
Solar thermal heating	€4,000	€350	>10 years
Heat recovery system (in addition to pre-cooling)	€3,500	€500	7 years
Micro photovoltaic system	€6,000	€700	8.5 years
Wind turbine	€25,000	€800	>30 years

Further information

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 The following resource is also helpful:
 🌐 www.seai.ie

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