

# Small footprint equa ls big savings

Reduce your herd's energy usage and cut costs

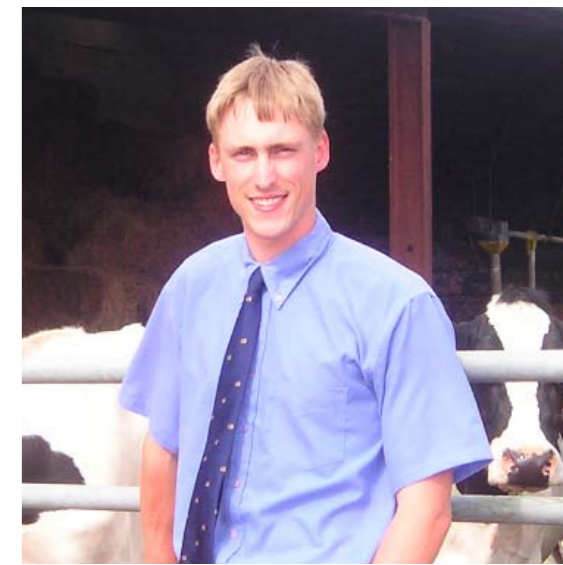
Caring for the environment can have a positive financial impact on your business. We outline a few easy steps, as well as a more adventurous one, that producers can take to reduce their herd's energy usage and carbon footprint – and boost their bank balance.

Reducing your herd's carbon footprint doesn't mean investing in expensive, high-tech equipment or being extremely 'green'. There are several things that all dairy units can do with little or no additional cost. And, most importantly, they could actually save you money, according to Kingshay's technical manager Martin Yeates. "In order to reduce your herd's 'carbon footprint' you need to get a handle on your unit's carbon inputs," says Dr Yeates. "And one of the key inputs is electricity."

A typical dairy unit, with say 150 cows producing 7,500 litres of milk per year, will use 60,000 units of electricity per year at a cost of around £5,500. However this can range, for very similar farms, from less than 50,000 units to more than 75,000 units per year – a cost difference of more than £2,000. "This difference shows the potential for cost and environmental savings on dairy units," says Dr Yeates.

The first thing to do is to look at your

*Water heating accounts for a third of total electricity usage*



Martin Yeates: "You can do your bit for the environment and save a few quid"

current annual electricity usage. "Is it good, bad or average? Do you know? Look at your electricity bills for the past couple of years and determine average annual usage. Ensure they are actual usages and not estimates." Producers can plot the total annual electricity units used against annual litres of milk produced using Figure 1. Below the line and your unit is not using

*If you can find the capital, it may well be well worth investing in a digester*

## Digester will cut costs and emissions – and boost income



Stephen and Catherine Temple: "The digester will save us thousands of pounds in costs each year"

One Norfolk-based herd is taking measures to reduce heating costs and generate electricity a step further. Stephen and Catherine Temple, who process 25% of the milk from their 107-cow herd into award-winning cheese at Copys Green Farm, in Wighton, are planning to install an electricity generating bio-gas plant. This will make use of all the dirty water, FYM, silage effluent and cheese making by-product whey produced at their 223-hectare unit. They will also grow some maize silage as fuel for the digester.

The 2006 NMR/RABDF Gold Cup finalists, who already generate the power required to heat their domestic heating and hot water, parlour and cheese dairy water, as well as dry grain, using a combination of wood chip and straw burners, are now set to invest in a digester. This will not only provide enough electricity for their own use, but also that of the 230 or so homes in the nearby village. Stephen has always wanted to build a

bio-gas plant at the unit – he built a small one while living in Africa several years ago.

The digester works by breaking down organic material and producing gas – a little like a giant cow's stomach is how Stephen describes it. Anything that goes into or out of a cow can be used as fuel.

After a fact-finding trip to farms in Austria and Germany, where there are already many bio-gas producing digesters up and running, Stephen and Catherine looked at the possibility of building one on their unit.

"The figures stacked up and the plant will fit in perfectly with the scale of our unit and still be large enough to generate enough power – about 140kW – to export to the grid," says Stephen.

The digester will also produce the same amount of heat as it will electricity and this heat can be used to heat water.

"If our application for planning permission is successful, the digester could be up and running and plugged

into the grid by the end of the year," says Stephen, who is very excited about the project.

"The villagers are enthusiastic too – they've seen a draft proposal for the digester and are keen on the idea of their electricity coming from a sustainable source."

Another benefit for the villagers and the Temples is that there will be no smell from annual dirty water spreading, which has been a problem in the past depending on wind direction.

"The digester is totally sealed – no gases or smells can escape. Methane gas is not being released into the atmosphere – we'll be harnessing it and not simply reducing emissions at the unit.

Stephen says he will save thousands of pounds in electricity and water heating costs each year and that he should also make money from the digester as surplus electricity generated will be sold to the National Grid.

He's currently talking to EDF Energy to

ensure that the grid can handle the power that his bio-gas plant produces.

The 660-cubic metre bio-gas digester will cost around £700,000 to install and should pay for itself in seven or eight years. "After that we'll actually be making money from the waste products on our farm and at absolutely no further cost to the environment," explains Stephen.

"It's not the sort of capital that everyone can get their hands on, but if you could it would be well worth investing in something like this."

Stephen knows of another UK-based producer who's investing in a much larger digester and is positioned close to a main road, allowing them to take bio-waste from other off-farm sources. "This has the potential to be a real money spinner, though obviously taking waste from elsewhere will require additional paper work and more stringent rules and regulations.

"We won't be looking to work on that

scale – that's not what our project is about. We want to cut emissions from our unit, reduce the carbon footprint of our herd and business, conserve nutrients and save money," he says. "We'll do all that and we'll also generate another source of income from our waste in the longer term."

One of the existing energy generating burners at the Temple's unit



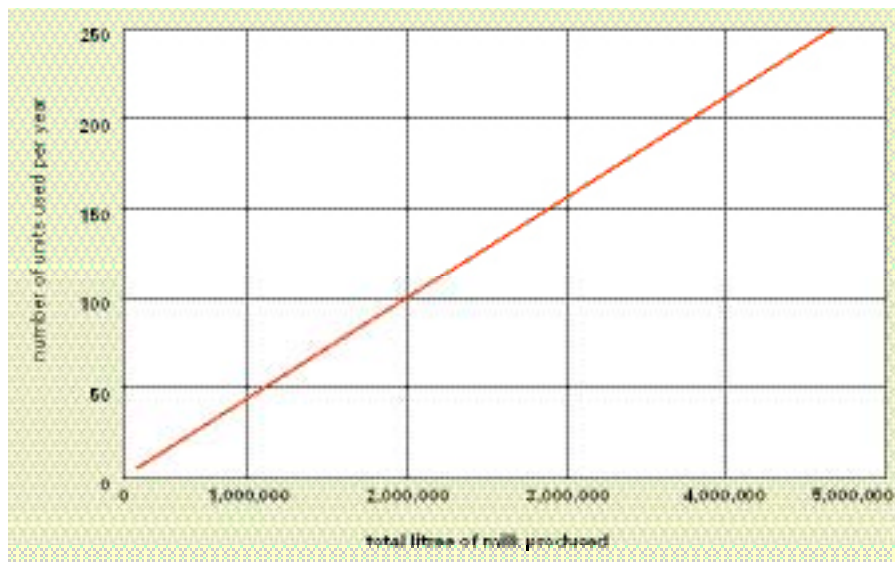


Figure 1: Litres of milk produced per unit of electricity

excessive amounts of electricity. If it's above the line then you need to investigate why.

### Milk cooling

"If your usage is more than expected for your unit's size then the important areas to tackle are the areas using most – typically water heating and milk cooling.

"Water heating accounts for around a third of total usage," says Dr Yeates. "Hot water is essential for clean milk production, but heating it can use more or less electricity depending on how the dairy is set up."

He adds that producers should check that water is heated to the correct temperature because overheating will

increase power usage and costs – just an additional 1°C can add 15% to costs. "And check insulation. Poor insulation on tanks and water pipes will lose heat and require more electricity – poorly lagged tanks can lose 50% of their heat."

Milk cooling accounts for another third of total electricity usage.

Plate coolers are the key to reducing costs, so check that yours is working efficiently. As long as you reuse the water, it is free cooling. What temperature is the milk coming through the plate cooler at? A single-stage plate cooler should reduce the milk temperature to below 20°C, but a two-stage cooler, using mains and ice bank water, should get the milk temperature down to below 5°C. "Check this by looking at the bulk

tank milk temperature shortly after the start of milking.

### Plate coolers

"For the plate cooler to run efficiently you need at least as much water as milk going through the tank – ideally twice as much. So if you sell 5,000 litres of milk per day you need to be re-using more than 2,500 litres of warm water from the plate cooler at each milking. Check that this is happening on your unit," says Dr Yeates.

Lighting is another area where substantial savings can be made. Replacing five tungsten halogen lamps for equally bright high-pressure sodium fittings will save around £2,000 in running costs for 10,000 hours of running each light. "This is due to a marked increase in efficiency of sodium lamps over halogen lamps, which mostly produce heat and fry moths," says Dr Yeates.

### Simple changes

Finally, make all the use you can of time switches to make sure water is hot when you need it and not when you don't and that lights are not left on and energy wasted.

"Reducing the carbon foot print of your herd and reducing costs can go hand in hand," explains Dr Yeates. "Simple changes can often reap huge rewards. That way you can do your bit for the environment while saving your business a few quid."

Rachael Porter

Milk cooling and parlour washing account for a considerable amount of electricity usage, so take a closer look to see if you make any savings

