Improving energy efficiency on the dairy farm

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Steep rises in electricity costs in the last year have brought energy efficiency into sharp focus for all dairy farmers.

There are a number of things that can be done to reduce electricity usage. With kWh prices rising, making investments in efficiency are more attractive as payback timescales shorten. However, there are also measures that can be taken that will make the best of what you have.

Milk cooling, water heating and the milking process itself are the most energy intensive activities on a dairy farm, so it is important that they are done efficiently.

Milk cooling

Is your refrigerant topped up?

Leaks can occur which can lead to the refrigeration system running for longer to bring the milk down to the required temperature.

Are your refrigerant pipes insulated?

Over time, degradation of pipe insulation can occur. Make sure this is included in an annual service

Is your condenser coil clean and in the right place?

Condenser coils will not work well if clogged with dust. Keep them clean. Make sure they are in a well ventilated position, out of direct sunlight.

Is your condenser fan running for the right length of time?

If the fan doesn't run long enough, cooling will take longer. If it runs for too long, it will be using more electricity than is needed. Check that the pressure switch controlling the fan the set correctly, at service.

Is your plate cooler up to the job?

Use of a plate cooler can greatly reduce the need for further milk cooling by the refrigeration system. Make sure solenoids are working properly. If milk exiting the cooler is at greater than 22^{o}C, something could be wrong. Check that water pipes leading to

and from the cooler are of adequate diameter and that the cooler is big enough to cope with your milk pump at full capacity.

Can your tank be filled from the bottom?

Many modern tanks are bottom filled. This means that milk entering the tank passes through the already cooled milk in the tank. Check to see if your tank can have this system retrofitted

Water heating

Are your pipes and tanks properly insulated?

Paying to heat water for it to cool down before it is used highly inefficient. Check insulation from time to time.

Can you use a night time tariff to heat water?

Check with your supplier to see if this would be advantageous. Change immersion heater timers accordingly. It may be worth installing a larger tank to take full advantage, which would also have the efficiency of a greater thermal mass.

Can you use a heat recovery system?

These systems use heat produced by the refrigeration system to heat water. This can be up to 60^{0}C. This reduces the need for further use of the immersion heater and makes the refrigeration system more efficient.

Milking process

Can variable rate vacuum pumps be used?

These pumps will produce vacuum when needed, rather than constantly. Purpose built variable rate pumps are usually lobe pump, but vane pumps can be adapted to variable rate, but with lower energy savings.

Can variable rate milk pumps be used?

These pumps will run at a slower rate when there is less milk in the milk receiver but can speed up when necessary. This reduces energy usage and allows the plate cooler to work more efficiently, helping the refrigeration system.

What else can be done to speed up milking times?

With shorter milking times, the less electricity will be used. Can cow flow be improved? Is the parlour being tested and serviced regularly so that it is running at its highest efficiency?

Other measures

Energy audits

An energy audit could identify areas of peak usage in order make changes where they will have the most effect. This can also be achieved by installing individual meters for different processes or pieces of equipment.

Renewables

It is worth considering producing your own electricity. However, reducing usage will mean that a smaller renewable project would be required.

If you have further questions, please contact the FAS helpline for advice and support:
Email: advice@fas.scot

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