

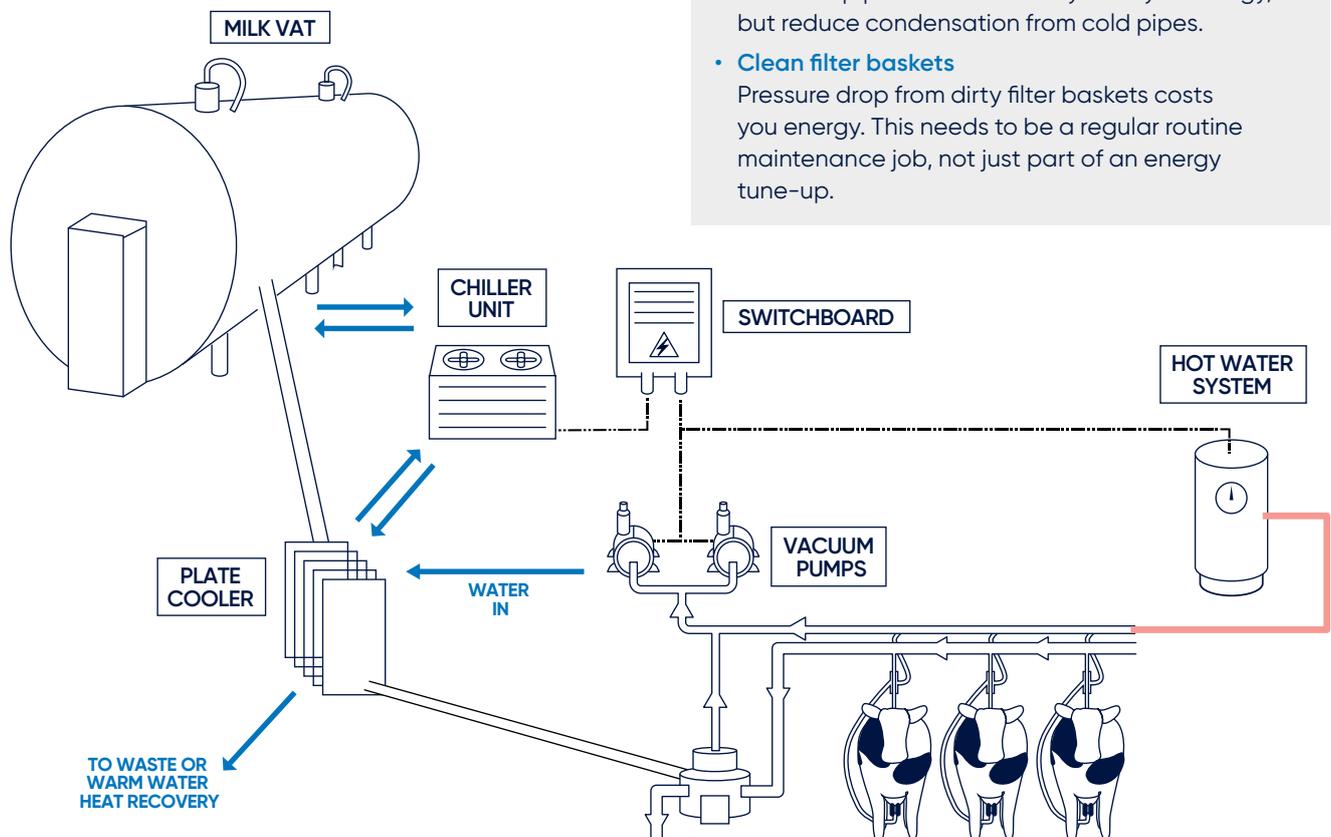
# Dairy shed easy energy tune-up

Just like your car, the dairy shed needs an energy tune-up now and then to keep it efficient.

Investing just two hours per week for four weeks each year will make a noticeable improvement to the efficiency of your dairy shed. Each of these actions in isolation won't result in any significant change, but routinely done together they can result in some really good savings – more than \$500 each year. Over several years this payback is worth the few hours per week.

## EASY ACTIONS FOR SAVINGS

- **Stop the leaks**  
Check for leaking hot water, chilled water, cooling water or compressed air can cost you a lot.
- **Clean condenser coils**  
Get rid of dirt and cobwebs so that the air can run freely across the condenser coils (tip: don't use harsh chemicals for cleaning as this might cause corrosion of the condenser metals).
- **Insulate hot and cold pipes**  
Next time you're at the hardware store, pick up some pipe insulation and cover all your hot and cold pipes – it will not only save you energy, but reduce condensation from cold pipes.
- **Clean filter baskets**  
Pressure drop from dirty filter baskets costs you energy. This needs to be a regular routine maintenance job, not just part of an energy tune-up.



## Electrical metering

Using electricity without a smart meter is a bit like driving without a speedometer. There are quick and easy ways to get started. As step one, you can easily gain insights on your energy use using a smart phone app before working up to more comprehensive solutions. All such monitoring solutions offer a return on investment (ROI) of around 25 per cent.

It would not be unreasonable to expect to spend around 15 per cent of your annual energy bill on a metering solution if you are serious about saving.

### Easy actions to save:

- Download your energy retailer's app to track your electricity use via your smart meter. This will take **less than an hour** to set up and could unlock thousands of dollars in savings by helping you understand how much electricity you are using and when. Importantly, it will also allow you see the improvements from the energy efficiency measures you implement.

### Next-level savings:

- For greater insights and bigger potential savings, install monitoring on your individual electrical circuits to benchmark the energy performance and use of individual pieces of equipment, rather than just your dairy shed as a whole.

This will take around **two hours** to organise and \$1,000 in setup costs. To find suppliers, you can search 'energy visualisation and analytics platform' online.

### Serious savings:

- For larger energy users (>\$50,000 annual electricity bill), investing in an energy audit is recommended. An energy auditor will provide you with a clear assessment of current performance versus what is possible, and the solutions needed to improve.

Ensure the audit report gives recommendations on the suppliers who can install the proposed solutions.

## Chiller cooling systems

Milk cooling accounts for around 20 to 30 per cent of dairy shed electricity use. For every 1°C better your pre-cooler works, you will save around \$300 per year in energy costs (based on a dairy producing two megalitres annually).

### Easy actions to save:

- Insulate chilled water/glycol pipes to prevent cooling losses.
- Look for and fix leaks in the piping system.
- Clean your condenser coils and ensure they are well ventilated (tip: don't use harsh chemicals for cleaning as this might cause corrosion of the condenser metals).

### Next-level savings:

- Many dairy sheds could save more than \$1,000 each year by optimising their pre-cooling systems. Make sure the cooling water flowrate is about 1.5 times the milk flow so that the milk is cooled to within 2°C of the incoming cooling water. You can check this by briefly turning off the chilled water/glycol flowrate and checking the milk temperature going to the vat. See 'Saving energy on dairy farms' booklet for more on checking the pre-cooler.

### Serious savings:

- If you have excess solar production and receive little for the electricity you export to the grid, add in a glycol thermal storage tank – also known as a thermal battery – so you can create cold glycol/chilled water when you have solar PV electricity generating.

This can be used later to cool the milk when solar PV production is low and electricity prices are higher. This requires around 10–20 hours of investigation and around \$50,000 to \$100,000 to install. ROI is dependent on your amount of excess solar PV.



## Water heating

Creating hot water typically accounts for 20 to 30 per cent of dairy shed electricity consumption. Energy efficiency solutions are available to reduce hot water energy costs quickly with potential savings of more than 60 per cent. Please note: If you are using bore water with high hardness or dirty river or dam water, extra precautions are needed to allow for the scaling of heat exchangers.

### Easy actions to save:

- For those on time-of-use electricity tariff structures, ensure any electric hot water system is operating during the time periods with lowest electrical tariffs. If you don't have timers, get them installed the next time your electrician is on-site.

### Next-level savings:

- If using good quality water, heat recovery is a good option for reducing costs. Pre-heat your hot water by installing a brazed plate heat exchanger to cool the refrigerant before the condenser coils on the chiller plant. This requires around two to three hours of investigation and around \$5,000 to \$10,000 for your refrigeration mechanic to install and set up. You should expect to save around 40 per cent of your hot water heating costs and see a payback in three to five years.
- If you have a supply of good quality water, you could switch to a high-efficiency, low-temperature heat pump solution (for heating up to 65°C). This could give hot water energy savings of **up to 50 per cent** with a payback of around five years.

You will need to invest around four to eight hours of investigation and \$10,000 to \$15,000 for equipment costs and installation. If you are using bore water with high hardness or dirty river or dam water, extra precautions and design considerations are needed. To find suppliers, you can search 'dairy farm heat pump' online.

### Serious savings:

- A high efficiency, high-temperature heat pump can heat water to up to 82°C to deliver hot water energy savings of **up to 70 per cent** and a payback of around five years.

You will need to invest around four to eight hours to investigate and \$15,000 to \$20,000 for equipment costs and installation. Again, if you are using bore water with high hardness or dirty river or dam water, extra precautions and design considerations are needed. To find suppliers, you can search 'dairy farm CO<sub>2</sub> air to water heat pump' online.

## Vacuum pumps

Around 10 to 20 per cent of dairy shed energy consumption goes towards the operation of vacuum pumps. However, there are a range of actions to implement for some good savings.

### Easy actions to save:

- Ensure the vacuum pump is turned off when the dairy shed is not in operation.
- If the vacuum pump is oversized, you can change pulleys to reduce the speed and motor load.
- Fix leaks – a hole in the vacuum system could be costing you hundreds of dollars per year.

### Next-level savings:

- Adding in a variable speed drive – so that the motor speed is adjusted to meet the required vacuum – can deliver more than 20 per cent in energy savings for the vacuum pump operation. A typical installation will need around three to four hours of investigation and \$5,000 to \$8,000 for equipment and installation to give a payback between five and 10 years.

### Serious savings:

- Upgrading to a new lobe pump with variable speed drive control included can deliver more than 30 per cent in energy savings for vacuum pump operation. A typical installation will need around three to four hours of investigation and \$10,000 to \$15,000 for equipment and installation to give a payback between five and 10 years.

For more information and resources on how you can save energy use on dairy farms, visit the **Greenhouse Gas Emissions webpage on the Dairy Australia Website.**