

# 2 REFRIGERATION FACT SHEET



## REFRIGERATION IS AN ESSENTIAL COMPONENT OF MANY BUSINESSES THAT CONTRIBUTES GREATLY TO DAILY RUNNING COSTS.

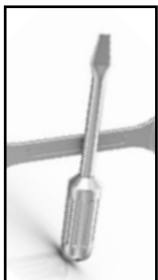
Fortunately many opportunities exist to reduce refrigeration costs from simple measures with minimal costs like checking seals on doors and the better stocking of fridges to large upgrades such as improving cool room insulation and upgrading to more efficient compressors and condensers. There are many benefits to increase the

energy efficiency of refrigeration in your business including reduced energy, operation and maintenance costs, improved safety and productivity as well providing a better work environment for staff. Plus the environment benefits with reduced greenhouse gas emissions from lower electricity and refrigerant gas consumption.



### INSPECT CURRENT SYSTEMS

Regular inspection of refrigeration systems is essential to ensure optimum performance. Identifying early warning signs will save you money later on. Things to look for include: ice build up on evaporators, unusual noises and long cycling compressors, debris on condensers and damaged fans.



### MAINTENANCE

Ensure regular maintenance with a qualified contractor. It is important to regularly service condensers, compressors, evaporators and expansion valves. If the refrigeration system is over 10 years old consider replacement as savings of 30% to 40% can be achieved.



### REFRIGERATION CONTROLS

Digital refrigeration controls allow flexibility in how systems are used. Understanding the controls and your business requirements can allow increased efficiency through better management of the refrigeration system.



### REDUCE COOLING LOAD

To achieve best practice with refrigeration it is a priority to only refrigerate your product, space or process when or where you really need to. Turn units down or off when not needed and set temperatures to the lowest setting possible while still ensuring desired outcomes are met.



### BETTER INSULATION

Limiting heat gain and the loss of refrigerated air can deliver big savings in efficiency improvements. Using plastic strip curtains, air curtains, good quality door seals and avoiding direct sunlight on units can all deliver significant efficiency improvements.



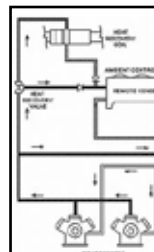
### HOUSEKEEPING

Make sure staff are aware of daily measures to reduce refrigeration costs. Measures include: closing blinds and covers at night, not overstocking shelves, shutting doors and keeping air grilles clear.



### GOOD DESIGN

A poorly designed system will always struggle to work efficiently so it is fundamental that when installing a new system or making significant improvements to an existing one that a high efficiency, well designed refrigeration system is used. Large running costs mean higher up front costs for more efficient equipment are quickly recouped.



### SERVICE PROVIDERS

Having professional advice on how to increase refrigeration efficiency and ensuring systems are well maintained can be invaluable. Ensure providers are well trained, experienced, have a good reputation and are knowledgeable on refrigeration energy efficiency.



**The Ha Ha Bar is a small café/restaurant/** bar located on the shore of Lake Ginninderra in Belconnen. The owner-operator of Ha Ha Bar was conscious of high energy costs and wanted to do all he could to reduce the running cost of his business. After receiving their ACTSmart energy assessment and report the owners of Ha Ha Bar implemented the following recommendations: • Internal refrigerator motors and compressors were moved to a more suitable external location to improve the operating efficiency of their refrigeration units.

• A timing system was installed to shut down non-essential refrigeration during closing hours. • Thermostat settings on the refrigeration were appropriately adjusted reducing energy use. The owners were able to claim a rebate of \$5,000 from ACTSmart to pay for half of the cost of the refrigeration relocation and timer system. *"Savings achieved from implementing the opportunities identified in our ACTSmart report have been significant. We have actually installed some additional equipment (an extra oven) due to our business growing, but our bills are still lower than last year's due to improved efficiency in other areas"*

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## NO COST AND LOW COST SOLUTIONS

**No cost and low cost solutions** are the first steps in saving money with increased energy efficiency. Over time

simple measures can offer significant reductions in the operating costs of equipment over its lifetime.

**CORRECTLY SIZED UNITS** – Overloading fridges or having a fridge too big for its needs will increase the units running costs. Keeping units full also reduces running costs.

**COILS AND DEFROSTING** – Keeping compressor coils clean help the unit run more efficiently as does regular defrosting.

**TEMPERATURE** – Keeping food too warm is unsafe but keeping it too cold can ruin produce, increase energy costs and wastage. Most fridges can be kept between 3 and 5 degrees and freezers at -15 degrees.

## TYPICAL SAVING SOURCES



## INSTALLING A NEW SYSTEM

**Installing a new refrigeration system** is an ideal time to look at increasing efficiency and limiting future running

costs. Higher up front costs for better units can often be quickly recovered through their cheaper running costs.

**DESIRED OUTCOMES** – Be as clear as possible on what needs to be achieved by the new system now and in the future. Can processes and staff behaviour also be improved?

**CONTROLS** – Control systems are essential for maximising the efficiency of a refrigeration system. Controls can be manually programmed or can be automated to respond to many things, including changes in air temperature or times of day.

**LIMIT HEAT GAIN** – This can include unit placement, insulation and efficiency of internal motors. Also important is to limit heat generated from units going into air conditioned spaces.

**CONDENSORS** – Can be air and water cooled or evaporative. Ensure high energy efficiency.

**COMPRESSORS** – Like condensers it is important to get the right unit for the job and to ensure it's a low energy consumer.

**VARIABLE SPEED DRIVES (VSD)** – A control Mechanism that allows variation in the speed of the compressor increasing efficiency. VSD's can greatly reduce running costs.

## GLOSSARY

**CHILLER** – a generic name for a refrigeration package.

**COMPRESSOR** – A machine that compresses refrigerant gas and raises its temperature before sending it to a condenser. The main power consumer in a refrigeration system.

**CONDENSER** – A heat exchanger that cools and condenses refrigerant gas to a liquid.

**COEFFICIENT OF PERFORMANCE (COP)** – A measure of the efficiency of a refrigeration system defined as cooling duty (kW) / input power (kW).

**COOLANT** – Secondary refrigerant used to transfer cooling energy in the refrigeration system.

**COOLING LOAD** – The amount of heat to be removed to keep a refrigerated area within desired limits.

**EVAPORATOR** – A heat exchanger where refrigerant fluid is changed to gas absorbing heat in the process.

**HEAT RECOVERY** – A process of reusing waste refrigeration heat for other purposes to reduce overall all electricity consumption.

**REFRIGERANT** – Fluid that is vaporised and condensed to achieve cooling in the refrigeration system.

## CHECKLIST

**DETERMINE HOW WELL YOUR CURRENT SYSTEM IS PERFORMING** What are the reasons for upgrading and what are you wanting to achieve? Get staff involved.

**AUDIT CURRENT REFRIGERATION** Determine age, capacity and efficiency of current system. Determine usage patterns. Identify what components need to be upgraded.

**DETERMINE UPGRADE OPTIONS** Rank them based on payback periods. Prepare a business case for upgrading. Speak to a professional for the best advice.

**GET QUOTES FOR UPGRADES** Check installer

credentials, legal compliance and product warranty. All units should meet current mandatory energy performance standards (MEPS) and applicable legislative requirements (Electrical safety act 1971, Electrical Safety Regulations 1971. [www.actpla.act.gov.au](http://www.actpla.act.gov.au)). Check old items are being disposed of properly. Check product warranties.

**COMPLETE AND CHECK THE OF QUALITY WORK** implement any behavioural change strategies.

**ASSESS EFFECTIVENESS OF UPGRADES** Check your energy bills pre and post retrofit.