

Energy Efficiency Fact Sheet: Refrigeration

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Introduction

Refrigeration is of critical importance to many small businesses – from keeping simple kitchen facilities in commercial premises to equipment for the food service industry where needing to preserve perishable items or cool non-perishable products for sale is a day to day imperative. Regardless of the scale, being smart and efficient with refrigeration energy usage can translate to significant environmental and financial savings.

For many businesses the energy component of total operating costs may be small, but a significant proportion of this cost can be consumed by refrigeration. Whether making the most out of existing refrigeration solutions or implementing new energy efficient ones, energy can be saved through quick wins or longer term projects.

Energy Saving Tips

Quick wins

- **Regulate your refrigerator's temperature.** Simply reducing the amount of cooling required from a refrigeration system will mean the system will not have to work as hard. Refrigerators should be optimally kept at 3 to 4°C and freezers at -15 to -18°C. Using a thermometer to help accurately set temperatures, switching off display or internal lighting and controlling anti-sweat heaters are simple ways to achieve this.
- **Defrost regularly.** Ice is an insulator. In refrigerators and freezers an ice build-up greater than 4 or 5 mm can reduce efficiency³. Make sure refrigerators and freezers remain frost-free by regularly defrosting any ice build-up on the evaporator.
- **Keep refrigerators level.** Keeping a refrigerator level will help prevent the door gasket from not sealing tightly and cold air leaking out – the refrigerator will not have to work harder to maintain the cool air.
- **Check doors are sealed and that hinges and gaskets are working properly.** Making sure the door seal is tight and free from gaps will help prevent cold air leaking out and means a refrigerator will not be overcompensating for the leakage. If cold air can be felt leaking out, the refrigerator doors are either not sealing properly or cracked from wear. Worn door gaskets, hinges and catches can also add to this problem – check these regularly and replace them if necessary.

- **Do small routine checks yourself.** Periodically inspect the thermal insulation on refrigeration lines for damage.
- **Scatter food in freezers before you group.** Scattering food packages in freezers first before grouping them will help to ensure better initial circulation and less time to freeze. Do not overfill the freezer - that can interfere with the circulation of cold air inside.
- **Fill an empty refrigerator with water containers.** Refrigerators and freezers operate efficiently when full. Keeping a refrigerator at least two thirds full or a freezer at least three quarters full will help to ensure they run efficiently and do not overcompensate when cooling. The more air space in a refrigerator, the more power it may use to keep that air space cool, and the more cold air can spill out when you open the door if the refrigerator is close to empty. Fill any big air spaces in your refrigerator with containers of water.



- **Wait for food to cool before refrigerating or freezing.** Avoid putting hot food into the refrigerator or freezer as the inside cooling may have to adjust to compensate. Allow food to cool down first before refrigerating or freezing.
- **Cover before you store.** Cover all liquids and wrap foods stored in the refrigerator. Uncovered foods release moisture and may make the compressor work harder. The best wrappings for food items are aluminium or plastic wrap. Avoid paper as it can act as insulator.
- **Find the right position for your refrigerator and freezer.** Place the refrigerator or freezer away from direct sunlight, or an oven. Shield externally located motors from direct heat, sun and weather. Choosing a cool position for the refrigerator means it will not have to work as hard to keep cool.
- **Give the refrigerator breathing space.** Leaving an area around and above the refrigerator and freezer is crucial for proper ventilation. A clearance of at least 80 mm between the condenser coils at the back of the refrigerator and the wall is a good guide⁴ but always refer to manufacturers' recommendations. Restricting ventilation can add up to 15 percent to energy use⁴. Keep the fridge free from cartons or items around it that can impede airflow.
- **Keep the refrigerator and freezer condenser coils clean.** Layers of dirt, dust, cobwebs and fluff on condenser coils can reduce the amount of heat that the refrigerator or freezer can transfer to the surroundings. Evaporator coils should be clean and free of ice build-up.
- **Think before opening.** Every time the refrigerator or freezer door is opened or left open for too long cold air from inside the refrigerator escapes and warm, moist air from the outside gets in. Thinking ahead and planning what is needed to be taken out can help. Keeping a refrigerator and freezer organised so that the door is not kept open for too long while searching for items is also a good habit. Regularly used items should be placed front and centre to make this habit easier.
- **Be smart about load sharing.** If two refrigerators or freezers are running, fill one up and turn the other off.
- **Service regularly for a more efficient and enduring lifespan.** Like any other mechanical equipment, performing scheduled maintenance on refrigerator and freezer units will help increase lifespan. Things to look out for are motors refusing to shut down or switch off regularly, refrigerators running continuously or making a strange noise. These are signs that the refrigerator is not operating efficiently and needs an inspection by a refrigeration mechanic.
- **Things to do at night.** Do the lights really need to stay on? Turn off any display lighting on refrigeration equipment. For commercial refrigerators, use thermal covers for display units.
- **Turn off refrigerators while away.** Before going away for a long period, turn off, empty and clean the refrigerator and leave the door open.
- **Make the cool room work less.** Transfer product to the cool room promptly after delivery. If non-perishable products are kept outside, keeping them as cool as possible and out of direct sunlight is a must. Keep a cool room closed for as long as possible after stocking will allow the temperature to stabilise. Taking cold product out in batches rather than constantly opening and closing the door for one or two items will mean less cold air is lost in the process with fewer ins and outs. Supplementing a cool room with a smaller holding refrigerator for product needed to be accessed more regularly makes good energy saving sense.
- **Be mindful of ins and outs.** Always close the doors when entering and leaving the cool room. If there is a lot of traffic in and out of the cold room, plastic strip curtains or swinging doors are essential to avoid cool air escaping.

Long Term

- **Invest in a new generation refrigerator.** Newer, high efficiency refrigerators may use around half the energy of older models and therefore can cost half as much to run. When looking for a new model refrigerator or freezer, combinations with the freezer on the bottom are typically more energy efficient. In upright freezers more cold air can escape which may be costly to run. Choose a non-defrosting model if practical; self-defrosting models typically use more energy.
- **Check for Star Ratings.** Star Ratings are a good measure of the energy efficiency of a refrigerator or freezer model. More stars can also mean the refrigerator or freezer uses less electricity to achieve the same level of performance as similar models. Choose a six star model if it is suitable for your business.
- **Re-use heat.** Heat expelled from large refrigeration systems can be re-used to heat water for offices, toilets and change rooms.
- **Think about what features a refrigerator needs.** Some refrigerator features might be unnecessary. Automatic ice-makers and through-the-door dispensers can increase energy use and the price of the refrigerator.
- **Rethink refrigeration needs.** Considering exactly what the refrigeration requirements are in terms of quantities and type of product, required storage temperatures, and the speed at which products need to be cooled should make purchase decision making and installation of commercial refrigerators and cool rooms easier.
- **Invest in green energy.** Choosing Government accredited Origin GreenPower can benefit everyone and is one of the simplest things your business can do to reduce its impact on our environment. We give you the choice of accredited new renewable energy from environmentally friendly sources such as solar and wind energy. For more information about Origin GreenPower, visit www.originenergy.com.au/GreenBusiness.

Benefits

There are financial and environmental benefits to derive from smarter and more efficient refrigeration solutions.

Cost Benefits

The above mentioned actions can result in cost benefits in terms of:

- reduced energy consumption;
- a longer lifespan for refrigeration equipment;
- lower running costs and associated energy expenditure; and
- reduced maintenance costs for refrigeration.

Environmental Benefits

The associated environmental benefits include:

- avoided emissions, including greenhouse gases, through energy efficient products and actions; and
- resource conservation through increasing the lifespan of existing refrigeration devices with regular maintenance, repairs and improvements.

Did you know?

1. Sometimes using a timer to turn off your refrigerator at closing time and switching it on a few hours before you open will be enough to cool your products and save your energy usage. Taking into account how much energy you need to cool your products down again versus keeping a cool temperature overnight, as well as whether you use off-peak electricity overnight also come into the equation – it may be worth doing the math!

Useful references

1. **Australian Government – Department of Resources, Energy and Tourism**
www.eex.gov.au/eexhomepage/smeenergymanagement
2. **Government of Western Australia – Sustainable Energy Development Office**
www.sedo.energy.wa.gov.au
3. **Government of South Australia – Department of Transport, Energy and Infrastructure**
www.dtei.sa.gov.au/__data/assets/pdf_file/0008/16595/refrigeration.pdf
4. **Government of South Australia – Department of Transport, Energy and Infrastructure**
www.dtei.sa.gov.au/energy/energy_action/household/saving_energy/refrigeration_and_freezing.html
5. **Australian Government – Department of Environment, Water, Heritage and the Arts – Greenhouse Challenge Plus**
www.environment.gov.au/settlements/challenge/publications
6. **Sustainability Victoria**
www.sv.sustainability.vic.gov.au/manufacturing/sustainable_manufacturing
7. **PACE - Australia's Process & Control Engineering website**
www.pacetoday.com.au/articles/Seal-your-refrigeration-leaks-and-save-the-environment_z54882.htm

Further information

For more information visit www.originenergy.com.au or phone our dedicated small business team on 1300 730 533.

Endorsement

This fact sheet is endorsed by Ingrid Cornander, MSc Environmental Engineering and Senior Consultant with Impact Employee Communications – An Ogilvy Public Relations Worldwide Company. It is for general use only and should be used as a reference guide only.