



Energy Management Guidelines for Food Manufacturing Businesses

Perth Region NRM is a not-for-profit Natural Resource Management Association committed to assisting small and medium sized Australian businesses minimise their Environmental footprint.

Perth Region NRM, with the assistance of the Office of Energy and in conjunction with principal energy consultants Eco Advance and the management and staff of Canon Foods, have produced this Guideline for Food Manufacturing Businesses keen to reduce their energy use and Greenhouse Gas (GHG) Emissions.

For details on how Energy Management Action Planning (EMAP) can be applied to your business, first read the *Energy Management Guide for Business*.

This Guideline is based on the pilot of Energy Management Action Planning at Canon Foods, Canning Vale. It builds on the process outlined in the *Energy Management Guide for Business* by identifying areas of energy use in the food manufacturing sector where further investigation may be warranted or where energy efficiency improvements could be targeted and realised.

The following information is provided as general advice however it should be recognised that businesses operate in different ways and in different circumstances. You should make your own inquiries as to the appropriateness and suitability of the information as it relates to your particular business.

Energy use in the food manufacturing sector

Business operators should have a good understanding of where energy is used in business processes. The following systems are typically used in most food manufacturing businesses:

- Chilling
- Heating and Cooking
- Lighting
- Motors & Equipment
- Heating, Ventilation & Air Conditioning
- Other Equipment

Reducing energy use in these areas can lead to financial savings for your business as well as a reduction in Greenhouse Gas emissions from operations. This Guide applies both for operational businesses as well as for design stages for new or expanding businesses.



Chilling

- Often a large consumer of energy in food manufacturing, engaging the services of a refrigeration engineer with energy efficiency experience should be considered.
- Chillers need to be regularly maintained – Check seals for damage, check for ice build up on evaporators, keep external coils clean and free from litter and regularly check system pressure
- Minimise cooling loss from chillers – Install door closers, air curtains or physical strips for coolroom and freezer doors
- Minimise heating loads on chiller systems – Ensure that adequate insulation is provided for the freezer and refrigerant lines, pre-chill product prior to chilling
- Consolidate chiller use – Keep chillers well stocked and turn off units that are unnecessary.
- Use the most efficient chiller available for your requirements – Avoid buying oversized units or cheaply constructed units that are expensive to operate, select high efficiency fans and compressors and consider replacing old, inefficient refrigeration plant and equipment with new energy efficient units
- Educate staff – Ensure that staff do not leave chiller doors open
- If your business operates a lot of chillers that are run 24 hours a day, then investigate the suitability of using peak/off-peak electricity tariffs. This won't reduce your energy use but may reduce the cost of your electricity use.

Heating & Cooking

- Use efficient appliances – Obtain information about the energy use from suppliers of cooking equipment (MJ/hr for gas and kWh for electric) or arrange for an electrician to test electricity use during operation. Avoid the use of inefficient cooking appliances
- Ensure that equipment is well maintained – Replace worn oven seals
- Consider the use of gas cooking appliances – Gas is generally cheaper to use and has less Greenhouse Gas emissions
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Lighting

- Turn lights off in unused areas - Install separate switching or motion sensors for areas that are infrequently occupied. E.g. store rooms, amenity areas and individual offices
- Avoid over lighting - Recommended interior light levels are provided by Australian Std 1680 Remove excessive lights from areas with low lighting requirements such as storerooms and walkways and from over-lit areas. Consider purchasing an inexpensive light (lux) meter
- Use natural lighting - Provide sky-lighting and separate switching so that all or banks of lights can be turned off during the day
- Use energy efficient lights in low ceiling areas like offices - LED and T5 Fluorescent lighting systems are generally the most efficient and should be used to replace incandescent, halogen and older magnetically ballasted fluorescent lamps



- Locate lights closer to work areas - High bay lighting is required for areas where clearance is necessary for equipment such as gantry cranes or forklifts. It may be possible to lower the height at which lights are suspended and use smaller, more efficient lights
- Use energy efficient lights in medium to high ceiling areas and for security lighting - Consider the use of Magnetic Induction Fluorescent and LED lights in lieu of traditional sodium vapour, metal halide and mercury vapour lamps for high bay situations. These new types of lamps use significantly less electricity and last twice as long so they don't need to be changed as often
- Provide task orientated lighting – Ensure that lighting is provided above task areas. It is not necessary to provide high levels of lighting for store rooms, walkways, change rooms, automated processing areas, foyers and rough bench and machine work. Lights should be located directly over areas where it is required

Motors and Equipment

- Turn equipment off when possible – Plan work so that equipment is not left idling. Equipment that generates heat or cooling (stays warm or cold when not in use) can use a significant amount of energy when idling. Turn equipment off during breaks where practicable
- Use the smallest, most efficient motor suitable for the task – Select high efficiency motors (HEM) that operate at close to peak capacity when selecting replacement motors rather than rewinding or purchasing cheap, inefficient motors
- Consider the use of variable speed controls for motors with variable demand – VSD controllers are appropriate for motors that spend a lot of time under partial load
- Ensure that motors are regularly serviced – Check for tight belts and for motors that run hot

Heating, Ventilation & Air Conditioning (HVAC)

- Invest in building improvements – This includes insulation, improving ventilation, efficient lighting and external shading to reduce HVAC requirements. An architect experienced in thermal modelling can identify areas of heat gain/loss in your business and determine load reductions from insulation or the use of thermal reflective paint on steel workshop roofs which can result in significantly less use of HVAC systems
- Ensure that equipment is regularly maintained. Clean filters and check ducting, belts and pressure regularly
- Set reasonable thermostat settings – Setting lower (19^oC) thermostat setting in winter and higher (24^oC) settings in summer reduces the amount of work your unit has to do resulting in energy savings
- Only turn HVAC systems on when required – Use zone control for unoccupied areas and timers to ensure that HVAC units are not left on overnight
- Seal openings in areas serviced by refrigerative air conditioners - Doors and windows should be kept closed and have good seals to keep out draughts. Consider the use of door closing devices for openings to air conditioned areas.
- Use the most efficient compressors. Check star ratings www.energyrating.gov.au and select an appropriate sized unit with the highest efficiency rating.



Other Equipment

- Enable energy saving modes on equipment – Most new electronic equipment have energy saving modes that can be enabled to turn on at the earliest opportunity
- Use timers to reduce energy use – Timers fitter to hot water urns, vending machines, drink fridges and cold water dispensers can eliminate energy wastage
- Turn equipment off after hours – While some equipment such as refrigerators, security systems, servers and fax machines need to be kept on, most equipment can be turned off at night
- Avoid installing oversized or inefficient hot water services – Consider the different benefits of solar, instant gas/electric, storage and heat pump units when determining hot water provisions
- Consolidate equipment use – Avoid duplicating equipment where possible e.g. providing each office with an individual printer, photocopier or bar fridge
- Ensure that energy efficient fridges are used – Select staff fridges with a high energy rating and avoid the use of commercial (large glass display) fridges where possible. Keep refrigerators full so that energy is not spent chilling air that is lost whenever the door is opened

For more information on Energy Management, visit www.perthregionnrm.com or contact Perth Region NRM via e-mail – info@perthregionnrm.com or telephone – 9374 3323.