



Energy Management Guideline for Engineering/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 Goodwill Engineering, have produced this Guideline for Engineering and 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 Goodwill Engineering, Malaga. It builds on the process outlined in the *Energy Management Guide for Business* by identifying areas of energy use in the Engineering and Manufacturing sector where further investigation may be warranted or where energy efficiency improvements could be 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 Engineering/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 Engineering and Manufacturing businesses:

- Compressed Air Systems
- Motors and Equipment
- Heating, Ventilation & Air Conditioning
- Lighting
- Other Equipment

Identify the major areas of energy use in your business is of top priority. Reducing energy use in these areas can lead to financial savings for your business as well as a reduction in Greenhouse Gas (GHG) emissions from your operations. This Guide applies both to operational business as well as new or expanding businesses in the early design stages.



Compressed Air

- Install correctly sized compressors designed to suit specific requirements – Avoid installing oversized compressors and consult with compressed air engineers about the most efficient type of compressor for its intended use
- Develop an in-house maintenance program for reporting and repairing leaks as soon as possible
- Consider the use of Variable Speed Drive (VSD) compressors – For variable or fluctuating compressed air demand, the use of a VSD compressor can lead to significant savings
- Install shut off valves - This will enable air supply to unused equipment to be turned off
- Minimise compressed air use - Do not use compressed air for cleaning, mixing, agitating or cooling
- Turn compressors off during breaks and after hours (using automatic timers)

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 to minimise the load on your HVAC unit, 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 automatic 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.



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

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 star rating¹ and avoid the use of commercial (large glass display) refrigerators 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.

¹ For a comprehensive list of energy efficient whitegoods, check out the Australian Government Energy Rating website: www.energyrating.gov.au