



5 Minute Guide 2.4

PACIA

energy+

Turn energy savings into business power

Process operations and equipment

This 5 Minute Guide examines process operations that handle materials streams, and identifies ways that you can reduce their energy requirements and cost of operation.

Process operations are those key manufacturing activities where materials, liquids and/or gases are being handled and processed. The equipment is the machinery required to perform those operations.

There are significant savings to be made in improving the energy performance of process operations and equipment. However, when assessing these energy saving opportunities, it is important to also review key operational areas as a whole. This will help you to ensure that proposed modifications to your current operations will deliver energy savings, without disturbing production.



Evaporation

Evaporation is the process that removes water and concentrates feed liquid. This requires energy to raise the water to boiling point and supply latent heat to convert water to steam.

The energy used in an evaporation system can be reduced by:

- ✓ Decreasing the water content of the feed product.
- ✓ Using heat recovered from another process to drive the evaporator.
- ✓ Using a multi-stage evaporator, which is more efficient than single stage evaporators. It recovers the steam from the previous stage to drive the next stage at a lower pressure, creating a closed heat recovery system.

Drying

Drying is the removal of water from a solid product using hot air. Energy use by dryers can be reduced by:

- ✓ Decreasing the water content of the feed product before it enters the dryer.
- ✓ Improving the control of the system by ensuring it is well insulated and operating consistently at the desired temperature.
- ✓ Optimising the design of the dryer to ensure efficient air input and air circulation patterns.
- ✓ Recovering waste heat from the air leaving the dryer, and using it to pre-heat the air entering the dryer or applying it in another process.





Refrigeration

Refrigeration is an energy intensive operation and should be carefully monitored. Energy use by refrigeration systems can be reduced by:

- ✓ Identifying and repairing leaks that could lead to inefficient operation, as well as posing an environmental hazard through the loss of refrigerant gases to the atmosphere.
- ✓ Purging the system to remove air, as the air is an inefficient refrigeration medium.
- ✓ Ensuring insulation is sufficient and in good condition.
- ✓ Switching the system off when the factory is not operating for extended periods.

Remember to
**refer back to your
energy plan regularly.**
Go to the PACIA energy+
portal for help in setting
up your plan.

Cooling water

Cooling water (or chilled water) is used for cooling industrial processes. Essentially it prevents damage to plant or product so that the production rate is maximised.

Energy use by chilled water systems can be reduced by:

- ✓ Minimising the use of cooling water around the factory. This will minimise the energy used by pumps to move the cooling water around the plant.
- ✓ Carefully managing fluctuating demand for chilled water across the year due to varying weather conditions and different products and processes. For example, if your chillers are set to meet maximum demand during summer, this will result in wasted energy throughout the rest of the year when the ambient temperature is lower.
- ✓ Implementing an automatic management system to manage coolant temperature and coolant flow around the plant. Ensure that temperature set-points are set as high as the process will allow.

This is just one piece of the energy efficiency puzzle!

There are many other areas that you should also consider. PACIA energy+ covers the key topics and provides you with the tools and information you need to improve your energy efficiency and reduce costs. PACIA energy+ has been designed specifically for businesses in the chemicals and plastics industry.

Go to the PACIA energy+ portal for more: www.paciaenergyplus.org.au



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