



# 5 Minute Guide 2.1

PACIA

**energy+**

Turn energy savings into business power

## Process heating, hot water and steam systems

This 5 Minute Guide explains how to improve the energy efficiency of your process heating, hot water and steam systems. This can be one of the most effective ways to reduce energy costs in your business.

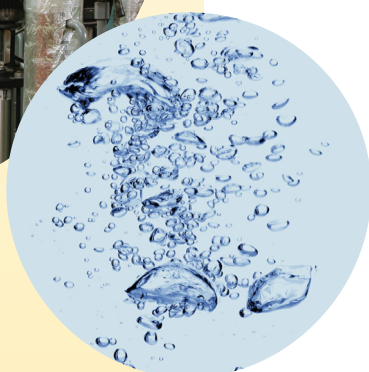
Steam, hot water and other forms of process heating are all essential resources that provide convenient, reliable and cost effective energy to undertake activities fundamental to your business. The systems used to produce these heat resources require large amounts of energy. They can easily become inefficient because system losses can be difficult to measure or observe.

You can improve the energy efficiency of your process heating, hot water and steam systems in a number of ways:

- ✓ **Supply:** ensure that supply volumes, temperatures and pressures match your demand.
- ✓ **Substitution:** ensure steam is not used where (cheaper) hot water would suffice. The higher the temperature of the heat medium, the larger the energy cost.

- ✓ **Pre-heating:** recover heat from furnace or boiler exhaust gases to pre-heat the combustion air (using a heat exchanger) or the feed water (using an economiser). Economisers are an excellent way of reducing energy input into a boiler.
- ✓ **Fan speeds:** use variable speed fans controlled by variable speed drives instead of dampers to control combustion air and exhaust gases.
- ✓ **Blowdown operation:** implement an automatic system to prevent excess blowdown. Typically 1-5% of energy input to a boiler is lost during manual blowdown operations.
- ✓ **Insulation:** check that vessels, pipes, valves, and pipe bends and junctions are covered with sufficient insulation (also referred to as lagging) to prevent heat loss.
- ✓ **Leaks and losses:** implement a regular program of leak detection and repair, and remove redundant pipe work (known as a 'dead leg'). Steam can be difficult to contain and reducing steam losses by fixing leaks is one of the easiest ways to save energy.
- ✓ **Maintenance:** ensure that equipment is well maintained; pressure and temperature set points are optimised for efficiency (most importantly the air/fuel ratio of burners); and steam traps are working effectively and are not leaking.
- ✓ **Condensate recovery:** implement a condensate recovery system to return condensate to the boiler. Recovering condensate is an excellent way to save energy and water.

Figure 1 summarises the potential energy savings that can be achieved through simple improvements to your process heating, hot water and steam systems (see page 2).





For facilities with boilers, the energy needed to run the boiler(s) **typically accounts for 20-60% of site energy costs, represents up to 35% of all potential site energy improvement**, and can be more than 96% of whole of life cost. Running your boiler more efficiently is one of the most important investments you can make to your bottom line.

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

**Figure 1: Energy saving opportunities for process heating, hot water and steam systems**

Technique/method	Energy saving potential
Improved operation and maintenance of boilers	Up to 5%
Improved water treatment and boiler water conditioning	Up to 2%
Total dissolved solids (TDS) control and boiler blowdown	Up to 2%
Blowdown heat recovery	Up to 3.75%
Boiler and burner management systems, digital combustion controls and oxygen trim	Up to 5%
Variable speed drives (VSDs) for combustion air fans	–
Flue gas shut-off dampers	Up to 1%
Economisers	Up to 5%
Combustion air pre-heating	Up to 2%

Source: Energy Efficiency Best Practice Guide: Steam, Hot Water and Process Heating Systems p10, Sustainability Victoria, 2009

### 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](http://www.paciaenergyplus.org.au)**



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