Gas Information Sheet No. 52

Type B Appliance Energy Efficiency for End Users

One of the key objectives of Energy Safe Victoria is to promote the awareness of energy efficiency of gas installations and appliances. The intent of this technical information sheet is to help identify where there may be opportunities for end users to realise efficiency benefits for Type B appliances through decisions made during specification, installation and commissioning and through ongoing maintenance.

Why is energy efficiency important

The main drivers for gas system efficiency include:

1. Reducing operating costs.
2. Reducing environmental impact (e.g. greenhouse emissions and toxic gas emissions).
3. Marketing opportunities (e.g. improved NABERS rating for commercial buildings, which has been shown to lead to increased property prices and leasing demand).

Note: When specifying, installing or optimising type B gas appliances and processes, consider seeking expert advice to ensure the most energy efficient outcome is achieved.

What is an energy efficient gas appliance

A higher efficiency gas appliance means less gas input for the same heat output.

There are opportunities for end users to influence the efficiency of Type B appliances and associated processes through decisions made during the appliance specification stage, including reducing process and site heat demand, and ensuring regular maintenance is carried out.

Reducing heat losses

Opportunities for end users to reduce process heat loss include:

1. Insulating of processes, including:
   - Hot water pipes. Losses from well-maintained pipework are estimated to be 1.5% of the system capacity in a commercial office building.
   - Steam pipes. Uninsulated steam pipes incur a relatively large heat loss, which increases the amount of condensate in the steam, and thus reduces the heat transfer efficiency. An uninsulated 100 m run of 50 mm pipe, carrying steam of 10 bar, could condensate approximately 180 kg/h of steam through heat losses with ambient temperature of 15°C.
   - Spray booths.
   - Vats.
   - Kilns.
   - Building fabric.

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2. Isolating lag boilers, when on standby, from the water flow by using automatically actuated valves. Heat losses from standby boilers are typically 5-10% of the system heat per hour.
3. Minimising temperatures in heating processes, where possible, to reduce radiant losses. The potential for reducing temperatures will be dependent on the process the system is serving.
4. Applying time clocks to circulation pumps (in some cases) i.e. such as DHW reticulation in a commercial building, to reduce heat losses from pipes when heat supply is not required.

Example 1

Project:	*Reduce losses by isolating standby boilers*
Average heat load:	*500 kW, leaving temperature = 60°C*
Natural gas unit cost:	*$9/GJ*
Upgrade scope:	*install automatic isolation valve on standby boiler (5% benefit)*
Benefit to operational cost =	*$7,100/annum*
Capital cost =	*$5,000*
Simple payback =	*<1 year*
Reduction in greenhouse gas emissions =	*440 tonnes CO_2-equivalent/annum*

Reducing heat demand in a commercial building

Opportunities for reducing heat demand include:

1. For space heating, introducing dead band between heating and cooling temperature set points, to reduce conflict between heating and cooling systems (this reduces both heating and cooling energy requirements).
2. Reducing HW supply temperature set points – i.e. 60°C for DHW.
3. Introducing temperature reset for HW supply (HHW loop) i.e. reset temperature between 50-80°C as demand increases.
4. Introducing ambient temperature lockouts to prevent the heating plant from running when not required.
5. Reducing air infiltration.

Reducing heat demand in industrial processes

Using lower temperature (liquid) solutions in industrial processes could be an alternative means of reducing heat demand. For example, new chemicals may be available for commercial laundries to run their washing cycles at lower temperatures.

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Maintenance

Regular maintenance is essential for the efficient operation of a Type B appliance. The maintenance regime includes:

1. Tuning the gas burner – to achieve an optimum air/fuel mixture can improve heating efficiency by up to 2% (see Example 2). High combustion efficiency is shown through the appliance exhaust gas temperature and the oxygen level in the exhaust gases.
2. Boiler blow down – is essential to maintain the total dissolved solids (TDS) level in the boiler drum. An optimal TDS level control can save energy, water and chemical treatment costs.
3. Boiler water and fire tube condition – exhaust gas temperature indicates how efficiently the energy from the combustion of gas inside the combustion chamber is used in the boiler. If the exhaust gas temperature rises over a period of time it indicates that there is scale formation on the water side of the heat exchanger surfaces and that the boiler water treatment is not effective, or there is a build-up of soot in the fire tubes, which requires cleaning.
4. Regularly checking the steam traps – it is essential to identify steam losses. Steam in a condensate recovery tank is an indicator of steam trap failure.
5. Maintaining hot water valves – to prevent unwanted hot water bypass and subsequent overheating and heat loss.

Example 2

Project:	*Initiate regular burner tuning*
Average heat load:	*500 kW*
Natural gas unit cost:	*$9/GJ*
Upgrade scope: *benefit)*	*Tuning air/fuel ratio (assumed 2% efficiency*
Benefit to operational cost =	*$2,800/annum*
Tuning cost =	*$2,000*
Simple payback =	*<1 year*
Reduction in greenhouse gas emissions =	*17 tonnes CO2-equivalent/annum*

Monitoring

Installation of gas sub-meters enables end users to track energy consumption and monitor system efficiency (e.g. process gas consumption per unit produced).

Incentive programs

Incentive programs may be able to provide funding or part-funding for gas efficiency projects. Current energy efficiency incentive schemes available to Victoria are as follows.

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VEET

Type B gas appliances are not currently eligible for incentives under Victorian Energy Efficient Target Scheme (VEET), although project-based assessment may be included in the future, enabling the funding of Type B gas appliance activities.

ERF

Energy efficiency measures, including the replacement of gas plant with high efficiency equipment may be eligible for funding under future rounds of the Emissions Reduction Fund (ERF). More information regarding the fund can be found at the following web address:

http://www.cleanenergyregulator.gov.au/ERF/About-the-Emissions-Reduction-Fund