HOT WATER SYSTEMS

In Australia, about one quarter of household energy is used to provide hot water (23% of residential energy use in 2007[3]), amounting to about 33 MJ/day for each household (based on 92 PJ/annum in 2005[4, (7 pp 197)]and 7.63 million households[122]). Most domestic water heating systems in Australia use gas or resistive electric elements [5]. With such a substantial amount of energy being used for heating water, by such inefficient means, it follows that there is considerable scope for saving energy in this area.

Approaches to improved efficiency. The major strategies for reducing hot water consumption are low-flow shower heads, front-loading washing machines (which require a greatly reduced amount of water), or machines with cold wash cycles. The other approach is to increase the efficiency of hot water generation. Government regulation, mainly through the MEPS scheme (see Part 2), has led to some improved efficiencies in the area of hot water energy use, though this report shows that there is considerable scope to further reduce energy use in this area. There are two high-efficiency technologies which are both readily available and with the potential to significantly reduce energy use, namely solar (thermal, not PV), and heat pumps. (Note the Clean Energy Council includes heat pumps within their definition of solar.

This report will treat heat pumps and solar as distinctly separate technologies).

Beyond these two broad approaches to designing hot water systems, there are other aspects of the energy efficiency of hot water generation and use, such as temperature control, behaviour, and installation and insulation practices.

Instantaneous hot water systems. Instantaneous hot water systems, i.e. systems that require no storage, are widely available and are frequently described as being highly efficient. This report does not consider instantaneous systems as generally suitable in the context of a zero-carbon Australia because:

- **Gas**. Most instantaneous hot water systems operate using fossil methane as a fuel. As discussed in Part 1, appliances requiring gas are not considered in this report; and
- **Electric**. Electric instantaneous boosting uses resistive elements which are a very inefficient way to generate heat. Except for very small units, electric instantaneous systems generally require a very high power and use three-phase wiring which can have adverse peak load implications on the electricity grid if widely used.

However, electric instantaneous would be still appropriate in some circumstances, in situations where usage is very low and/or infrequent, then instantaneous systems would avoid an excessive proportion of standing heat loss that would be associated with a storage system. Similarly, if the use of an instantaneous system avoids very long pipe runs, then it would be preferred.

Ring mains. An increasingly common configuration of hot water uses a pumped ring mains. These promise hot water without delay, but are to be avoided because of a) increased standing losses and b) pump energy required.

Source: http://decarboni.se/publications/zero-carbon-australia-buildings-plan/5-hot-water-systems