

More efficient use of evaporative air-con cuts water use, peak energy demand

Greater water and energy savings could be achieved from the use of evaporative air conditioners (EACs) if householders and service personnel were educated about best-practice operational and maintenance procedures, according to researchers from Sydney's Institute of Sustainable Futures.



Credit: Benjamin Howell

The research was commissioned by the savewater!® Alliance, the NSW Water Directorate, Riverina Water and Dubbo City Council to determine the impact of EACs on water and energy consumption.

In the report, researchers recommended that training programs, including web-based self-study options, be rolled out for air-conditioning service personnel. Best-practice operation and maintenance procedures include proper adjustment of water quality controls to suit local conditions, adherence to maintenance schedules, and correct installation and operation.

The researchers found EACs currently use excessive amounts of water – up to 10 per cent of total annual household water use. However, they use less than one-fifth the energy used by refrigerative systems, reducing peak energy demand and putting less strain on the grid on hot summer days.

The report suggests that promoting the purchase of EACs over refrigerative systems has enormous potential to save energy and reduce greenhouse gas emissions.

The researchers also pointed to areas for further research. Today's 'direct' EACs are used extensively in drier coastal and inland regions of Australia; 'indirect' EACs could become an option in humid coastal regions where direct EACs are not suitable.

Direct evaporative coolers draw dry outside air through water-saturated pads. The air is cooled by evaporation and then circulated by a fan. Direct evaporative cooling adds moisture to the air stream until the air stream is close to saturation,

limiting their use in humid coastal areas.

With indirect cooling, a heat exchanger is used to cool the supply air. There is no direct contact between the supply air and the evaporated water. This means no moisture is added to the supply air stream.

Indirect coolers are currently mainly used in the non-residential sector for space cooling and pre-cooling for air conditioning systems. However, little research has been done on their application in the residential sector in Australia.

The researchers also found a paucity of data on non-residential EACs, despite the very large water-saving potential from appliances with improved operation, and recommended this as an area warranting further investigation.

Source: University of Technology Sydney

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