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Energy Efficiency Inquiry

Introduction

Electrical energy consumption in our society is currently contributing to the following major problems:

- The Greenhouse Effect
- Other types of air pollution (Nox, SO2, particulates etc)
- Consumption of non-renewable resources (coal, gas)

In addition, the use of electricity for air conditioning is driving increased peak summer loads on our electricity generation and distribution systems. These increased peak loads, which are already a major problem in South Australia, Victoria, Western Australia and much of regional Australia, are driving the need for increased investments in electricity generation capacity. Sydney's peak electricity demand is shortly going to shift to the summer, and once this happens the required rate of growth of electricity generation and distribution capacity will be dramatic. The magnitude of the problem has been shielded from view for the last few years because of the slack in the NSW summer generation capacity. However once this is taken up, the whole eastern seaboard will experience dramatic problems with electricity growth. This has already caused problems of system breakdowns in much of Australia, and the need for rapid capacity expansion. However the cost of electricity generation capacity at around $2,800 per kW is driving up the price of electricity in those areas where the summer peak already significantly exceeds the winter peak. It is ludicrous that a customer can buy an air conditioner for $500 that draws 1kW and requires the generating authority to spend $ 2,800 to power it!
Electricity prices rose by 25% in 18 months in South Australia largely because of the construction required to power the sales of air conditioners. This growth is requiring the continuous building of 'peaking' power stations which tend to be used for as little as 4% of the year. This dramatically pushes up the cost of electricity. A number of new small power stations have come on line, but the peak electricity demand will again set a new record this summer. This is in spite of the efforts of the Australian Greenhouse Office and other agencies.

Energy efficiency of Evaporative Cooling

Most of the talk has been about increasing the supply. A better option is to reduce the growth in electricity use by air conditioners. On a hot day, at least 46% of South Australia's electricity use goes to air conditioners and refrigerators. If there were no air conditioners there would be no talk of price increases and the risk of blackouts would be minimal. From 1990 to 2000 there has been a 50% growth in air conditioner energy use. Most of this increase in demand has been due to refrigerated air conditioners. There are less power hungry solutions than refrigerated air conditioning. The author has published a paper 'Blanchard, C.R.: “New Trends In Residential Cooling – Energy Saving With Evaporative Cooling” AIRAH Journal (July 1999)' showing that evaporative coolers typically use 80% less energy than refrigerated coolers.
It is possible to cool a typical family/dining room effectively with an average power use equivalent to that of only about two thirds of a 100W light bulb. This compares with the power use of over 3 light bulbs for an equivalent refrigerated air conditioner. Many organisations are working on strategies to switch power off during peak demand periods. A far better method of reducing demand is to install equipment that inherently uses dramatically less energy. This will also save the householder money.
Although evaporative cooling is not applicable in all of Australia, over **7million Australians** live in areas where evaporative cooling is suitable.

Overall potential saving.

The biggest saving is in the reduction in the cost of power station construction. This could easily amount to $460million dollars per year Australia wide. With the substantially reduced air conditioner power demand, the electricity generation and distribution infrastructure would be more effectively used. This will result in lower

average electricity prices. It should be noted that encouraging evaporative cooling in those areas where it is effective, will also keep the lid on prices in areas where evaporative cooling is not effective because of the interconnectedness of the systems.

The lower prices for industrial users would lead to increased international competitiveness, particularly for companies competing against South East Asian countries where evaporative cooling is not an option.

Wall and roof evaporative coolers are made in Australia while most refrigerative air conditioners are imported. Substituting evaporative cooling for refrigerative cooling would beneficially impact on the balance of trade to the tune of at least $130million.

Low-income people are paying a higher proportion of their income for energy than higher income people are. However low income people are also cross-subsidising higher income people with large air conditioners. This is because a household with a large air conditioner is going to use a higher percentage of their electricity for air conditioning than a household with a small air conditioner. Because electricity used for air conditioning costs the supplier more than electricity used for say lighting (because it is used at peak demand periods), the large air conditioner household should be paying a higher rate for their electricity, whereas in most tariffs they end up paying less per kW.

Barriers to the substitution of evaporative cooling for refrigerative air conditioning

The biggest barrier to encouraging evaporative cooling (or any low energy cooling technique) is the fact that the cost of providing the generation and distribution capacity required to support the air conditioner is not borne directly by the person buying the air conditioner.

Another major barrier is that decisions affecting the viability of evaporative cooling when made at a national level are often made by people who are not from evaporative cooling areas, and thus don't understand the potential. (To find out more about evaporative cooling visit www.coolmax.mx.com.au/evapcool)

In very humid conditions the performance of an evaporative cooler is less effective. This is an inherent limitation, however it can be minimised by good design of the cooler and the system. Incorrectly designed evaporative cooler systems lead to a reduction in perception of the effectiveness of evaporative cooling.

A lack of awareness of the availability of wall or window evaporative coolers is a problem. Wall or window evaporative coolers are generally sold through air conditioning dealerships, however the majority of people go to discount electrical places to buy box type air conditioners and wall splits. Because the discount electrical retailers are only interested in products that they know will sell; they are not prepared to trial new products until they have already been proven to be successful. This is very much a chicken and egg situation.

The Cost of wall or window coolers is greater than cost of box type refrigerative room air conditioners. This is because the refrigerative air conditioners are mass-produced (in the millions) in low wage countries while the evaporative coolers are made in Australia in very low volumes (in the hundreds).

A misconception that when people say evaporative condensers cause legionnaire's disease, they are referring to evaporative coolers.

Potential strategies to minimise the barriers

A strategy proposed by the Total Environment Centre is a levee on refrigerative air conditioner purchase. They propose a 10%levy. This would alter the cost relativities between refrigerative and evaporative cooling and other low energy use technologies.

An alternative would be a subsidy for evaporative and alternative cooling strategies, perhaps based on the 'negawatts concept'. This could be a similar model to solar cell manufacturing subsidies.

Hour by hour electricity charging would increase the cost of running a refrigerative cooler up to say $20 per hour on a very hot day when the same cooling could be achieved by an evaporative cooler for $4 per hour. This pricing signal would be highly effective, as it would be targeting those who are contributing to the need to build additional power stations.

Another alternative is the provision of low interest loans for evaporative and alternative cooling strategies.

Increased education would be help. This should cover the potential savings and the availability of alternatives and also the fact that a well-maintained evaporative cooler has no risk of causing Legionnaire's disease.

If you have any questions, please don’t hesitate to contact me on 08 8354 1062.