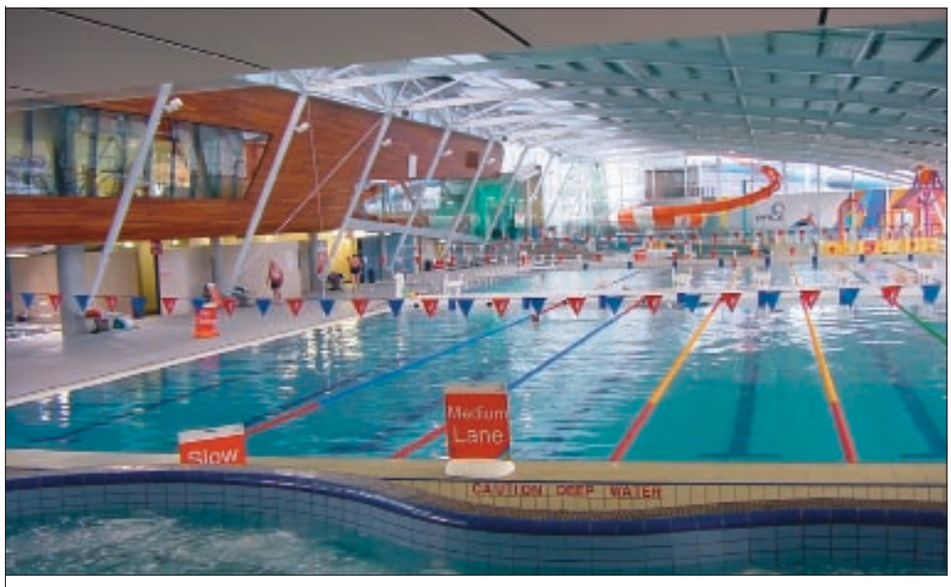
Saving race

In today's world effort to fight increasing energy usage, Bill Ellul says rotary heat exchangers are becoming an accepted state-of-the-art alternative to making buildings greener energy users. Here, he details a growing international effort aimed at developing a better RHE.



Rotary Heat Exchanger's chief executive officer Bill Ellul was actively involved in the early research and development work at CSIRO during the 60s. He is excited about the increasing popularity of their products, and rotary heat exchangers (RHEs) in general.

Australia's own rotary heat exchanger company, RHE, are increasingly utilised to substantially reduce energy consumption in indoor pools and commercial building air conditioning and heating.

RHE, a 100 per cent Australian-owned company based in Bayswater Victoria, was established in 1968 as a result of the leading energy recovery research developed for solar air conditioning by CSIRO.

Their heat exchangers have withstood the test of time as hundreds of wheels have been installed all over Australia, many still in operation after over 30 years continuous use.

"We have developed an efficient, robust RHE," proudly claims Ellul, "with a proven longevity of over 30 years, even in aggressive environments, which can effectively recycle up to 90 per cent of waste energy used in air conditioning, heating and industrial high temperature applications."

Ellul is also the CEO of Ecopower, an energy consulting company he formed in 1989 that has implemented many energy conservation measures in industry. Ecopower has three Australian Energy Awards for innovative energy conservation and energy sustainability projects.

"What we have found over the years," says Ellul, "that in the past consultants were happy to put in some waste heat recovery, especially in aquatic centres where the energy savings are large. However with the advent of climate change policies today consultants are looking for much better energy recycling."

"Where in the past consultants would use one or two heat wheels for an aquatic centre today they ask for three to four resulting in much higher energy savings."

Both high thermal efficiency and low-pressure drop are important factors ensuring the low energy usage requirements. This results from recycling the waste energy in the exhaust from the building to precondition the fresh air to the building.

This also allows buildings to be designed with higher fresh air quantities without a large energy penalty.

In an indoor pool the savings are in the reduced heating requirement of the large fresh air intake to the pool hall, as well as having the added benefit to the environment of reducing greenhouse gas emissions compared to a system that requires a large electric power input.

Other novel applications being developed by RHE are indirect evaporative cooling and the cooling of data centres.

INDIRECT EVAPORATIVE COOLING

Indirect evaporative cooling is a good solution for low energy use cooling in most temperate climates of Australia.

Indirect evaporative cooling relies on the use of high efficiency evaporative coolers combined with high efficiency heat exchangers to capture the cooling, but not the humidity increase, of conventional evaporative cooling cycles. These air conditioning cycles were seriously considered by CSIRO in the 70s as part of a drive to develop solar air conditioning. These open cycle air conditioning systems utilise 100 per cent fresh air and were to be combined with desiccant dehumidification utilising solar heat to regenerate the desiccant, thus allowing a greater atmospheric range for control purposes.

Data centres can benefit from the use of high performance indirect evaporative cooling using high efficiency RHE's Ellul has looked at a preliminary design for a NSW data centre and estimates a 50 per cent reduction in refrigerated cooling if a Mylar RHE indirect evaporative cooling system is installed.

RACE AQUATIC CENTRE

The City of Casey is proud of its recently built aquatic centre facility which is one of the largest facilities of its kind in Victoria.

Will Northwood, design engineer from Irwin Consult, said that "they designed the aquatic centre to provide minimal energy and water usage as well as reduce greenhouse gas emissions.

"For space heating and fresh air intake we settled for the simple gas fired heating system coupled with the high efficiency, low pressure drop, low maintenance provided by the installation of four 2750mm diameter Australian Mylar heat wheels manufactured by Rotary Heat Exchangers.

This provided the lowest natural gas usage, the lowest electrical energy usage and the lowest environmental greenhouse gas emissions option with proven low maintenance costs and longevity." Further savings measures included variable speed fresh and exhaust fans governed by pool hall humidity.

An outside air economy cycle, which increases energy savings even further, is achieved by switching off the RHE's when outside conditions are better than inside conditions, thus avoiding bypass ducting and dampers.

Advising consultants, Ecopower, said the use of the four Mylar heat wheels would recycle 85 per cent of the energy from 31,000l/s exhaust air to provide free heated dry and fresh air.

Bill Ellul states that "for the Cranbourne Casey Race facility the estimated savings in natural gas heating is 15,000GJ annually; giving a cost savings of approximately $105,000 per annum, resulting in a less than one-year payback on the heat exchangers.

The environmental benefit is a reduction in greenhouse gas emission of 688 tonne CO_2 annually, derived from the natural gas savings.