



Sustainable hospitals = healthier people

With healthcare crises regularly in the media, everyone is acutely aware there are very few pennies in the public purse for building and operating health facilities. It's therefore little wonder that governments are looking to eco design to deliver cost effective outcomes. **Warren McLaren** reports.

In June 2009, the Green Building Council of Australia released another of its Green Star tools. This time it was for healthcare facilities. The Green Star tool is said to have four key objectives: to minimise the environmental impact of their buildings, improve patient health outcomes and staff productivity, receive recognition for green leadership and achieve real cost savings.

One of Victoria's leading hospitals is putting the tool to the test.



An artist's impression of the New Royal Children's Hospital. (Image by Scharp Design)

Melbourne's new Royal Children's Hospital (RCH), designed by Billard Leece + Bates Smart JV, has boldly stated it wants to be Australia's greenest hospital. The new \$1 billion, 100,000 sqm development is due to have its ribbons cut in 2011. The ambitions are based on the new hospital achieving a 45 per cent reduction in greenhouse gas emissions, compared with a conventional hospital. And similarly managing at least 20 per cent savings in water use.

How will these ambitious targets be attained? Wards will derive 40 per cent of their hot water from solar panels on the roof. On-site there will be a 2.8 MW gas-fired trigeneration

plant that will generate electricity equivalent to that used by around 450 homes. Excess heat will be captured and used for heating, hot water and cooling. Speaking of cooling, this will be accomplished through the deployment of active chilled beams in most patient areas. And for heating, renewable energy will be the norm, by virtue of an 800 kW biomass boiler.

Seventy-five per cent of the roof area has been designed to harvest rainwater, whilst blackwater will be treated alongside rainwater to flush toilets and feed the cooling plant and water gardens. However, water for the gardens will only be released if rainwater and moisture sensors suggest it is required. And, of course,

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the usual suspects of water efficiency will be installed wherever there is a need for showerheads, taps, toilets or urinals.

Not that the RCH is relying solely on technological apparatus to become a leading green hospital. Other inclusions are just plain common sense. For example, the bulk of the new facility will have access to daylight.

Why might this be a useful thing for hospitals? Robin Mellon, executive director of the Green Star program for the Green Building Council of Australia (GBCA), wrote an opinion piece for the ABC asking the question, can Australia's hospitals go green? In the article he observed that "increased daylight is shown to have significant benefits on patient recovery times, as well as benefiting staff on a day-to-day basis and thus improving staff retention overall. Patients provided with both natural light and visual amenity (a view through a window of the outside or an atrium) are certainly shown to heal faster."

Retention of staff in the nation's health service is such a chronic issue

that the Federal Government has resorted to dangling a \$6,000 cash incentive to try and lure around 9,000 nurses back to public hospital wards and aged-care homes. Only about 7 per cent have been so enticed. A recent research report – *The costs and benefits of sustainable healthcare facilities* – by Davis Langdon noted that "total energy and water costs for a major hospital are typically around 1 per cent of total annual operating costs," whereas "staff costs in an acute hospital may be in the order of 70

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per cent of all operational costs." The report concluded that "any established improvement in staff productivity, staff retention and patient wellbeing has very significant potential to reduce healthcare operational costs".

On the point about outside views, the old RCH will eventually be demolished and returned to parkland adjacent to the new hospital.

In South Australia, the Flinders

Medical Centre (FMC) by Woodhead earlier this year installed what it understands to be the largest solar hot water system in the state. In an effort to reduce greenhouse gas emissions by 1,100 tonnes annually and cut around \$200,000 in energy costs, a 286 hot water panel system was included in the Centre's total \$153 million redevelopment works.

All up, the new FMC, when completed by 2013, is anticipated to slash greenhouse gas emissions by 4,200 tonnes a year. Over 60 million litres of water is also expected to be

saved through judicious use of rainwater harvesting and greywater diversion. Employing the GBCA's new aforementioned Green Star healthcare rating tool, FMC expects it will be Australia's first health facility to receive a 5 star Green Star As Built rating.

Part of the redevelopment will see the rollout of Australian designed Muller 3C closed circuit coolers to reduce the risks

associated with Legionnaire's disease developing in traditional cooling towers, whilst cutting cooling water use by 50 per cent.

Another hospital to benefit from home-grown technical innovation is Mount Alexander Hospital at Castlemaine in rural Victoria. It has partnered with the CSIRO and three local businesses to collectively manage a 30 per cent reduction in greenhouse gas emissions by 2010. It is a high profile project and one of only eight case studies cited at the Garnaut Climate Change Review. Initiatives include a form of cogeneration technology is under investigation, whereby heat produced as a by-product of a smallgoods processing business could be captured and converted to energy that the hospital could then use for the laundering of its linen.

The greening of health facilities has been very topical this year. As this article was being completed in September, the 12th Annual Health Facilities Planning & Design event was getting underway in Sydney. The conference had key presentations and workshops on Integrating design and the environment – sustainability,

eco economics and efficiency, Impact of design on health and wellbeing and Patient-centred design.

A few weeks prior to that event, the Queensland branch of the Institute of Hospital Engineering – Australia (IHEA) held its 60th national conference. Again, prime amongst its topics was eco efficiency. It is a subject that years ago, the IHEA teamed up with the Victorian Department of Human Services to provide more information on to develop case studies showcasing the ways in which health facilities can be more environmentally benign. Such as the 50-bed Evelyn Wilson Residential Aged Care Lodge in Sale, which won a Master Builders Award in 2005 for Best Sustainable Energy Commercial/Industrial Project for its long list of eco design attributes, including in-floor hydronic heating, geothermal cooling and reverse brick veneer construction.

Or the Bendigo Health Care Group, which leveraged \$50,000 spent on a building automation system to control its air-conditioning systems to see immediate annual savings in electricity greater than this amount, providing it with a return on investment (ROI) of

under one year. However, the previously mentioned Davis Langdon report suggest eight years is a more realistic timeframe for a ROI.

The two aforementioned seminars were preceded by another in May 2009 when Melbourne hosted the second annual Green Hospitals conference where two hospitals in Queensland were highlighted – Gold Coast University Hospital and Queensland Children’s Hospital – as examples of under-construction facilities with environmental design attributes. The latter was part-designed by Lyons Architecture, which were also the architects behind Canberra’s John Curtin School of Medical Research (JCSMR) at the Australian National University. The JCSMR has within its green story a range of sophisticated ventilation systems, including thermal chimneys and night purging.

NSW Health’s guidelines for Engineering Services and Sustainable Development observe that “... the building form shall incorporate passive design considerations to minimise the intervention of engineering services, and to minimise energy use”. Because as it also



calculates, “Engineering services account for approximately 35 to 40 per cent of the capital costs in the construction of health care facilities”.

It seems then that green hospitals can lead to healthier patients, happier staff and a hopeful planet. ●

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