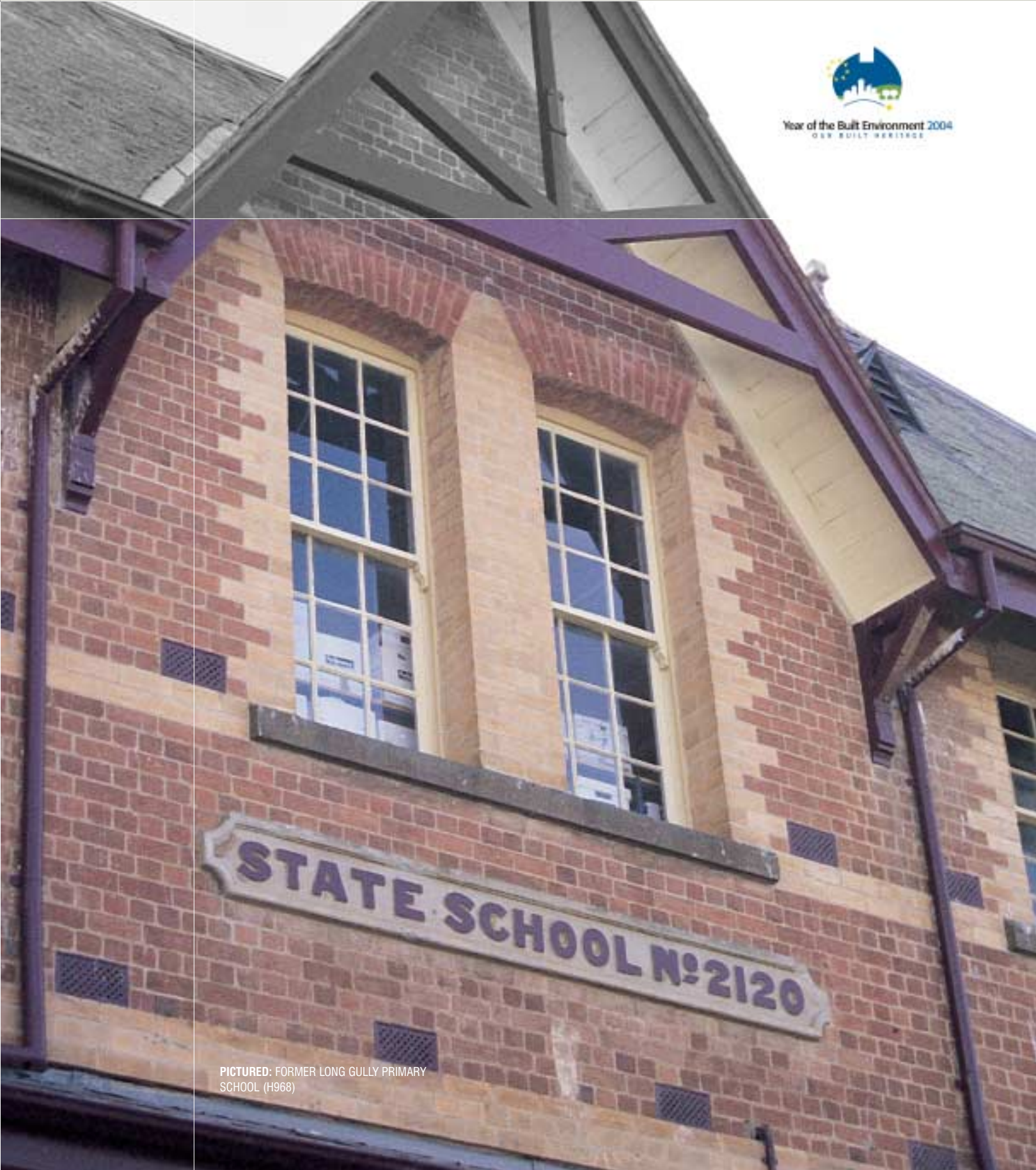




Inherit

HERITAGE COUNCIL VICTORIA MAGAZINE ISSUE 19 MAY 2004 www.heritage.vic.gov.au



PICTURED: FORMER LONG GULLY PRIMARY SCHOOL (H968)

Recognising the embodied energy in heritage buildings

By Sue Balderstone, Heritage Victoria

A particularly illuminating finding of his research is that, "...the energy embodied in existing building stock in Australia is equivalent to ten years of the total energy consumption for the entire nation."²

It has long been argued that there are environmental gains to be achieved through the maintenance and conservation of heritage buildings.

These buildings represent a major investment in natural and human resources. Maintenance and conservation drastically reduces or eliminates demolition and new construction waste, and conserves the embodied energy in the existing buildings. However, supporting this view with hard evidence has not been easy. Now that more studies involving the measurement and analysis of embodied energy in buildings and comparative life-cycle maintenance costs are available, it is possible to back up the assertion about environmental impact.

What is embodied energy?

Dr Selwyn Tucker of the CSIRO has defined embodied energy as, "...the energy consumed by all of the processes associated with the production of a building, from the acquisition of natural resources to product delivery, including mining, manufacturing of materials and equipment, transport and administrative functions."¹

A particularly illuminating finding of his research is that, "...the energy embodied in existing building stock in Australia is equivalent to ten years of the total energy consumption for the entire nation."²

In Britain, research conducted by the British Research Establishment (BRE), in a September 2003 report called 'Measurement of Residual Embodied Energy in Heritage Housing', has identified some very clear findings. The BRE's consideration of the energy inherent in materials and construction shows that a 'typical' Victorian period house contains energy equivalent to 15,000 litres of petrol which is enough to send a car round the earth five times, or half way the distance to the moon.

The British Government's Performance and Innovation Unit report, called 'Resource Productivity: Making More With Less' dated 2000, stated that, energy is consumed in the production of construction materials and bricks, cement and metals and in their distribution.

In fact the report went on to outline that, "...the energy produced from non-renewable sources consumed in building services accounts for about half of the UK's emissions of carbon dioxide. Over 90% of non-energy minerals extracted in Great Britain are used to supply the construction industry with materials. Yet, each year some 70 million tonnes of construction and demolition materials and soil end up as waste."³

This suggests that the upgrading or recycling of heritage buildings is an energy efficient option.

But it has been postulated that the costs of maintaining and occupying older buildings result in overall energy inefficiency. The English House Condition Survey undertaken in 2001, applied a Standard Assessment Procedure (SAP) to measure the energy efficiency of housing and concluded that post-1980 houses were nearly 50% more efficient than pre-1910 houses. This was thought to relate to the fact that over 80% of pre-1919 dwellings have non-cavity walls and therefore are limited in their ability to accommodate energy efficiency improvements.

However, research carried out in 2003 for the English Heritage Annual Review 'Heritage Counts', used a life-cycle costing approach and compared three properties of similar size but differing ages in the Manchester area, projecting maintenance costs over a 100 year period. The ages of the houses studied included a Victorian period house, an inter-war house and a 1980s house. **The results showed that older housing actually costs less to maintain and occupy over the long-term life of the building, when compared to more modern housing.** For instance, the Victorian period house was the most economical. The overall maintenance costs, when compared to the Victorian house, increased by 17.5% for the inter-war house, and by 18.4% for the 1980s house.

It is clear from these reports that the upgrading and recycling of older (at least pre-World War II) heritage buildings, makes a considerable contribution to environmental sustainability.

Historic terraces to showcase design, sustainability and best building practice

A pair of heritage terrace houses in Carlton is the star of a new renovation 'reality' television series and online communications program to promote and demonstrate good design and environmentally sustainable building principles.

The Terraces, a \$1.5 million project, is transforming two rundown houses into showpieces of contemporary living. It is intended to assist people to prepare for their next home improvement project by showcasing good architectural design, stimulating imagination and providing an in-depth look at the design and construction process.

A weekly segment on the Seven Network's Today Tonight program and a website (www.archicentre.com.au/theterraces) with a live web cam, a daily Architects' diary, a photo gallery and fact sheets, keeps the public informed of progress.

In providing valuable information on renovation, The Terraces complements the consumer and owner-builder awareness programs conducted by partners in the project, Archicentre, the Building Commission and the City of Melbourne. The three bodies are undertaking the project to celebrate the Year of the Built Environment, which was launched in February by the Premier, Steve Bracks.

The attached houses are a mirror image of each other. Located on Elgin Street, Carlton, they were built in 1866 and over recent years have fallen into disrepair. They were purchased two years ago by Archicentre, which then approached the City of Melbourne and the Building Commission with the renovation concept. The Council and the Commission had jointly been investigating a similar project, called "Future Home", over a number of years.

Mr Robert Caulfield, Managing Director of Archicentre, said Melbourne and its suburbs were undergoing continual change, including heritage areas. It was important that building design and construction was compatible with heritage controls while also providing opportunities for innovation.

Lord Mayor of Melbourne John So said the City of Melbourne had many heritage areas where renovation was taking place, with older homes being transformed. The council was committed to retaining Melbourne's residential history and streetscapes while encouraging innovative and sustainable design.

Building Commissioner Tony Arnel said The Terraces would provide Local Government and people wanting to renovate with information and strategies to plan and undertake well designed renovations. It would also demonstrate best building practice, including waste management and health and safety on the worksite.

The project has received town planning approval so architects Chris McSteen and Terence Nott will begin transforming the 19th century houses into examples of stylish, sustainable 21st century living with unique and innovative designs, providing a lasting legacy of the Year of the Built Environment. Work is expected to begin in mid-May with completion in late October, after which the terraces will be auctioned.

Follow progress of The Terraces at www.archicentre.com.au/theterraces and on the Seven Network's Today Tonight.

- Article provided by the Building Commission

¹ TUCKER, DR. SELWYN, 'EMBODIED ENERGY', CSIRO CMIT BROCHURES-TECHNOLOGIES EMBODIED ENERGY, [HTTP://WWW.CMIT.CSIRO.AU/BROCHURES/TECH/EMBODIED/](http://www.cmit.csiro.au/brochures/tech/embodied/)

³ BRITISH GOVERNMENT'S PERFORMANCE & INNOVATION UNIT REPORT, 'RESOURCE PRODUCTIVITY: MAKING MORE WITH LESS', 2000, UK.



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Published by the Victorian Government Department of Sustainability and Environment Melbourne, May 2004
Also published on www.heritage.vic.gov.au

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Authorised by the Victorian Government,
8 Nicholson Street, East Melbourne.

Printed by Hampton Press
Unit 7, 677 Springvale Road, Mulgrave VIC 3170.

ISSN 1448-6296

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