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Old buildings take the green lead

Updating existing building stock to become more energy efficient is the most effective way of reducing greenhouse gas emissions from the built sector – and it pays off in many ways. Robin Taylor reports on progress.

In an increasingly carbon conscious world, there is much emphasis on the creation of new 'green buildings' and infrastructure. But, with 98 per cent of Australia's existing office buildings built without sustainability considerations, people are starting to recognise the importance of improving this space, rather than using lots of energy to build new buildings.

A report by the Centre for International Economics in 2007¹ found that 23 per cent of Australia's greenhouse gas emissions come from buildings. This figure relates to operational emissions (energy used to power the buildings) and does not include the embodied emissions (generated to produce the steel and concrete etc used in construction). Of this total, 13 per cent of emissions were attributed to residential buildings and 10 per cent to the commercial sector.

While in the past, property owners have often taken the view that retrofitting buildings to reduce energy and water use is too hard or too expensive, rising energy costs and the introduction of environmental performance requirements by the federal and most state governments mean that owners increasingly have to comply to attract public sector and some corporate tenants.

Some of the major property owners in Australia have joined forces to take part in the Total Environment Centre's (TEC) Existing Buildings Project (see box), which will see almost 100 buildings in Australia's

major cities being upgraded to a National Australian Built Environment Rating System (NABERS) energy rating of either 4.5 or 4.0 by 2012.

Participants in the first tier include GPT Group, Macquarie Office Trust, Australian Prime Property Fund, the Local Government Superannuation Scheme (LGSS) and Brookfield Multiplex.

TEC Policy Analyst Cameron Eren says that by upgrading the energy efficiency of their buildings, owners are safeguarding their profit margins against rising costs while ensuring their buildings continue to have a market.



500 Collins Street in Melbourne is another office retrofit success story. Inset: modernised change rooms in the building. Green Building Council of Australia



Chief Executive of the LGSS, Peter Lambert, manages the fund's \$500 million portfolio of commercial, industrial and retail space.

He says LGSS has been improving environmental performance of its properties for at least five years, and being involved in the TEC project gives the organisation a chance to see what other property owners are doing.

'We're doing it mainly because we can see that it is the way of the future, but as a superannuation fund we must also be able to justify it on an economic basis.'

As part of its commitment to improving energy efficiency, LGSS requires renewing tenants to commit to green energy and has not lost any tenants through this condition. In fact, it could be seen as a positive move. 'We try to work with those tenants to find ways to reduce their total consumption to offset the higher costs of green energy,' says Mr Lambert.

TEC's Cameron Eren says property owners can take a number of actions to reduce energy use in the 'base building' which includes air-conditioning, lifts, foyer lighting and exterior lighting.

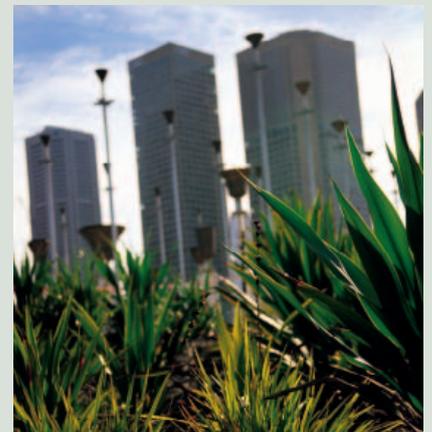
'The building owner has almost complete control over the base building (which controls about 50 per cent of the

¹ CIE (2007) 'Cutting GHG emissions: what the building sector can do'. <http://www.thecie.com.au/publication.asp?PID=74>



Trevor Pearcey House, the new head office of Australian Ethical Investment in Canberra. The building was over 20 years old when it underwent a complete overhaul focusing on simple, passive systems and reuse of materials. A 6 Star Green Star rating demonstrates that low-technology design principles and a modest budget of \$1.7 million can produce a leading-edge green building. Green Building Council of Australia

The building rating tools



A view to Melbourne's CBD from Birrarung Marr. City of Melbourne

Green Star is the widely accepted standard for design that awards a rating on the basis of a building's design features. In Australia it is administered by GBCA.

The National Australian Built Environment Rating System (NABERS) administered by the NSW Department of Environment and Climate Change (DECC) provides guidance for owners of existing buildings. It awards a rating on the basis of what the building achieves irrespective of design features.

According to Green Star and NABERS officials, the two rating systems are complementary. Green Star makes assumptions at the design stage, while NABERS Energy measures the validity of those assumptions in operating buildings. 'NABERS measures and compares the actual environmental impact of buildings, while Green Star rewards sustainable design choices. Both play a valuable role in moving the property industry towards greater sustainability, and are complementary,' says Matthew Clark, Manager Built Environment at DECC.

'The separate design and performance-based approaches of Green Star and NABERS potentially form a powerful feedback loop that can strengthen both tools, and we are working with the GBCA to develop a harmonised approach to help capture this possibility,' says Mr Clark.

However, most property owners and tenants of commercial office accommodation would prefer a single rating system, concludes a report by global real estate adviser DTZ. The report recommends the creation of a single rating system that incorporates all the elements of the two programs.



Tony Arnel, GBCA's Chairman, is seeing the benefits of green upgrades leading the market. Green Building Council of Australia

building's total energy use) and can also influence what the tenants do, for example by installing efficient lighting and sensors.'

The City of Melbourne's Buildings Retrofit Initiative targets existing building stock as part of the Clinton Climate Initiative. Lord Mayor Robert Doyle says the goal of the program is to retrofit 1200 commercial and apartment buildings (about two-thirds of the city's building stock) by 2020, reducing emissions in the municipality from 9.9 tonnes per worker to 4.1 tonnes per worker.

'Commercial buildings account for half of the municipality's carbon footprint, so improving their environmental performance will play a key role in achieving a carbon neutral status for the city,' he says.

In other initiatives, the City of Sydney has committed its operations – including buildings – to being carbon neutral from 2008 (through energy efficiency, renewable energy and offsets) and has aimed to reduce emissions by a further 20 per cent

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The environmentally considered interior of Melbourne's cutting-edge Council House 2, a new green building. Interior fit-outs and furnishings are a priority too. City of Melbourne

through energy efficiency by 2012.

The ACT Government has a target of carbon neutrality in its own buildings by 2011.

The City of Brisbane's Sustainable Development Grants for Offices program is a \$10 million investment that offers substantial incentives to developers who build best practice sustainable office buildings. Eligibility is linked to the Green Building Council of Australia's (GBCA) green star rating tools.

A number of other government grants for energy efficiency and sustainability may be relevant to building projects. The NSW Government climate change fund, for example, provides \$340 million over five years for households, business, government agencies, schools and local councils to implement projects that will save water or energy. Many building projects are eligible to apply.

The federal government is offering financial support for sustainable buildings through the Green Building Fund for commercial buildings, which allocates \$90 million in grants over four years (from January 2009) to reduce emissions from existing commercial buildings.

Of course, tenants themselves also have a role to play in improving operational energy efficiency and many organisations are signing up to programs such as CitySwitch Green Office, a national tenant energy management program run in partnership between the cities of Sydney, North Sydney, Parramatta, Willoughby, Melbourne, Perth,

Adelaide and Brisbane, and the Department of Environment and Climate Change, NSW and Sustainability Victoria.

More than 80 organisations, covering more than 830 000 m² of commercial office space, have committed to achieving and maintaining an accredited 4 stars or higher NABERS energy tenancy rating as part of the program.

The Australian Sustainable Built Environment Council has called on the federal government to take policy initiatives to support green buildings, including:

- accelerated depreciation of investment in plant and equipment that reduce emissions;
- introduction of tradable white certificates where consumers can sell the rights to verified energy efficiency improvements they make as a complement to the supply side emissions trading scheme; and
- public funding of building retrofit projects.

GBCA Chairman and Victoria's Building Commissioner, Tony Arnel, says property owners are starting to realise the opportunity to retrofit buildings and get real energy efficiency gains, water savings and better indoor environments.

'People are seeing it as a way of saving money, and the implementation of new technology into older buildings is a very clear way of getting returns on investment,' says Mr Arnel.

Dr Greg Foliente, Senior Principal Research Scientist in the urban systems program at CSIRO Sustainable Ecosystems, recognises there has been a good uptake of sustainability principles in Australia over the past few years, but believes we need

The Existing Buildings Project

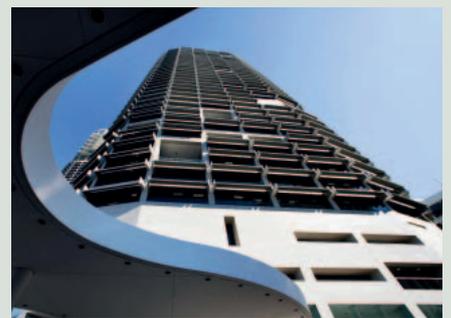
The world leading Existing Buildings Project is a landmark collaboration between the Total Environment Centre and Australia's commercial property sector aimed at driving voluntary emissions reductions in Australia's existing office buildings.

Through the project, Macquarie Office Trust, GPT Group, Lend Lease's Australian Prime Property Fund (APPF), Local Government Superannuation Scheme (LGSS) and Brookfield Multiplex have announced they will upgrade their entire Australian office portfolios to 4.5 NABERS Energy at base building level by 2012 – representing a 40 per cent reduction in emissions below the current market average.

Becton Property Group announced they will upgrade their office portfolio to 4.0 NABERS Energy by 2012 – equivalent to 30 per cent reductions below the current market average.

Taken together, these commitments relate to over 10 per cent of Australia's investment grade office stock.

Over the first half of 2008 the project



Partly due to energy use sub-metering, Brisbane's Riverside building moved from a 2 star NABERS Energy (2004) rating to 5 stars (2008) under the GPT Group's management.

GPT Group

brought together another 20 property groups to explore improving the energy efficiency of existing office stock.

The trusts in the leading tiers of the project will work with tenants to improve their energy efficiency and increase their use of zero emissions energy.

See www.tec.org.au.

to increase climate change mitigation for existing buildings and infrastructure. He refers to a conclusion by a United Nations Environment Program report on the necessary policy instruments to reduce greenhouse gas emissions in buildings, as 'carrots, sticks and tambourines'. In other words, incentives, regulations and awareness raising are all required.

But, Dr Foliente also believes more work is needed to determine which policy, regulatory and incentive options are most cost-effective.

'In the CSIRO zero emission house project, for example, we are developing a decision support tool to plan and/or assess the impacts of single or a set of options on greenhouse gas reduction in housing.

'The new stimulus spending set aside for infrastructure is one great opportunity to do the right thing to contribute to both mitigation and adaptation efforts,' he says.

Deputy Director of the Centre for Built Infrastructure Research at the University of Technology, Sydney, Professor Keith Crews, also welcomes the federal government's large spending commitments for infrastructure (the \$20 billion infrastructure Australia initiative was announced in May '08), but feels a fundamental change is needed in the way decisions about infrastructure (including buildings) are made.

'I believe there is a strong need for a triple bottom line approach which starts to put value on social and environmental consequences – including process energy and operational energy, not just making the decision on whether it is the cheapest option financially,' says Professor Crews. He would like to change perceptions about building materials, including the use of timber in commercial buildings.

'If you are looking at building forms that are going to reduce carbon emissions, you must have timber as a major building material. The green credentials of wood products can't be beaten in terms of process energy and carbon stored,' he says.

'There are many structures being built utilising concrete and/or steel where timber could do just as good a job structurally.'

TEC's Cameron Eren welcomes the industry's renewed focus on the life-cycle implications of construction materials and credits this with the 'growing focus on improving existing building stock, where "embodied emissions" are a sunk cost.'

He points to the superior environmental performance of existing building upgrades, a general 'can-do attitude' in the property

The Redfern Public Housing Green Star project

The suburb of Redfern in Sydney hosts Australia's first public housing redevelopment to pilot the 'Green Star' national standard for energy efficient residential buildings. It is one of six residential pilots underway nationally.

Developer Housing NSW spends around \$300 million on maintenance every year for 146 000 properties on its books. The intended 6 Star Green Star rating will save \$5 million annually, although it is a prototype process.

Two hundred and forty-six public and private apartments and houses are involved, with land for another 149 private apartments being sold to offset the project's \$28 million cost.

Sydney architects LFA are incorporating cross-ventilation within residences, insulation, thermally sensitive materials to ensure reduced energy costs in summer and winter, and, where possible, are positioning buildings for optimal sunlight. The project will also have solar lighting in communal areas,



An architect's view of the Redfern 6 Star redevelopment. Housing NSW

gas-boosted solar hot water heating, water-saving showerheads, rainwater tanks to wash clothes and flush toilets, native landscaping and on-site water recycling for gardens. Green electricity will not be sourced at this stage apparently because of cost issues.

These innovations will offset rising energy costs for poorer residents and develop knowledge and technology for other similar large-scale housing projects.

sector, and the strong commercial rationale for building upgrades as the principal drivers behind the wholesale movement on existing buildings that he sees underway in Australia.

'Most governments, and many large companies, now require that the buildings they occupy achieve a rating of at least 4.5 NABERS Energy. This is a significant share of the market and makes it likely that a two-tier office market will soon emerge along greenhouse lines.

'Those with buildings above the 4.5 NABERS Energy mark will lease to large corporate and government tenants, those with buildings below 4.5 NABERS Energy will not. Tenants willing to occupy sub-4.5 NABERS Energy buildings are likely to use their new-found market power to drive down the price on sub-4.5 floor space. It's only a matter of time until this flows through to asset valuations.'

The Property Council of Australia, a body that champions the interests of corporate property organisations in the political arena, is on board with 'green' upgrades, but advocates that financial incentives – such as specific green building grants or set depreciations on 'green' upgrades – are still needed to drive faster progress and avoid significant up-front cost burdens for its members.

Tony Arnel at the GBCA says, 'I take the view that we need a number of policy

instruments. Incentives, information to building owners, building designers, industry stakeholders, and regulatory instruments are all part of transforming the sector.'

In late March, The Warren Centre for Advanced Engineering released the 'internationally ground-breaking' 'Low energy high rise building research report', which showed that large advances in energy efficiency can be achieved without major capital expenditure on technologies. The three-year survey involved 127 buildings in Australia's capital cities, and extensive analysis covering the attitudes and energy management practices of tenants and building, asset and portfolio managers. The research identified that most buildings could achieve a 4 Star NABERS Energy base building rating solely through improved management practices.

More information:

Australian Sustainable Built Environment Council, www.asbec.asn.au

Green Building Council of Australia, www.gbca.org.au

Property Council of Australia, www.propertyoz.com.au

Sustainable Buildings and Construction Initiative, www.unepsbci.org

Your Building, www.yourbuilding.org