



CLOSING THE GREEN GAP – ARE WE THERE YET?

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The Property Council's Sustainable Property Conference on Wednesday 25 May 2011 is themed 'Closing the Green Gap'. Arup's Mike Rainbow questions the gap between current best-practice green design and future fitness-for-purpose considerations.

'Are we there yet..?' This familiar cry from the backseat has taught many of us that some economy with the truth may be prudent early into a long journey somewhere exciting.

But we're all grown-ups here aren't we?

The last decade has seen the Australian property sector make truly impressive green strides from a standing start, through a stodgy field of political and regulatory indifference. Last year we celebrated the arrival in Melbourne of the first building in the world scoring 100% against a whole building rating scheme. Grocon's Pixel building is a remarkable achievement that can be seen as a gratifying notch on the global bedpost of green building development.

This landmark effort consciously begs questions of 'what next?' Optimistically it may be a signal that our sector is ripe to embrace a new stage of maturity. Traditionally the thrill of the chase is expected to subside, overtaken by a desire for deeper meaningfulness

from a long-term relationship with our conquests.

On Valentine's Day this year Shell released a notable foresight report entitled *Signals and Signposts*.¹ Whilst side-stepping the emotive phrase 'peak-oil' it ends a long period of neutrality on future energy scenarios. In common with other major global institutions it anticipates periods of significant volatility ahead, predicting the likelihood of shock increases with delay in climate policy action. The same week saw Wikileaks revelations of overstated Saudi oil reserves, a return to triple-figure oil prices, and the Royal Academy for Engineering publishing a report highlighting national economic benefits as a result of early preparation for climate change.²

Shell identify a 'zone of uncertainty' caused by the anticipated tripling in energy demand between now and 2050 triggering a 'zone of extraordinary opportunity or misery'. It is worth emphasising that all this occurs well within the lifetime of the buildings we're currently designing.

Our legal obligations as property professionals are based around the notion of 'reasonable foreseeability'. Regardless of personal persuasions it is likely that both acute resource scarcity and climate change would be deemed 'reasonably foreseeable' in 2011 by future arbitrators.

Buildings that score highly against today's rating tools are unquestionably great for today's market and likely to be more amenable than average to future trends. We've yet to acknowledge though, an emerging wider duty to deliver buildings that are resilient and/or adaptable to a range of plausible future scenarios, however unpalatable. Australia's recent flood and cyclone related events may serve to emphasise this.

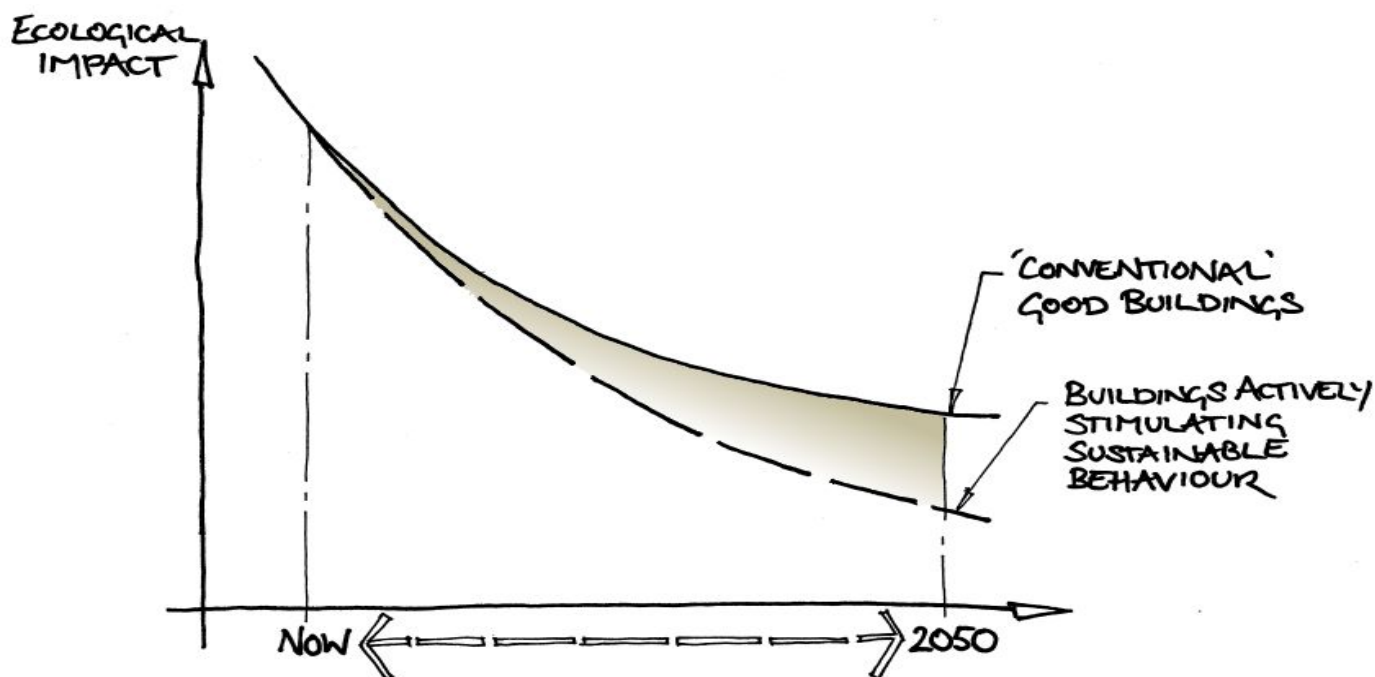
Oil is one of many essential resources expected to approach critical availability peaks in the next couple of decades. We need to do more with less. Melbourne's new Rectangular Stadium at AAMI Park stands as a prominent example of roof design utilising half the material of more conventional solutions, such as its Melbourne Cricket Ground neighbour. It is possible.

We can anticipate that before the decade is out we may need to shift focus from *efficient* design to *sufficient* design, particularly in the arenas of energy and comfort.

1. 'Signals & Signposts: Energy Scenarios to 2050', Shell International BV, Feb 2011. www.shell.com/home/content/aboutshell/our_strategy/shell_global_scenarios/signals_signposts/

2. 'Infrastructure, Engineering and Climate Change Adaptation – Ensuring Services in an Uncertain Future', Engineering the Future, RAEFeb 2011. www.raeng.org.uk/adaptation

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In 2002, a European Union directive on energy performance of buildings caused member countries to commit to a trajectory towards 'zero-energy' buildings by 2020. This mandatory roadmap has given property markets, their investors and global supply chains a crucial level of certainty and lead-time.

The 2006 UK building regulations required a 25% reduction in carbon emissions relative to 2002. Last year's version required a further 25% cut. With each revision industry economists forecast cost premiums of up to 5% to achieve these goals. In reality, designers and suppliers have proved remarkably resourceful with delivered cost premiums frequently being negligible. A similar response can be seen with the 5 Star Green Star benchmark in the Australian commercial sector.

Technological advances over recent years mean we can deliver cooling systems (for example) more efficiently than ever before. Application of advanced materials helps us engineer facades of unprecedented performance. If desired, both can be delivered without your casual bystander being aware that anything has changed. But this approach, in isolation, has an expiry date looming. Meeting each new wave of targets efficiently requires more expansive

thinking and a more collective determination from the team. W. Edwards Deming told us, "It is not necessary to change. Survival is not mandatory." We risk being negligent if we don't actively anticipate an era when traditional definitions of value, comfort, convenience or even quality are challenged. The graph highlights the law of diminishing sustainability returns associated with linearly increasing effort over time. Conventional sustainability efforts give us a flying start but, as we move closer to truly sustainable standards, real-world effects become increasingly significant. One of these is the 'rebound effect'. This phenomenon was first described in 1865 when the invention of a more efficient steam engine caused an increase in coal consumption due to reduced running costs.

A loose behavioural analogy from the motoring world may help. This year ordering a hybrid car may be considered commendable and plenty green enough. Once peak-oil kicks in (or comparable geo-political effects) our behaviour associated with such products becomes significant, for example, how we drive it, how often, air-con usage and car-sharing. Top Gear's Jeremy Clarkson recently demonstrated that BMW's M3 is more fuel-efficient than a Toyota Prius (when driven together round a racetrack

at the Prius' top-speed). Behaviour that's not aligned with design intent produces warped results.

Unlike car choices, building design decisions last for decades and so require greater foresight. How we design buildings that stimulate sustainable behaviour change remains relatively untrodden ground. Key stages toward changing behaviour are Awareness, Intent, Action and Habit.

Architectural legibility of a building's highly sustainable intentions is currently undervalued in increasing Stage 1, Awareness. This motive should influence both external and internal design in terms of form, materials and mood. Melbourne's Council House 2 building is an example that is purposefully 'green' in its rendering.

This can be particularly valuable in the arena of adaptive comfort for example, as passive Heating Ventilation and Air Conditioning (HVAC) solutions require more leeway than usual in terms of both comfort expectations and response. Achieving engagement and buy-in from occupants and facilities management is set to be more important than ever. Melbourne City Council are currently implementing innovative employee agreements linking salary increments to attainment of sustainability KPIs related to energy, waste and transport.

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Notable developments further afield include new Spanish regulations that came into effect in December 2010 limiting the internal temperature of non-residential spaces for both new and existing buildings to a maximum of 21°C in winter and a minimum of 26°C in summer. Such policies can be expected to trigger more discontent in slick, heavily-glazed, sealed-façade environments than those where façade and soffit radiant exposure have been optimised, and opportunities provided for individuals to moderate their environment. These latter characteristics are, of course, intrinsic to vernacular architecture of the region.

An underexplored area linking an occupant’s awareness of ecological impact to intent and action is that of ‘Informatics’. This term covers a huge range of communication opportunities across either building or urban scales. These aim to enhance behavioural outcomes by providing real-time visualisations of sustainability factors that can influence choices. Feedback may be related to energy, carbon, comfort, water and waste.

Realising outstandingly successful sustainable buildings, communities

and cities is a multi-disciplinary life-cycle journey that’s about relationships. Major geo-political events show an increasing tendency to intrude on contented relationships in ways that make the proverbial mother-in-law look harmless.

We’ve flirted with green design for several years now, with some success. But are we ready for commitment - in sickness and in health?

Arup propose to embrace a new cultural era – the Ecological Age³. Getting there by 2050 requires setting off now. Suitable provisions for the trip may include snow chains, travel sweets and perhaps a small sick bag for those in the back seat, in order to arrive as happily as intended.

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Informatics is an area targeted by Arup for ongoing global research and development. Arup’s Melbourne office is a hotspot for this activity - recent outcomes include the development of a series of interactive touch-screen



displays being rolled out across its Australasian offices, generating live behaviour related visualisation. Current content includes co-located live transport updates, associated impacts and local weather advice that seek to influence spontaneous and planned transport choices of staff. The intention is to stimulate and record positive behavioural change. Feedback will help focus ongoing refinement and development.

3. www.arup.com/Publications/Entering_the_Ecological_Age