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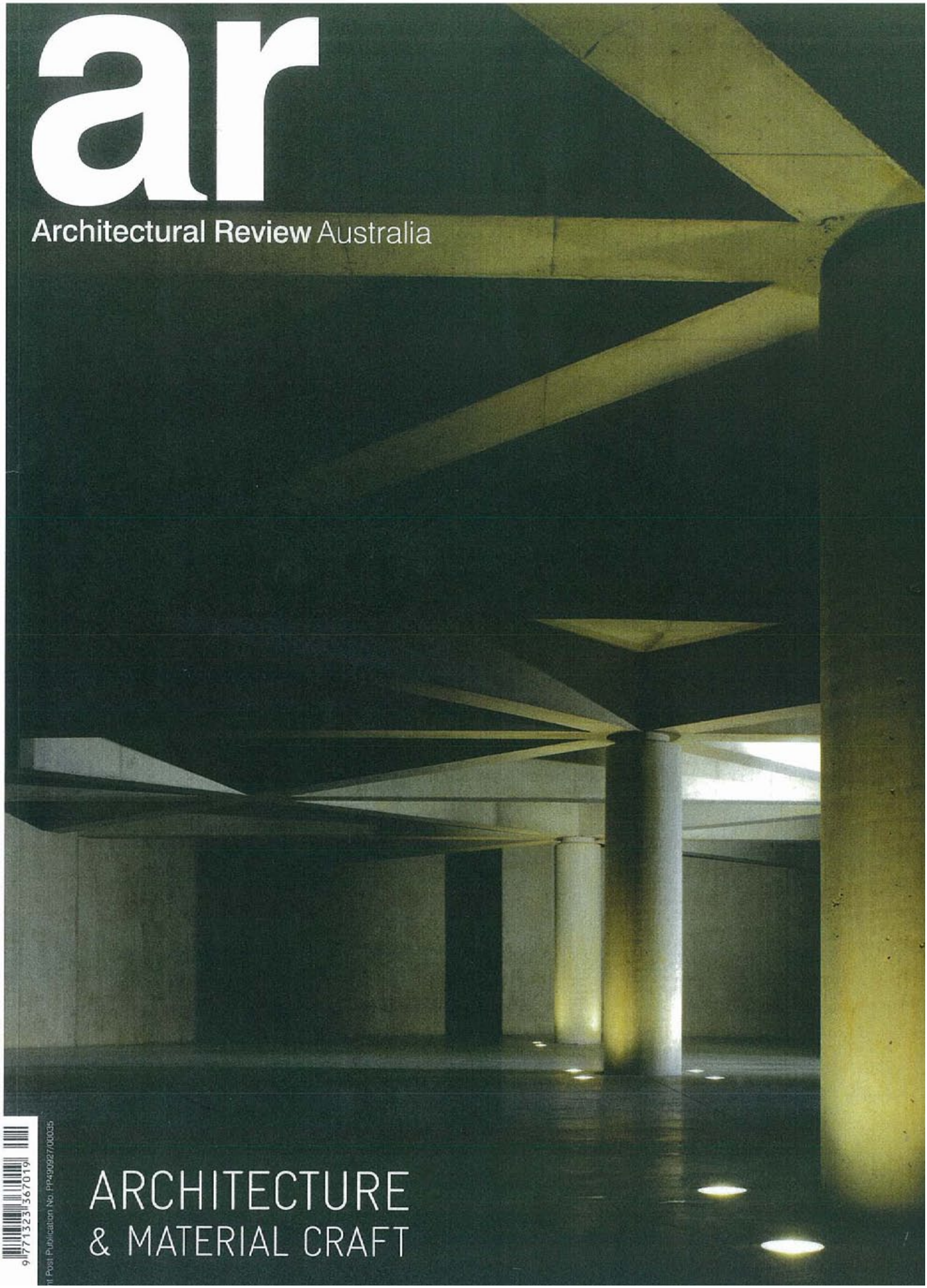

ARCHITECTURE & MATERIAL CRAFT

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HOW GREEN IS GREEN?
MEASURING SUSTAINABILITY

text Tone Wheeler

Green ratings for residential and commercial buildings are set to become mandatory under a new federal government program. As Tone Wheeler describes, however, the development of an effective ratings system will be fraught with challenges – especially given the government's poor track record in green policy implementation to date.

How green is green? Is your building emerald, jade or just greenwashed lime? Sustainable design, once a moral movement of good intentions, now requires metrics, a way to measure the environmental contribution of any building. In the next two years Australia will undergo a revolution in the requirement for green certification, particularly energy efficiency and greenhouse gases (E2G2), but there are questions about our preparedness for such a change. What are we trying to measure, do we have the tools to measure it, and what do we do with the results once we have them?

In any debate on green a definition of sustainability is a good starting point, if only one was easily obtained, let alone how it relates to building design. The current debate is heated, particularly in academic journals, but we can summarise current practice in the acronym FEWA: Fire/Earth/Water/Air (the four elements that Aristotle believed made up the world, which we apply to green design as energy, water, materials and footprint – see *AR111*). Over the past 30 years there have been many attempts to codify these issues in order to compare designs, verify claims of greenness, set benchmarks, and then certify the building. This last has given rise to the idea of 'star ratings', and the best-known tool used in Australia is indeed called Green Star (see *AR114*). This certification, like others such as NABERS (see below), has remained voluntary until now and has thus been relatively marginal, but all that is about to change with a new program from Australia's federal government.

Called BEEC (Building Energy Efficiency Certification) it targets existing residential and commercial buildings, which equally contribute about 10 percent of Australia's E2G2 output. A rating certificate will be required when a dwelling is sold or when a commercial building over 2000m² is sold or leased. It is being introduced in two stages, the Commercial Building Disclosure (CBD) program was launched on 1 November 2010, and the residential program, previously misleadingly referred to as 'Mandatory Disclosure' (the 'of Energy Efficiency' was often omitted in bureaucratic speak) is being introduced on a state-by-state basis over the next two years. The intention in both programs is the same: to disclose to the buyer (or lessee) of a building what its likely environmental performance will be in regard to energy in particular.

The program is admirable, as we shall see, but in order to see where things are coming unstuck we need to look at the motivation behind the government's push for green certification. The reasons are broadly twofold: 'green statistics' and 'green jobs'. The desire for the former can be traced back to the Kyoto Protocol of 1997, which was the first universal attempt at codification to reduce climate changing greenhouse gases. The initiatives were to rest on two pillars: changing energy sources to less polluting energy generation systems, and reducing energy demand by increasing efficiencies. Australia has been recalcitrant in both areas. Any real commitment to new energy sources has been thwarted by the coal lobby in two related ways: the promotion of the dubious idea of CO^2 sequestration has allowed the continuation of 'business as usual' and hindered innovation in alternative power generation. 'Big ticket' base-load systems, such as geothermal and solar-thermal, need government support to get established, but this is currently being misdirected towards coal. [01]

So without a commitment to changing energy sources, the federal government is forced to put greater emphasis on the second part of the protocol: energy efficiency. The process was begun under the Howard government, albeit under a rather neutered Australian Greenhouse Office, and it has been significantly ramped up under the Rudd/Gillard governments' various, and mostly disastrous, initiatives. [02]

But there is a fundamental problem: we have little idea of what our current E2G2 building performance is. Without that baseline, and therefore an understanding of what capacity for savings there might be, how can we realistically commit to achieving any reductions in E2G2 through energy efficiencies? So a survey of the current situation has been urgent for some 10 years: that's the 'green stats'.

To gather that data, and implement the required changes, we will need an army of well-trained experts in sustainability: the so-called 'green jobs'. This was accentuated under the incoming 2007 Labor government with its response to the GFC: an ESP, with a BER [03], not to mention the doubly dammed roof insulation program (see *AR113*). But the initiative that gives us most cause for concern for the future of the BEEC is the Green Loans Program (GLP), initiated with great fanfare by Energy Minister Peter Garret in 2009.

The GLP sought to provide a 'green assessment' of individual dwellings that would set out a series of initiatives that the homeowner could undertake to increase sustainability and decrease E2G2 – with the larger ones, such as solar water or PVs, being subsidised by a 'no-interest green loan' that gave its name to the program. The intentions were initially modest: some 2000 assessors would be trained, and they would do assessments

on 600,000 dwellings over three years, but the program was so poorly set up and administered that it was swamped with 10,000 assessors being 'trained' in six months, who so rapidly consumed the funds set aside for the program that it had to be heavily modified, and then closed down in ignominy, by Minister for Climate Change and Energy Efficiency, Greg Combet in December 2010.

There are two salutary lessons here, for the residential BEEC in particular: firstly, there needs to be a robust certification program, the science must be trustworthy; and secondly, the assessors must be well trained, for the accuracy of the program depends on their expertise. The Green Loans program had no such robustness. One organisation that the government turned to for advice on Green Loans was ABSA (Association of Building Sustainability Assessors), an NGO set up in 2003 to administer the NatHERS program (see *AR114*). Given its experience with NatHERS over the years, ABSA recommended that the new assessors have some building industry knowledge, be well trained in a certified course, and that the certificate be based on rigorous data and algorithms. The government disregarded the advice, mostly because of the haste to implement the program. The assessors often had no prior knowledge whatsoever, needed only to sign up to a four-day course that was hastily cobbled together and that was delivered by a variety of organisations, some of which presented the course in two days. The report (not a certificate) was generated from data gathered by those assessors based on a simple questionnaire filled in at a quick visit to the house. The answers were then codified in Canberra by a centralised program. Neither the data, nor the program, was reliable, and the results were so awry that many homeowners could see that the advice was therefore flawed.

The program to date for the BEEC for commercial buildings has largely avoided these pitfalls, but there is a danger that some of these mistakes could be repeated in the residential BEEC.

Under Commercial Building Disclosure (CBD), a BEEC certificate is produced mostly by using NABERS (National Australian Built Environment Rating System), a robust program that has been developed over more than 15 years, which already had a recognised system for training and accreditation of assessors. Importantly, the usage patterns of most commercial buildings are relatively consistent and stable, so the data collected from one occupier, used to calculate the BEEC, can be relied on by the new occupiers to give a fair indication of expected energy efficiency.
None of those arrangements pertain to the residential sector however. Critically, the energy use in individual dwellings can vary dramatically, depending on occupancy, lifestyle and usage patterns. For instance, a retired couple with modest needs would use a house entirely differently from a family of five with teenagers, and the pattern of energy use for thermal comfort, water heating, lighting etc. would be entirely different. Relying on a year or more of data, the basis of a NABERS rating, won't work. So a baseline tool, with consistent assumptions, that allows apples to be compared with oranges is needed. We already have such simulation software, generically called NatHERS (National Housing Energy Rating Scheme). Despite its limitations (see *AR114*) it has a similar profile to NABERS: years of development (i.e. lots of early bugs resolved), with well-trained and accredited assessors. It is now incorporated into the BCA as the basis for compliance for thermal comfort in new buildings, although not all states have yet adopted the regulations.

One irony from the Green Loans fallout is that the expected development of 'green jobs' has gone backwards. The peak accrediting organisation for NatHERS to date has been ABSA, who had about 400 accredited NatHERS assessors in 2009. With the addition of Green Loans assessors, whom the government asked ABSA to administer, the numbers swelled to almost 10,000. However, when the Green Loans program failed, many of those assessors sought compensation from ABSA and an exit from the industry, rather than seeking an opportunity to upgrade their limited training to the more comprehensive NatHERS in anticipation of the residential BEEC.

The chequered history of NatHERS is but one reason that the implementation of a national residential BEEC system has stalled, and it now seems likely that a state-by-state system will be implemented. Despite the early success of the national CBD scheme, with the transitional year underway, the recent failure of the Green Loans program in particular has meant that the states are being cautious about residential BEEC.

Nevertheless a form of residential energy efficiency mandatory disclosure, using NatHERS, has operated quite successfully in the ACT for some years, and most states have been studying that model for their own schemes. What they are finding is that the NatHERS program, which was already well established in the Australia Capital Territory (partly because it has always given reasonable results in a cool temperate climate), requires not only the support of well-trained assessors but also adaptation to their particular requirements. In other words, well-trained 'green jobs' that are collecting meaningful 'green stats'. **ar**

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[01] This is something that the nuclear lobby conveniently forgets: the depth of subsidy required to start a nuclear power station far exceeds that being requested by the low-to-no CO^2 sources such as geothermal, solar-thermal wind and tidal power.

[02] Not that the current opposition has learnt from past mistakes – it is still proposing to achieve promised greenhouse gas reductions solely from energy efficiencies which, as the Greens point out, is mathematically impossible if significant cuts are to be made.

[03] More TLAs: Global Financial Crisis, Economic Stimulus Plan and Building Education Revolution. Oh, and TLA? Three Letter Acronym.