Australian non-domestic buildings policy as an international exemplar

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ABSTRACT

The Australian policy approach, based on the NABERS energy performance benchmarking scheme for commercial offices, is promoted as a 'success story' and is of interest to governments internationally. This paper explores the evidence for the impacts of the Australian approach on energy use and carbon emissions, identifies the key elements of its conception, design and implementation, and investigates the role of government. It uses a mixture of literature review, re-analysis of quantitative data and analysis of 30 original stakeholder interviews. The literature suggests that NABERS' appeal to multiple benefits of energy efficiency and its place in the wider policy mix should help deliver positive results. Analysis of publicly available data has highlighted data gaps. However, evidence suggests significant energy savings have been made, although the attribution to NABERS alone, given the policy mix, is uncertain. The interviews show high levels of agreement that the policy mix has transformed large commercial office buildings. They also highlight the wide range of actors mobilised to deliver this change and the central role of well-designed government intervention and support. The Australian experience is rightly of interest to international governments, but they must recognise that replicating its success requires attention to detail and long-term commitment.

POLICY RELEVANCE

The decarbonisation of commercial buildings is challenging and many countries, including the UK, are struggling to make progress. In-use performance benchmarking policies such as NABERS are considered to be effective by engaging with industry and promoting the multiple benefits of energy efficiency. The lessons from the Australian experience help to identify four key policy design features for governments to consider: (1) political leadership, adequate financial resources and people with the right engineering and

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market skills and experience; (2) an in-use performance benchmark designed to allow industry to innovate and aligned with the way both buildings and energy managers operate; (3) the careful and progressive application of government interventions to tackle poor performance without compromising the voluntary nature of the policy; and (4) a governance model to give industry effective, but measured and proportionate, influence over the design and implementation of the policy.

1. INTRODUCTION

Carbon emissions are not declining at the rate required to deal with the climate emergency. Reducing emissions from non-residential buildings is an essential part of the response because, globally, the sector is responsible for 8% of energy-related CO_2 emissions (GABC *et al.* 2019). Evidence about policies that successfully deliver emission reductions is therefore of considerable practical value to both policymakers and researchers (IPEEC 2014a).

This is particularly relevant to the UK, where past successes in reducing emissions have recently begun to falter (Mallaburn & Eyre 2014; CCC 2018). Commercial buildings are a concern because, unlike homes and industry, emissions have not reduced and in recent years may have even begun to rise (Mallaburn *et al.* 2019). As a result, policies to address the sector are at the centre of the government's developing plans for new policies and programmes (BEIS 2019a).

The UK government launched a formal consultation on a new in-use energy performance benchmarking scheme for large buildings in March 2021 (BEIS 2021). Benchmarking is a popular policy: by 2018 it had been adopted in 85 countries (GABC *et al.* 2019). The government's thinking has been strongly influenced by the Australian government's policy approach,[1] key elements of which are the mandatory disclosure of operational energy performance of office buildings >1000 m² under the Commercial Buildings Disclosure Act (CBD) (Australian Government 2017) based on a benchmarking tool called the National Australian Built Environment Rating System (NABERS) rating tool (BEIS 2019b).

The Australian approach has assumed exemplary status and is widely considered to have transformed the Australian office market (IPEEC 2014b). NABERS has been licenced for use in New Zealand and trialled in India, Hong Kong and Indonesia. The UK Better Buildings Partnership (BBP), representing leading sustainable office developers and owners, has assessed the suitability of a NABERS-style approach for new office buildings in the UK (BBP 2019; Bordass *et al.* 2016) and a UK version of NABERS was launched in November 2020 (NABERS 2021).

There are no peer-reviewed studies on the suitability of NABERS and the wider Australian policy approach as a model for adoption by other countries. This paper attempts to fill this gap by addressing three research questions:

- What has been the impact on energy use and carbon emissions and on the sector generally?
- What are the key features of the conception, design and implementation?
- What role has the government played using policy measures and its relationship with industry?

Although we hope this paper has broad applicability in the non-residential sector, the focus is on existing offices >1000 m² because these are the parameters underpinning both the Australian and the nascent UK policy approaches. We do not directly address new buildings or other subsectors such as retail or hospitality. The discussion and conclusions sections contain comments on the merit of the Australian system and set out general lessons for the UK and other countries, but we do not comment on how in-use benchmarking might work in the UK policy environment.

This paper comprises a short review of energy performance benchmarking and how it has been applied in Australia, a methodology covering the techniques and approaches used, and a discussion of the results in relation to the research questions. A conclusion section summarises the findings and makes several policy recommendations.

2. LITERATURE REVIEW OF BUILDING ENERGY PERFORMANCE BENCHMARKING

2.1 BENCHMARKING IN GENERAL

Benchmarking compares the energy performance of a building with other similar buildings and best practice. There are two types. Operational schemes, such as NABERS, measure in-use performance in terms of energy use or CO_2 emissions, typically as a function of area. The second type, asset-based benchmarks, uses predictions at the design stage compared with a reference building built to specific standards. Benchmarks can also vary significantly in terms of the metrics used and how the building and its services are assessed (Bordass 2020). Current UK policy is based on asset ratings in the form of Energy Performance Certificates (MHCLG 2013).

Countries apply benchmarks in different ways. They can be voluntary, acting simply as information tools. More typically, some degree of coercion is used by requiring their disclosure at the point of sale or lease of a property, or by setting minimum performance standards for certain buildings such as those owned or occupied by the government. In some countries, including Australia and the US, schemes that began as voluntary became mandatory once established, whereas in the European Union (EU) disclosure has always been mandatory (IPEEC 2014b; Burt *et al.* 2015).

The current UK policy debate centres around the relative merits of operational and asset-based benchmarks. Asset-based ratings are relatively simple to use but they are thought to contribute to the 'performance gap', where the in-use efficiency of the building can be significantly lower than intended because of a lack of a feedback loop between design and operation (Cohen *et al.* 2017). Operational benchmarking can help to overcome these issues (Liddiard *et al.* 2008; Hong *et al.* 2013) and the NABERS approach was considered by the BBP to be particularly effective in this respect (Bordass *et al.* 2016).

2.2 HOW DO BENCHMARKS WORK?

Benchmarking works by providing market actors with information about the energy performance of the building. In the mid- to late 2000s, sustainability became a key differentiator in the real estate market leading to increased interest from tenants, owners, investors and developers to demonstrate their environmental credentials. By making energy performance visible and understandable, benchmarking allowed these actors to distinguish the most efficient buildings from the rest of the market (Palmer & Walls 2017).

Benchmarking is also useful for actors within an organisation. For all but the most energy-intensive companies, energy use is marginal and delegated to energy and facilities management teams. By exposing poor performance relative to the competition, benchmarking raises the salience of energy, especially if disclosure is mandatory (DECC 2012; Mallaburn 2018; Cohen & Bordass 2015). This gives agency to the energy manger, attracts the attention of the board and makes investments in energy efficiency much more likely.

There is some evidence that benchmarking policy, and the implementation of minimum operational performance standards more generally, can have a positive impact on the retrofit supply chain, both internationally and specifically in Australia (RAP 2020; Energy Action 2016). Having to focus on actual performance means that specialists such as engineers, contractors and facilities managers need to upskill to identify and deliver the improvements in annual energy efficiency needed to meet the benchmark standards.

But why does a relatively simple information tool have these effects? A key barrier to investment in energy efficiency is the low value to the company of the potential savings and hence the return on the investment. The concept of 'multiple benefits' (IEA 2014) argues that other, non-energy benefits can be significantly more valuable to organisations (Ürge-Vorsatz *et al.* 2015), offering 'meaningful monetary contributions' in the case for investment in office retrofits (Bleyl *et al.* 2019).

Energy-efficient buildings have been associated with increased corporate reputation, staff health and welfare, and productivity (WGBC 2018; Businge *et al.* 2019; IEA 2014). Studies in the US and the UK have identified a 'green premium' associating high energy performance with asset value drivers such as increased rental income and lease length (Eichholtz *et al.* 2010; Fuerst & McAllister 2010).

This effect was also seen in Australia (Warren-Myers 2018) with a study by the Australian Property Institute finding a 10% premium for highly rated NABERS buildings (Newell *et al.* 2011, 2014), although this correlation has been disputed (Gabe & Rehm 2014). Nonetheless, the investment community took notice in 2006 when the Property Council of Australia made a 5-star NABERS rating a requirement for Prime and A-rated offices, its two most prestigious quality benchmarks. NABERS is now considered to be an important reason why Australia performs strongly in international rankings such as the Global Real Estate Sustainability Benchmark (GRESB) (2019).

2.3 BENCHMARKING IN CONTEXT

Information on its own is rarely enough to trigger material change. Policymakers usually make benchmarking part of a policy mix where multiple instruments simultaneously address complex policy objectives (Gunningham & Sinclair 1999). Getting the balance right is important because some measures work well together, whereas others can cancel out or conflict (Kern *et al.* 2018; Rosenow *et al.* 2016; Wiese *et al.* 2018). Energy taxes, performance standards and information programmes are generally complementary, whereas different types of financial measures can over-subsidise the energy user (Rosenow *et al.* 2016).

The optimal policy mix for commercial buildings is reasonably well understood. Information tools such as energy audits and benchmarking are typically implemented alongside building codes and minimum performance standards to remove the worst performing buildings from the market. Governments exert leverage by requiring disclosure and ensuring that public buildings meet minimum performance standards. Financial incentives are used to overcome the additional capital cost associated with an energy efficient project (IPEEC 2014b, 2017).

2.4 BENCHMARKING POLICY IN AUSTRALIA

NABERS originated in New South Wales (NSW) in 1998 as the Australian Building Greenhouse Rating (ABGR) before being incorporated into the Federal NABERS scheme and extending nationwide in 2009 (Pears 1998; Bannister 2012). The ABGR was conceived and designed by the Sustainable Energy Development Authority (SEDA), a statutory agency set up in 1996 to implement the environmental policies of the NSW government (Government of New South Wales 1995).

Energy performance was originally represented on a 1–5-star scale, with 2.5 stars representing average performance and 4.5 stars industry 'best practice'. As the performance of the stock improved a sixth star was added in 2011 marking the halfway point between 5 stars and net-zero carbon emissions. NABERS is based on 12 months of metered energy data adjusted for local weather conditions and hours of use and converted to carbon emissions and normalised by floor area (Bannister 2012; Bannister *et al.* 2016; CIE 2019).
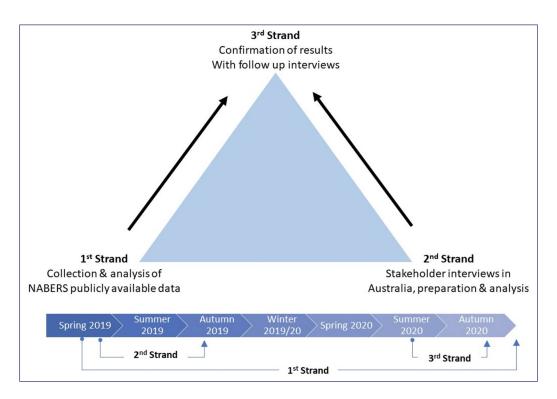
NABERS is unique in that, as well as rating the building as a whole, it also separates the 'base building' controlled by the landlord from the space occupied by the tenant. It primarily focuses on existing offices, and in the 20 years since it was introduced it has been applied to 3586 buildings at least once (NABERS 2020). In 2019/20, a total of 1952 ratings were carried out. NABERS has been extended to cover new offices, apartments, hospitals, data and shopping centres, and for water use, the indoor office environment and waste. However, office energy ratings dominate the scheme.

NABERS, as the ABGR, began as a voluntary scheme. However, in 2004 the NSW government set 3.5 stars as a minimum standard for its own offices and extended this nationwide in 2006 (Government of New South Wales 2008), tightened to 4.5 stars and applied to all new government buildings, major refurbishments and new leases >2000 m^2 (Australian Government 2020).

In 2010, NABERS was effectively made mandatory for offices >2000 m² under the CBD (Australian Government 2017). This required a Building Energy Efficiency Certificate (BEEC) to be published on sale or lease. Each BEEC was made up of a NABERS Base Building rating and a tenancy lighting assessment. The threshold was reduced to 1000 m² in 2018.

3. METHODOLOGY

A mixed-method approach was used to address the research questions in three interlinked strands (**Figure 1**). Strand 1 collated and analysed publicly available NABERS and CBD reports and impact assessments. Strand 2 addressed the second and third research questions by collecting primary qualitative data through semi-structured interviews with a range of Australian stakeholders. Strand 3 cross-checked the preliminary results from Strands 1 and 2 using follow-up interviews.

Figure 1: Strands 1–3 of the mixed-method approach as carried out in the study.

3.1 PUBLICLY AVAILABLE IMPACT DATA (STRAND 1)

Data on the impact of NABERS over the life of the scheme were extracted from the official NABERS online portal (NABERS 2020). This holds data on all NABERS ratings in several formats, from the original annual report pdfs to online presentations. The more recent reports also contain 'life of programme' statistics going back to the start of the ABGR.

Four datasets were analysed using MS Excel to investigate the impact on three metrics over the life of the programme: star ratings, CO_2 emissions and market coverage.

- The 'certified buildings & tenancies' dataset was analysed to show the number of buildings with ratings of either ≤4 or ≥4.5.

- The 'office energy market penetration' dataset to show the proportion of the office market with a NABERS rating.

- The 'annual carbon intensity' dataset to show the carbon reduction over time.

- The 'distribution count of office energy ratings' dataset to show how annual star ratings change over time.

Our analysis used simple averages to produce the mean star rating based on number of ratings for a given year, in contrast to the NABERS approach, which was last mentioned in 2016 (NABERS 2016), of weighting average by floor area. A simple average was chosen to treat all buildings equally and to avoid giving relative importance to larger buildings based on their floor area.

The analysis also took account of the two formal impact assessments of the CBD and NABERS carried out by the Federal government in 2015 and 2019 (Acil Allen 2015; CIE 2019). These examined a wide range of data to assess the impact, additionality and cost-effectiveness of the policy, and to make recommendations on its development. Much of these data are not publicly available.

To provide context we also reviewed several government and third-party reports examining the impact of the policy on the broader market (IPD & DOI 2013; Gabe & Rehm 2014; Newell *et al.* 2014), or to provide detail on the Australian non-domestic buildings market (Ernst & Young 2015; Ostwald *et al.* 2015; Department of Climate Change and Energy Efficiency 2012).

3.2 STAKEHOLDER INTERVIEWS (STRANDS 2 AND 3)

Strand 2 involved 20 face-to-face interviews with Australian stakeholders familiar with the development, management and impact of NABERS and the Australian policy mix. The interviewees were selected to provide a range of opinions from State and Federal government and its agencies, building owners, developers and tenants, trade and professional bodies, and market specialists and consultants (*Table 1*).

INTERVIEWEES		*N*
Government	Civil servants from the New South Wales (NSW) Department of Planning, Industry and Environment	3
	Former NSW civil servants who helped set the scheme up in 1998–99	2
NABERS	Representatives from the current NABERS senior management team	5
	Former special advisor to the premier of NSW in 2003–04	1
Building sector and property market	Australian property developers and building owners	3
	Representatives from the Australian Property Institute, the Australian Energy Efficiency Council and the Green Building Council of Australia	3
	Representative from *thefifthestate.com*, a sustainable built-environment website	1
Academia	Academic and consultant involved with the design of the original Australian Building Greenhouse Rating (ABGR) scheme	2
Total		20

Table 1 Interview number by stakeholder type carried out in Australia.

The interviews were carried out in Australia over the summer of 2019. They were structured following an interview guide to ensure the three research questions were covered. The interviews were open-ended ensuring that the data gathered fully addressed each interviewee's expertise and interests (Cassell & Symon 2004) and to reflect the fact a given individual was unlikely to have considered views on all the research questions.

Each interview lasted between 40 and 60 minutes. Detailed notes from each interview were systematically archived and anonymised following research ethics procedures. Content analysis was used to examine the answers to collate the views of interviewees and ascribe them to different market perspectives shown in *Table 1*.

For Strand 3 the preliminary findings from Strands 1 and 2 were used in follow-up interviews (*n* = 10) to cross-check emerging insights, fill gaps and answer queries. These interviews were carried out remotely in the summer and autumn of 2020. Using triangulation methods, the interviews were structured in a schematic format in which key findings associated with the three core questions were explored by the interviewer.

Seven Strand 3 interviews involved stakeholders already covered in Strand 2. Of these, three were reflective conversations on the emerging findings of the research with interviewees with a broad knowledge of the programme and four were to clarify specific issues raised by the analysis or gaps in coverage.

There were also three interviews with new stakeholders: a senior representative of the Property Council of Australia, a trade body representing building owners and developers; a former representative of real estate investment analytics company Investment Property Databank (IPD); and a representative from the Australian Institute of Refrigeration, Air conditioning and Heating, a trade body representing heating, ventilation and air-conditioning (HVAC) manufacturers and installers. These interviews lasted between 20 and 30 minutes and were structured broadly around the research questions, with queries specific to the interviewee. The interviews with new stakeholders followed the format used for the original Strand 1 interviews.

The two trade bodies interviewed in Strand 3 provided a variety of written cases study material describing in detail how buildings were upgraded and reflections on the role of the ABGR and NABERS and other policy interventions. These case studies covered a range of building types and sizes, mainly from the period 2008–16. They were provided in confidence and cannot be reproduced in detail. However, several insights were analysed and incorporated into the interview results.

4. RESULTS

The results address the three research questions set out in Section 1 using data drawn from all three methodological strands, *i.e.* a blend of data from the public record and from interview testimony.

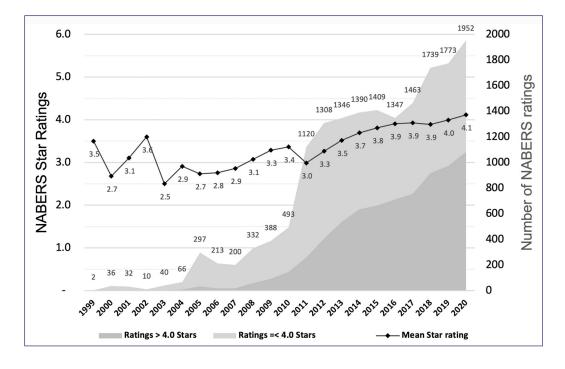### 4.1 THE IMPACT OF THE AUSTRALIAN POLICY APPROACH

4.1.1 Reports published by the NABERS programme

Figure 2 shows the mean star rating for all rated buildings in a given year, and the total number of certified whole building, base building and tenancy ratings each year, broken down into the number of buildings with a rating >4 (dark grey) and the number with a rating of ≤4 (light grey).

Discounting the fluctuations in the mean star rating before 2004, which is due to the small sample size, the mean star rating has increased by 1.6 stars, from 2.5 in 2003 to 4.1 in 2020. Using a simple average to calculate the mean rating for a given year depressed the rating by around 0.2 stars in 2010, increasing to around 0.4 stars in 2020 compared with the average rating reported by NABERS.[2] This difference highlights how outcomes could vary based on different reporting methods. The proportion of ratings >4 stars has increased substantially from around 10% in 2005 to 57% in 2020. The average annual carbon intensity of NABERS-rated buildings has decreased by 36% between 2010 and 2020, from 136 to 86 kg CO_2/m^2.

The impact of the three government interventions can be seen in the numbers of rated buildings: a small increase in 2003–05 following the introduction of government procurement standards, followed by a significant acceleration of around 40%, most noticeable in the lower rated buildings, following the introduction of mandatory disclosure under the CBD policy in 2010, and finally a modest uptake in 2018 after the minimum floor area threshold for the CBD was reduced from 2000 to 1000 m^2. Despite the uptake in 2018, mainly by buildings <2000 m^2, the mean star rating did not increase due to the increased number of buildings with ratings <4 stars (*Figure 2*).

There are several gaps and uncertainties in the published NABERS data. There is no unrated control cohort of buildings, which makes it difficult to judge the additionality of NABERS. It is also not clear how the annual rating numbers break down into new (or first) ratings or repeat ratings on the same building. Similarly, it is unclear whether the average star rating is based on means or medians, and if it is still weighted by floor area after 2016, when it was last reported. Finally, there are some discrepancies between the same metric in three different datasets published on the online portal: The Annual Report 2019/20, the Life of Program Statistics and the 2019/20 Program Statistics Office—Energy.

Figure 2: Total number of certified NABERS office energy ratings (pale grey) and <4 stars (dark grey), and the mean star rating over time across all buildings.

The market penetration numbers are also contradictory. The 2020 total of 1952 rated buildings of all types is reported to cover 22.8 million m². However, the same NABERS report states that rated buildings account for 76% of the market and occupy 29.8 million m². Both numbers are comparable with the total floor area covered by the CBD scheme, which is 20 million m² for base buildings only. It is reasonable to assume that NABERS accounts for 35–45% of the total national office market, which is 64 million m².

The interviewees from NABERS and the government pointed out that while NABERS was under an obligation to publish data for programme management reasons, the public dataset was necessarily limited. They also pointed out that the two Federal impact assessments (Acil Allen 2015; CIE 2019) had put the programme under rigorous scrutiny and been given access to a much wider dataset. Both reviews declared that the programme was well run and cost-effective. This view was supported by several of the independent interviewees.

4.1.2 Official government impact assessments

The formal government impact assessments of the CBD programme looked in more detail at the patterns of energy use and savings across different buildings types (CIE 2019). Overall, the reports correlate with the top-level numbers published by NABERS outlined above, in particular confirming the correlation between average rating and carbon intensity (expressed as energy in the CBD report).

The CBD data also show the clear impact of the three government interventions on the total number of rated buildings and tenancies. However, the CBD data go into more detail, also showing that as well as influencing total number of ratings, the CBD triggered a significant increase in the number of new ratings and particularly in ratings performed on smaller buildings <5000 m².

It is difficult to attribute any changes in energy use to the CBD programme and NABERS alone. Improvements could also be linked to office size, numbers of hours of use and the base building scope. Other drivers could be involved such as electricity price fluctuations, other sustainability drivers and the level of maintenance carried out.

The reports make several additional observations, of which the following is a selection:

- Poorer performing offices show the greatest improvements: ratings between 0 and 3 stars improve by 2 stars, whereas ≥3 stars only improve by around 0.5 star.

- Energy intensity changes are even more marked: a zero-rated building improves 10 times as much as a 5-star building (reductions in energy use per m² of 176 MJ versus 15 MJ).

- Most buildings showed an increase in ratings over the life of the CBD programme. But a significant proportion (around 20%) showed progressively lower ratings, with some as much as 2 stars.

- A degree of gaming was happening where organisations were shifting energy use outside the base building to improve their rating.

4.1.3 Distributional impacts

IPD compiled a 'Green Property Index' asset value tracker between 2008 and 2013. A report published with the Australian government showed that buildings with NABERS ratings of ≥4 had 10.8% higher rental income, 18.1% higher operating income and 49.5% lower capital costs (IPD & DOI 2013). The analysis also showed a shift in the mean rating of the buildings studied from 3 stars in 2008 to 4.5 stars in 2013.

However, on closer analysis the IPD results are mixed. The uplift was not as marked in lower rated buildings. More complex investment indicators such as annualised total returns showed only a small uplift. To add to the uncertainty, a study of office transactions in Sydney (Gabe & Rehm 2014) found no correlation between energy performance and the rent that tenants were prepared to pay. The 2015 CBD review also found a correlation between asset value and productivity, but the review equivocates on the meaning of this linkage, also citing Gabe & Rehm (2014).

Interviewees familiar with the developer market pointed to a wider impact on business perceptions and behaviour. There was a particularly strong wave of corporate investment in highly rated buildings during the period 2007–13 driven by a combination of a supportive policy environment, increased demand from tenants and international investor pressure.

Specifically relating to NABERS and the ABGR, developers said that ratings had a crucial role in facilitating emissions reductions once the decision to invest in a refurbishment had been made by senior managers. One leading developer familiar with the investment market summed this up as follows:

> NABERS changed the rules of the game. Having the pension funds breathing down our necks about sustainability flipped our default view of energy efficiency from 'why should I bother?' to 'how can I afford not to?'

4.2 KEY DESIGN FEATURES

This section summarises stakeholders' views broken down into several key features of the Australian policy approach. Where necessary an indication is given on the degree of consensus and which stakeholder type was prevalent.

4.2.1 The focus on performance

All interviewees said that the performance-based approach used by the ABGR was a critical factor in gaining early industry acceptance. Former officials and consultants from SEDA, the NSW government's delivery agency, said that the priority was to focus on existing buildings, which meant engaging energy managers and commissioning agents rather than with designers. A more practical problem was that predictive models were poor at generating realistic greenhouse gas estimates.

The driving philosophy was to create market pressure for businesses to make use of their energy managers. SEDA therefore took great care to develop a benchmark that worked for those running the building rather something that might be cheaper to administer. Simplicity and relevance were key drivers, with one comment being: 'you don't need a Gucci handbag when a carrier bag will do the job'. A more measured view was:

Key to the success of the NABERS rating system has been an underlying set of benchmarks which are essentially fair, reasonably accurate and stable. Absolute accuracy is neither possible nor necessary for a successful rating system.

(Bannister 2012: 9)

This approach was not entirely altruistic. SEDA did not want to get involved in technical detail. The intention was that if a developer decided to adopt the scheme, the rating should offer basic feedback on the most effective measures in terms of design and operation. The analogy used was project managers who were not technical specialists but instead set broad parameters and relied on the professional expertise of their subcontractors to interpret the brief and deliver the outcomes.

4.2.2 Operational relevance

Commissioning agents, energy managers and trade bodies strongly supported the operational focus of NABERS. The separation of 'base building' and tenancy was particularly relevant because it aligned with the way metering boundaries worked in Australia. This is important to the energy manager because it dictated how the energy services operated. It also allowed prospective tenants to judge the underlying energy performance of 'their' space irrespective of existing activities.

The second operational feature was the way the star boundaries worked. Rather than using a potentially unattainable definition of 'best practice', they were grounded in reality, reflecting the actual distribution of building performance across the building stock. SEDA officials simply drew lines on a 1998 performance distribution curve. A rating of 4.5 stars meant market leading performance, and 5 stars was aspirational at the time. Average buildings received 2.5 stars. Poorly performing buildings <1 star were excluded from the scheme.

The value of this approach was that people both knew where they stood and what they had to do to progress, from simple energy management tools at the lower and of the scale to more expensive technical and organisational interventions. The requirements for moving from 4.5 to 5 stars were mentioned by several interviewees and came across strongly in the case studies. A total of 5 stars cannot be achieved simply with good design and efficient fabric and services. Careful attention to detail and close collaboration are needed at all stages in the design and operation to ensure that the refurbishment delivered the intended energy savings. Control and commissioning were considered to be particularly important.

Although the use of operational benchmarks clearly improved the focus and professionalism of the energy manager and other key actors involved in the design and retrofit supply chain, no interviewee specifically mentioned upskilling as a specific impact of NABERS or the CBD even when asked directly. However, there was a broad consensus that the overall capacity of the market to deliver energy savings year on year improved as a direct consequence of the approach. According to one developer:

It was clear once the [NSW] government made NABERS mandatory for their stock that we would have to up our game. Commissioning teams particularly had to wake up and do their job right not only at handover but for at least 12 months until the second rating came in.

4.2.3 Salience, reputation and competitiveness

A strong NABERS rating was important particularly for senior managers with strong reputational drivers. The stars were tangible, conferring salience on energy efficiency and making it a strategic priority. For the government, the philosophy of rewarding success rather than penalising failure built a cohort of businesses keen to promote the scheme, which over time built credibility and momentum. This was important because, as a voluntary scheme, the ABGR had to appeal to a much wider set of businesses than the large developers that helped set it up.

For energy managers the star-based approach, coupled with the requirement to repeat the rating annually, was useful within the company because it helped them demonstrate the benefits of

taking part in the scheme and, crucially, the aspirational value of moving from one star to the next. It also gave them the evidence they needed to make the investment case to their senior managers, particularly the finance director, with each star gained helping to make the business case to progress to the next one. One energy manager said:

> Suddenly I was in demand. The CFO's [Chief Financial Officer] office was on the phone constantly and I was asked to make a Board presentation to explain where we stood on energy use compared to others. When they realised that we would be ABGR 2 star I got a budget to get us to 3.

Businesses also mentioned that NABERS helped initiate a broader market transformational impact. There was a strong degree of competitiveness between owners and developers to deliver ≥5-star buildings, particularly with prime offices. Developers are keen to outdo each other, not simply to achieve a good rating but to do it on a difficult building without resorting to expensive technical solutions.

4.2.4 Asset and reputational value

Several interviewees mentioned the impact of a NABERS rating on asset value, and indirectly on the perceptions of the wider investment community. Developers and owners said that whilst asset value was an important driver, the less tangible non-economic benefits tended to be more useful when competing for tenants who prefer an efficient building for reputational or staff welfare reasons. This connection features strongly in the case study material.

Interviewees familiar with the investment community pointed to the period 2004–08 as a 'golden age' when the Australian real estate market began to take a strong interest in sustainability. NABERS made energy performance visible to investors, helped considerably by the Property Council of Australia making a NABERS 5-star rating a requirement for Prime and A-rated offices. This conferred 'investment grade' status on NABERS, which was important because of the high proportion of buildings owned by real estate investment trusts (Bordass *et al.* 2016; Bannister *et al.* 2016). Two interviewers commented that the high GRESB rating for Australian real estate was directly linked to NABERS.

4.2.5 The role of government

Interviewees said that the role of government in the conception and development of the Australian policy approach was essentially a story of two Labor administrations: the State-level government of Bob Carr from 1995 to 2005 and the Federal government of Kevin Rudd and Julia Gillard from 2007 to 2013.

The ABGR scheme arose during a period of close public scrutiny of corporate sustainability stimulated by the negotiation of the 1997 Kyoto Protocol. Real estate was no exception and prime office developers in Sydney asked the NSW government for help so they could distinguish their highly efficient buildings from the rest of the market. The ABGR was the result.

Several interviewees mentioned the key role played by NSW Premier Carr. Although prime office developers were supportive, the rest of the market was sceptical. Carr's involvement gave SEDA political cover in its dealings with industry together with adequate resources and a statutory base. Carr recruited Cathy Zoi as chief executive officer (CEO), bringing high-level experience from the Bill Clinton White House and the US Environmental Protection Agency. A scoping report was commissioned (Pears 1998) and work began in July 1998 overseen by an industry steering group drawn from across the market (Pears *et al.* 1999).

When take-up began to falter in the early 2000s, the government recognised that some degree of coercion was necessary, but also that a mandatory scheme would alienate industry. A compromise was reached in 2004 when a 3.5-star-base building rating was required for the sale or lease of existing government buildings. This had considerable market leverage because government occupied a significant proportion of the office stock. Developers said that this relatively simple

change elevated the ABGR from a technical curiosity to something of considerable strategic interest:

> [Government procurement standards] changed our entire approach. At the time 3.5 stars was pretty cutting edge. But because public tenants were in 30% of our stock we had to scramble to upgrade because we didn't know which buildings they were going to move into next.

Take-up accelerated significantly between 2004 and 2010, a trend that is clearly visible in *Figure 2*. The Federal government in 2007 harnessed the rapidly growing interest of the Australian real estate industry in sustainability. In addition to expanding NABERS into a Federal programme, the energy efficiency requirements in the building codes were significantly tightened for new buildings. A A$90 million Green Building Fund was introduced, which developers considered to be a significant measure, particularly for smaller office developments.

The financial crash of 2008 arrested the international momentum for sustainable buildings. However, the supportive political climate in Australia kept interest alive and gave the government an opportunity to tackle the organisations that the scheme so far had failed to reach, particularly smaller organisations. This led to introduction of the Buildings Energy Disclosure Act and the CBD scheme in 2010/11.

Business interviewees and sector experts said that the success of the voluntary phase scheme was crucial in paving the way for mandated ratings under the CBD without undue pushback from industry. The close relationship government had established with industry helped to build confidence and develop the capacity to deliver. Several interviewees said that the ultimate test of the scheme's resilience was that it survived the close scrutiny of the highly climate-sceptical Tony Abbott government in 2013.

5. DISCUSSION

The research questions this paper set out to answer were to estimate the impact of the policy approach both quantitatively and qualitatively, identify the key features of the Australian policy approach, and finally explore the role of the government at State and Federal levels.

5.1 IMPACT

The evidence from the data published by NABERS is mixed. The impact on carbon and energy use seems clear. However, public access to the data is limited and the published data contain ambiguities and inconsistencies. NABERS operates in a complex and stratified office market where impacts seem to vary by office grade, size and geographical location. Simple analysis, for example, looking at the changing average star ratings of office buildings, is not sufficient for policy evaluation purposes. The 'learning story' for other governments is that high-quality data collection and a strong evaluation methodology are needed alongside benchmarking to feed into improving policy design and implementation (Janda & Topouzi 2015).

In this respect, we can be, in part, reassured by the two Federal government impact assessments that had access to a much wider dataset. Although they do not extend before 2010 when the CBD was introduced, they clearly show a reduction in carbon emissions and energy intensity and that this can be attributed to the CBD and NABERS. Both reports were widely considered by the interviewees to be robust and credible policy evaluations. It seems likely that any major shortcomings would have been highlighted in these reports. Indeed, the lack of detail in the published NABERS data could be a consequence of confidentiality concerns or reporting requirements placed on organisations, issues that overseas governments could address in their own schemes.

Additionality is a key issue for governments. NABERS is part of a complex policy mix and consequently it is necessary to try to understand the influence of other policies and external drivers. This is the perennial policy evaluation problem of which baseline to use. Governments must also factor in

the propensity of organisations to 'game' the rules (CIE 2019). These considerations are always present in policy development and would, we presume, be part of any country's regulatory impact assessment.

The data on the wider distributional impact are also mixed. The IPD analysis is dated, and the academic literature in relation to Australia is limited and contradictory. However, the sustainability agenda has not gone away and there is a clear perception from Australian stakeholders that NABERS and the CBD combined have had, and continue to have, a significant impact on corporate and investor behaviour through a range of multiple benefits, particularly asset value, reputation, and a conducive and healthy workplace environment. The debate on energy performance and value is still contentious (Warren-Myers 2018). But perception is often all it takes to move investment markets. This is clearly an area that would merit further study.

5.2 DESIGN AND GOVERNANCE

The exemplary nature of NABERS lies in the way it works. The interviews illuminated the importance of the early history: the idea was developed at time when there was clear imperative to take action; there was high-level political support when it was most needed, and key parts of the industry were also supportive. The NSW government also made best use of SEDA, staffing it with experienced political operators and staff who knew and were trusted by the market. The role of agencies in delivering complex market transformations is difficult to understate.

This strong and iterative collaboration with industry is a fundamental feature of the success of the Australian approach. It does not seem to have weakened the policy aims, rather it resulted in a design seen as fair, accurate and proportionate, and a governance process that enabled good decisions on policy details, such as the boundaries between different star ratings. This relationship also, crucially, enabled a measured transition from a voluntary scheme with limited appeal to a mandatory one reaching beyond the prime office market without too many industry complaints. Governments thinking of emulating the Australian experience, especially as part of a net zero policy, such as the UK, need to take careful note of this.

In design terms, the separation of base building and tenants' energy consumption was not only a technically good decision, in terms of metrics and energy metering boundaries, it also enabled data-supported decisions to be made by and between different groups of actors: building owners, building energy managers and tenants. Enabling building energy managers, the actors most expert on and engaged with the energy use of the buildings, to engage with this policy was seen as very important.

More generally the Australian approach is a fine example of operational benchmarking. Focusing on actual energy and carbon performance data allows developers to advertise their highly performing buildings, allowing the market to identify and assign value to good performance, taken principally as reputational benefit for building owners and a conducive working environment for tenants. The evidence for a distributional impact is less clear, but NABERS has certainly built capacity and experience particularly in commissioning and facilities management.

Policy governance has changed as the scheme grew in ambition, from state level to federal government. Given the urgency of reducing energy use and carbon emissions, and the evidence from NABERS, other international governments would be advised to skip the subnational stage and start with a national scheme.

6. CONCLUSIONS

This paper set out to determine whether the Australian approach to energy performance benchmarking policy has been as successful as its promoters suggest, if so, why, and whether this policy should be of interest to governments internationally.

No one metric can prove the 'success story' of a policy that operates in a complex surrounding policy environment and within a dynamic market. Nevertheless, by combining quantitative analysis with an extensive set of interviews with a range of stakeholders, there is a 'learning story' which sets out how the Australian policy approach has contributed to the transformation of a section of the Australian commercial office market.

We think it is clear that that Australian prime office sector is considerably more energy efficient as a direct result of NABERS. There is also good evidence that the Commercial Buildings Disclosure Act (CBD) is extending the reach of the policy into smaller 'mid-tier' organisations that many countries find difficult to reach because they do not respond as readily to reputational and other corporate drivers. However, the key lesson for overseas governments is how policy has shifted focus from large, committed organisations to smaller companies.

We would single out four interrelated aspects that together characterise the policy 'choreography' that makes the Australian experience stand out:

- *Resources*: a combination of political leadership, money and people, together with an agency structure with sufficient freedom to engage constructively with industry.
- *Policy design*: a benchmark that was clear and robust to allow industry to innovate and aligned with the way both buildings and energy managers operated in the real world.
- *Pressure*: careful and progressive application of a compliance model that tackled poor performance without compromising the voluntary ethos of the NABERS scheme.
- *Governance*: a benchmarking system flexible enough to learn from its mistakes and a governance model that gave industry effective, but measured and proportionate, influence.

The Australian policy story is complex. However, NABERS provides credible, salient information to a range of actors who use it to achieve multiple business benefits. By managing to link delivery of environmental and business benefits, NABERS offers a model of policymaking which could have wider application.

NOTES

1   In this paper the term 'Australian policy approach' or similar phrase refer to the combination of the CBD, NABERS and other directly related measures, unless specified otherwise.

2   The NABERS average star rating is assumed to be weighted by floor area.

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