

# **TOWARDS THE GREEN AGE BUILDING**

## ***Energy Efficiency and the Property Industry***

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### **Abstract**

The Australian property industry is about to enter a significant period of energy efficiency regulation and "structured encouragement". This paper looks at some of the background to the forthcoming energy efficiency amendments to the Building Code of Australia. It puts forward a series of industry impacts that may arise from the increased focus on energy efficiency, elaborates on the issues involved and the consequential challenges that the industry faces.

### **KEY WORDS**

Building Code of Australia; Energy Efficiency; Green Dividend; Green Lease; Property Industry

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### **INTRODUCTION**

We are about to enter a significant period of energy efficiency regulation and "structured encouragement" in Australia's commercial buildings. Regulation will occur via the Building Code of Australia and the requirement for minimum energy efficiency standards in new construction. Structured encouragement is occurring with the uptake by the property industry of building rating systems such as the Australian Building Greenhouse Rating System (ABGRS) and the broader environmental rating system recently developed by the Green Building Council of Australia in conjunction with the industry. This increased focus on energy efficiency will have a number of impacts on the property and construction industries, some hoped for and some unlooked for.

### **BACKGROUND**

In November 1997 the Prime Minister announced a series of new policy measures intended to help bring Australia's growth in greenhouse gas emissions under control. One of these measures was the proposed development of a system of energy codes and standards for buildings. The building industry expressed a desire to regulate itself rather than have a full mandatory regime of energy performance standards imposed upon it. This desire was given substance through the formation of the Australian Building Energy Council (ABEC) in 1998. Foundation members included the Master Builders Association, the Property Council of Australia, the Royal Australian Institute of Architects and the Institution of Engineers Australia. Soon after its inception ABEC proposed the adoption of a dual mandatory / voluntary system of energy efficiency reform for the industry.

To eliminate worst practice in the industry, ABEC proposed that minimum standards be mandated through a revision of the Building Code of Australia. ABEC observed, "Such practices are not substantially influenced by market forces and are unlikely to be influenced by voluntary measures". It also observed that minimum standards in themselves were likely to distort the market to a lower overall level of energy efficiency and that a voluntary market driven best practice mechanism must be developed for total market transformation.

ABEC promoted adherence to the following key principles in the development of mandatory minimum energy efficiency standards:

1. Mandatory standards should benchmark acceptable levels of energy performance and encourage, not hinder, the adoption of best practice.
2. Mandatory standards should apply to new construction and renovation/refurbishment.
3. The improvement of the building envelope's thermal performance should be a primary objective of mandatory energy performance standards.
4. The Building Code of Australia (BCA) should be the vehicle for mandatory energy performance standards. The resultant amendments to the BCA should be the subject of a thorough Regulatory Impact Statement (RIS) process involving full consultation with all stakeholders. Implicit in this approach is the requirement for a consistent application of the BCA amendments throughout Australia.
5. "No Regrets" issues including definition and threshold policies must be thoroughly investigated, canvassed and agreed upon during the RIS process.
6. Mandatory energy performance standards should be developed in cognizance of the development of the other non-mandatory measures to encourage the adoption of best practice throughout the industry.
7. Mandatory energy performance standards must be sensitive to and reflective of the scope and complexity of buildings, and aimed specifically at the kind of organisations likely to require such standards.
8. Compliance paths should include both straightforward 'deemed to comply' and more sophisticated, performance based approaches, to facilitate adherence, allow flexibility in design, and encourage innovative solutions.
9. Mandatory energy efficiency standards, as included in the BCA, will act in effect as a design standard only. The efficacy of the application of the BCA (and the ultimate energy efficiency outcome) is subject to range of variables post design. This standard must provide, wherever possible, for the transfer of design and operational information to the building owner and user, in order to facilitate and promote the energy efficient

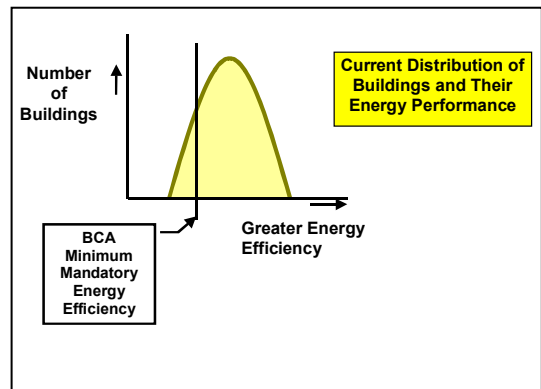


Fig. 1. The Current Situation

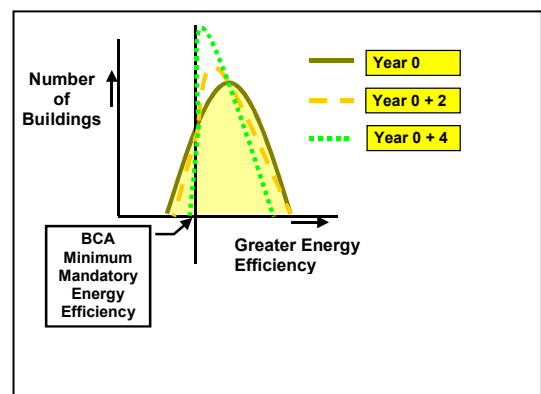


Fig. 2. Minimum Standards Only

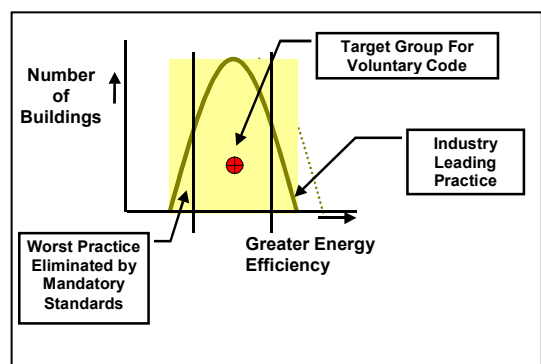


Fig. 3. Minimum Standards and Voluntary Market Mechanisms

operation of buildings, and help ensure that any future modifications are carried out without compromise to energy efficiency.

The revision of the BCA to specify minimum energy efficiency was agreed upon and funded by the Federal and State Governments. Energy Efficiency revisions to the housing related sections of the BCA have been released this year and revisions to the commercial building sections are programmed for 2005.

The second aspect of the energy reform proposal from industry was the development of a voluntary code of practice with a building rating tool as its core. The ABGRS has enabled the rating of buildings based on their operational energy consumption for several years. The concept of building rating within a best practice context has been taken up and broadened by the Green Building Council Australia with their recently released building environmental rating tool, "greenstar". This tool addresses sustainability criteria including operational energy efficiency and provides the basis for a consistent and comparable building environmental rating system.

This tool is likely to be first taken up by the major building portfolio owners. These are predominantly superannuation and growth fund based and are likely to use the tool in part to provide additional differentiation to their investment products in an increasingly "green" conscious marketplace. The tool will also be applied by the tenancy market which is also becoming more environmentally aware, reflecting changing community values, and now much more interested in inhabiting green space.

### **IMPACTS, ISSUES AND CHALLENGES**

What are some of the likely impacts that the forthcoming regulation of minimum energy standards and the increased encouragement of energy efficiency will have on the commercial property and building industry?

#### **The Green Dividend and Existing Buildings**

The concept of the green dividend and its realisation is relatively straightforward for a new development. The investment can be cost effective compared to a "less green" building, and the return is readily modeled, and hopefully achieved through market positioning and tenant commitment. It is however a different proposition for an existing building where the "split incentive" is at the heart of energy efficiency inaction. As a building owner why would you be driven to invest in energy efficiency improvements when your tenants are on nett leases and are paying for energy outgoings? As a tenant why would you invest in energy efficiency when energy is a relatively minor component of your costs? You would certainly have no reason to invest in changes to improve the lot of the landlord.

With the increasing drive towards energy efficiency it is in existing buildings that the greatest challenges, and the greatest benefits lie. To state the obvious, the vast majority of Australia's buildings are "existing". New commercial stock is being added at a rate of less than 2% per year.

There is significant opportunity for "green deals" between the large building portfolio owners, their property managers, and the large tenancy portfolios and their facilities managers. Green deals that see each entity commit to energy efficiency and provide each with equity in energy savings and market benefits.

### **Lack of Design Outcome Surety**

Designing, constructing and delivering a building to meet an energy efficiency outcome is a new requirement for the commercial building industry in Australia. There are a range of design, technical and contractual issues that are coming to the fore.

Traditionally the design of buildings, and the systems that consume energy, has been about form and function, not efficiency of energy use. Whilst the design professions have come a long way in a relatively short period of time, particularly in the area of integrated design (building physics and building services), they remain somewhat underdeveloped in their understanding with regard to the effect that the building construction process, and the activities of building occupants themselves over time, can have on the predicted energy efficiency of their designs. This is also exacerbated by the disconnection, slowly over time, of the design professions from the construction and building occupancy processes.

An energy efficient building is the outcome of contiguous processes of design, construction and operation. Designs that do not fully comprehend and address the influence of construction and occupancy on energy efficiency are difficult for the construction industry to “guarantee” in terms of their energy outcome. There are very few buildings as yet in this country that have been built to strict energy budgets, as such the experience base is small, and the opportunity thus far to “close the loop” on the energy efficient design process has been similarly minor. The challenge is for the design professions to reconnect with the construction process and the property industry and incorporate the understanding thus gained back into their designs. This will increase the level of the pre-commitments to new energy efficient buildings and the ability of the constructors to deliver on the promise.

Building construction also works to a very wide range of standards of construction. Green, high energy efficiency buildings are typically being delivered at the leading edge of the industry. And whilst there remain challenges at this end of the market in delivering energy efficient designs it is in the broader industry where the significant skill gaps are emerging in the ability to install, commission and handover *verified* energy efficient systems.

From a contractual standpoint these skill gaps also contribute to limiting the inclination of the construction industry to take responsibility for the energy efficiency of its product.

These emerging skill gaps need to be recognised and addressed proactively. The regulatory and market measures under development also need to reflect the current skill status of the industry, the changes that are required, and that these changes will take time.

### **Operational Energy Efficiency – the “long tail”**

Building energy efficiency is a long term proposition. It is not something that is “set and forget”. In the dynamic environment that is a commercial building it requires ongoing management and monitoring to ensure that energy efficiency, once achieved, is maintained. This process becomes much more important if the building is “energy rated” and therefore its energy efficiency is to be annually audited to maintain the rating. Such a requirement for an annual performance measure is not something the property

industry has had to deal with in the past and this requirement will challenge the industry in a number of areas:

*Skill gaps:* Tracking and reporting energy efficiency within a single building or a small portfolio of buildings is well within current skill sets. Where it does get more difficult is in large portfolios where there are always considerable numbers of properties in various stages of coming and going, refurbishment, occupancy and usage. This is an area where skills are developing, particularly in the large property and facilities management organisations charged with the stewardship of large portfolios; however there is still a way to go.

Where there are emerging skill gaps, is within the building services maintenance industry. Traditionally building services maintenance has been all about system reliability and performance, and if you get sophisticated, “asset management”. Reliability and performance is typically driven by tenant complaints and asset management is driven by a relatively recent understanding of the role that the cost of building services play in the commercial value of a building and importantly its contingent liabilities come sale time.

Maintenance practices that are driven by the need to maintain energy efficiency are different to those that are usually applied to ensure reliable performance and maintain asset value. Energy efficient maintenance is founded on an understanding of how air conditioning systems consume energy and where the risks to energy efficiency lie. This level of sophistication is not common in the building services maintenance industry and will take some time to develop.

*Information Gaps:* Managing and maintaining energy efficiency in a building requires a good understanding of the building and how its energy consuming systems should work. In an industry where practically all aspects of building service provision are outsourced and shorter term contracts are the norm this becomes a considerable problem. Ideally building systems and their operation should be well documented however up until now the value of such documentation hasn't been appreciated and as such it is at a very poor standard generally in commercial buildings in Australia, particularly in regard to the operation of what are often complex air conditioning control systems. (Interestingly, this issue is increasingly a problem in the maintenance of essential fire services also.)

*Contract Periods:* The periods of engagement for property managers and especially maintenance providers are typically short. In a 12-month contract a management or maintenance organisation is unlikely to have the budget or the motivation to take the time to invest in understanding how the building systems work in detail and much less likely to achieve material energy savings. Whilst longer term contracts are becoming more prevalent for various reasons the underlying thinking often remains short term.

*Contract basis:* Complaint levels are a principal KRA in many service contracts, and energy management is often just a feel good “continuous improvement” clause. The environmental or energy rating of buildings will act materially to change that. Contractual responsibility for energy efficiency must however be equitable and reflect the level of influence that the contracted party has over the outcome. Some early iterations of service provision contracts with “hard” energy efficiency deliverables have

been somewhat unrealistic and it will take time for an appropriate balance to be achieved.

### **Costs are Up?**

One of the mantras that have been used over many years to encourage the incorporation of energy efficiency in new buildings has been, “energy efficient buildings don’t cost more”. No, energy efficient buildings don’t have to cost more. But they more often than not do. This is sometimes because what is ultimately delivered is at higher standard than what was initially envisaged, and budgeted for. Also typically, in an energy efficient building development more needs to be invested in the design. This stems from the need to investigate options to get the *correct* solution rather than simply applying the *standard* solution, and because the design process needs to be managed differently from the traditional approach to ensure an energy efficient outcome.

In order to ensure that energy efficient buildings don’t cost more to build a holistic approach must be taken to the design and construction process and there needs to be budget transference in effect from construction to design. For an energy-efficient building to cost the same as a less energy efficient version its construction must actually cost less because more will be spent on its design. Therefore its design must not only be enhanced in terms of energy efficiency it must also produce construction economies. This points towards a much more integrated design and construction process.

Maintaining and managing building energy efficiency is a task that is additional to the traditional building management role and as such adds to the costs of owning the building. This hopefully is offset by lower energy costs. Again this is a new way of thinking and allocating costs.

### **Accommodation Amenity Paradigm Shift #1:**

An energy efficient building is a partnership between the base building operator and the tenant. They are effectively linked through their energy consuming systems, predominantly the air-conditioning. This will become increasingly evident as more buildings are energy rated in their entirety by schemes such as the ABGRS and the forthcoming GBCAus Greenstar. Whilst the base building and tenancies can be rated separately building owners and the market want to see the whole building rating. Anything less is a dilution and an incomplete picture.

In seeking whole building energy efficiency there can be a fundamental conflict of interest. As the tenant works to make their space more productive, increasing operating hours, using more light, adding business equipment such as computers and intensifying to add more staff per square metre, the greater the heat load to be removed by the air-conditioning systems and the greater the resultant energy consumption per square metre. Whilst in most cases the tenant pays for the energy consumption relating to light, power and air-conditioning, an increase in energy usage doesn’t do a lot for the whole of building energy / greenhouse rating.

If a whole of building rating is to be achieved, and maintained over time, it needs to be done on the basis of an understanding between landlord and tenant. A fundamental component of this must be a tenant undertaking to limit direct and indirect energy consumption. The concept of the green lease has been around for some time. Perhaps the best known example in Australia to date is the leasing arrangements in place for the

60L Green Building in Melbourne. This however was essentially a new building development, and a particularity special development in that. There are a number of examples overseas, predominantly in the United States, in existing buildings, where the basis for energy efficiency in a building is agreed and ratified via a commercial “green lease”. We need to develop model green leases in this country for existing and new buildings. They must be equitable to all parties, reflect the commercial reality of building ownership and occupancy, and set out the basis for achieving and maintaining energy efficiency within that framework. However, for the widespread application of these leases we need to accept that the current “accommodation amenity paradigm” needs to change in that tenants, simply because they pay for the energy, cannot act in isolation in increasing the energy consumption of “their” space. The energy efficiency of the building and its resultant environmental impact is the responsibility of all parties and the “rating” of buildings will highlight this.

### **Accommodation Amenity Paradigm Shift #2:**

With the widespread application of “closed box” air-conditioning, and fluorescent artificial lighting since World War Two the provision of “perfect” internal conditions, 21°C±0.5 and consistent lighting levels, has become somewhat sacrosanct.

“It might be 37°C outside but we have to *keep conditions* in the building or the tenant complains”.

Interestingly the tenant’s staff goes home to accommodation that is very unlikely to be so comfortable and closely controlled. For each degree of temperature difference between internal and outside conditions additional energy is consumed. Even allowing building conditions to float a couple of degrees can have a significant impact on lowering energy consumption.

Indoor air quality is increasingly linked by solid science to occupant productivity and health. Critical indoor air quality issues are predominantly related to the composition of the air and the adaptability of air conditions for individual needs not the uniform close control of its temperature.

The new wave of hybrid (mechanical and natural) ventilated green buildings do not by and large set out to maintain strict internal temperature regimes, they use the opportunity afforded by a new development to reset the accommodation amenity paradigm associated with temperature and temperature control.

This paradigm shift must also occur in existing buildings. As building occupants we need to accept that the temperature will vary between acceptable limits and that we need to clothe ourselves accordingly. Such a significant shift in the general expectation from commercial buildings will take time and is not without considerable challenge. Landlords do not wish to alienate tenants and tenants do not wish to alienate their staff. It is a change that will take fortitude to start and insight, understanding and patience from all the proponents to deliver.

### **The Level Playing Field**

To date the application of regulation related to energy efficiency has been sporadic and varied around Australia. Because of the nature of building regulation this has usually fallen to local government and because of the lack of uniform direction it has varied from

jurisdiction to jurisdiction. We now have a situation in some parts of Australia with differing energy efficiency requirements in neighbouring local government areas. Even on a larger scale there are variations with the application and uptake of the new housing energy efficiency amendments to the Building Code of Australia with a number of States yet to fully adopt the amendment and two States exceeding the requirements by varying degrees. The property industry publicly supported the concept of regulation to eliminate worst practice and the Building Code of Australia as a vehicle for that regulation because it offered the Regulatory Impact Statement process to ensure industry consultation. This hasn't to date delivered a level playing field nor in terms of its actual application on a State level has it ensured industry engagement.

The property industry needs consistency of regulation. Most of the major participants in this industry whether investors, managers, tenants, constructors or maintainers now operate on a national basis. Organisations do not want to be disadvantaged relative to a competitor because of inconsistencies in energy efficiency requirements from place to place. The lack of clear direction and consistency of application is a barrier to the uptake of energy efficiency in commercial buildings and needs to be addressed.

### **CLOSE**

The property industry is a strong supporter of the need for improving sustainability in Australia's commercial buildings and the introduction of minimum mandatory standards to eliminate worst practice in the industry. It is important however that the key principles put forward by the industry for these standards are adequately addressed in the development process and most importantly, that the application of the new requirements is consistent through Australia.

The introduction of these standards and other initiatives will have considerable impact on the property industry. Challenges exist in identifying and filling emerging skill and knowledge gaps, in reconfiguring how the industry delivers services and outcomes, and in the paradigms it applies to the amenity of accommodation. Challenges also exist for Government particularly in working towards the provision of a consistent energy efficiency "playing field" throughout Australia.

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