



## Australian Building Codes Board



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Energy Efficiency Inquiry  
Productivity Commission  
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Dear Commissioner

### **ENERGY EFFICIENCY INQUIRY**

I am writing to you in relation to the Productivity Commission's Inquiry into Energy Efficiency.

The attached submission by the Australian Building Codes Board (ABC B) provides details of the ABC B's role in the development of energy efficiency measures for the Building Code of Australia. It also provides an outline of the work which has been completed to date and that will be undertaken in the future.

I hope that the ABC B submission assists the Inquiry. If you require any further information, please contact Mr Ivan Donaldson, Executive Director, Australian Building Codes Board (tel: 02-6213 7240; email: [Ivan.Donaldson@abcb.gov.au](mailto:Ivan.Donaldson@abcb.gov.au)).

Yours sincerely

Peter Laver  
Chairman

November 2004

# **PRODUCTIVITY COMMISSION**

## **INQUIRY INTO ENERGY EFFICIENCY**

**SUBMISSION FROM**

**AUSTRALIAN BUILDING CODES BOARD**

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## 1.0 The Australian Building Codes Board

The Australian Building Codes Board (ABCB) is a joint initiative of all levels of Australian Government. It brings together government, industry, the professions and the community to develop the regulatory environment affecting the health, safety and amenity of people in their use of buildings in Australia. The ABCB is responsible for:

- developing and managing a nationally uniform approach to technical building requirements, currently embodied in the Building Code of Australia (BCA);
- developing a simpler and more efficient building regulatory system; and
- enabling the building industry to adopt new and innovative construction technology and practices.

The Board was established by means of an inter-government agreement signed on 1 March 1994 (and reaffirmed in July 2001) by the Australian Government and State and Territory Ministers responsible for building regulatory matters. The Board reports directly to these Ministers and comprises four industry representatives, the chief executives responsible for building regulatory matters in the Australian Government and the State and Territory Governments, and a Local Government representative.

## 2.0 The Building Code of Australia (BCA)

### 2.1 What is the BCA?

The BCA is a national building code which is developed and maintained by the ABCB on behalf of the Australian Government and the State and Territory Governments, who each have statutory responsibility for building regulatory matters.

The BCA is referred to as a 'performance-based' code, containing acceptable Performance Requirements that must be met by buildings and other structures throughout Australia. This allows cost savings in building construction by:

- the use of alternative or innovative materials and forms of construction or designs;
- allowing regulatory solutions to be tailored to a particular building;
- being clear and providing guidance on what the BCA is trying to achieve; and
- allowing the designer flexibility to use new products and techniques, while still allowing existing building practices to continue through Deemed-to-Satisfy compliance.

Allowing for innovation is particularly relevant in developing energy measures, because technologies are rapidly emerging as the community and industry become more conscious of energy efficiency issues.

The performance-based BCA has a hierarchical structure as shown in Figure 1 below. Generally, it is the Performance Requirements that are recognised under building laws. The Objective is the broad societal goal, while the Functional Statement describes what the building needs to do to meet the Objective.

Performance Requirements must be satisfied by the design and construction of buildings not exempted under building regulations. There are two types of Building Solutions to meet the Performance Requirements:

- (i) **Deemed-to-Satisfy Provisions.** The Deemed-to-Satisfy (DTS) Provisions are detailed prescriptive technical requirements of how the building can be constructed. Most building designers choose to develop a solution following the Deemed-to-Satisfy Provisions. These Provisions include reference to technical details found in Australian Standards.

- (ii) **Alternative Solutions.** Alternative Solutions are ones that can be demonstrated to meet the Performance Requirements of the BCA by means other than the DTS solutions. The Alternative Solution path allows for new ways of achieving the required levels of performance. The onus is on the building applicant to show that the Alternative Solution complies with the Performance Requirements.

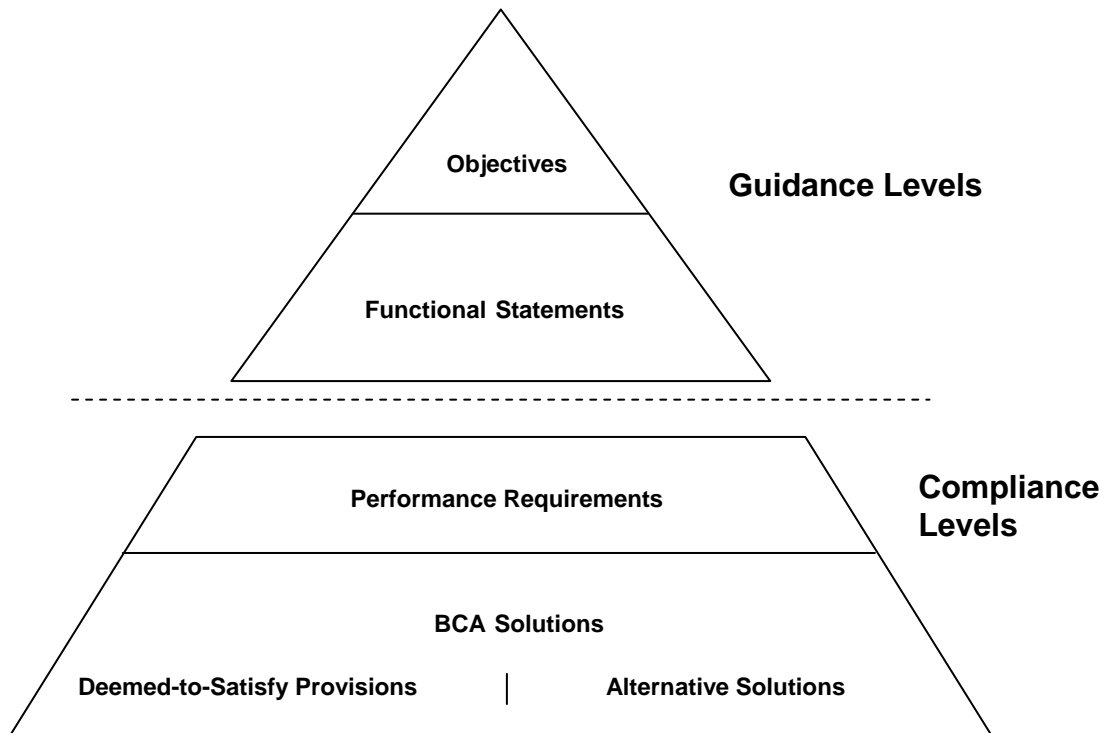


Figure 1 – BCA Hierarchy

## 2.2 BCA Amendment Process

The BCA is amended annually<sup>1</sup> to reflect changes in building practices, usage and technology. The BCA change process follows an agreed procedure that is both consultative and as transparent as possible, while respecting confidentiality.

Under the Council of Australian Governments (COAG) Agreement on national standard setting, the Australian Building Codes Board (ABCB) is required to undertake a regulatory analysis on all technical changes proposed for the BCA and to invite public comment on the Regulation Impact Statement (RIS). The objective of the process is to ensure that technical change proposals are appropriate and cost effective.

<sup>1</sup> Annual amendments to the BCA are adopted on 1 May.

In order to meet its obligations under the COAG Agreement, the ABCB has developed a model for performing impact assessments. The model identifies which proposals need to undergo detailed financial and socio-economic analysis, hence avoiding unnecessary assessment.

## **2.3 Building Regulations**

Each State and Territory has building control legislation that adopts the BCA as the document containing the technical design and construction requirements for buildings. Although States and Territories may include minor variations to the BCA in their legislation, and different criteria ('triggers') for how they apply the BCA to new work in existing buildings, essentially the BCA applies to the following:

- all new buildings;
- new building work in existing buildings, such as additions and alterations; and
- existing buildings that are to be used for a purpose different from that for which they were originally designed (this is often referred to as "change of use").

## **3.0 The ABCB & Energy Efficiency**

### **3.1 Background**

An energy efficiency project for buildings is currently being undertaken by the ABCB. This project followed on from the Prime Minister's 1997 Statement: "Safeguarding the Future: Australia's Response to Climate Change". After taking into account the views of industry, the Australian Government announced in July 2000 that agreement had been reached with State and Territory Governments to introduce mandatory energy efficiency measures into the BCA, as part of the Commonwealth's strategy to address greenhouse gas emissions from buildings.

The objective of the project is to develop nationally consistent, cost effective, energy efficiency regulations for the BCA. The project is jointly funded by the ABCB and the Australian Greenhouse Office. It is being developed in consultation with State, Territory and Local Governments, building practitioners, industry and the community.

### **3.2 Policy Rationale**

The BCA energy efficiency measures will help to address market failure relating to information gaps and split financial incentives.

As noted in the Productivity Commission's Issues Paper, relevant information is not always available to enable informed energy efficiency choices. This is particularly the case in the residential and commercial sector, where many participants (including builders, appraisers and prospective purchasers) lack the necessary information to assess the construction and design characteristics of buildings in regards to energy efficiency. In addition, the existence of split financial incentives, whereby the person making the decision to invest in energy efficient products or design is usually not the one who pays the ongoing energy bills, means there is no direct incentive to improve the thermal performance of buildings.

The mandating of minimum energy efficiency requirements through the BCA helps to overcome these problems by creating an increased awareness and uptake of energy efficient products and design and construction practices, whilst directly improving the energy efficiency performance of new buildings. The measures will also help to address the issue of split incentives by ensuring that investments in energy efficiency are made by the appropriate parties during the design and construction stage of new buildings.

### **3.3 National Consistency**

Given the inter-governmental structure of the ABCB and the national application of the building code, the implementation of energy efficiency measures in the BCA provides a platform for facilitating a nationally consistent and coordinated approach to energy efficiency regulation in Australia. The measures also help to minimise regulatory overlap and duplication, thereby increasing the efficiency of government resources and providing greater certainty and reduced compliance costs for industry and consumers.

It should be noted, however, that States and Territories have the power to vary or add to the technical provisions of the BCA. The nature of the ABCB's reform process is that when a new area is first subject to regulation, rather than prolonging the process until differences are resolved, State and Territory administrations accept the introduction of measures into the BCA on the proviso that they can vary out those aspects they cannot accept or that they believe need changing. At the same time, they agree to continue working towards adopting or developing acceptable amendments to allow the measures to be adopted at a later date.

This process is evident in the case of the BCA energy efficiency measures, with only five States adopting the energy measures for houses to some extent in 2003. However, it is likely that all but one jurisdiction will largely adopt the BCA energy changes proposed by the ABCB over the next two years. These changes involve the agreed new measures for Class 2, 3 and 4 buildings for BCA 2005, and a 5 star stringency for houses for BCA 2006.

## **4.0 Energy Efficiency Project: Current Status**

### **4.1 Energy Efficiency Requirements for Residential Buildings**

On commencement, the highest priority of the project was the development of energy efficiency measures for houses. Following the preparation of a RIS and a public consultation process, the housing measures were introduced into the BCA on 1 January 2003 and were adopted by most States and Territories<sup>2</sup>. The RIS indicated that the provisions would result in total net savings, after capital costs, of around \$500 million (present value) for dwellings constructed during the period 2003-2010, and could be expected to generate a cumulative greenhouse reduction of CO<sub>2</sub> equivalent of 1.51 million tonnes for this period.

When the measures were approved by the ABCB in August 2002, it was on the basis that the stringency level of some measures would be temporary to allow industry time to adjust. There was, however, an expectation that the stringency would be reviewed in the near future.

Some States and Territories subsequently indicated an intention to increase the stringency of the energy measures in their jurisdictions. To facilitate a nationally consistent approach, the ABCB agreed in September 2003 that the current BCA housing energy provisions should be reviewed and the stringency increased where appropriate.

A Regulation Document, containing revised proposals which aim to achieve a 5 star stringency, has just been released for public comment. A RIS on the proposals is currently being prepared and will be released for public comment early in 2005. It is expected that the revised BCA measures for houses will be finalised during 2005 for adoption in the BCA in 2006.

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<sup>2</sup> Victoria has exceeded the national 4 star standard by implementing a five star requirement for all new houses and apartments. The ACT already had a 4 star standard in place at the time of the introduction of the BCA energy measures. NSW has adopted a sustainability approach that includes other elements as well as energy efficiency.

## 4.2 Energy Efficiency Requirements for Commercial Buildings

The development of the BCA energy efficiency measures for commercial buildings has proceeded in two phases: the development and implementation of measures for multi-residential buildings, followed by measures for other commercial buildings.

### *(i) Energy measures for multi-residential buildings*

In September 2003, the ABCB released a Regulation Document for public comment containing draft energy efficiency measures for apartments, hotels and motels. A draft RIS assessing the costs and benefits of the measures was also prepared and released for public comment. It showed that the benefits from the proposals have a Net Present Value of \$21.5 million.

The measures have now been finalised and will be introduced into the BCA on 1 May 2005. They include provisions for the building fabric, glazing, natural ventilation, building sealing and engineering services (including some lighting systems; air-conditioning, heating and ventilation systems; hot water supply systems; and maintaining these systems).

### *(ii) Energy measures for all other commercial buildings*

Energy efficiency measures for other classes of commercial buildings (Classes 5 to 9) have also been developed and generally cover the same building elements as the Class 2, 3 and 4 energy measures, but with different requirements. A Regulation Document outlining draft measures for Class 5 to 9 buildings has recently been released for public comment. A RIS is currently being prepared and will be released for public comment early in 2005. It is intended that the measures be finalised during 2005 for adoption in the BCA in 2006.

Based on an independent study,<sup>3</sup> an average design target (as against actual energy consumption) was set at around 740 MJ/annum.m<sup>2</sup> for an office building in the temperate locations. The proposed design target represents a saving of around 20% of the energy consumption on average over a building treated with minimal energy measures.

However, it must be emphasised that this is a design-based target only, and is only applicable to a particular set of hypothetical circumstances. The target is based on assumed operating profiles and internal loads and, therefore, does not hold true for all buildings and all climates. In particular, it is difficult to achieve the same target in hot humid climates, while in cooler climates lower values can be more easily achieved. In addition, the target does not take into account many buildability and operational matters. It is also important that the design target not be compared with the values of any of the existing energy or sustainability rating tools, as there is no correlation between the BCA target and these tools.

As was the case with the introduction of the BCA housing energy measures, while a greater stringency would still be cost effective, the proposed provisions are considered a reasonable first step in eliminating worst practice. It is acknowledged that the stringency will need to be increased in the future, as industry adapts its practices and the supply of energy efficient products increases.

Unlike the majority of residential buildings, most commercial buildings are not occupied by their owners. Building developers in general attempt to minimise capital cost and maximise lettable space and, as tenants are liable for operating costs, this frequently means there is little incentive to exceed the BCA defined minimum requirements for energy efficiency. There is a

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<sup>3</sup> A study was carried out by Exergy Australia in 2003 of existing office buildings, their actual energy consumption and their modelled predicted energy consumption. This study indicated that the actual energy consumption of buildings can be considerably more than the design target.



move towards the construction of more environmentally sustainable buildings, a trend which needs to be encouraged.

### **4.3 Consultation**

The ABCB has been actively involving stakeholders to assist in the development of the BCA energy efficiency provisions. Several committees and working groups have been established comprising representatives from a range of government and industry organisations. A list of key organisations participating in the project is included at Appendix A.

The Energy Efficiency Steering Committee is a policy body comprising ABCB Board Members, representatives from key industry and government organisations, and a Community Advocate. This Committee oversees the development of the project and is responsible for major policy decisions relating to the BCA energy efficiency measures.

The Housing Technical Committee and Commercial Buildings Technical Committee provide advice to the ABCB and the Energy Efficiency Steering Committee on technical issues, and assists in the development of technical proposals for the energy provisions. A number of specialist Working Groups have also been established to advise on energy efficiency issues relating to specific building elements.

At certain stages of the project the ABCB also seeks the views of the wider community, for example on the release of Regulation Documents and Regulation Impact Statements on proposed energy efficiency measures.

### **4.4 Environmentally Sustainable Development**

The ABCB is conscious of the desire of many in the community to regulate other aspects of Environmentally Sustainable Development (ESD) besides operational energy. Although operational energy is being tackled as a first step, the ABCB is considering how sustainability could also be part of the BCA. This is part of a separate project. There is also a divergence of opinion in the community as to what should be covered by ESD, and after the full scope is agreed, it may be found that only some elements are suitable for regulation or need to be regulated.

A difficulty yet to be overcome is the ability to regulate ESD matters nationally. Because building control is a State and Territory responsibility there are eight sets of legislation involved. Few, if any, of those have the power to control all aspects of ESD, while most have different aspects under different legislation (ie. plumbing, OH&S, environment protection etc.).

## **5.0 National Framework for Energy Efficiency**

ABCB stakeholders have become increasingly concerned in recent years about the variety of government and non-government energy efficiency initiatives being undertaken. In the absence of better national coordination, this situation has the potential to create confusion for key stakeholders, including the community, and to result in a fragmented approach and costly duplication of effort.

The implementation of a coordinated, cohesive National Framework for Energy Efficiency (NFEE) has the potential to address these concerns. The BCA national regulatory program on energy efficiency comprises one element of the Framework, and the ABCB Office has recently assisted the Department of Environment and Heritage to prepare the draft implementation plan for the housing and commercial building design aspects of NFEE.

The ABCB notes that the NFEE is being progressed by the Ministerial Council on Energy, through the energy agencies from the Australian Government and the State and Territory Governments. Given that energy efficiency regulation for buildings is the responsibility of State and Territory building regulatory agencies, it will be important that effective consultation and coordination linkages are established at the State and Territory Government level. Ideally, the NFEE process should be used as a means of renewing the commitment by State and Territory Governments to deliver on a nationally consistent approach to energy efficiency for the built environment.

## **6.0 Other Issues**

Two other issues which should be considered by the Commission relate to the current low cost of energy and the lack of comprehensive data on energy issues.

A key factor influencing the uptake of energy efficiency opportunities in the residential and commercial sectors is Australia's low energy pricing structure. This has been particularly evident in attempting to demonstrate the cost-effectiveness of the BCA energy efficiency measures as part of the regulation impact process. While this issue represents a significant challenge for improving energy efficiency, one possible solution is to encourage all life-cycle costing analysis to reflect a long term cost of energy, including generation, reticulation and developing alternative sources, rather than the actual energy prices charged by energy retailers.

It should also be noted that, in developing the BCA energy efficiency measures, some technical and policy decisions have had to be made on limited or anecdotal evidence due to the lack of energy data. One reason why this data is not available is because of the current fragmented approach to funding energy efficiency research activities. From a government perspective, better coordination and targeting of funding is essential to ensure that reliable data is available for informed policy decisions to be made.

## **7.0 Conclusion**

The ABCB/AGO energy efficiency project aims to develop and implement national, cost-effective, energy efficiency regulations that reduce greenhouse gas emissions from buildings. This national project has the potential to make a significant contribution to addressing some of the key barriers to improving energy efficiency in the residential and commercial building sectors.

The ABCB is also considering whether sustainability requirements should be introduced into the BCA, and is concerned that the current absence of a nationally coordinated approach for sustainability will result in confusion and costly duplication of effort.

The ABCB strongly supports efforts to develop a coordinated, cohesive National Framework for Energy Efficiency, and considers that this is critical for ensuring maximum economic and social benefits from increased energy efficiency. The BCA energy efficiency regulations form an integral element of the Framework.

Additional issues which threaten the accelerated uptake of cost-effective energy efficiency opportunities include the low cost of energy used in some analyses, and a lack of energy consumption data on which to make informed policy decisions.

**APPENDIX A**

**ABCB/AGO ENERGY EFFICIENCY PROJECT  
PARTICIPATING ORGANISATIONS**

Air-Conditioning and Mechanical Contractor's Association of Australia  
Air-Conditioning and Refrigeration Equipment Manufacturers Association  
Aluminium Foil Insulation Association  
Australian Council of Building Design Professions  
Australian Glass & Glazing Association  
Australian Greenhouse Office  
Australian Institute of Building Surveyors  
Australian Institute of Refrigeration, Air-Conditioning and Heating  
Australian Local Government Association  
Australian Window Association  
Building Designers Association of Australia  
Business Council for Sustainable Energy  
Cement and Concrete Association of Australia  
Clay Brick and Paver Institute  
Commonwealth Scientific & Industrial Research Organisation (CSIRO)  
Concrete Masonry Association of Australia  
Department of Industry, Tourism and Resources  
Earth Building Association of Australia  
Facility Management Association  
Housing Industry Association  
Illuminating Engineering Society of Australia & New Zealand  
Institution of Engineers, Australia  
Insulation Manufacturers Association of Australia  
Lighting Council Australia/Australia's Electronics and Electrical Manufacturing Industries  
Master Builders Australia  
Timber Development Association  
Property Council of Australia  
Royal Australian Institute of Architects  
Skylight Industry Association  
Standards Australia International