



Australian Building Codes Board



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Dear Chairman

I write to you in relation to the Inquiry into Energy Consumption in Residential Buildings and the Standing Committee's invitation for the Australian Building Codes Board (ABCB) to make a submission.

Firstly, I would like to thank you for this opportunity.

The attached document provides details of the ABCB's role in the development of energy efficiency measures for the Building Code of Australia, and contains information on the process we are following. The submission 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 ABCB submission assists the inquiry and I welcome further requests for additional information.

Yours sincerely

Ivan Donaldson
Executive Director

30 July 2003

**STANDING COMMITTEE ON
PUBLIC WORKS**

**INQUIRY INTO ENERGY CONSUMPTION
IN RESIDENTIAL BUILDINGS**

**SUBMISSION FROM
AUSTRALIAN BUILDING CODES BOARD**

JULY 2003

Table of Contents

1	THE AUSTRALIAN BUILDING CODES BOARD	4
2	THE BUILDING CODE OF AUSTRALIA	4
3	BUILDING REGULATIONS	6
4	THE ABCB & ENERGY EFFICIENCY	6
5	ENERGY EFFICIENCY FOR HOUSES	7
6	ENERGY EFFICIENCY FOR MULTI-RESIDENTIAL (CLASS 2-4) BUILDINGS	9
7	A NATIONALLY CONSISTENT APPROACH TO ENERGY EFFICIENCY FOR BUILDINGS	9
8	ENERGY RATING TOOLS	10
9	WORK PROGRAM: OTHER COMMERCIAL BUILDINGS	12
10	CONCLUSION	12
	APPENDIX A – MAJOR ORGANISATIONS INVOLVED IN ABCB ENERGY EFFICIENCY PROJECT	
	APPENDIX B – ABCB PRESS RELEASE	
	APPENDIX C – REGULATORY IMPACT STATEMENT: BCA HOUSING ENERGY PROVISIONS	

1 The Australian Building Codes Board

The Australian Building Codes Board (ABCB) is a Commonwealth, State and Territory funded body. The ABCB 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 Board was established by means of an inter-government agreement signed by the Commonwealth, State and Territory Ministers responsible for building regulatory matters on 1 March, 1994. 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.

Board members include a number of industry representatives, the Commonwealth, State and Territory Governments' chief executives responsible for building regulatory issues, and a Local Government representative. The ABCB reports directly to the Commonwealth, State and Territory Ministers responsible for building regulatory matters, and provides a vital link for the building industry between building practice and Government building regulatory policy.

NSW is directly represented on the Board by the Department of Infrastructure, Planning and Natural Resources. The agency also has a representative on the ABCB's peak technical body, the Building Codes Committee, which considers all major technical issues relating to the BCA.

2 The Building Code of Australia (BCA)

The BCA is a national building code which is developed and maintained by the ABCB on behalf of the Commonwealth and the State and Territory Governments, who each have statutory responsibility for building control and regulation within their jurisdiction.

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

- the use of alternative or innovative materials and forms of construction or designs;
- allowing designs 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 while still allowing existing building practices through Deemed-to-Satisfy Provisions.

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 hierarchy that starts with an Objective and is followed by Functional Statements, Performance Requirements and Building Solutions

(see Figure 1 below). Generally, it is the Performance Requirements that are recognised under building law. The Objective is the broad societal goal, while the Functional Statement describes what the building needs to do to meet the Objective.

BCA Performance Requirements must be satisfied by the design and construction of the building. There are two types of Building Solutions to meet the Performance Requirements:

1. Using the **Deemed-to-Satisfy Provisions**. The Deemed-to-Satisfy Provisions are detailed prescriptive technical requirements of how the building is to be constructed and equipped. 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.
2. Using an **Alternative Solution**. An Alternative Solution is one that can be demonstrated to meet the Performance Requirements of the BCA by other means. 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.

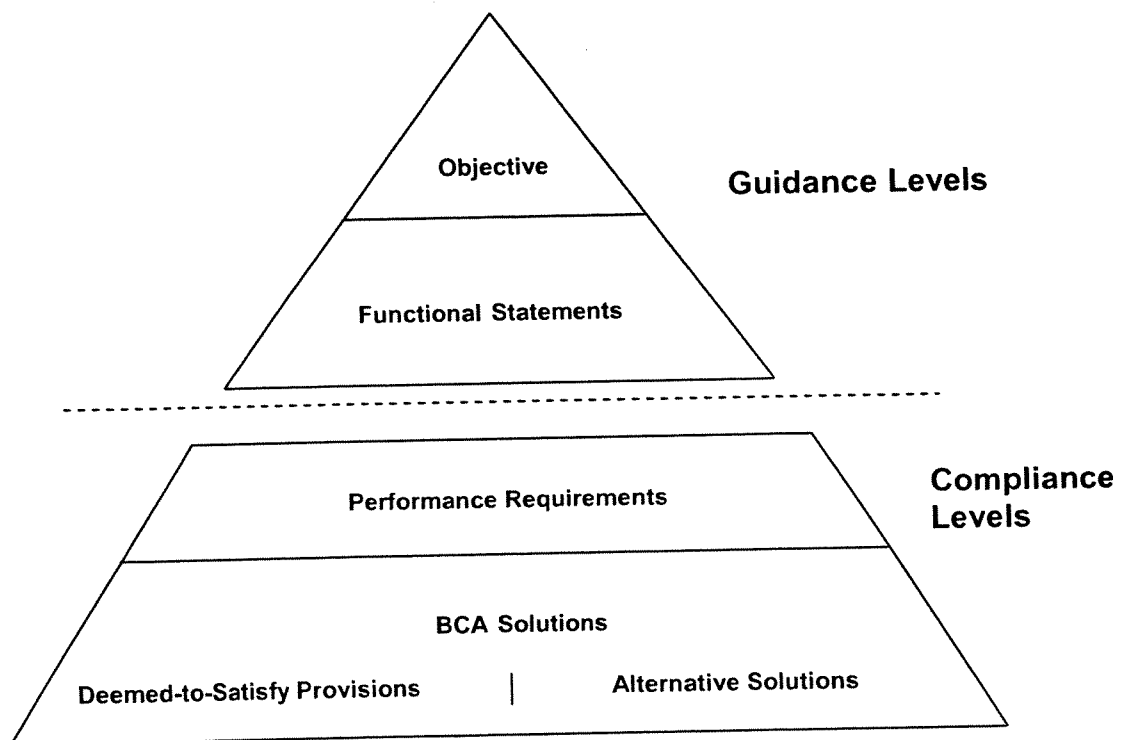


Figure 1 – BCA Hierarchy

The BCA is amended annually in May 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. It includes preparation of a detailed technical proposal (Regulation Document) and, as required under Council of Australian Government (COAG) arrangements, a Regulatory Impact Statement for broad community consultation.

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. While States and Territories may include minor variations to the BCA in their legislation and different criteria, or 'triggers' for how they apply it to 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".

4 The ABCB & Energy Efficiency

4.1 Background

A national 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 Commonwealth 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.

4.2 Housing and Commercial Buildings

The energy efficiency project comprises two major elements:

- Development and implementation of energy efficiency measures for commercial buildings (BCA Volume One - Class 2-9 buildings)
- Development and implementation of energy efficiency measures for houses (BCA Volume Two - Housing Provisions)

Prior to the commencement of the project, industry had expressed concern at the proliferation of "Energy Codes" at a regional level and called for the expedient development of mandatory measures in the BCA. The Board gave priority to developing measures for housing. These were finalised in 2002 and introduced into BCA Volume Two on 1 January 2003.

Measures for multi-residential, public and commercial buildings are now being developed.

4.3 Consultation

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

The Energy Efficiency Steering Committee is a policy body comprising ABCB Board Members and representatives from key industry and government organisations. 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 (CBTC) provide advice to the ABCB and the Energy Efficiency Steering Committee on technical issues, and assist in the development of technical proposals for inclusion in the BCA energy provisions. A number of specialist Working Groups have also been established to advise on energy efficiency issues relating to specific building elements.

NSW was recently invited to join the Energy Efficiency Steering Committee and the CBTC, and will be represented on both committees by the Department of Infrastructure, Planning and Natural Resources. The Department is also represented on selected specialist Working Groups.

At specific stages of the project, the ABCB also seeks the views of the wider community, for example on the release of Regulation Documents and Regulatory Impact Statements on the BCA energy efficiency provisions.

5 Energy Efficiency for Houses

5.1 Development of BCA housing energy measures

The first phase of the energy efficiency project was to develop energy efficiency measures for houses. Following an extensive policy and technical development process with all stakeholders, the ABCB Board approved a set of provisions and announced on 30 August 2002 that national energy measures for houses would be introduced into the BCA on 1 January 2003 (Press Release at Appendix B).

These new, cost effective provisions are intended to improve the energy efficiency of new houses, while avoiding excessive technical and commercial risks and unreasonable initial costs. The Regulatory Impact Statement (RIS) on the measures (Appendix C) indicates that the provisions will result in potential total net savings, after capital costs, of around \$500 million (present value) for dwellings constructed during the period 2003-2010. The provisions will also play an important role in reducing greenhouse gas emissions from the residential building sector. This RIS shows an expected cumulative greenhouse reduction of CO₂ equivalent of 1.51 million tonnes for the period 2003-2010.

The BCA energy efficiency measures mark a significant starting point for eliminating worst practice in energy efficient design in the housing industry. In summary, the provisions cover five main areas:

- *Building fabric:* to control conduction of energy through the building fabric.
- *Solar radiation:* to control discomfort in warmer climates from solar radiation and to provide solar heating in cooler climates.
- *Building sealing:* to control air leakage into or out of a building, and hence avoid an increased need for heating or cooling.
- *Air movement:* to ensure adequate air movement either with external and internal openings provided to permit a building to be ventilated naturally, or with fan assistance.
- *Services:* to avoid losing energy through piping or ductwork.

The BCA housing energy measures aim to achieve a 4 star performance generally in climates where winter heating is the dominant need, and 3.5 stars generally where summer has the greater impact. Some further information on the BCA housing energy measures is at Appendix D.

5.2 Implementation of BCA housing energy measures

The housing energy provisions were introduced into the BCA on 1 January 2003 and were adopted by the Northern Territory, South Australia and Tasmania on that date. Western Australia adopted the measures on 1 July 2003 and Queensland is scheduled to implement the measures on 1 September 2003.

The ACT already has an equivalent 4 star energy rating system in place. Victoria has recently announced that it intends to exceed the national 4 star standard by implementing a 5 star requirement for all new houses and apartments from 1 July 2005. Transitional arrangements will apply in Victoria from 1 July 2004, incorporating the 4 star energy standard together with some water efficiency requirements.

NSW is currently considering the BCA housing energy provisions. Further information on the possible implementation of these measures should be sought from the NSW Minister for Infrastructure, Planning and Natural Resources or his Department.

The BCA housing energy provisions have now gained widespread acceptance throughout the building and construction industry. There are a few technical issues of a complex nature that have been identified as needing further consideration. These will be addressed in consultation with relevant technical specialists, and incorporated into future BCA Amendments.

It should be noted that some of the stringency levels of the BCA housing energy provisions have been adopted on the understanding that they will be increased in the future to further improve the energy efficiency performance of houses. The ABCB will, therefore, review the provisions after an appropriate bedding down period.

5.3 Education Program

The ABCB has developed a comprehensive education seminar program for all jurisdictions adopting the BCA housing energy measures, to ensure that building practitioners are adequately prepared for the new requirements. Seminars have already been held in South Australia, Tasmania, the Northern Territory and Western Australia. Education seminars for Queensland will be held in August 2003.

Should NSW decide to adopt the national BCA housing energy measures, the ABCB would be happy to assist in developing a seminar program for the jurisdiction.

6 Energy Efficiency for Multi-residential (Class 2-4) Buildings

Having developed and introduced housing energy measures into the BCA, the major focus of the energy efficiency project is now on commercial buildings. The Board has agreed that the implementation of commercial building energy measures will commence with multi-residential buildings. These comprise BCA Class 2 buildings (apartments), Class 3 buildings (hotels/motels) and Class 4 parts (eg a caretaker's residence over another building).

A draft Regulation Document (RD) containing energy measures for Class 2, 3 and 4 buildings has now been prepared by the ABCB Office in consultation with the ABCB's working groups, committees, and energy efficiency experts. The RD is scheduled for release for public comment in September 2003.

The draft technical measures contained in the RD relate to the building fabric, building sealing, glazing, ventilation, lighting and building services systems. Many of the measures are the same as the BCA housing energy provisions, or are of a similar stringency but expressed differently because, unlike houses, some apartments have external walls that face only a single direction.

A draft Regulatory Impact Statement (RIS) will also be prepared on the proposed measures and will be available for public comment early next year. The RD and RIS will have the same closing date for public comment (currently scheduled for 5 March 2004). The BCA provisions for Class 2-4 buildings are scheduled to be finalised in November 2004, for introduction in the BCA in 2005.

7 A Nationally Consistent Approach to Energy Efficiency for Buildings

The new BCA housing energy measures provide a nationally uniform, cost-effective approach, thereby avoiding the need for jurisdictions to impose separate energy regulations. Accordingly, the measures provide a significant starting point in addressing industry concerns about the proliferation of different energy requirements around Australia.

While improving energy efficiency in the built environment is to be encouraged, the ABCB is concerned about the variety of government and non-government energy efficiency activities currently being undertaken. In the absence of better coordination, the ABCB believes that this situation has the potential to create confusion for key stakeholders, including the community, and could lead to a fragmented approach and costly duplication of effort if organisations fail to work closely together on key issues.

It is the Board's view that clear communication linkages are essential, particularly between government agencies at both federal and state levels. In NSW, the importance of effective communication linkages is clearly evident, given that the responsibility for energy matters is split across a number of State government agencies and local councils. It is also important that all relevant organisations take account of the clear differentiation between the regulatory issues being progressed by the ABCB, and the best practice initiatives being undertaken by other agencies.

Many local councils in NSW have implemented separate energy efficiency regulations for houses. This situation also occurred in some other jurisdictions prior to the introduction of the BCA housing energy measures. However, in those cases the national BCA measures override existing local council requirements once adopted by the jurisdiction. That will not be the case in NSW if a council decides to retain or impose regulations over and above the minimum requirements of the BCA.

Recommendation: *It is suggested that any future proposals in NSW relating to energy efficiency for buildings take into account the benefits of national consistency being progressed by the ABCB and the energy efficiency work program being undertaken by the ABCB.*

It is also recommended that if NSW wishes to set the stringency bar differently, that it be consistently applied across the state having regard to climate zones, rather than on a council by council basis.

8 Energy Rating Tools

8.1 The BCA and energy rating software

Energy rating software has become an important tool in the design and construction of energy efficient buildings. As a result of public comment received on the draft BCA energy efficiency provisions for houses (June 2002), the ABCB incorporated a Verification Method¹ in the final provisions to enable house energy rating software to be used to demonstrate compliance. The BCA does not, however, reference particular energy rating software, primarily for reasons relating to proprietary ownership, differences in the results from different software, and the high cost of validating software.

Under the Verification Method, houses must attain a 3.5 star energy rating in defined northern parts of Australia and a 4 star energy rating in defined southern parts of Australia. These star ratings are based on the Nationwide House Energy Rating Scheme (see section 8.2). In addition, some individual States and Territories have specified (as a BCA Variation) the use of specific energy rating software for demonstrating compliance (for example in South Australia, FirstRate software must be used).

¹ A BCA Verification Method is one of several means of demonstrating that an Alternative Solution meets the BCA Performance Requirements.

The ABCB decided to adopt this approach even though some stakeholders were concerned about technical deficiencies of energy rating software. It is understood that over the last 12 months, considerable work has been undertaken by the Australian Greenhouse Office (the ABCB's joint partner in the Energy Efficiency Project) aimed at overcoming these deficiencies.

Recommendation: *In NSW, many Councils currently only require 3.5 star energy rating. It is suggested that any future proposals in NSW relating to energy ratings for houses take into consideration the national BCA approach of a 4 star energy rating for houses in southern parts of Australia.*

8.2 The Nationwide House Energy Rating Scheme

The Nationwide House Energy Rating Scheme is a standardised approach for energy rating houses throughout Australia. There are currently three energy rating software packages under the Scheme: NatHERS, FirstRate and BERS.

The Scheme was initially developed by the Commonwealth Government and State/Territory energy agencies, in conjunction with CSIRO. The ongoing development of the Scheme is managed by the Energy Efficiency and Greenhouse Working Group (E2G2), on behalf of the Ministerial Council on Energy. This Group comprises officials from Commonwealth, State and Territory energy departments and is responsible for the energy performance levels (star bands) associated with the Scheme's star ratings.

The inclusion of star ratings in the BCA Verification Method has resulted in a situation whereby State/Territory energy agencies (through E2G2) control the Nationwide House Energy Rating Scheme, while the star bands of the Scheme are implemented through building regulatory agencies (through ABCB). Given this resultant split in administrative arrangements, there will now be an ongoing need for close collaboration between the ABCB and E2G2.

Mr Peter Laver, the ABCB Chairman, has written to the E2G2 Chair proposing closer cooperation between the two organisations. Mr Laver's letter also emphasises that it will be critical for the ABCB to be consulted on any future E2G2 proposals to change the star band levels associated with the Scheme. This will be necessary to allow an assessment of potential impacts on BCA compliance and to enable a regulatory assessment to be undertaken, as required under COAG arrangements.

There is also a strong need for government energy agencies and building regulatory authorities in each State and Territory, to closely consult on proposed changes to the Scheme and associated software. This is particularly important in NSW, where several different government agencies and many local councils have varying degrees of interest and involvement in the Scheme and the NatHERS software.

Recommendation: *It is suggested that any future proposals in NSW concerning the Nationwide House Energy Rating Scheme should take into account the need for close consultation on issues relating to the Scheme's star band levels. In particular, it will be important for the energy and building regulatory agencies in NSW to liaise on the Scheme and associated software, to ensure that any proposed changes are compatible with the jurisdiction's building regulatory requirements.*

8.3 Protocol for House Energy Rating Software

An issue regularly discussed throughout the development of the BCA housing energy provisions was the need for an overarching protocol for house energy rating software. The ABCB has been developing a draft Protocol over the last six months.

The primary goal of the 'Protocol' is to provide a legal basis for the recognition of all house energy rating software that can be used for demonstrating compliance with the BCA Energy Efficiency Performance Requirement. The draft Protocol incorporates the Nationwide House Energy Rating Scheme star band levels, and details on what is considered appropriate testing for software. Once finalised, it is proposed that the BCA will give recognition to the Protocol so that software developers can have their software appraised for compliance with the BCA.

The ABCB is consulting with stakeholders, including key software suppliers, on the draft Protocol. It is currently intended that the Protocol document be finalised in time for the next Amendment to the BCA (1 May 2004). It should be noted that once the Protocol is recognised in the BCA, energy rating software will need to meet the requirements of the Protocol if used to demonstrate compliance with the BCA housing energy provisions.

***Recommendation:** It is suggested that any future proposals in NSW relating to energy rating software, take into account the work currently being undertaken by the ABCB on a Protocol for House Energy Rating Software.*

9 Work Program: Other Commercial Buildings

In conjunction with the development of energy efficiency provisions for multi-residential buildings, the ABCB is also developing energy measures for other commercial buildings. A significant element of the commercial buildings work program is the development of measures for office (Class 5) buildings.

The ABCB is currently preparing a public document on the proposed BCA stringency level for office buildings. The purpose of this document will be to alert industry that there will be future BCA changes relating to the energy performance of these buildings, and to provide the opportunity for public comment on the stringency targets being considered. The document is scheduled to be released in late 2003.

Under the current work program, the BCA energy measures for office buildings will be finalised in 2005, with implementation scheduled for 2006. Energy efficiency measures for other commercial buildings will follow.

10 Conclusion

The ABCB is a joint initiative of all levels of Australian government, in cooperation with the building industry. Through its responsibility for developing national, cost-effective, minimum regulatory requirements for the BCA, the ABCB is actively involved in energy efficiency issues relating to the built environment.

The implementation of housing energy measures in BCA Volume Two (Housing Provisions) will result in reduced energy consumption in houses, primarily through improved design and construction practices required by the BCA. The provisions will also play an important role in reducing greenhouse gas emissions from the Australian residential building sector. The work currently being undertaken by the ABCB relating to energy efficiency measures for multi-residential and other commercial buildings, aims to further reduce energy consumption and greenhouse gas emissions throughout Australia.

The introduction of the BCA housing energy measures marks a significant starting point in providing a nationally consistent approach to energy regulations for buildings. However, given the array of energy efficiency activities currently being undertaken, the ABCB believes that it is imperative for federal and state/territory government agencies to establish clear communication linkages to avoid a fragmented and costly approach to energy efficiency issues affecting the building and construction industry.

The ABCB has an interest in the use of energy rating tools, particularly in relation to the Nationwide House Energy Rating Scheme. The Scheme is managed by the E2G2, and the star bands of the Scheme are now implemented through building regulation. Accordingly, it will be important for state/territory government energy agencies and building regulatory authorities to closely consult on proposed changes to the Scheme (and associated software). Once a Protocol for house energy rating software is recognised in the BCA, all energy rating software will need to meet the Protocol's requirements if used to demonstrate compliance with the BCA.

Recommendation: *It is strongly recommended that any future proposals in NSW relating to energy consumption in residential buildings take into account the work being undertaken by the ABCB on energy efficiency issues, as outlined in this submission.*