Australia

Building Code Implementation - Country Summary


Section I: Code Development

History

Starting year
The National Construction Code comprises the Building Code of Australia (commenced in 190) Volumes One and Two (BCA), as well as the Plumbing Code of Australia (commenced 2011), Volume Three. The National Construction Code is a nationally developed model code that is adopted by all States and Territories of Australia as a mandatory code governing the design and construction of new buildings as well as additions and alterations to existing buildings that meet certain thresholds. Energy efficiency measures were first introduced into the BCA for residential buildings in 2003.

Timeline/ road map
Since 2003, there have been three tranches of increased energy efficiency requirements under the BCA, for both residential and non-residential buildings, the most recent being in 2010.

Existing codes

Structural coverage
The Building Code of Australia provides two compliance options:
1.) Prescriptive Solution (Deemed to satisfy provisions)
2.) Performance Solution (Alternative solution): the Performance Solution must be shown to comply with the mandatory performance requirements of the Code.
NCC is a nationally developed code that contains building energy efficiency requirements. It becomes mandatory when adopted (with variations) by states and territories of Australia and is enforced regionally/locally both at design and construction with the support from third parties.

<table>
<thead>
<tr>
<th>Scale (National, regional, local, etc.)</th>
<th>Building size threshold</th>
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</thead>
<tbody>
<tr>
<td><strong>Residential buildings</strong></td>
<td></td>
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<tr>
<td>New buildings</td>
<td>Regional</td>
</tr>
<tr>
<td>NCC applies to new buildings and alterations and additions, the thresholds for which are determined by the individual jurisdictions (note retrofitting of hot water services is regarded as new works).</td>
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<tr>
<td>The Plumbing Code applies to the energy efficiency of hot water services.</td>
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<tr>
<td>Volume Two of the BCA contains requirements for the design and construction of domestic buildings (i.e. Class 1 and 10 buildings, plus some Class 10 structures) (equivalent of 6 star level energy performance requirement for new buildings)</td>
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<tr>
<td>Existing buildings for retrofits</td>
<td>Regional</td>
</tr>
<tr>
<td>NCC applies to alterations and additions, the thresholds for which are determined by the individual jurisdictions (note retrofitting of hot water services is regarded as new works).</td>
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<tr>
<td>The deemed-to-satisfy provisions typically applied to both the alterations and the existing house over a certain threshold (not consistent across Australia)</td>
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<tr>
<td><strong>Commercial buildings</strong></td>
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<tr>
<td>New buildings</td>
<td>Regional</td>
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<tr>
<td>Volume One of the BCA contains requirements for the design and construction of commercial buildings; i.e. Class 2 to 9 buildings, plus some Class 10 structures. For non-residential, based on a calculation of CO₂ over mega joules of energy used. Plumbing Code applies to hot water services.</td>
<td></td>
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<tr>
<td>Existing buildings for retrofits</td>
<td>Regional</td>
</tr>
<tr>
<td>Major refurbishments are included. Many states have also included requirements for existing buildings, but varies between the jurisdictions</td>
<td></td>
</tr>
</tbody>
</table>
Measures covered

- Envelope
- HVAC
- Service water heating
- Lighting
- Maintenance
- Thermal comfort
- Option for performance-based approach

Correction/new codes

Motivation/policies for improving existing building energy codes

The objective of the energy efficiency provisions within the National Construction Code (NCC) is to reduce Greenhouse Gas Emissions.

The current policy focus of the Australian Building Codes Board (ABCB) is to:

- Obtain compliance with the current performance requirements, which anecdotally may be more significant than raising the stringency of the energy efficiency provisions
- Introduce quantified measures into the performance requirements to enhance clarity and certainty as to what is required
- Review energy rating software for its application in Australia’s tropical northern climates where its modelling is not as effective, leading to sub-optimal outcomes.

Revision schedule

These projects are being worked on with the aim of being available for NCC 2019.

Involvement of stakeholders in the development of codes

The ABCB works closely with key industry and government stakeholders in the development of the NCC.

Key methods used to engage stakeholders in the code development process

The establishment of subject matter expert working groups, the use of industry technical committees, surveys or information distribution, stakeholder engagement, formal regulatory impact assessment processes and decisions by a Board that comprises key industry representatives.
Section II: Code Implementation

Administration

Administrative/Enforcement structures

**Government agency** Local governments monitor compliance, and in some jurisdictions conduct inspections.

**Private sector/third party** Third parties conduct on-site inspections.

The roles of stakeholders

<table>
<thead>
<tr>
<th></th>
<th>Design</th>
<th>Construction</th>
<th>Pre-occupancy check</th>
</tr>
</thead>
<tbody>
<tr>
<td>The role of federal/central government</td>
<td>None</td>
<td>Monitor and enforce compliance. In some jurisdictions, local governments conduct inspections.</td>
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</tr>
<tr>
<td>The role of state/provincial and local government</td>
<td>Application is made by building surveyor or contractor to construct building according to NCC performance requirements. A private certifier or council will check that the building complies with the performance requirement using either a deemed-to-satisfy or acceptable construction practice in the NCC, unless the applicant indicates that the building should be assessed through an alternative solution. In residential buildings, such an alternative</td>
<td>On-site inspections by third-party assessor occurs</td>
<td>In some cases a post-occupancy assessment is completed</td>
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<tr>
<td>Involvement of third parties and their role</td>
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</table>
solution could be nominated as requiring assessment against the Deemed to Satisfy Provisions, which requires a 6-star rating determined using a thermal calculation method that complies with the current ABCB Protocol for House Energy Rating Software. House energy ratings should be completed by a designer, builder or building surveyor or other person who is competent in using the house energy rating software. Under Regulation 88, a relevant authority does not need to check certain aspects of the Building Rules if a certificate from an independent technical expert is lodged with the development application. A relevant authority must accept a certificate from a house energy rating assessor who is recognised as an independent technical expert for the purposes of energy efficiency and who must be listed on the Register of House Energy Rating Assessors maintained by the Registration Authority. These certificates are to provide independent verification of the star-rating being claimed and
as such, house energy rating assessors must not have any involvement in any aspect of the relevant development (other than through the provision of preliminary advice of a routine or general nature), or have a pecuniary interest in any aspect of the relevant development or any body associated with any aspect of the relevant development in accordance with Regulation 85.

Requirements for commissioning before occupancy
Certificate of Occupancy. What this includes varies between jurisdictions.

Requirements for energy audits after occupancy
Yes, in some jurisdictions.

Tools used for compliance checking

Software used for compliance checking
In Australia, the building certifier has the authority to decide what method of calculation is acceptable. Thus, there are no references to a national software tool. However, general simulation tools that help with the whole building compliance path are available.

The Star Rating used for the purpose of regulating the thermal performance of homes is derived using computer software packages; AccuRate, BERS Pro, FirstRate 5 and BASIX.

For commercial buildings it is the National Australian Built Environment Rating System (NABERS), although it does not strictly perform the same function as it provides a star rating based on the actual performance of a building after it has been certified. These tools are all maintained by governments or operators licensed/accredited by governments.
It is not necessarily required that these software tools be used for compliance checking, but they are a means by which compliance with approved plans can be demonstrated. The difficulty is those features of a building that are hidden from view, such as insulation.

Other tools used to check compliance
For residential buildings all software must meet standards set in the Nationwide Home Energy Rating Scheme (NatHERS) Software Accreditation Protocol. For commercial buildings the software must meet accredited by the ABCB.

Capacity building and education

Education and capacity building programs that support code implementation
The ABCB has a range of training modules (Resource Kits) that are designed to increase awareness of NCC provisions within the Australian building and construction sector. The Resource Kits are intended to provide current and consistent information on the NCC and have been designed to assist those who are in a training profession such as teachers or lecturers.

A major component of the Awareness Resource Kits is an extensive PowerPoint presentation including lecture notes and comprehensive information on Performance Requirements and Alternative Solutions. Also featured are FAQs, Group Exercises and Case Studies, which can all be work-shopped as a group. Non-government organisations and building associations have been and are highly active in conducting research and outreach activities to improve implementation of the building energy codes.

More recently these resource kits have been converted into on-line training modules aimed at building practitioners, linked to training provided by industry associations. In turn, these are complemented by non-mandatory handbooks. In time it is intended to supplement this material with more user-friendly digital resources, such as YouTube clips and illustrations.

The State and Territory building regulators also conduct their own education or support training providers.

Target groups for programs
Building and construction professionals, trades people, regulators and students.

Effective programs or aspects
Engaging with industry through surveys, seminars, workshops and technical committees to establish where problems exist and possible solutions, moving the focus away from sensitivity about the importance of having energy efficiency to the importance of making it work.
Impactful program or capacity building effort
The ABCB has recently engaged with the HVAC sector to identify and work through how the NCC provisions relating to HVAC can be improved to increase practitioner awareness, understanding and competence in meeting these requirements, with the aim of lifting compliance. It has resulted in a very positive exchange of views and ideas, but it’s too early to judge results.

Section III: Compliance & Enforcement

Penalties, incentives and other mechanisms for improving compliance

Decided at the state level

Penalties for non-compliance with energy provisions in codes:

- Refusal of permission to construct
- Refusal of permission to occupy
- Suspension/Loss of license (possible use of demerit points)
- Fines can be applied

Incentives/rewards to go beyond minimum required performance level

The Department of Industry and Science has also developed a series of other programs - aimed at assisting designers to go beyond the minimum requirements of the NCC. These programs promote best practice rather than NCC minimum requirements. There have been grant programs offered by various tiers of government and some sectors of industry provide their own best practice benchmarks through voluntary mechanisms. Many industry associations feature an award category for buildings exhibiting exemplary energy efficiency or sustainable design practice.

Other mechanisms to encourage compliance

In 2009, the Australian Government launched the Energy Efficient Homes Package to install ceiling insulation in up to 2.9 million Australian homes and solar hot water systems in 300,000 homes. Under the programme, states and territories considered specific jurisdictional issues and interaction with other regulatory initiatives in designing and delivering residential incentive programs.

Examples include: Queensland’s Climate Smart Homes program; and Victoria’s provision of a range of rebates, grant and audit processes to improve energy efficiency or residential dwellings, including:
- complementary solar and gas hot water rebates;
- assistance to upgrade to more efficient appliances; and
- auditing programs to assess and advise households on ways to cut their energy bills.

Some Australian government agencies, including at the federal level, have positively discriminated in favour of energy efficient buildings when procuring for the purchase or leasing of buildings.
Industry newsletters and professional magazines promote best practice examples as well as discuss regulatory requirements, which for the mainstream remain the benchmark.

**Compliance assessment**

*Assessments on rate and effectiveness of compliance*
The National Energy Efficient Building Project (NEEBP), led by the South Australian government on behalf of all Australian states and territories, has coordinated studies to review discrepancies between building design and construction stages and common points of non-compliance with the energy efficiency requirements of the NCC. Compliance varies across the jurisdictions. Some jurisdictions require mandatory disclosure, others require audits and New South Wales, under BASIX (BASIX code: Single Dwelling, Multi-Unit & Additions/Alterations), requires reporting.

*Publicly available information on compliance assessment*

*Lessons learned from compliance studies*
There is significant non-compliance or under-compliance, poor industry knowledge and practice, cost cutting, lack of enforcement and that there is limited value in putting up stringencies further if practitioners are not complying with what is already there.

*Airtightness testing required prior to compliance*
Typically, no. Note that increased condensation, in part contributed to by buildings becoming more airtight, is an emerging issue that will need to be addressed by the ABCB.

**Section IV: Building Materials & Energy Performance Certificates**

**Building materials (e.g. windows, insulation, HVAC, lighting)**

**Building materials rating and labeling**

Primarily building materials are rated through voluntary industry schemes, but still have to meet referenced standards in the NCC to demonstrate fitness for purpose. There is no national labelling
scheme for energy efficient building products, but the designer and certifier need to satisfy themselves that the building materials, along with other features of the building, can meet the performance requirements of the NCC, including where necessary satisfying standards that are referenced. Most imported products are not rated or labelled according to Australian standards and they represent a sizeable share of the market.

The ABCB also operates a non-mandatory building product certification scheme, called CodeMark, where products can seek to obtain certification against referenced standards, which, if achieved, means that product must be accepted a building site for use in its intended purpose.

If an industry scheme exists, such as or glazing, it is voluntary and generally used for brand recognition that a product satisfies that industry’s protocol.

*Testing by certified test labs*
If required to meet a referenced standard, then yes, although imported products represent a significant challenge.

*Manufactures and sampling for tests*

They would be required to provide samples given certification would be for product compliance against the referenced standard at the time of design. Acceptance on the construction site of the materials is at the discretion of the builder and building certifier (i.e., evidence of suitability). False and misleading representation of product conformance can lead to prosecution by Offices of Fair Trading or the Australian Competition and Consumer Commission.

*Labels showing the ratings for building materials*
There is not a specific labelling scheme, but if the product needs to conform with a specified standard, that it should be stamped and certified to illustrate which standard it complies with.

*Approaches for different categories of building materials*

Appliances are treated differently as are electrically and plumbing products.

*Energy Performance Certificates*

*Building codes and energy performance certificates*
Rating schemes NatHERS (asset rating for residential buildings) or NABERS (operational rating for new and existing non-residential buildings) are in place to ensure compliance with the building code. These are mandatory schemes.
In 2010, Australia passed a Building Energy Efficiency Disclosure Act 2010 (http://www.comlaw.gov.au/Details/C2010A00067), which requires disclosure of energy efficiency information for buildings and areas of buildings that are for sale, lease or sublease. A building energy efficiency certificate is issued for a period of 12 months.

*Energy performance certificates replacing codes in some regions/areas*
Building labelling does not replace codes.

* Differences between energy performance certificates and performance-based approach of code compliance*
For commercial buildings, there is a national scheme to disclose the energy rating of a building at point of sale or lease. For residential, there is a similar scheme, but it is only operated as a mandatory scheme at point of sale in the Australian Capital Territory. These certificates differ from the NCC in that they relate entirely to post-occupancy and are not used to determine the buildings compliance with the NCC requirements.

*Enforcement of codes and energy performance certificates*
Under the Commercial Building Disclosure Programme energy efficiency information must be provided in most cases when commercial office space of 2,000 square metres or more is offered for sale or lease.

*Existence of national registry database for energy performance certificates*

*Number of certified buildings and the percentage*
Australia adds approximately 1% to its building stock per annum. Given that all new buildings, both commercial and residential have had to achieve some level of energy efficiency since 2008 and in theory these buildings have been certified as complying with the NCC, it could be crudely argued that 7% of Australia’s building stock has been certified as meeting a minimum energy efficiency performance level.
We have reason to believe, however, that there is non-compliance or under-compliance.