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Enabling innovation in building sustainability: Australia's National Construction Code

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Abstract

The National Construction Code (NCC) is a performance-based code for building and plumbing, which provides the minimum necessary requirements for safety, health, amenity and sustainability in the design and construction of new buildings.

There are two pathways for achieving compliance with the NCC's mandatory performance requirements; (i) developing a performance solution, or (ii) following a prescriptive solution. Typically, performance solutions are unique designs proposed as achieving compliance with respective performance requirements; whereas prescriptive solutions are generic solutions deemed by regulators as complying with respective performance requirements.

A recent study has identified that there is a potential productivity gain of \$1.1bn by increasing the use of performance solutions within the Australian building and plumbing industry [1].

While the NCC has been a performance-based code since 1996, there is still a reliance on prescriptive solutions as it has been difficult to quantify performance requirements [2]. This has resulted in designers and practitioners not being confident in using some performance requirements, such as those for energy efficiency. The Australian Building Codes Board (ABCB) is currently undertaking a project to help increase the use of performance solutions, including in the area of energy efficiency, through quantifying the performance requirements, changing culture, building capacity and removing potential impediments within the industry. This includes looking at appropriate metrics, the use of verification methods, engaging with regulators to improve the tools they use for handling performance solutions and developing educational materials aimed at both residential and commercial building practitioners.

The aim of this work is to help increase productivity and innovation within the building industry through enabling the development of tailored innovative performance solutions, and in the case of energy efficiency, aligning methodologies with best-practice voluntary sustainability schemes as appropriate.

This paper describes how the NCC facilitates innovation within the building industry in relation to energy efficiency and sustainability performance.

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1. Introduction

A performance-based building code (PBC) allows the freedom for architects, engineers, building designers, developers and builders to create innovative building solutions. It also allows for flexibility in responding to unique design challenges, the use of alternative approaches to design and construction in the absence of regulatory change and adaptation to the scale and pace of technological change, which prescriptive regulation cannot keep up with.

The Australian Building Codes Board (ABCB) has been the author of the Building Code of Australia (BCA), the Plumbing Code of Australia (PCA) and the National Construction Code (NCC), since 1992. In 1996, the BCA shifted from a prescriptive code, to a PBC. However, the uptake of the performance culture has been slow, and in some cases has reverted to a prescriptive mindset, which has inhibited the potential for innovation within the industry.

Nomenclature

ABCB	Australian Building Codes Board
BASIX	Building Sustainability Index
BCA	Building Code of Australia
CIE	Centre for International Economics
CO ₂ -e	Carbon dioxide equivalent
COAG	Council of Australian Governments
COP	Conference of Parties
DtS	Deemed-to-Satisfy
MJ	Megajoules
NABERS	National Australian Built Environment Rating System
NatHERS	Nationwide House Energy Rating Scheme
NCC	National Construction Code
NEPP	National Energy Productivity Plan
PBC	Performance-based Code
PCA	Plumbing Code of Australia
VM	Verification Method

2. Background

Performance-based regulation is not a new concept, with examples dating back nearly 4000 years, to the code of Hammurabi [3]. However, in modern building regulation a PBC has only been in force in Australia for approximately 20 years, with varied success.

The fundamental principle of the PBC is to allow the development of innovative solutions by regulating building outcomes as opposed to providing both the way and means of building [3]. A PBC facilitates this through a series of mandatory statements that are qualitative in nature. These qualitative statements describe the building occupant's needs rather than setting a quantitative metric for compliance.

An example of this is the performance requirement in room heights: "A habitable room or space must have sufficient height that does not unduly interfere with its intended function" [4]. This statement, while describing what occupants require, provides no direction on how it is achieved. Quantitative measures for compliance have typically

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