

Commercial building energy efficiency

What are the proposed changes?

We are proposing changes to NCC Volume One to reduce emissions and move to a net zero future. The changes provide cost-effective, fuel and technology neutral ways for buildings to move towards a net zero future. They also support the continued uptake of electric vehicles (EVs).

The changes cover commercial buildings (Class 3 and Class 5 to 9 buildings) and the common areas of apartment buildings (Class 2 buildings).

The proposed changes include:

- Cost-effective updates to the Deemed-to-Satisfy (DTS) Provisions
- New infrastructure requirements to further support EV charging
- Requiring photovoltaics (PV) to be installed
- Measures that support broader government initiatives to transition towards a renewable electricity grid. For a building, this means changes to the NCC to enable gas-powered equipment to be easily changed to an electric replacement in the future (this is known as electrification).

In terms of the detail, there are proposed changes across most of Section J including to the Performance Requirements, Verification Methods and DTS Provisions compared to NCC 2022. This information is summarised at the end of this article.

Why are these changes proposed?

This work continues progress on the '[Trajectory for Low Energy Buildings](#)' policy that was agreed by Energy Ministers in 2019.

The Trajectory requires us to update the NCC's commercial energy efficiency provisions in the next edition of the NCC, to help make new commercial buildings:

- more resilient to the impact of climate change

- cheaper to operate and run
- emit less greenhouse gas emissions.

The changes also help to support Australian governments' broader policies for energy efficiency and emissions reduction, including the 'Net Zero by 2050' national greenhouse gas (GHG) emissions target and the [National Electric Vehicle Strategy](#).

How were the changes developed?

To develop these new provisions, we engaged a group of specialists to research and analyse various potential changes to the NCC energy efficiency provisions for commercial buildings.

From this analysis, we developed NCC changes at 3 different levels of ambition/stringency to improve the NCC energy efficiency of commercial buildings. These changes were then refined with key stakeholders and an assessment of their economic impact undertaken. Given the strong economic and environmental performance, the most ambitious reforms have been included in the Public Comment Draft.

Links to the technical reports that informed the proposed changes are provided at the end of this article.

Who has been involved?

In addition to our peak technical committee, the [Building Codes Committee \(BCC\)](#), we consulted with our Commercial Energy Efficiency Technical Reference Group (TRG).

What are the impacts?

We engaged economists to develop a Consultation Regulatory Impact Statement (CRIS) to explore the costs and benefits of 3 options (based on the 3 different stringency levels).

All options show significant overall benefits, moving Australia closer to its emission reduction targets, with some variances by climate and building type.

Based on the CRIS, the option proposed for the next edition of the NCC is the one with the highest gross level of economic benefit, which also contributes the most towards meeting our net zero emissions target. The recommended option will take new buildings to Net Zero Ready in one step and generate a gross economic benefit of almost \$17 billion.

However, broader EV charging support shows an overall net cost. This is likely due to the rapidly maturing, market acceptance of EVs and the substantial benefits already attributed to earlier NCC changes ('rough in' for apartment buildings).

More information and relevant links

- [Trajectory for Low Energy Buildings Policy](#)
- [National Electric Vehicle Strategy](#)
- [CIE Commercial Energy Efficiency CRIS Report](#)
- [ABCB Commercial EE RIS Economic parameters](#)
- [Commercial energy efficiency Impact Analysis placemat](#)

Technical reports

These technical reports were commissioned to support the development of Section J of the Public Comment Draft and Consultation Regulatory Impact Assessment. The reports explore a variety of options and were not the only inputs considered in developing the Public Comment Draft. As a result, not all of the content of these reports is reflected in the provisions of the Public Comment Draft. Views expressed in the reports are the views of the consultants and do not represent the views or policy of the Australian Building Codes Board.

- [Final Stringency analysis report - NCC 2025 Advice on the technical basis](#)
- [Initial measures development: building envelope report](#)
- [Initial measures development: electrical services report](#)
- [Initial measures development: electrification report](#)
- [Initial measures development: HVAC services report](#)

Case study

This case study was recently produced to illustrate the application of the proposed updates to Section J. As a result of this work, the consultant has suggested some potential refinements to the provisions, which will be considered as part of the process to finalise the next edition of the NCC. Views expressed in this case study are the views of the consultant and do not represent the views or policy of the Australian Building Codes Board.

- [NCC 2025 Chiller Plant Selections: Case study](#)

To read the full details of the changes, please review the [NCC 2025 Volume One PCD](#) and [Section A](#).

Worked examples

The Department of Climate Change, Energy Efficiency, the Environment and Water (DCCEEW) has published some worked examples that illustrate aspects of the proposed energy efficiency changes, including PV, EV charging, future electrification readiness, fans and building envelope changes. The worked examples have been developed to facilitate the NCC 2025 public comment process.

The worked examples are not legal or professional advice. Persons rely upon the worked examples entirely at their own risk and must take responsibility for assessing the relevance and accuracy of the information in relation to their particular circumstances.

- [DCCEEW worked examples](#)

Want to provide feedback?

Responses to the Public Comment Draft are invited until **11:59 PM AEST Monday 1 July 2024**.

In line with the ABCB's process for undertaking public consultation, comment will only be accepted through the ABCB's online [Consultation Hub](#).

To access the Public Comment Draft and response form:

1. Download the NCC volume(s) you wish to view and provide comment. You can also download the supporting information PDF for detailed information on the more significant/complex changes.
2. Download the response form.

Once you've reviewed the draft, complete the response form, and include your feedback on the suggested changes to the NCC.

To submit your comments:

1. Enter our Public Comment Draft consultation hub.
2. Start by agreeing to the privacy statement.
3. Let us know if you'd like your submission published publicly.
4. Enter your contact details.
5. Upload your completed form in .doc format (please make sure each file is under 25MB) and submit.

Table 1 Proposed changes to the energy efficiency Performance Requirements for commercial buildings

PCD reference	Proposed changes
J1P1 Energy use and greenhouse gas emissions	<ul style="list-style-type: none"> Includes a requirement to facilitate near zero operational energy and GHG emissions appropriate to the use of the building and the required level of human comfort Removes qualitative statements for solar radiation, energy source and sealing against air leakage Updates made to the regulated energy consumption and associated GHG emissions to align with stringency increase
J1P4 Renewable energy and EV charging	<ul style="list-style-type: none"> Includes an exception for future installation of renewable energy equipment in some instances Includes clarification of the amount of EV charging equipment required in a Class 2 building New EV charging equipment requirement for a Class 3 building or a Class 5 to 9 building

Table 2 Proposed changes to the energy efficiency Verification Methods for commercial buildings

PCD reference	Proposed changes
J1V1 NABERS Energy	<ul style="list-style-type: none"> Updates to the star ratings and GHG emissions targets required to align with stringency increase For a Class 5 building, includes a room temperature modelling requirement as an alternative to assessing thermal comfort level based on Predicted Mean Vote (PMV) For a Class 2, 3 and 6 building, includes a room temperature modelling requirement as a replacement for assessing thermal comfort based on PMV Refer also to changes to Specification 33
J1V2 Green Star	<ul style="list-style-type: none"> No changes Refer also to changes to Specification 33
J1V3 Verification using a reference building	<ul style="list-style-type: none"> Includes a requirement for a building's total proposed annual GHG emissions to be at least 10 per cent better than the reference building. This brings the J1V3 modelling process in line with the requirements of Verification Methods J1V1 and J1V2 Includes two alternatives to assessing thermal comfort level based on PMV Removes the ability to offset the performance of a building's envelope with onsite PV Refer also to changes to Specification 33, Specification 34, and Specification 49

J1V4 Verification of building envelope sealing	<ul style="list-style-type: none"> No changes
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Table 3 Table 3 Proposed changes to the energy efficiency DTS Provisions for commercial buildings

PCD reference	Proposed changes
Schedule 1 Defined terms	<ul style="list-style-type: none"> Updates to the NCC defined term 'envelope' to clarify where the term applies Includes a new defined term 'Solar Reflectance Index' Includes a new defined term 'Total Solar Reflectance'
J2D2 Energy efficiency Application	<ul style="list-style-type: none"> Updates to give effect to the proposals throughout the DTS Provisions
J4D3 Building fabric- thermal construction	<ul style="list-style-type: none"> Updates to clarify how the installation of insulation must be undertaken
J4D4 Building fabric – roofs and ceiling construction	<ul style="list-style-type: none"> Updates to Total R-Value requirement for a roof or ceiling Includes higher reflectance and new requirement for emittance of metal roof of a building with rooftop air conditioning equipment
J4D6 Building fabric- Wall-glazing construction	<ul style="list-style-type: none"> Requires thermal performance of wall-glazing constructions to be assessed for each story, including any mezzanine Requires more stringent solar admittance requirements for wall-glazing in all building classifications and climate zones Updates to wall-glazing, Maximum Total System U-Value and opaque wall Total R-Value
J5D2 Building sealing- Application	<ul style="list-style-type: none"> Updates to provide more clarity on the application of the provisions
J5D4 Roof lights	<ul style="list-style-type: none"> Removes application requirements which are now proposed to be covered by J5D2
J5D5 Windows and doors	<ul style="list-style-type: none"> Removes application requirements which are now proposed to be covered by J5D2 Updates to clarify when an airlock or the like is required, with new exemptions for entrances that are moveable walls or required to be left open for safety
J5D6 Exhaust fans	<ul style="list-style-type: none"> Updates to exhaust fans requirements for when they need to be fitted with a sealing device
J5D7 Construction of ceilings, walls and floors	<ul style="list-style-type: none"> Removes application requirements which are now proposed to be covered by J5D2
J5D8 Evaporative coolers	<ul style="list-style-type: none"> Minor updates to when a self-closing damper is required for evaporative coolers

J6D3 Air-conditioning system controls	<ul style="list-style-type: none"> • Updates to the air-conditioning control requirements to restrict simultaneous heating and cooling and prevent poor design • Updates to reduce the threshold to provide economy in some climate zones • Updates to add temperature reset requirement for heated water and condenser water • Expansion of requirement for interlock to prevent air-conditioning from operating when an external door is opened • Updates to the time-switch provisions to improve functionality and align with provisions for time-switches used to control lighting
J6D4 Mechanical ventilation system controls	<ul style="list-style-type: none"> • Updates to require energy reclaim systems to be fitted with a bypass where beneficial • Reduces threshold to provide outside air treatment in some climate zones • Includes separate provisions for outside air treatment for variable and constant outside air flow systems • Includes a requirement for indirect evaporative cooling for larger, constant outside air ventilation systems in climate zone 1 and 3 • Removes variable speed fan requirements. Refer to J6D5 for related changes • Updates to the time-switch provisions to improve functionality and align with the provisions for time-switches used to control lighting
J6D5 Fans and duct systems	<ul style="list-style-type: none"> • Updates to the provisions to align with EU327 • Updates to require peak efficiency and duty point efficiency to both be considered • Updates to allow the efficiency at duty point to be assessed individually or collectively • Includes a requirement for most fans to be capable of variable speed operation where the input power is above 750W • Updates to require fans serving multiple rooms or spaces to be capable of variable pressure operation, to the extent practicable • Addition of pressure drop allowance for exhaust louvres and relief louvres • Refer also to changes to Specification 46
J6D6 Ductwork insulation	<ul style="list-style-type: none"> • Removes the exemption for equipment complying with MEPS

J6D8 Pumps systems	<ul style="list-style-type: none"> • Updates to broaden the use of variable volume systems and to facilitate more effective turn down of systems
J6D9 Pipework insulation	<ul style="list-style-type: none"> • Updates to clarify the exemption for pipework insulation within equipment covered by MEPS
J6D10 Space heating	<ul style="list-style-type: none"> • Includes provisions to facilitate future electrification, including reserved electrical infrastructure capacity, plant space, and hot water distribution system temperatures that are appropriate to be delivered by heat pumps • Updates to reduce wasteful operation of heating and cooling equipment serving outdoor areas • Updates to specify minimum efficiency requirements for air-source heat pump equipment • Updates to the minimum gross thermal efficiency requirement to 90% for gas heaters in all cases
J6D11 Chillers	<ul style="list-style-type: none"> • Updates increase the stringency of requirements for chillers and require chiller plant to be assessed based on the load served rather than chiller capacity. Provisions are specific to the climate, load and building classification • Refer also to changes to Specification 47
J6D12 Unitary air-conditioning equipment	<ul style="list-style-type: none"> • Updates to increase minimum efficiency requirements for air-cooled packaged air-conditioning systems and facilitate more efficient operation across the full load range • Updates to test standards • Updates to allow equipment in a building to be assessed collectively • Refer also to changes to Specification 48
J6D13 Heat rejection equipment	<ul style="list-style-type: none"> • Updates to require fans in heat rejection equipment to be capable of variable speed operation, except for heat rejection fans in chillers, unitary air-conditioning equipment and heat pumps that are covered by other aspects of Section J
J7D3 Artificial lighting	<ul style="list-style-type: none"> • Updates to light switching and control provisions to make them easier to understand
J7D4 Interior artificial lighting and power control	<ul style="list-style-type: none"> • Updates to simplify control requirements and make them less prescriptive • Refer also to changes to Specification 40
J7D8 Lifts	<ul style="list-style-type: none"> • Minor editorial updates
J8D2 (New) Heater water supply and swimming pool and spa pool plant - application	<ul style="list-style-type: none"> • Includes a new exemption stating the J8 provisions do not apply to a sole-occupancy unit of a Class 2 building, or a Class 4 part of a building

J8D3 Heated water supply	<ul style="list-style-type: none"> • Updates to clause numbering • Updates to facilitate future electrification, including reserved electrical infrastructure capacity, plant space • Includes insulation requirements for pipework containing circulating heated water used for sanitary purposes and food preparation
J8D4 Swimming pool heating and pumping	<ul style="list-style-type: none"> • Updates to clause numbering • Includes provisions to facilitate future electrification, including reserved electrical infrastructure capacity, plant space, and hot water distribution system temperatures that are appropriate to be delivered by heat pumps • Update to the minimum gross thermal efficiency requirement to 90% for gas heaters in all cases
J8D5 Spa pool heating and pumping	<ul style="list-style-type: none"> • Updates to clause numbering • Includes provisions to facilitate future electrification, including reserved electrical infrastructure capacity, plant space, and hot water distribution system temperatures that are appropriate to be delivered by heat pumps • Updates to the minimum gross thermal efficiency requirement to 90% for gas heaters in all cases
J9D4 Facilities for EV charging equipment	<ul style="list-style-type: none"> • Updates to allow bus ducts to be used with EV charging equipment • Includes a requirement to specify the maximum permitted length of the cable run from EV charging distribution board or bus duct to car parking spaces • Includes requirements for EV chargers for a specified number of spaces in carparking areas associated with a Class 3, 5, 6, 7b, 8 and 9 buildings • Updates to the infrastructure requirements for future EV charging in recognition that these provisions are additional to the requirement to install EV charging equipment
J9D5 Renewable energy	<ul style="list-style-type: none"> • Updates require on-site PV panels to be installed. Capacity depends on the available roof space, climate zone and building classification. Additional PV is specified where gas is used to balance the emissions from gas appliances
Specification 33 Additional requirements	<ul style="list-style-type: none"> • Includes requirements to facilitate future electrification • Includes requirements to specify a building using J1V1 must comply with the requirement for facilities for solar PV panels (J9D5)
Specification 34 Modelling requirements for J1V3	<ul style="list-style-type: none"> • Updates to require a reference building to be equipped with PV (J9D5) • Includes the requirements for calculating U-Value and solar admittance of wall glazing • Updates to require the use of future climate data

<p>Specification 35 Modelling profiles for J1V3</p>	<ul style="list-style-type: none"> • Updates to lighting operating profiles with reduced operation during unoccupied periods or low-occupancy periods • Updates to occupancy schedules for Class 6 and Class 9c buildings to reflect higher daytime occupancy than other commercial buildings • Updates to the HVAC operating schedule for Class 9c aged-care buildings
<p>Specification 37 Calculation of U-Value and solar admittance</p>	<ul style="list-style-type: none"> • Updates require Total System U-Value and solar admittance to be calculated on a single storey basis, thus limiting trade off between storeys • Removes solar admittance limit from S37, refer to J4D6 for relevant provisions • Updates to the shading multiplier methodology to expand it to accommodate vertical shading fins • Includes the requirements to accommodate vertical shading
<p>Specification 40 Lighting and power control devices</p>	<ul style="list-style-type: none"> • Updates to refine and consolidate the lighting control devices to clarify their intended function

Note to Table 3: Table 3 presents the key proposed changes to the DTS Provisions of Section J for the next edition of the NCC. For a comprehensive view of all proposed changes, please see the [NCC 2025 Volume One PCD](#).