



ABCBC

The Consultation Regulation Impact Statement (CRIS) explained

Proposed NCC 2022 residential energy efficiency provisions

2021

The Australian Building Codes Board

The Australian Building Codes Board (ABCBC) is a joint initiative of all levels of government in Australia, together with the building industry. Its mission is to oversee issues relating to health, safety, amenity and sustainability in building. The ABCBC promotes efficiency in the design, construction and performance of buildings through the National Construction Code, and the development of effective regulatory and nonregulatory approaches. The Board aims to establish effective and proportional codes, standards and regulatory systems that are consistent between states and territories. For more information see the [ABCBC website](#).

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What is the purpose of the CRIS?

The purpose of a Consultation Regulation Impact Statement (CRIS) is to examine in detail the impacts (both costs and benefits) of a proposed change to regulation. In this case, the ABCB is proposing to change the residential energy efficiency provisions in the 2022 version of the National Construction Code (NCC).

There are three objectives of the CRIS:

1. explain to all stakeholders why the changes to the NCC have been proposed
2. inform and seek stakeholders' views on the proposed changes to the NCC and potential impacts of the changes
3. provide information on the impacts of the proposed changes, as well as stakeholders' views, to ultimately assist decision-makers in determining whether the proposed changes to the NCC should be adopted.

What are the proposed residential energy efficiency provisions?

Two options have been proposed for increasing the energy efficiency of new homes through a change to the NCC. These options have been informed by the former COAG Energy Council's 'Trajectory for Low Energy Buildings' policy (the Trajectory). Further details on the relationship between the proposed provisions and the Trajectory are provided at the end of this document.

Thermal performance improvements

Both options will require the thermal performance of new homes to achieve a minimum level of efficiency equivalent to 7 stars under the Nationwide House Energy Rating Scheme (NatHERS), up from the current standard equivalent to 6 stars (in most jurisdictions).

Whole-of-home energy use budget

Both options propose to set an annual energy use budget for certain fixed equipment, namely heating and cooling equipment, hot water systems, lighting, swimming pool pumps and spa pumps. The budget can be achieved by installing efficient equipment. On-site renewable energy equipment (likely rooftop photovoltaics or PV) can also be installed to help meet the budget. This part of the proposal is referred to as the 'whole-of-home' provisions.

The only difference between the two options is the size of the annual energy use budget. The budget under the first option (Option A in the CRIS) is 30% less than the second option (Option B in the CRIS). This means the budget in Option A is relatively harder to meet than Option B.

The budget for Option B is based on the following equipment as the central case, with Option A being 30% tougher:

- heating equipment: equivalent to a 3-star rated (Greenhouse and Energy Minimum Standards, GEMS, 2019) heat pump heater
- cooling equipment: equivalent to a 3-star rated (GEMS 2019) heat pump cooler
- water heater: 5-star rated (GEMS 2017) instantaneous gas
- 4 Watts per square metre of lighting.

Under the proposal, equipment with different levels of efficiency can be installed provided that, in combination (and with any PV), they achieve the overall annual energy use budget. Simple tools will be provided to make these calculations for practitioners.

What information is presented in the CRIS?

To assist in meeting the objectives of the CRIS, and to ensure the CRIS is robust, the ABCB follows a set of government guidelines¹ when developing a CRIS. The

¹ These guidelines are titled Regulatory Impact Analysis Guide for Ministers' Meetings and National Standard Setting Bodies. They can be found at: <https://obpr.pmc.gov.au/resources/guidance-impact-analysis/regulatory-impact-analysis-guide-ministers-meetings-and-national>

guidelines set out several key parts of a CRIS. Each part of the CRIS is summarised in more detail below.

Description of the nature and extent of the problem the proposed new regulation is designed to address

Regulation should only be put in place where there is a clear problem to be solved.

There are two main problems that the proposed changes to the NCC are trying to address. The first is that despite cost-effective options being available, new buildings are (in many cases) not being designed or constructed to reduce the use of energy.

The second part of the problem relates to climate change. Buildings contribute to part of the climate change problem by creating greenhouse gas emissions. The Australian Government, as well as the State and Territory Governments, have made several commitments to reduce greenhouse gas emissions. The proposed changes to the NCC are therefore designed to help address this problem.

Stating the intended objectives of the proposed changes to the NCC

Setting objectives provides metrics for judging whether the proposed changes to the NCC will be successful in addressing the identified problem. Stakeholders are invited to comment on whether they think the proposed changes to the NCC will meet these objectives.

The objectives of the proposed changes to the residential energy efficiency provisions are to:

- reduce energy consumption;
- reduce greenhouse gas emissions;

The guidelines are also supported by a handbook, which can be found here:

<https://obpr.pmc.gov.au/resources/guidance-impact-analysis/australian-government-guide-regulatory-impact-analysis>

- improve occupant health and amenity; and
- improve the resilience of buildings to extreme weather and blackouts.

Identifying a range of feasible policy options that are capable of addressing the problem

With the problem and objectives in mind, the CRIS discusses potential ways of addressing them.

The NCC is recognised as a nationally-consistent set of construction specifications, with energy efficiency requirements which are already well established and understood by the construction industry. With the ABCB proposing to make changes to these requirements, the CRIS analyses the costs and benefits of the alternative stringency levels of the two options. Other possible ways of solving the problem and achieve the objectives are also described in the CRIS.

Stakeholders are encouraged to provide their views on whether the proposed NCC changes can address the identified problem and objectives.

Undertaking cost-benefit analysis of the options to quantify their impacts.

This is the key part of the CRIS. All costs and benefits of the proposal are identified and quantified to the extent possible with the available information.

Importantly, the CRIS looks at the quantifiable costs and benefits from two perspectives, i.e. the household perspective and the economy-wide perspective.

Impacts from a household perspective

For householders there are two impacts that the CRIS considers: the extra cost to construct a new home that meets the proposed NCC changes; and the benefits in the form of reduced energy bills.

The costs include any additional building products (e.g. insulation), costs to install more efficient equipment or PV, and other costs.

The savings include the annual benefit that households will receive from using less energy (electricity, gas, firewood, or LPG). And because this looks at the impacts to the household, the benefits are measured at retail energy prices, which is the price households actually pay for their energy.

These costs and benefits are based on estimates derived from typical housing, and therefore are subject to a level of uncertainty as to how accurate they are. Stakeholders are invited to review the cost information provided in the CRIS, and comment on whether it is reasonable, and what alternative sources of data could be used.

The net impact (of the costs and benefits above) is presented in Net Present Value (NPV) terms. This figure is the sum of all costs and benefits discounted into today's dollar terms. Benefits are measured until the end of the 'life' of each asset (i.e. the house itself, any new equipment, etc.). Costs are measured over 10 years' worth of new home construction, from 2022 to 2031. Costs and benefits in the future are discounted so the NPV shows how much better (or worse) off a house will be in today's dollar terms.

The impacts are also presented as a benefit-to-cost ratio. This indicates, for every \$1 spent, what the return will be on that investment.

Under Option A, the benefit-to-cost ratio is estimated to be 0.80 for houses (Class 1 buildings) and 0.53 for apartments (Class 2). The NPV (which can be thought of as the net energy bill savings) is estimated to be -\$521 for houses, and -\$1,590 for apartments. On average, the amount saved on energy bills is less than the increased cost of construction.

Under Option B, the benefit-to-cost ratio is estimated to be 0.70 for houses and 0.55 for apartments. The net energy bill savings is estimated to be -\$507 for houses, and -\$919 for apartments.

Impacts from an economy-wide perspective

The economy-wide analysis takes into account the net impact on the whole of society, not just individual households. Therefore, more costs are included in this analysis, specifically the cost to industry to learn about the new changes, as well as costs to government.

More benefits are also included, including the benefits of lower energy costs, lower greenhouse gas emissions, and the health benefits of lower pollution (both from energy production and in the home), and avoided network investment.

The economy-wide analysis also measures household energy savings differently. It recognises that most of the savings at the household level do not materialise at an economy-wide level. This is explained in more detail below. Instead of using retail energy prices to value energy savings, wholesale energy prices are used (as a proxy for resource costs and avoided energy network costs). This results in significantly less benefits when looking at the proposal at a whole-of-society level.

Like the household level analysis above, the value of costs and benefits are uncertain. Stakeholders are encouraged to provide comment on the estimates used in the CRIS.

Under Option A, the benefit-to-cost ratio for the entire Australian economy is estimated to be 0.35, with the NPV being -\$2,247 million. Therefore, the cost is greater than the benefits for this proposal.

Under Option B, the benefit-to-cost ratio is estimated to be 0.25, with the NPV being -\$1,783 million. Option B is expected to incur a lower cost relative to Option A, but the benefits are also lower, resulting in a lower benefit-to-cost ratio.

Why retail energy prices are only used at the household level

It may appear odd that the impacts of the proposed changes to the NCC are more favourable at a household level than at the societal level. This is primarily due to the fixed costs.

Fixed network costs (like electricity poles and wires) and energy retail costs (call centres, marketing, etc.) make up the biggest cost to provide energy, and these costs still need to be recovered by energy retailers. These costs do not reduce when households use less energy. Household energy bills are based on how much energy is used, rather than the cost to provide energy, resulting in a loss to energy retailers that must be passed on through higher energy prices in order for the energy businesses to stay viable. For this reason, a large part of the household-level benefit is the result of a transfer between individuals, i.e. from the household that saves energy to other energy users.

Sensitivity and breakeven analyses

The above results are based on a number of data sources. Some data sources are directly relevant to new construction, other data sources relate to all homes (both existing and new).

Sensitivity testing is used to understand how robust the results of the analysis are to changes in key assumptions. The key assumptions that are varied include: doubling and halving the industry costs; increasing the price of avoided greenhouse gas emissions; and changing the discount rates.

The sensitivity analysis found that, under every scenario tested, the net impact of the proposal remains negative for both options. Refer to chapter 6.4 of the CRIS to see the full results of the sensitivity analysis.

The CRIS also contains a breakeven analysis, which looks at how much (in percentage terms) key variables need to change in order for the proposal to breakeven (i.e. the total benefits equal the total costs). In other words, it answers the questions:

- how much would the wholesale energy prices have to increase for the proposed options to breakeven in cost-benefit terms?
- how much would the upgrade costs have to decrease for the proposed policy options to breakeven in cost-benefit terms?

It found that:

- to at least breakeven in every state and territory:
 - energy prices would need to be around five times higher under Option A and more than 15 times higher under Option B
 - the costs of upgrades would need to be very low or potentially almost free (around 3 to 24 per cent of the current costs).
- to breakeven on an economy-wide basis:
 - energy prices would need to be more than three times higher
 - the costs of upgrades would need to be around 23 to 34 per cent of the current costs.

Refer to chapter 6.4 of the CRIS to see the full results of the breakeven analysis.

Other impacts explored

A key question the CRIS addresses is the impact on the electricity grid of new homes installing more PV. This analysis found that the impact is small, and:

- no current power plants will close earlier than expected
- minimum demand issues (like reduced stability of the electricity grid) are not expected to increase by a significant amount above the business-as-usual level
- reductions in energy use and a reduction in peak demand will result in a 'barely perceptible' change to wholesale energy prices, compared to business-as-usual.

The CRIS also discusses other impacts that could not be quantified and added to the cost benefit analysis above. Chapter 8 discusses the potential for the following benefits:

- increased the health of occupants (for example, through reduced mortality from extreme heat and cold)
- improved resilience of homes to blackouts and extreme weather events
- reduced energy bill stress, and the resulting benefits to occupants
- economic impacts such as improved government budgets and economic stimulus.

Consultation to incorporate the views of parties affected by the proposal

The purpose of a CRIS is to invite stakeholders to provide their views on the analysis, its assumptions, the expected impacts of the proposed changes to the NCC, alternative options and unintended consequences.

Questions are presented in the CRIS on key issues. Responses are invited through the [ABCBC Consultation Hub](#) until 11:59pm 7 November 2021.

What is the difference between a CRIS and a Final (or Decision) RIS?

A Regulation Impact Statement (RIS) is developed in two stages. Under stage one, initial analysis is released as a CRIS for public comment. This includes all the analysis described above along with requests for feedback and input from stakeholders.

Stage two involves the RIS being updated and finalised with new evidence and feedback from consultation, before it is used as an input into decision making. Both stages are covered in more detail below.

CRIS

A CRIS is prepared in accordance with the guidelines² for the purpose of consulting with interested parties. It incorporates all formal elements of a RIS, including a full cost-benefit analysis.

Interested parties are invited to comment on any aspect of the CRIS. For example, interested parties could provide comment on whether the description of the problem captures the essence of the issues, or suggest other options for addressing the problem.

Interested parties are encouraged to comment on the estimated impacts of the options – both the costs and the benefits – and how the regulatory proposal will work in practice. Comments on the CRIS will inform the preparation of a Final RIS for consideration by decision-makers.

The content of a CRIS does not reflect a final decision of the ABCBC Board in relation to the matter that is the subject of the RIS.

The CRIS is assessed by the Office of Best Practice Regulation (OBPR) for compliance with the guidelines. In this regard, the OBPR has issued a letter stating that the CRIS is suitable for release for consultation.

² Regulatory Impact Analysis Guide for Ministers' Meetings and National Standard Setting Bodies

Final RIS

All comments received on a CRIS are reviewed and stakeholder information and data incorporated into the regulatory analysis, as appropriate. The RIS is then used as an input into decision-making and is published as the Final RIS (sometimes known as a Decision RIS).

The Final RIS is also assessed by OBPR for compliance with its guidelines. OBPR's assessment is published [on its website](#) when the Final RIS is published by the ABCB.

What is the purpose of the supporting documents released with the CRIS?

There are two key documents that have been released alongside the CRIS.

Costs and Benefits of Upgrading Building Fabric from 6 to 7 Stars (Tony Isaacs Consulting)

This report was developed to estimate the cost of increasing the level of thermal performance to the equivalent of 7-stars NatHERS. These costs are used in the CRIS. The report estimates these costs through the use of a number of dwelling designs (selected to be typical of current house designs) modelled to determine what upgrades are required for the houses to achieve 7 stars in each major climate zone within each jurisdiction. The report has been provided so that stakeholders can understand how the costings were developed.

NCC 2022 Update - Whole of Home Component (Energy Efficient Strategies)

This report was developed to estimate the cost of the whole-of-home component of the proposal. The report compares the cost of an assumed set of equipment (heating and cooling equipment, water heaters and PV) that are installed in typical homes (in each jurisdiction and climate zone), against the cost of appliances that will need to be installed to meet the new requirements. It also estimates the energy savings of the proposal, in order for the benefits to be calculated. This report has been provided so that stakeholders can understand the costs and estimated energy savings in more detail.

National Construction Code (NCC) 2022 public comment draft (stage 2) - proposed amendments to energy efficiency and condensation technical provisions

In addition to the above documents, the proposed NCC 2022 residential energy efficiency provisions are available to review in full. A separate consultation process for these provisions is now open, and stakeholders are invited to participate in this process. This process is focused on seeking feedback on the proposed changes to the NCC itself, rather than the economic analysis presented in the CRIS.

Public comment draft (stage 2) can be found on the [ABCBC consultation website](#). Public comment commenced on 30 August 2021 and closes on 17 October 2021.

What are the timeframes and decision-making processes?

- Consultation on the CRIS opened on 20 September 2021
- Consultations on the CRIS closes at 11:59pm on 7 November 2021
 - After the close of consultation, the ABCBC Office will review the responses, update the analysis where new information is provided, and reflect stakeholder comment in the Final RIS
- A decision whether to include the proposed provisions in the NCC will be made in mid-2022 after which the Final RIS will be released to the public.

How can I be involved?

A number of specific questions are included in the CRIS and in the online response form in the [ABCBC Consultation Hub](#). In line with the ABCBC's process for undertaking public consultation, comment will only be accepted through Consultation Hub.

What is the relationship between the Trajectory for Low Energy Buildings and the NCC?

In early 2019, Energy Ministers requested that Building Ministers direct the ABCBC to update the NCC's energy efficiency provisions in accordance with the 'Trajectory for Low Energy Buildings' policy (the Trajectory). The ABCBC was subsequently directed by Building Ministers to investigate possible changes to the NCC's residential energy efficiency provisions, in consideration of the Trajectory.

The Trajectory sets out a pathway of regular, incremental, cost-effective changes to each triennial update of the NCC, adapting to changes in building practices and technology. The objective of the Trajectory is to reduce the operational energy use and associated greenhouse gas emissions of buildings and establish a pathway towards 'zero energy (and carbon) ready buildings'. Rather than specify overarching targets for each increment, the Trajectory details some specific changes for consideration, particularly for NCC 2022, and suggests a means of determining the appropriate cost-effective stringency level.

NCC proposal evolution

The NCC proposal was further developed following public consultation on a scoping study titled, 'Energy Efficiency - NCC 2022 and beyond', which outlined a range of approaches to upgrading the NCC's energy efficiency provisions. The proposed approaches sought to address the aims of the Trajectory and potentially reduce the number of triennial NCC updates contemplated by adopting a slightly more stringent level of thermal performance and annual energy use.

In this regard, where the Trajectory recommends the starting point for stringency consideration in NCC 2022 should be the equivalent of 6.5- to 7-stars NatHERS depending on the climate, the proposed NCC requirements target 7 stars in all climate zones. The annual energy use budget in Option A is also more stringent than the base level suggested in the Trajectory. The responses to the ABCBC's scoping study revealed that there was broad support for expanding the proposals, including consideration of additional items such as on-site renewables, pool and spa pumps, and thermal bridging.

Differences in the focus of modelling

In 2018, modelling to support the Trajectory was undertaken to inform the policy's direction. This modelling used capital costs and the energy bill savings to house and apartment occupants to estimate the cost effectiveness at the household level from the upgrades.

The CRIS assesses the ability for the options to deliver a net benefit to society by looking at economy-wide impacts of the NCC proposals, which leads to low comparability with the Trajectory. The level of current building performance under the status quo is also an important consideration for the CRIS. Data suggests regulatory minimums are commonly exceeded by residential buildings in 2021, with the uptake of PV also increasing significantly in recent years.

Additional Considerations

In addition to the differences in the NCC proposal, there are other factors the CRIS considers that also contribute to a low comparability with the results of the Trajectory.

These additional considerations include:

- grid impacts
- industry impacts, including retooling and retraining costs
- the societal value of avoided energy, network investment and greenhouse gas emissions
- health impacts.

The key differences between the Trajectory and the CRIS are presented in more detail in the table below.

Summary of key assumptions used for the Trajectory and in the CRIS

Element	Trajectory (2018)	CRIS	Additional considerations
Focus of the analysis	Financial household level only with a focus on the long-term impact of the policy in the context of a broader trajectory for the residential building sector.	Societal economy-wide (with separate household analysis to illustrate distributional impacts of the proposed regulatory change).	A RIS must consider costs and benefits to society beyond benefits to a household including changes in the building stock, industry training and education, grid impacts and abatement impacts. A distributional analysis is included in the CRIS for information.
Value of energy savings	Retail prices based on 2017 prices (generally higher than 2021 prices).	Economy-wide analysis: valued using the resource cost (for which wholesale energy prices and avoided network investment are used as a proxy). Distributional analysis: latest retail prices.	Retail energy prices are not suitable for an economy-wide analysis as they imply more available savings than may actually exist after transfers. Wholesale prices and avoided network investment used as a proxy for the value of the resource consistent with the Department of Environment and Energy methodology developed by HoustonKemp .

Element	Trajectory (2018)	CRIS	Additional considerations
Timeframes of the analysis	Assessed costs and benefits up to 2050 with all assets replaced at the end of their life and no tailing of benefits beyond the period of the analysis.	<p>Economy-wide analysis: assessed the costs and benefits of a 10-year building cohort, and the life of assets as applicable (e.g. building 40 years, inverters 10 years, photovoltaics 20 years). No costs or benefits included for asset replacement.</p> <p>Distributional analysis: assessed the impact of the regulation for a dwelling built in 2022 with benefits included for the life of the assets. No costs or benefits included for asset replacement.</p>	<p>There is no regulatory trigger to require replacement of assets with higher efficiency choices than those adopted under the status quo.</p> <p>Costs and benefits durations are consistent with OBPR advice and avoid implying higher energy saving and GHG abatement than the assumed regulatory period would achieve.</p>
Cost of compliance	Retail prices. Reductions of up to 9 per cent per annum applied to the capital cost of equipment until 2050.	<p>Economy-wide analysis: retail prices reduced by 10 per cent to reflect the resource cost. Costs of PV systems over time reducing in accordance with CSIRO projections. No rebates accounted for as they are a transfer.</p> <p>Distributional analysis: retail prices as at 2022, costs of PV</p>	<p>Retail costs of compliance are reduced in the economy-wide analysis for consistency with the resource cost approach to energy savings.</p> <p>Future efficiencies and prices of other appliances are both highly uncertain and reductions would occur both under the comparison case (the</p>

Element	Trajectory (2018)	CRIS	Additional considerations
		systems and solar and heat pump water heaters reduced according to market rebates.	status quo) and the regulatory case. Additional analysis used to determine the level that costs would be required to reduce to breakeven.
Appliance selection for determining the baseline	Based on one combination of the most prominent household make up for each jurisdiction, i.e. gas instantaneous water heaters (electric in QLD), central ducted heating and cooling. Not specific to appliances and equipment used in new housing.	Economy-wide and distributional analysis: based on consumer surveys of behaviour (specific to new housing) accounting by fuel availability and jurisdiction. This avoids implying more costs or energy savings than may actually exist under a single set of appliances of lower efficiencies typically found in older building stock.	The CRIS assesses the impacts from changes in current behaviour based on a detailed assessment of propensities.
Baseline used	Single baseline building used in each NCC climate zone. Photovoltaics uptake as per AEMO forecasts. Minimum level of compliance	Economy-wide and distributional analysis: baseline reflects current minimum requirements in the NCC (i.e. 6 stars), current levels of over-compliance (i.e. 7 stars and above) and current and projected	The CRIS is measuring the change from current behavior. It draws on current data that would lower both cost and benefits (all other factors being equal).

Element	Trajectory (2018)	CRIS	Additional considerations
	equal to or less than 6 stars.	levels of photovoltaics installed in new housing.	
Other benefits	<p>Feed-in tariffs applied. No rebound effect factored in.</p> <p>Network savings implied in use of retail costs of energy.</p> <p>GHG savings and health benefits not valued.</p>	<p>Economy-wide analysis: looks at the broader societal impacts. Quantifies:</p> <ul style="list-style-type: none"> • energy savings (through wholesale prices and avoided network investment) • PV exports (reduce costs to retailer at a wholesale price) • rebound effects • reduction in greenhouse gas emissions • health benefits from reduced emissions quantified. <p>Distributional analysis: updated forecast of retail energy prices and feed-in tariffs applied, rebound effect at the household level included.</p>	

Element	Trajectory (2018)	CRIS	Additional considerations
Targeted stringency for NCC 2022	Between 6* and 7 stars. Different levels of stringency depending on the climate zone (i.e. 6.5 stars in some tropical and temperate locations, 7 stars elsewhere). Status quo for pool pumps. No thermal bridging or difficult blocks provisions applied	Economy-wide and distributional analysis: shift from minimum 6 to 7 stars equivalent in all jurisdictions. Additional costs associated with meeting the requirements for pools and spas, difficult blocks (shaded, narrow, sloping and poor orientation) and thermal bridging considered.	

* Up to 6 stars in NCC climate zones 2, 3 and 4