# Issues Paper - Energy Performance Compliance

for General Release

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# Document information

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Prepared for General Release

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# 1. Introduction

The National Construction Code (NCC) details the minimum necessary requirements for safety, health, amenity and sustainability in the design and construction of new buildings throughout Australia. The NCC is given legal effect by relevant legislation in each State and Territory.

The NCC contains provisions regarding the energy performance of new homes (the Performance Requirements). Compliance with the relevant energy efficiency provisions of the NCC continue to be a significant problem nationally. Problems are widespread and complex, and:

- differ on a jurisdictional basis;
- relate to different parts of the design and construction process; and
- involve a range of different professionals and regulatory bodies in the sector.

To get a better understanding of the various compliance issues and their potential solutions, Renew interviewed 10 experts in the field – ranging from designers and architects, to academics, government officials and industry consultants. This paper briefly documents the main findings from those discussions and proposes some initial directions.

# 2. The Issues

Based on the expert feedback, compliance issues generally fall into three main categories with regards to the residential building process:

- Design phase issues;
- Construction phase issues; and
- Post-Construction phase issues.

## 2.1. Design Phase

To date, compliance with the residential energy efficiency provisions of the NCC really only occurs (to an extent) during the building design phase.

Three main pathways exist to satisfy the thermal Performance Requirements of the NCC.

1. The Nationwide House Energy Rating Scheme (NatHERS) rates the thermal efficiency of a new home, based on modelling of that home's design and materials (on plan) in accredited software tools. Maximum heating and cooling loads by home size and location are decided by jurisdictional governments (which translate to a minimum "Star Rating" for that location).

   Software tools accredited under NatHERS are referenced in the NCC as part of one option for demonstrating compliance with the relevant thermal energy Performance Requirement for houses (Class 1 Buildings) and individual units in apartments (Class 2 buildings).

2. Complying with the relevant DTS **Elemental Provisions** detailed in the NCC (which prescribe specific levels of energy efficiency materials be included in the home, such as insulation and glazing). This option is typically used where minimum star rating levels cannot be achieved due to sub-optimal site orientation and location.

3. A **Performance Solution**, where it can be demonstrated that the proposed solution meets the Performance Requirement through other means.

   For example, a Performance Solution could demonstrate that the heating and cooling loads of the proposed building are less than or equal to the heating and cooling loads of a Reference Building, as prescribed in the NCC.

For a more detailed explanation of the three pathways to achieve compliance, please refer to **Appendix A**.

Feedback from interviewees suggested the following problems exist with the compliance framework during the design phase:

- There is too many compliance pathways to meet the energy Performance Requirements of the NCC, with a number of these being exploited by industry;
- There is a lack of evidence that alternative pathways result in a similar overall energy performance outcome than the primary NatHERS pathway and meaningfully respond to the thermal Performance Requirements of the NCC;
- The *Verification using the Reference Building* method needs to be reviewed to ensure it is congruent with the primary NatHERS pathways, and tightened to prevent rorting;
- The Performance Solution – using the Reference Building to guide the heating and cooling loads, remains too prescriptive and should be refined to be more performance based;
- The urban and regional planning approvals process for sub-divisions remains a significant "elephant in the room". Without greater focus on optimising sub-division design to account for optimal lot orientation, low and zero cost thermal improvements will remain unachievable;
- Inadequate documentation in design makes it unclear on what basis NCC compliance was determined in the first place, i.e. roof colour, lighting, air-conditioning not specified in documentation;
- Energy raters should be mandatorily accredited in all States & Territories – so that only one system exists for rating plans under NatHERS;
- Building air tightness is not assessed at all under NatHERS and yet is typically the first or second option low/zero-cost option for improving thermal performance in most buildings. Condensation issues need to be considered and balanced in this content.
- There is no system governing the overall energy use from appliances or house size. These are significant and should be regulated in an expanded system;
- There is currently a very limited evidence base as to how effective the industry is at complying with the existing energy performance requirements of the NCC. An initial audit project is underway in Victoria however this only extends to Class 1 dwellings and both the building types and locations needs to be significantly expanded;
- Whilst there is a 90% correlation between ABS dwelling approval statistics and the number of compliant energy ratings coming thru the NatHERS system, this number is below 20% in WA. No accreditation system exists for WA assessors and consumer awareness in this jurisdiction appears lower than for the rest of Australia.

## 2.2. Construction Phase

Feedback from interviewees suggested the following problems exist with the compliance framework during the construction phase:

- Ultimately no assessment of compliance with the energy performance requirements of the NCC or energy ratings is carried out. Mandatorily accredited energy assessors should be used during construction to assess energy performance compliance;
- The existing audit system of two inspections – one at frame stage and a second at building handover – is not suited to checking efficiency measures. Efficiency measures such as insulation are typically not in place at frame stage but are covered/invisible by handover;
- Most issues with energy performance under-compliance occur during the construction stage;
- Inadequate documentation during construction makes subsequent assessment difficult (i.e. lack of receipts for purchase of specific items, photographic evidence of key features such as wall insulation prior to being covered);
- A fifth inspection point is required to to deal with energy performance compliance during construction – after plumbing and electrics have been installed but before plastering;
- Ongoing potential for conflicts of interest involving private building surveyors being contracted directly by building companies;
- Significant product substitution occurring on-site, without regard to the original design documentation or energy performance implications;
- Use of poor-quality materials in product substitution; and
- Significant gaps in industry training, accreditation and professional development.

## 2.3. Post Construction Phase

Finally, feedback from interviewees suggested the following problems exist post-construction:

- There is no specific requirement for energy performance testing post-construction (e.g. blower door testing, thermal imaging, etc), to ensure that *As-Built* performance complies with both minimum performance requirements and energy ratings on-plan;
- A regime of blower door testing should be implemented (voluntary to start with, moving to a mandatory system), and that is in line with air tightness standards that increase over time;

- A national program of post-construction auditing is required, that covers all jurisdictions and building types, that expands on the current work being done by the *Victorian Building Authority*;

- The industry needs to move toward a verified, performance based, *As-Built* assessment system – in line with what is done in the commercial buildings sector (i.e. assessment of energy bills 12 months-post, alignment with commercial sector processes such as bonds, insurance costs to the builder that are discharged when building performance is proven).

## 2.4. Research Required

The interviewees also suggested key areas of research that currently require significant attention. These include:

- Investigating the three NatHERS assessment pathways for congruence, including the role and use of the *Reference Building*. Little documentation exists to date to suggest that the alternative pathways actually meet/ are equivalent to the primary NatHERS pathway and minimum star bands;

- The impact/opportunity of better design (both building specific and sub-division level) in achieving zero and low-cost energy performance;

- Market research investigating what consumers actually want (and would want) with the benefit of better information regarding energy performance;

- Better understanding the co-benefits of higher building energy performance (particularly public health and well-being).

## 2.5. Other Issues

Other issues raised by interviewees included:

- Significant time and investment is required in the development of industry skills & training, professional development and accountability – for builders, building assessors, energy raters, surveyors and town planners;

- Consumer education needs to be lifted generally regarding the consumer benefits of energy performance in the life of new buildings. A lack of consumer awareness of the benefits of higher energy performance and the relative invisibility of efficiency measures is undermining consumer enforcement/engagement;

- Investigations should be undertaken on the issues surrounding consumer rights in this space (i.e. where a certain level of energy performance is documented, what recourse do consumers have where these outcomes are not met?);

- There is a significant industry perception that there's little risk cutting corners on energy performance will be discovered (by regulators or consumers), or if it is, consequences will not be serious. This industry culture needs to be changed;

# Appendix A:

## Detached & Row Houses (Class 1)

At present, there are three options to meet the thermal Performance Requirements for Class 1 buildings.

The two methods predominantly used are known as *Deemed to Satisfy* (DTS) options. Under the DTS options, a home is considered to meet the thermal Performance Requirements of the NCC if they meet specific criteria, including:

1. Obtaining an **Energy Rating** of at least 6 stars[1] using a software tool accredited under NatHERS, coupled with complying with certain provisions for energy-saving features, and provisions for building sealing.

2. Complying with the relevant DTS **Elemental Provisions** detailed in the NCC (which prescribe specific levels of energy efficiency materials be included in the home, such as insulation and glazing).

There is also a third option:

1. A **Performance Solution**, where it can be demonstrated that the proposed solution meets the Performance Requirement through other means.

   For example, a Performance Solution could demonstrate that the heating and cooling loads of the proposed building are less than or equal to the heating and cooling loads of a reference building, as prescribed in the NCC.

## Apartments (Class 2 Buildings)

The most common option used to meet the relevant energy efficiency Performance Requirement for units in a Class 2 building is to obtain an **Energy Rating** of at least 5 stars for each unit and an average of 6 stars across all units in the building using a software tool accredited under NatHERS. Certain provisions for energy-saving features and detailed provisions for building sealing must also be met.

Unlike Class 1 buildings, there are no DTS elemental provisions for units in a Class 2 building.

However, similar to Class 1 buildings, there is the option for practitioners to develop a Performance Solution to meet the Performance Requirement. For the remainder of the apartment building, such as common areas, practitioners can use the DTS elemental provisions or develop a Performance Solution.

[1] Where the building is in NCC climate zones 1 or 2, a rating of 5 or 5.5 stars may be allowed if the building has an outdoor living area meeting certain requirements for the insulation of the roof of the outdoor area, and the installation of a ceiling fan.

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