

Building and Plumbing Newsflash 548

Energy assessments for residential dwellings and use of software

Purpose

To advise building certifiers, other building practitioners and homeowners about energy assessments in Queensland for residential dwellings when software is used to demonstrate compliance with the energy equivalence standard.

Background

Energy equivalence standards for residential dwellings

Under the [Queensland Development Code Mandatory Part—4.1 Sustainable buildings](#) (QDC 4.1), houses and townhouses must achieve a minimum energy equivalence (thermal performance) rating of 6-stars. Units in a multi-unit residential building must have an average of 5-stars, which is determined by calculating the energy equivalence of all units, with no individual unit to be rated less than 4-stars.

The energy equivalence standards for residential dwellings promote a range of design features, such as good orientation and room layout, suitable ventilation, shading, insulation and glazing. The inclusion of such features can contribute to occupant comfort and reduced need for air conditioning.

Approved software

Software tools must be approved for use under the [Nationwide House Energy Rating Scheme](#) (NatHERS) and these currently are AccuRate Sustainability, BERS Professional and FirstRate5. Each tool has a different user interface and house energy assessors are trained in their preferred one.

Software is the most common method used for assessing the energy efficiency of a dwelling's building shell—its roof, walls, windows and floors. House energy assessors use an approved software tool to model the dwelling's plans to predict its total annual energy load. A house energy star rating (out of 10-stars) is then generated for the design given the particular location of the dwelling.

An energy rating using software allows for flexible design options compared to the more prescriptive provisions of the [National Construction Code](#) (NCC), as different building features can be emphasised. For example, a higher level of insulation can be used to off-set a darker coloured roof (that attracts heat) in hotter areas while still achieving compliance.

The software assessment for the dwelling's plans must be submitted with the building development application to demonstrate its compliance with the energy equivalence standard under QDC 4.1.

Optional credits

Under QDC 4.1 compliance with the relevant energy equivalence standard can be achieved by using approved software only or by combining the software's star rating with optional credits. Optional credits are available for (based on minimum design specifications):

- covered outdoor living area (up to 1 star with houses and with units in multi-unit buildings), and/or
- photovoltaic (solar) energy system (1 star for a minimum 1 kilowatt capacity with houses only).

If optional credits are used for a house or townhouse, the building shell must meet a minimum baseline star rating for the particular climate zone. The minimum building shell rating is 4.5-stars in [NCC climate zone](#) 1 (tropical), 2 (subtropical) and 5 (warm temperate), and is 5-stars in climate zone 3 (hot arid).

If outdoor living areas are included with units in a multi-unit residential building, then optional credits can only be used in climate zones 1 and 2 when calculating the average star rating of all units for the whole building.

Design inclusions

The type of energy efficient features proposed to be included with the dwelling should be identified early between parties, particularly the building designer/architect, house energy assessor, builder, building certifier and client, so all are clear about which ones will be incorporated into its final design and construction. These design inclusions should be clearly noted on the dwelling's plans.

House energy assessor competence

The building certifier has discretion under the *Building Regulation 2006* to decide whether a house energy assessor is a 'competent person' to perform the software assessment.

A house energy assessor may be accredited with either the Australian Building Sustainability Association (ABSA) or the Building Designers Association of Victoria (BDAV), as both are [Assessor Accrediting Organisations](#) (AAOs).

If an accredited assessor has performed the assessment, the building certifier can accept that it has been completed by a competent person (subject to any contrary evidence). Accredited assessors operate under a Code of Practice and are subject to quality assurance reviews by their respective AAO, are required to undertake continuing professional development and have professional indemnity insurance.

Updated software tools that produce the new NatHERS Universal Certificate identifies if the house energy assessor is 'accredited' or 'non-accredited' (see Figure 1).

If a non-accredited assessor has performed the assessment, before the building certifier can accept that they are competent, they will need to confirm that the assessor:

1. has suitable training and skills
2. used appropriate assessment practices, and
3. used an approved NatHERS software tool.

1. Training and skills

Since 1 July 2013, the 'Certificate IV in NatHERS Assessment' has been available as an appropriate qualification for new and existing house energy assessors. It would be expected that the building certifier would consider the Certificate IV in NatHERS Assessment as providing strong evidence that the assessor has the necessary training to undertake software assessments.

Further details about the Certificate IV in NatHERS Assessment and nationally registered training

providers are available from the Commonwealth [Department of Education and Training](#).

If the house energy assessor does not hold a Certificate IV in NatHERS Assessment, the building certifier will need to consider their successful completion of a software training course and relevant assessment skills and experience.

2. Assessment practices

The NatHERS National Administrator has issued a [NatHERS Technical Note](#) that sets out acceptable industry practice for undertaking software assessments for regulatory purposes.

In determining whether a non-accredited assessor is competent the building certifier should ensure that their assessment has complied with the relevant NatHERS Technical Note.

3. Approved NatHERS software tools

For a non-accredited assessor, the building certifier must be satisfied that the software assessment has been undertaken using an approved NatHERS software tool. Current software tools and their versions are listed on the [NatHERS website](#).

NatHERS Universal Certificate

The NatHERS Universal Certificate presents a comprehensive summary of the software assessment in a uniform format for all updated software tools. It aims to improve understanding about house energy star ratings, particularly for building practitioners and homeowners. It also allows the energy efficient design aspects of a dwelling to be more easily checked.

All updated software tools produce the Universal Certificate and it is generated in a fixed file format for record keeping (as a .pdf document).

The Universal Certificate includes relevant information, such as:

- if the software assessment was prepared by an:
 - accredited assessor—colour print-out, their accreditation number and NatHERS logo displayed, or
 - non-accredited assessor—black/white print-out and no NatHERS logo displayed
- building features and the specifications for windows, walls, floors, ceiling and roof, and
- a unique certificate number to enable confirmation that it is a valid assessment.

The Universal Certificate must be generated with all updated software tools. As the current version of BERS Professional (version 4.2.110811) is yet to be updated, it will generate its own separate certificate, as will the previous version of FirstRate5 (version 5.1x). This arrangement will continue until their approval period expires, as advised by the NatHERS National Administrator.

Examples of the two different types of Universal Certificate are shown in Figure 1. More information about the Universal Certificate, including sample certificates, is available at the [NatHERS website](#).

Other considerations

If using software for compliance with QDC 4.1, the following matters also need to be considered:

Building Form 15

If the building certifier determines that the assessor is a competent person they can accept and rely on a [Form 15—Compliance certificate for building design or specification](#) from the assessor. It is common practice for a building certifier to request a 'Form 15' from the house energy assessor to confirm that the dwelling's plans comply with the energy equivalence standard.

Optional credits

If QDC 4.1 optional credits are used and combined with the software's house energy star rating to achieve compliance with the energy equivalence standard, then the optional credits need to be separately noted with the dwelling's plans.

Thermal breaks for metal frames and trusses

As heat can bypass insulation by travelling along metal framing systems used with external walls and/or roof, the effectiveness of the insulation can be reduced where thermal breaks are not included in the design and construction of the dwelling.

If the design includes metal frames and trusses, then thermal breaks must be separately noted with the dwelling's plans. Thermal breaks are not assessed with software, but are separate requirements (elemental (DTS) provisions) for houses under [NCC Volume Two](#) (section 3.12.0(a)(i)(C)).

Stamped plans

The building certifier needs to confirm that dwelling plans used for the software assessment (to generate its star rating) are consistent with the building development approval. Dwelling plans that were assessed by the house energy assessor should be stamped, signed and dated on all pages. This avoids substitution of later versions of the dwelling's plans which may have been amended to include a design variation. Any variation to the originally approved plans could compromise the dwelling's compliance with the energy equivalence standard, as well as its ongoing performance. All relevant design specifications should be noted on the approved plans.

If there is a design variation, the dwelling's design will need to be re-assessed for compliance.

Dwelling-specific software assessment

Each dwelling must have its own individual software assessment and house energy star rating even if using a standard house plan, such as a project home. This accounts for the property's particular location and the dwelling's orientation and other specific design aspects (e.g. choice of roof colour), which influence energy efficiency and occupant comfort. This also applies to units in a multi-unit residential building to account for their particular elevation and aspect.

More information

For more information about:

- energy equivalence standards, see the link 'energy equivalence rating' on the department's website at www.hpw.qld.gov.au
- NatHERS, see www.nathers.gov.au
- Information Handbook on Energy Efficiency Provisions for NCC Volume Two (2015), see www.abcb.gov.au/Resources/All-Resources (under 'Education and Resources'), and
- for energy efficiency features, 'Your Home' at www.yourhome.gov.au.

Contact for further information





Building Codes Queensland
Building Industry and Policy
Department of Housing and Public Works
Email: buildingcodes@qld.gov.au

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Figure 1: Examples of the Universal Certificate

N.B. Examples shown are the front page only.

<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;">Nationwide House Energy Rating Scheme* Certificate</p> <p style="font-size: small;">Certificate number: 87654321 Date of certificate: 12 April 2014 ★ Star rating: 6.5</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="width: 30%;"> <p>Assessor details</p> <p>Accreditation number: 12345678 Name: Fred Williams Organisation: Capital Building Assessors Email: frederick.williams@cbassessors.com.au Phone: 0412 123 456 Declaration of interest: Employed by designer of the building Software: FirstRate5 v5.5.11 AAC: ABSA</p> </div> <div style="width: 35%; text-align: center;">  <p>6.5 The more stars the more energy efficient</p> <p>NATIONWIDE HOUSE ENERGY RATING SCHEME</p> <p>Predicted annual energy load for heating and cooling based on standard occupancy assumptions</p> <p style="font-size: large; font-weight: bold;">1234 MJ/m²</p> <p style="font-size: x-small;">For more information on your dwelling's rating see: www.nathers.gov.au</p> </div> <div style="width: 30%; text-align: right;">  </div> </div> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> <p>Overview</p> <p>Dwelling details</p> <p>Address: Unit 15, 237 Edwina Mountbatten Drive Suburb: West Wyndham State: NSW Postcode: 2345 Type: New dwelling NCC Class: 01 NatHERS climate zone: 14 Lot/DP number: 9/53 Exposure: Suburban</p> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div style="width: 45%;"> <p>Key construction and insulation materials <small>(see following pages for details)</small></p> <p>Construction: Brick veneer Ceramic tile roof Slab on ground Insulation: R1.5 wall insulation R3.5 ceiling insulation Glazing: Timber frame Single glaze clear</p> </div> <div style="width: 45%;"> <p>Ceiling penetrations <small>(see following pages for details)</small></p> <p>Sealed: 5 Unsealed: 18 TOTAL:** 23</p> <p>Principle daylight type: Compact fluorescent</p> </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div style="width: 45%;"> <p>Net floor area (m²)</p> <p>Conditioned: 55 Unconditioned: 23 Garage: 12 TOTAL: 90</p> </div> <div style="width: 45%;"> <p>Annual thermal performance loads (MJ/m²)</p> <p>Heating: 576 Cooling: 658 TOTAL: 1234</p> </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div style="width: 45%;"> <p>Window selection – default windows only</p> <p>Note on allowable window values: With a 10% tolerance to the nominated SHGC window values shown on page 2, the following ratings are achieved:</p> <p>-10% SHGC: 6.3 +10% SHGC: 6.6</p> <p>NB: This tolerance ONLY applies to SHGC, the U-value can always be lower but not higher than the values stated on page 2.</p> <p>If the rating listed above falls below 6.0 stars or the required rating, then the window with this tolerance can NOT be selected.</p> </div> <div style="width: 45%; text-align: center;"> <p>Scan to access this certificate online and confirm this is valid.</p>  </div> </div> <div style="margin-top: 5px;"> <p>Plan documents</p> <p>Plan refidate: Ref24/88 Prepared by: Wyndham Sustainable Homes</p> </div> <p style="font-size: x-small; margin-top: 5px;">* Nationwide House Energy Rating Scheme (NatHERS) is an initiative of the Australian, state and territory governments. For more details see www.nathers.gov.au Page 1 of 5</p> </div>	<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;">House Energy Rating — NON-ACCREDITED*</p> <p style="font-size: small;">Rating document number: 87654321 Date of rating: 12 April 2014 Star rating: 6.5</p> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> <p>Completed by</p> <p>Name: Fred Williams Organisation: Capital Building Assessors Email: frederick.williams@cbassessors.com.au Phone: 0412 123 456 Declaration of interest: Employed by designer of the building Software used: FirstRate5 v5.5</p> </div> <div style="border: 1px solid black; padding: 5px; margin-top: 5px; background-color: #f0f0f0;"> <p>Overview</p> <p>Dwelling details</p> <p>Address: Unit 15, 237 Edwina Mountbatten Drive Suburb: West Wyndham Postcode: 2345 State: NSW NCC Class: 01 Type: New dwelling NatHERS climate zone: 14 Lot/DP number: 9/53 Exposure: Suburban</p> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div style="width: 45%;"> <p>Key construction and insulation materials <small>(see following pages for details)</small></p> <p>Construction: Brick veneer Ceramic tile roof Slab on ground Insulation: R1.5 wall insulation R3.5 ceiling insulation Glazing: Timber frame Single glaze clear</p> </div> <div style="width: 45%;"> <p>Ceiling penetrations <small>(see following pages for details)</small></p> <p>Sealed: 5 Unsealed: 18 TOTAL:** 23</p> <p>Principle daylight type: Compact fluorescent</p> </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div style="width: 45%;"> <p>Net floor area (m²)</p> <p>Conditioned: 55 Unconditioned: 23 Garage: 12 TOTAL: 90</p> </div> <div style="width: 45%;"> <p>Annual thermal performance loads (MJ/m²)</p> <p>Heating: 576 Cooling: 658 TOTAL: 1234</p> </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div style="width: 45%;"> <p>Window selection – default windows only</p> <p>Note on allowable window values: With a 10% tolerance to the nominated SHGC window values shown on page 2, the following ratings are achieved:</p> <p>-10% SHGC: 6.3 +10% SHGC: 6.6</p> <p>NB: This tolerance ONLY applies to SHGC, the U-value can always be lower but not higher than the values stated on page 2.</p> <p>If the rating listed above falls below 6.0 stars or the required rating, then the window with this tolerance can NOT be selected.</p> </div> <div style="width: 45%; text-align: center;"> <p>Scan to access this rating document online and confirm this is valid.</p>  </div> </div> <div style="margin-top: 5px;"> <p>Plan documents</p> <p>Plan refidate: Ref24/88 Prepared by: Wyndham Sustainable Homes</p> </div> <p style="font-size: x-small; margin-top: 5px;">* This rating has been completed by a non-accredited rater. 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Accredited assessor—
Certificate in colour with NatHERS logo

Non-accredited assessor—
Certificate in black/white without NatHERS logo