



Nationwide House Energy Rating Scheme (NatHERS)

Administrative and Governance Arrangements

August 2015

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Glossary

AAO	Assessor Accrediting Organisations
ABCB	Australian Building Codes Board
ABSA	Association of Building Sustainability Assessors
AGO	Australian Greenhouse Office
BC	Buildings Committee
BCA	Building Code of Australia
BESTEST	Building Energy Simulation Test
COAG	Council of Australian Governments
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DIIS	Commonwealth Department of Industry, Innovation and Science
EWG	Energy Working Group
MCE	Ministerial Council on Energy
CEC	COAG Energy Council
NatHERS	Nationwide House Energy Rating Scheme
NFEE	National Framework for Energy Efficiency
NSEE	National Strategy on Energy Efficiency

PURPOSE

This paper documents the administrative and governance arrangements in place for the Nationwide House Energy Rating Scheme (NatHERS) as at August 2015 and a background to the Scheme's development.

THE NATIONWIDE HOUSE ENERGY RATING SCHEME (NatHERS)

NatHERS supports efforts of Australian Governments to reduce the energy and greenhouse gas impact of residential buildings.

NatHERS encourages energy efficient building design and construction by providing a reliable way to estimate and rank the potential thermal performance of residential buildings in Australia.

NatHERS tools provide one method of demonstrating compliance with the minimum energy efficiency standards for new residential buildings outlined under the Building Code of Australia (BCA), which is now part of the National Construction Code. Additionally, NatHERS software is a powerful tool for optimising energy efficient house designs for Australian climates.

BACKGROUND

NatHERS was initiated in 1993 by the Australian and New Zealand Minerals and Energy Council (later the Ministerial Council on Energy) to provide a standardised approach to rating the thermal performance of Australian homes. Identified at the time as the House Energy Rating Scheme (HERS), the intent of the Scheme was to:

...assist the public and the building industry in identifying the extent to which any house (new or existing) has the potential, through its design and construction, to be of high efficiency in its use of energy for heating and cooling purposes.¹

The Scheme was developed by the state and territory energy agencies and the Australian Government, in conjunction with the Commonwealth Scientific and Industrial Research Organisation (CSIRO).

Originally used by industry to market energy efficient homes, NatHERS was gradually adopted to support regulation of new building standards by some State and Territory Governments, beginning with the introduction of a minimum four star requirement for new home designs in the ACT in 1995. The NSW Government's Energy Smart Homes Program, implemented from 1997-1999, also used the HERS star ratings.

¹Source: Delsante, A. *The Development of an Hourly Thermal Simulation Program for Use in the Australian Nationwide House Energy Rating Scheme*, CSIRO Division of Building, Construction and Engineering.

The National Greenhouse Strategy was agreed by the Australian Government and all State and Territory Governments in 1998 as a comprehensive approach to tackling greenhouse issues. The strategy noted that improvements to the design of commercial and residential buildings have the potential to make an important contribution to limiting Australia's greenhouse gas emissions and committed governments to 'develop a minimum energy performance requirement for new houses and major extensions taking into account, as appropriate, opportunities offered by existing performance measures, or ratings, such as the Nationwide House Energy Rating Scheme (NatHERS)'².

The Australian Greenhouse Office (AGO) was formed in 1998 and established a partnership with the Australian Building Codes Board (ABCB) to produce a flexible approach to mandatory energy efficiency standards for new housing that could be incorporated into the BCA.

Stage 1 (2004) and Stage 2 (2007) of the National Framework for Energy Efficiency (NFEE) reiterated a national role for NatHERS by calling on agreed method(s) for rating building energy performance on a like-with-like basis to enable 'improving levels of minimum energy efficiency design standards'³ for new residential construction.

On 2 July 2009, the Council of Australian Governments (COAG) adopted a comprehensive 10-year strategy, the National Strategy on Energy Efficiency (NSEE), to accelerate energy efficiency improvements as a key component of the overall approach to combat climate change, including specific measures relating to the role of rating tools in improving the energy efficiency of Australia's buildings.

Although not specifically referenced in the NSEE, NatHERS underpinned measures 1.2.2 (to improve Australia's capacity to assess building energy) and 3.3.1 (to increase the stringency of residential building energy efficiency standards through the BCA).

REGULATORY FRAMEWORK

The first minimum energy efficiency standards for residential dwellings were incorporated into the BCA in 2003. Subsequent updates increased the stringency of residential energy efficiency measures using the BCA's thermal calculation verification method to a NatHERS five star rating (in 2006) and then to six stars (in 2010) for class 1 buildings (detached and attached houses). Energy efficiency standards for class 2 buildings (apartments) were introduced in 2005 and were increased in 2010 to an average of six stars for all units in an apartment block and a minimum of five stars for each unit.

The BCA performance requirements for energy efficiency can be achieved through several building solutions, one of which is computer simulation of the thermal performance of a

² Source: Commonwealth of Australia (1998) *National Greenhouse Strategy*.

³ Source: Ministerial Council on Energy, (2004), *Statement on National Framework for Energy Efficiency Overview Plan of Stage One Measures 2005 – 2007*.

building design. NatHERS software simplifies the calculation of complex thermal modelling for residential buildings.

The software tools are able to accommodate greater sensitivity in local topographical and climatic conditions and can produce a flexible, least-cost approach to meet energy efficiency standards.

The *Nationwide House Energy Rating Scheme Software Accreditation Protocol* defines the testing regime for simulation software suitable for use to demonstrate compliance with the thermal performance requirements. For regulatory purposes under the BCA, it is essential for ratings software to have current accreditation under the NatHERS Protocol.

The BCA is given legal effect by relevant legislation in each state and territory. This legislation prescribes or “calls up” the BCA to fulfil any technical requirements which have to be satisfied when undertaking new building work. This means the states and territories are able to vary the technical provisions of the BCA to suit their own circumstances. Table 1 describes the legislative and regulatory energy efficiency requirements for new buildings in each jurisdiction (current as at May 2014).

Table 1 Legislative and regulatory requirements applying to energy efficiency elements covered by thermal performance assessment in new buildings in each jurisdiction.

Jurisdiction	Regulator	Act	Regulation	Codes
ACT	ACT Planning and Land Authority	Building Act 2004	Building (General) Regulation 2008	BCA
NSW	Department of Planning and Environment	Environmental Planning and Assessment Act 1979	Environmental Planning and Assessment Regulation 2000 State Environmental Planning Policy (Building Sustainability Index - BASIX) 2004	BASIX
NT	Department of Lands, Planning and the Environment	NT Building Act 2014	NT Building Regulations 2014	BCA
QLD	Department of Housing and Public Works	Building Act 1975	Building Regulation 2006	BCA, Queensland Development Code (QDC)
SA	Department of Planning, Transport and Infrastructure	Development Act 1993	Development Regulations 2008	BCA
TAS	Department of Justice	Building Act 2000	Building Regulations 2004	BCA
VIC	Victorian Building Authority	Building Act 1993	Building Regulations 2006	BCA
WA	Building Commission	Building Act 2011	Building Regulations 2012	BCA

POLICY FRAMEWORK

NatHERS has been encompassed within two whole of government policy frameworks. The first was the NFEE a comprehensive package of measures covering the residential, commercial and industrial sectors, designed to overcome the barriers and challenges that prevent the market delivering the actual economic potential of energy efficiency. The second is the NSEE which incorporates and builds on measures in the NFEE, aiming to substantially improve standards for energy efficiency and accelerate the introduction of new technologies through improving regulatory processes and addressing the barriers to the uptake of new energy efficient products and technologies. A more detailed outline of relevant measures is described in Table 2. The COAG Energy Council (CEC) is currently developing a National Energy Productivity Plan which will supercede the NSEE.

Table 2 Summary of energy efficiency initiatives relating to NatHERS

Policy	Measure
National Framework for Energy Efficiency (NFEE) ⁷	
2004 - Stage 1	Nationally-consistent minimum standards adopted and enhanced over time with nationally consistent 5-star standards for all homes adopted in all jurisdictions. To set improving levels of minimum energy efficiency design standards for new construction including alterations and additions for residential and commercial buildings, and ensure credible and meaningful information is publicly and readily available to potential purchasers and renters/lessees on the relative energy performance of buildings.
2007 - Stage 2	Continuation of NatHERS - to develop and implement appropriate software tools to rate the energy performance of buildings.
National Partnership Agreement on Energy Efficiency	
2009	Higher energy efficiency standards to deliver substantial growth in the number of highly energy efficient homes and buildings, and provide a clear roadmap to assist Australia's residential and commercial building sector to adapt to a low carbon economy.
National Strategy on Energy Efficiency (NSEE)	
2009	The NSEE was constructed around 4 themes. NatHERS sits within the theme 'Making buildings more energy efficient' and was related to the following measures: 1.2.2 - Strengthen national capability in energy auditing and

	<p>assessment.</p> <p>3.1.1- All jurisdictions will work together to develop a consistent outcomes-based national building energy standard setting, assessment and rating framework for driving significant improvement in the energy efficiency of Australia's building stock. To be implemented in 2011.</p> <p>3.3.1 - Significantly increase the stringency of energy efficiency provisions for all new residential buildings in the BCA and broaden coverage of efficiency requirements. Minimum energy efficiency standards will be upgraded nationally to 6-stars or equivalent in the 2010 update of the BCA – to be implemented by May 2011 and reviewed regularly for potential upgrade thereafter.</p>
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MANAGEMENT OF THE SCHEME

Steering Committee

The Nationwide House Energy Rating Scheme (NatHERS) was an initiative of the former Ministerial Council on Energy (MCE), and is now the responsibility of the COAG Energy Council which was established in 2014. NatHERS is overseen by the Energy Working Group (EWG), a body which includes representatives of the Australian Government and state and territory energy and building authorities. The Commonwealth's Department of Industry, Innovation and Science is the National Administrator of the Scheme.

Policy direction on NatHERS is provided by EWG. Key decisions are referred to EWG including agreement on the national benchmark tool, star banding and the accreditation of software. EWG also provides policy advice for the Scheme and supports the work of the ABCB to develop and implement energy efficiency standards for buildings, including rating tools.

Development and implementation of the NatHERS work program is delivered by the Buildings Committee (BC), a sub-committee of the EWG. The BC is tasked by EWG to develop and implement improvements to the Scheme to facilitate consistent and repeatable ratings of the energy performance of buildings suitable for regulatory purposes.

Technical Advisory Committee

The development of NatHERS software tools is informed by specialist advice provided by a NatHERS Technical Advisory Committee consisting of state and territory officials, scientists, software developers and assessor industry representatives. The role of the Committee has included the provision of guidance on a range of technical issues including software functionality, modelling procedures, work plan prioritisation and new technology and product evaluation.

National Administrator

The role of NatHERS National Administrator was originally adopted by the Australian Greenhouse Office (AGO). This role has followed the transfer of functions from the AGO to the Department of Environment, Water, Heritage and the Arts in 2007, the Department of Climate Change and Energy Efficiency in 2010, the Department of Resources, Energy and Tourism in 2013 and the Department of Industry, Innovation and Science in 2013.

The role of National Administrator has varied over time and includes activities such as:

- Funding of activities (in addition to work funded through NFEE/NSEE)
- Research and development
- Project management
- Communication to industry, government and consumer stakeholders
- Administration activities such as budget, government coordination, workshop coordination
- Industry liaison and public point-of-contact
- Protocol and procedure development and coordination
- Software accreditation procedures
- Website development and maintenance

STAKEHOLDERS

Table 3 shows the roles of key stakeholders in NatHERS, and a brief analysis of their areas of interest.

Table 3 The roles and interests of key NatHERS stakeholders

Stakeholder	Roles	Interests
Commonwealth Government	<ul style="list-style-type: none"> - National Administrator for NatHERS - National EE Policy - NSEE implementation - Building industry policy 	<ul style="list-style-type: none"> - Flexibility for industry/consumers to achieve regulated minimum EE standards at least cost - Climate sensitive design - Integrity of Scheme and national building standards - Use of tools to estimate impact of EE policy on residential sector - Assessor acceptance of Scheme - Consumer acceptance of Scheme
State and Territory Governments	<ul style="list-style-type: none"> - Building construction and energy regulation - EE policy - NSEE implementation 	<ul style="list-style-type: none"> - Building approvals and compliance with standards within their jurisdiction. - Consistent use of tools to achieve minimum EE standards in new building work. - Integrity and responsiveness within the Scheme - Quality, reliability and validity of assessments and ratings - Suitability of rating tools for regulatory purposes

		<ul style="list-style-type: none"> - Climate sensitive design - Consumer understanding of ratings - Use of tools to estimate impact of EE policy on residential sector
Australian Building Codes Board	<ul style="list-style-type: none"> - Development of the National Construction Code (including the BCA) 	<ul style="list-style-type: none"> - Ensuring that building standards provide a net community benefit - Flexibility for industry/consumers to achieve regulated minimum EE standards at least cost - Reliability of ratings and suitability of rating tools for regulatory purposes - Use of tools to estimate costs and benefits of future BCA measures
CSIRO	<ul style="list-style-type: none"> - Benchmark software development - Validation of benchmark tool - Thermal performance research - Expert advice on thermal performance 	<ul style="list-style-type: none"> - Reliability and validity of ratings - Integrity of benchmark software - Industry acceptance of the benchmark software - Responding to emerging products and industry needs
Product manufacturers	<ul style="list-style-type: none"> - Supply of products to building industry - Practical application of EE policy - 'Real world' testing of software - Provision of expert advice about product 	<ul style="list-style-type: none"> - Reliability and validity of ratings - Transparency of research and analysis - Accurate reflection of product in software
Research institutions	<ul style="list-style-type: none"> - Research and development - Thermal performance research 	<ul style="list-style-type: none"> - Competitive funding for research activities - Transparency of research and analysis - Validation of ratings - Use of tools to estimate impact of EE policy on residential sector
Software developers	<ul style="list-style-type: none"> - Software development - Expert advice on thermal performance 	<ul style="list-style-type: none"> - the commercial viability of their tools - Transparency of research and analysis

		<ul style="list-style-type: none"> - Reliability and validation of ratings - Fair process for validation of software - Advance planning for changes to Scheme - Competitive funding for research activities
Assessors	<ul style="list-style-type: none"> - Undertake NatHERS ratings of residential buildings - Expert advice for building design to achieve good thermal performance - Education of consumers 	<ul style="list-style-type: none"> - Reliability and validation of ratings - Advance planning for changes to Scheme - Useability of software - Integrity of Scheme - Consumer acceptance of Scheme - Qualification and training of assessors - Quality assurance and auditing
Assessor Accrediting Organisations (AAO)	<ul style="list-style-type: none"> - Assessor support - Quality assurance of assessments - Access to continuing professional development - Maintain a complaints handling procedure 	<ul style="list-style-type: none"> - The setting and implementation of AAO accreditation requirements - The commercial viability of being an AAO - Promoting the benefits of accreditation to assessors and consumers
Designers/Architects/Builders	<ul style="list-style-type: none"> - Work with assessors to produce the required/desired level of thermal performance 	<ul style="list-style-type: none"> - Reliability of ratings - Understanding to what degree design elements and materials change star ratings and construction costs
Building certifiers	<ul style="list-style-type: none"> - Work with practitioners to assess the required level of performance - Assess compliance with building performance standards 	<ul style="list-style-type: none"> - Reliability of ratings - Interpretation/transparency of assessments - Understanding to what degree design elements and materials change star ratings - Ease of checking actual construction with approved plans
Consumers	<ul style="list-style-type: none"> - Purchase of new buildings - Influence new building design 	<ul style="list-style-type: none"> - Reliability and validity of ratings - Cost impact of Scheme - Demonstration of EE benefits

	<ul style="list-style-type: none"> - Pay operating costs for new buildings - Provide feedback to governments 	<ul style="list-style-type: none"> - Understanding intention of Scheme - Flexibility in options for home design
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ASSESSORS

NatHERS assessors use house energy rating tools, which comply with the NatHERS software accreditation protocol, to assess the predicted thermal performance of the design residential buildings and major extensions, on a scale of zero to ten stars. Information is gathered about the building shell from building plans/drawings and other specifications usually at the design stage. As the public is becoming increasingly more interested in making their houses energy efficient, NatHERS assessors can also be called on to provide ratings of existing building stock and advise on improvement possibilities to the existing building shell.

NatHERS assessors need to have sufficient knowledge and expertise of residential buildings and materials that make up the building shell to be able to provide analysis and options for improving building thermal performance to householders, designers, architects and builders. Other skills and knowledge identified as important for the NatHERS assessor include correct use of the rating tools in compliance with the NatHERS Technical Notes and building regulations, customer service, computer literacy, workplace health and safety and ethical behaviour.

Qualifications

The only recognised course for NatHERS accredited assessors is the Certificate IV in NatHERS Assessment. It replaced the Course in Building Thermal Performance Assessment (Residential) 91318NSW in January 2014.

The Certificate IV is recognised under the Australian Qualifications Framework, and all suitable Registered Training Organisations (RTOs) are able to deliver the course through the Vocational Education and Training system.

Accreditation

Accreditation of assessors is managed by Assessor Accrediting Organisations (AAOs) which are accredited by the NatHERS Administrator. Requirements that ratings for building regulation purposes must be done by accredited or licensed assessors are determined by State and Territory Governments and vary across jurisdictions. There are approximately 600 accredited assessors. Table 4 describes assessor accreditation requirements in 2014.

Table 4 Current assessor accreditation requirements in each jurisdiction.

Jurisdiction	Accreditation
NSW	Thermal comfort simulations that are entered into BASIX must be conducted by an accredited assessor
VIC	Ratings must be prepared by an accredited assessor
TAS	Ratings can be prepared by accredited assessors, architects or building designers
ACT	Has its own licensing scheme for assessors
NT	Use of accredited assessors encouraged but not mandatory
QLD	Use of accredited assessors encouraged but not mandatory
WA	Use of accredited assessors encouraged but not mandatory
SA	Keeps its own register of assessors

Assessor Accrediting Organisations

Requirements of AAOs are outlined in the NatHERS Protocol for Assessor Accrediting Organisations. Formal roles and responsibilities of AAOs under the Scheme include:

- Assessor support
- Providing access to Continuing Professional Development (CPD)
- Maintaining a quality assurance process for assessments
- Maintaining a complaints handling procedure
- Delivery of an annual report outlining:
 - Up-to-date list of accredited assessors
 - Summary of Quality Assurance processes undertaken
 - Financial statement
 - Changes to the accreditation process
 - Changes to the structure of the AAO organisation
 - A statement of compliance with the Protocol

Organisations may apply to become an AAO in accordance with the NatHERS Protocol. To date, the Association of Building Sustainability Assessors (ABSA) and the Building Designers Association of Victoria (BDAV) are the only accredited AAOs for NatHERS.

SOFTWARE

First Generation NatHERS software

The development of the first generation of NatHERS software by CSIRO began in the early 1990s, based on years of previous research in simulating heat flows in residential buildings. The original software tool (which was also known as NatHERS) formed the basis of the national rating scheme and was adopted in 2003 as the benchmark simulation tool for compliance to newly established BCA energy efficiency standards.

Sustainability Victoria (then known as Energy Victoria) developed and released the initial version of FirstRate in 1993, based on the CHEETAH thermal calculation engine, CSIRO's precursor to the NatHERS tool. In 1999, FirstRate was modified to use the settings and assumptions in the NatHERS Scheme.

A private business, Solar Logic, developed the BERS tool in the early 1990s, initially based on the CHEETAH and then NatHERS calculation engines.

Second Generation NatHERS software

In 2006, NatHERS was improved by adopting a more powerful second generation of software tools to enable better modelling of thermal comfort across all Australian climates. Improvements to the software included more realistic modelling of the benefits of natural ventilation and the cooling effects of ceiling fans, heat flows in underfloor and roof spaces and between attached dwellings, and the inclusion of a greatly expanded base of climate data. The older and more limited software tools were phased out from 2007, and were superseded by second generation software in the 2009 BCA.

Chenath Engine

Chenath is the endorsed calculation engine used by the national benchmark software tool (AccuRate) to model thermal flows within residential buildings. This engine is an advance on CHEETAH and is the culmination of decades of research by CSIRO and the Australian Government. CSIRO own the intellectual property to Chenath, but was required to provide a licence to all Australian Governments, and to third party software developers for its use.

In 2005, the calculation engine was substantially upgraded to incorporate modelling calculations that reflect the increased computing capacity of modern computers, enabling improved modelling of heat flows and human comfort. The revised engine was incorporated into the first commercial release of the approved benchmark software, AccuRate, in 2006.

Benchmark software

AccuRate is the NatHERS benchmark software for energy rating in Australia. The software was developed by the CSIRO and funded by Australian Governments through NFEES. CSIRO own the intellectual property to both the Chenath calculation engine and the AccuRate interface.

The annual energy loads and associated star bands contained within AccuRate were approved by the EWG. Unique star bands from zero to ten stars are set for each climate zone to allow comparison of the typical heating and cooling energy demand of buildings within Australia's diverse climatic regions. The energy load is the combined heating and cooling energy demand expressed as the maximum energy load per unit of floor area per

annum (MJ/m².annum). These star band settings apply to all software tools approved under the Scheme.

Accreditation of alternative software

NatHERS allows for competing software products to be accredited for use in the Scheme by providing a fair and transparent process for commercial software tools to be assessed. This process is based upon a comparison of the rating results of the alternative software tool against the benchmark tool for the same building plans. All software tools are required to assess the same minimum set of building design features, and must produce ratings consistent with the benchmark tool.

Two additional software tools are currently accredited with NatHERS – FirstRate5 and BERS Professional. Both tools provide alternative user interfaces to enable user-oriented input of building design data into the Chenath engine.

Software approved for regulatory use

Accredited software versions of the three tools for rating new building work in accordance with the BCA can be seen on the NatHERS website

COMMUNICATION

The main form of communication with stakeholders is through the NatHERS website (www.nathers.gov.au) which is currently maintained by the NatHERS Administrator. The Scheme is referenced on other websites including those of State and Territory Governments, industry organisations, assessors and building regulatory authorities. The main form of communication with accredited assessors is through the AAOs.

Information about NatHERS is also communicated through fact sheets, in response to requests for information, through conference presentations and journal articles.

NatHERS has no means to communicate or collect accurate details from unaccredited assessors.

AGREED PROTOCOLS

Existing protocols and procedures of the Scheme can be viewed on the NatHERS website:

- Protocol for Assessor Accrediting Organisations
- NatHERS Software Accreditation Protocol

FUNDING ARRANGEMENTS

Funding for ongoing support and maintenance of both the Scheme and the benchmark software is currently obtained from the following sources:

- Departmental funding from DIIS. Allocation of resources for NatHERS is subject to annual appropriation and budget priorities throughout the Department.
- Software licensing. Royalties from licencing of the Chenath Engine to the other tools are returned to CSIRO for re-investment in NatHERS related work.
- CSIRO investment. Research in developing building thermal performance analysis tools has been funded by the CSIRO. CSIRO has also absorbed additional costs associated with ad-hoc software support and maintenance tasks.

States and Territories have in the past contributed funding for maintenance of the benchmark software through their joint funding of implementation of the NSEE. This funding source closed in 2013/14 and further funding is dependent on decisions being made by states and territories through the COAG Energy Council.

Direct industry investment is not currently permitted for the benchmark software or Scheme to ensure that the software is developed and maintained free from commercial influence.

Modifications to software are made where robust evidence supports such a change. In some instances these modifications are made in response to evidence from research studies funded by industry investment.