Residential Efficiency Scorecard

The National Scorecard Home Energy Rating Program

A report on the National Scorecard evaluation 2021

April 2022

We acknowledge and respect Australian Traditional Owners as the original custodians of Australia's land and waters, their unique ability to care for Country and deep spiritual connection to it. We honour Elders past and present whose knowledge and wisdom has ensured the continuation of culture and traditional practices.

Acknowledgements

We would like to thank the Scorecard assessors and householders who took part in this field trial. We also extend our thanks to our colleagues in all jurisdictions and the Commonwealth who provided feedback on the report.

The new National Scorecard program, which builds on the Victorian Government's successful state-based Residential Efficiency Scorecard program, facilitates a nationally-consistent approach for assessing existing homes. It was piloted nationally in 2019 and further trialled in 2021, with support from all governments

Currently endorsed by NatHERS, the National Scorecard program is expected to be fully accredited and phased into NatHERS in 2022. Until this occurs, all elements of the National Scorecard program, including the assessment tool, assessor training and assessor accreditation, will continue to be delivered by the Victorian Government on behalf of all Australian governments.

ISBN 978-1-76105-941-4

Contact us

Please email your enquiry to scorecard@delwp.vic.gov.au

VICTORIA State Government | Environment, Land, Water and Planning

About this report

The National Scorecard Home Energy Rating Program (National Scorecard) uses a star rating and certification to help householders and others identify energy cost savings and improve the comfort of their homes. Accredited assessors derive this information using an online tool to measure the home's energy efficiency. This includes fixed appliances, such as hot water and air conditioning, as well as building features such as flooring and insulation.

This report summarises the evaluation of the National Scorecard. The evaluation included comparison with the CSIRO's trial Australian Zero Emission House (AusZEH) Whole of Home tool and an Australia-wide field trial conducted in the first half of 2021. Future actions identified as a result of the evaluation are also included in the report.

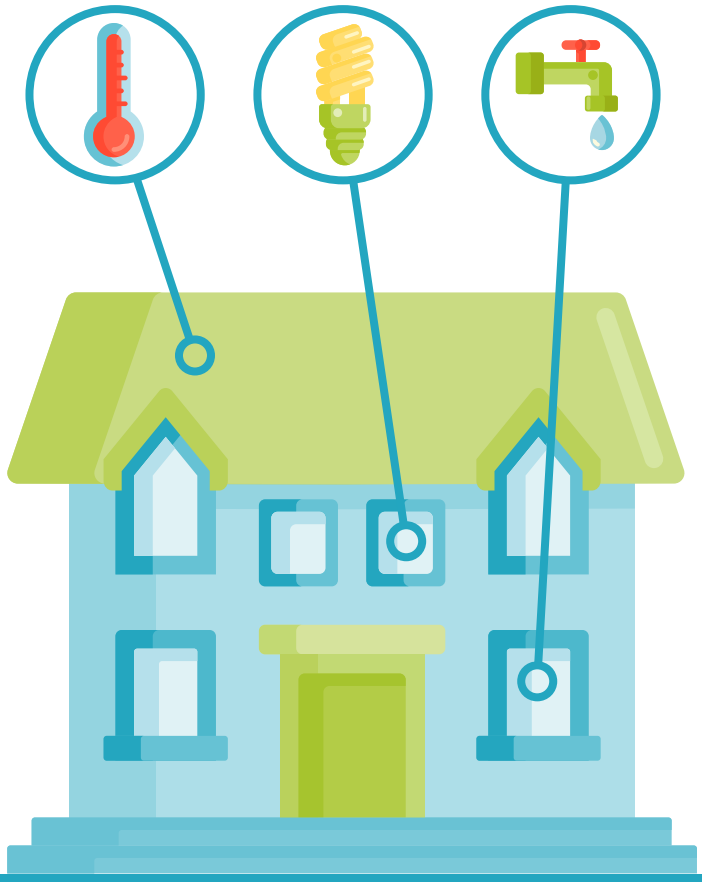
The aim of the National Field Trial was to test the National Scorecard's cloud-based tool using a diversity of assessors across jurisdictions and different types of home and climate zones. Technical elements of the tool, as well as the assessors' use of the tool, were evaluated.

The National Field Trial confirmed that the tool and associated assessor training and accreditation processes are operating effectively. When compared to the Whole of Home tool, the results were very similar.

Following the National Field Trial, the National Scorecard program was endorsed under the Nationwide House Energy Rating Scheme (NatHERS). The National Scorecard is expected to be fully accredited and phased into NatHERS in the near future.

This report provides high-level data and does not include detailed technical data. Due to the relatively small number of assessments in the trial (659), the data presented in this report is not representative of the overall building stock in any location.

For further information about the National Scorecard Home Energy Rating Program, go to www.homescorecard.gov.au



Contents

About the National Scorecard

What is the National Scorecard Home Energy Rating Program?

Many homes in Australia have not been built with our climate in mind. For example, in hot weather, homes can become too hot for comfort or optimum health. To keep our homes cool, we use more electricity than we need, which results in greater energy use. In cold weather too, our homes can be uncomfortable, unhealthy and costly to run.

The way a home is constructed, and the types of materials used, can affect how efficiently a home uses energy. Inefficient use of fixed appliances, such as air conditioning, increases the cost of electricity and the chance of blackouts.

The National Scorecard Home Energy Rating Program (National Scorecard) is a government program that gives householders in all Australian states and territories the opportunity to find out their home's energy performance. Using the information provided in an assessment by an independent, qualified assessor, householders can reduce their energy costs and make their homes more comfortable. Builders, real estate agents, financiers, community organisations, and public housing providers can also benefit from the Scorecard.

I knew my house had been built to meet high energy efficiency standards, but it was a good feeling to see that reflected in the National Scorecard's star rating. I also took the opportunity to check the feed-in tariff of my two solar systems and discovered that one of them had been turned off. The assessment helped me focus in on the energy efficiency of my house in a way I had not since I bought it.

Josh McIntyre, householder,
Aldinga Eco-Village, South Australia

Although the homes in the Aldinga Eco-Village in South Australia were built to be energy-efficient, I wasn't entirely confident they would all rate well. Every single home scored either nine or 10 stars, which confirmed that using good design principles means homes are less expensive to run. Having seen so many poorly built houses with low ratings, this experience reinforced my belief in having a national scheme that reflects high as well as low efficiency.

Lucinda Flynn, Josh's assessor,
Aldinga Eco-Village, South Australia

How does the National Scorecard work?

An accredited assessor comes to the home and determines a star rating out of 10 using an online tool. The star rating represents the average cost of energy for that home, with 10 being the most efficient and therefore the lowest cost to run the home. The assessor also provides the householder with tailored, expert advice about how they can make their home more comfortable and reduce energy costs.

The National Scorecard is voluntary. The assessor sets the fee for the assessment, which is generally in the range of $250 to $500 per assessment. The fee depends on factors such as the size and complexity of the home.

Step 1.

A householder goes to www.homescorecard.gov.au and finds an assessor in their area.

Step 2.

An assessor visits the home at the agreed time.

Step 3.

The assessor completes a comprehensive assessment and rates the home.

Step 4.

The householder receives expert advice from the assessor and previews their certificate.

Step 5.

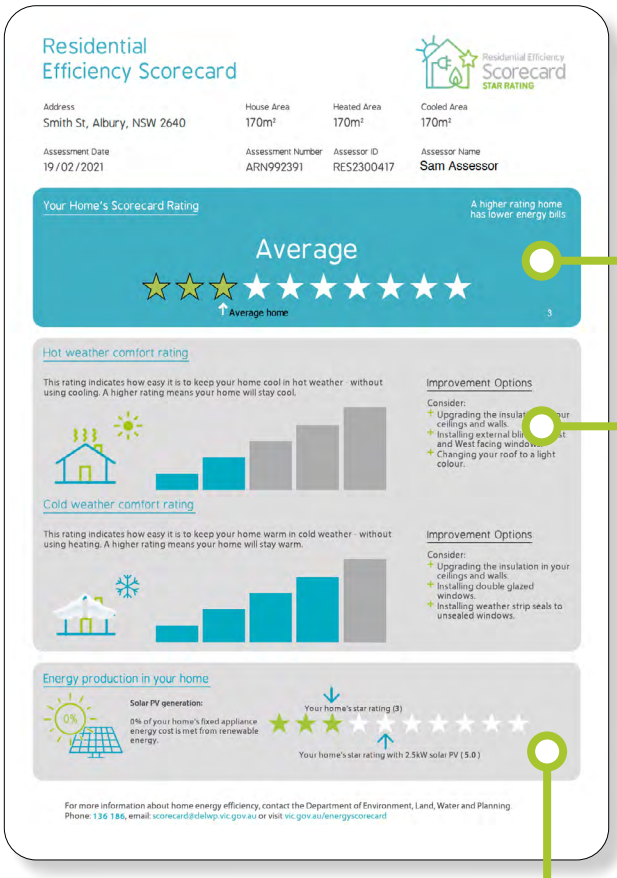
The householder receives their digital certificate via email within seven days.

Step 6.

The householder makes improvements based on the assessor's advice.

What is the National Scorecard certificate?

Following the assessment, the householder receives a certificate which details the home's energy performance. Hot and cold comfort ratings and appliance ratings are shown on the certificate using a five-bar scale. For the hot and cold weather comfort ratings, five bars means the home is easy to keep cool in hot weather and warm in cold weather; one bar means the home is not easy to keep cool during hot weather or warm during cold weather. For fixed appliance efficiency, five bars means the appliance is cheaper to run; one bar means the appliance is more expensive to run.

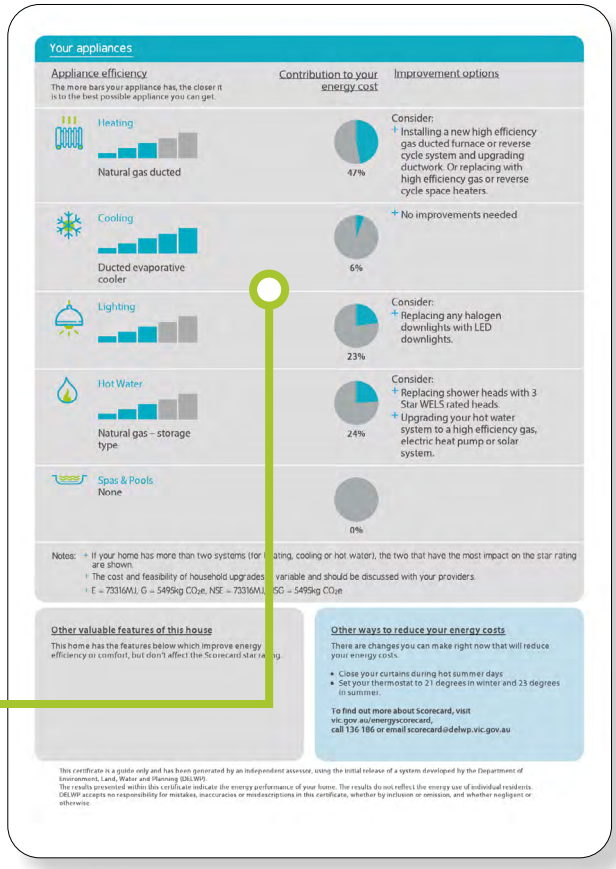


The certificate shows your home's overall star rating, indicating the average yearly running costs

The certificate shows how your home performs in hot and cold weather

The certificate shows your rating with and without solar PV

The certificate shows a rating and recommendation for each fixed appliance in your home



What are the benefits of the National Scorecard?

The National Scorecard program provides a national standard that allows homes to be assessed in a consistent way across all states and territories.

Who benefits?

Householders

- Receive tailored advice
- Know upgrade options
- Compare energy costs
- Enhance home comfort
- Increase value of the home
- Reduce carbon emissions
- Access lower-cost financing

Property Investors

- Understand asset quality
- Know potential improvements for their asset
- Increase tenant retention
- Improve quality property portfolio
- Depreciate upgrades over time

Architects, Builders and Developers

- Demonstrate environmental leadership
- Easily communicate efficiency
- Assess fixed appliances as well as the home's shell
- Stand out in market
- Attract interest in designs

Not-For-Profit Organisations

- Compile comprehensive database of housing stock
- Gather information for simultaneous upgrades
- Acquire information to access grants
- Reduce energy costs
- Increase comfort
- Better protect vulnerable residents

Councils

- Help householders make informed energy decisions
- Meet sustainability targets

Policymakers

- Access single central data base of assessments
- Compare data across jurisdictions

Social and Community Housing Providers

- Understand asset quality
- Know potential improvements
- Reduce energy costs for vulnerable community members

Estate Agents and Property Managers

- Provide bonus service to customers
- Provide quantifiable energy efficiency proof
- Stand out in the market
- Increase number of sales
- Accelerate sales and rentals
- Achieve higher sales prices
- Increase tenant retention

Community Organisatons

- Drive change
- Educate community
- Reduce energy costs
- Increase comfort
- Better protect vulnerable residents

What qualifications do assessors have?

All National Scorecard assessments are conducted by assessors accredited by the Department of Environment, Land, Water and Planning (DELWP). Interested applicants apply via an online portal.

Selected applicants undergo a rigorous accreditation process that includes a one-day training program followed by a two-part examination. The examination tests the assessors' knowledge of the program, technical ability and communication skills.

All assessors must also provide proof of insurance and appropriate training in occupational health and safety (OH&S) by a registered training organisation.

> ***National Scorecard assessors must uphold rigorous quality principles at all times. Assessors who do not meet the expected standard, as measured against the Scorecard Quality Principles, are not accredited.***

Assessors are supported throughout their National Scorecard training and in the field to improve their understanding of the Scorecard and achieve the highest accuracy. Where two assessors rating a house deliver a materially different result, this is considered unacceptable.

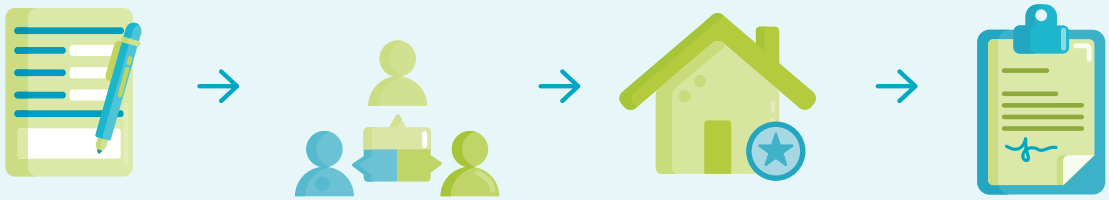
Accredited assessors are audited, and consumer complaints are followed up. There are strict penalties for an assessor's poor performance, including loss of their accreditation status.

National Scorecard Quality Principles

1. **Excellent customer experience.** Assessors must demonstrate strong customer relationship and engagement approach and skills, delivering a positive experience for the consumer.
2. **Robust assessment approach.** Assessors must have a strong ability to identify home energy efficiency features in the field and accurate data entry skills, to ensure assessments accurately reflect home performance.
3. **Consumer-focused energy efficiency upgrades advice.** Assessors must have the skills to assess and present appropriate upgrades options, considering the needs of the household.
4. **Knowledge of safety and wellbeing.** Assessors must have the skills to protect themselves and others while working.
5. **Robust administrative process.** Assessors are given Scorecard training and other support services, and must comply with administrative requirements, including audits.
6. **Consultation and continuous improvement.** Assessors are invited to provide feedback to continuously improve the scheme.

National Scorecard quality assurance

Assessor accreditation



Review applications from assessor → Conduct assessor training → Conduct assessor examination → Check assessor documentation

Program oversight

Keep public informed → Continually update website → Respond to technical issues → Collect feedback and respond to concerns

Program audit

Audit assessors against Scorecard Quality Principles → Escalate issues as appropriate → Analyse data and prepare reports → Provide feedback to assessors and implement improvements

Enquiries: scorecard@delwp.vic.gov.au

The National Scorecard evaluation

The National Scorecard was tested and evaluated between 1 January and 31 May 2021 via a national field trial. The program was also compared with CSIRO's Whole of Home tool.

Comparison with AusZEH Whole of Home tool

When a new tool is developed, it's important to demonstrate that it is robust and delivers results consistent with other reputable tools. The National Scorecard tool was compared with the CSIRO's recently released Australian Zero Emission House (AusZEH) Whole of Home tool, developed for NatHERS to support the National Construction Code (NCC) 2022, version 2.4.3.12. The Whole of Home tool is an extension of the CSIRO's original AccuRate tool, which covers thermal shell only. The extended tool has additional functionality for major appliances and fixtures.

The National Scorecard was compared with the core, non-optional elements of the Whole of Home tool: heating, cooling, lighting and hot water. The comparison with the Whole of Home tool showed that the core assumptions underlying the National Scorecard tool are robust and working well.

Despite some significant differences in the underlying modelling assumptions, both tools produced very similar results for the two housing scenarios used – a freestanding house and an apartment – when modelled in all Australian capital cities as well as Cairns in Queensland.

Fast facts

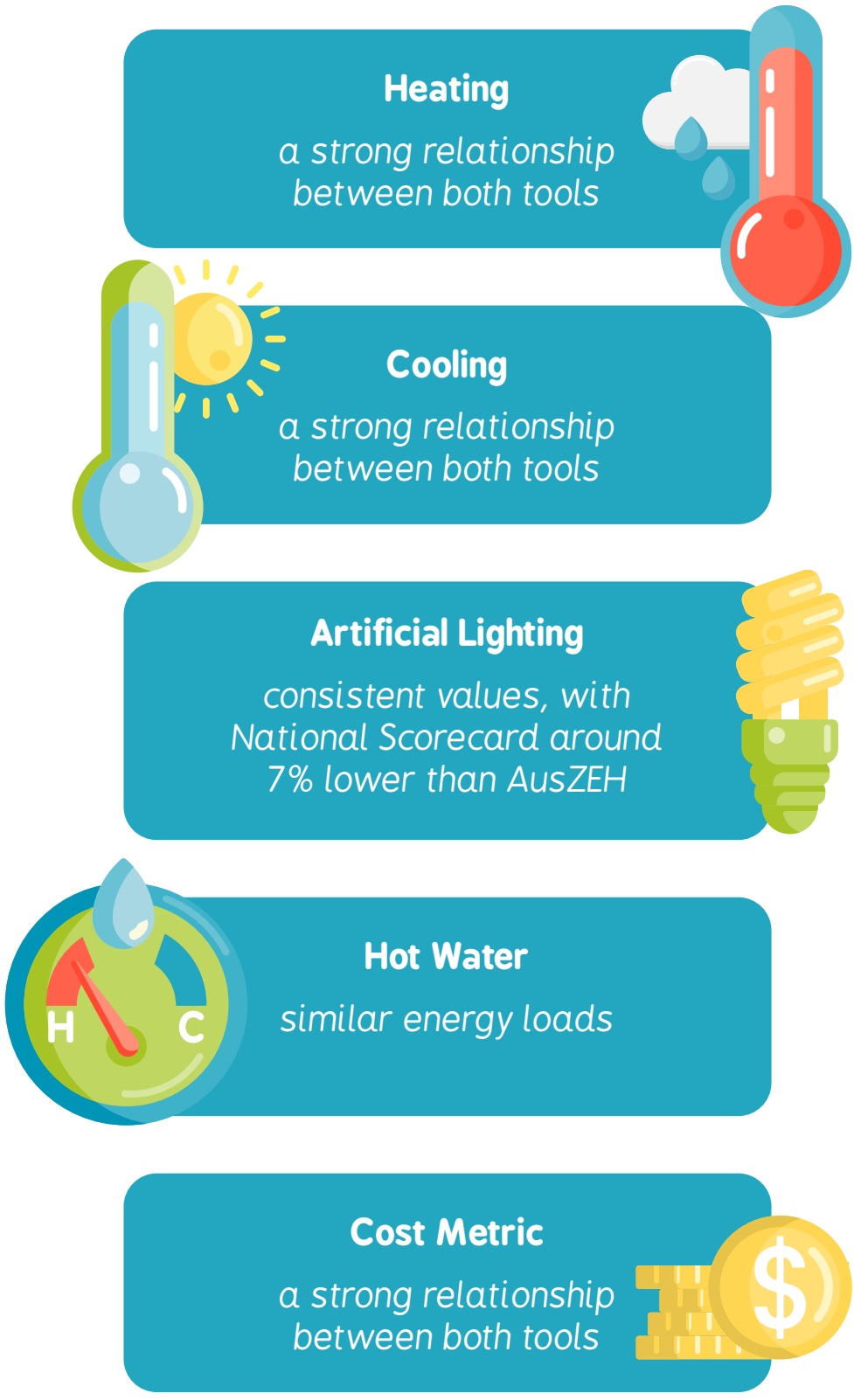
The comparison with the Whole of Home tool showed that the core assumptions underlying the National Scorecard tool are robust and working well.

A total of 659 homes nationally were assessed by 45 accredited assessors in 2021 during the National Field Trial in a range of locations and climate zones across Australia.

There is strong support from stakeholders for a quality National Scorecard program.

This was particularly apparent in the overall cost metric, which showed a strong relationship between the National Scorecard tool and Whole of Home tool across these two housing scenarios.

National Scorecard and Whole of Home tool comparison



For further information about the Whole of Home benchmark tool, go to nathers.gov.au

The National Scorecard Field Trial

The aim of the National Field Trial was to test the National Scorecard tool using a diversity of assessors across different climate zones and a wide variety of home types. The trial evaluated both the tool itself and the assessors' use of the tool. It also tested Scorecard training, accreditation and quality controls nationally.

Most assessments were carried out in the capital city of the jurisdiction (i.e. for the Northern Territory, all assessments were carried out in Darwin). However, in Queensland, half the assessments were in Brisbane and half in the tropical climate areas of Cairns and Townsville. Victorian assessments were spread across the state, with the majority in Melbourne.

Assessment data from a total of 659 assessments nationally performed by 45 accredited assessors was analysed along with responses from householder, assessor and stakeholder surveys. Due to the relatively low number of assessments, the data presented in this report must not be interpreted as representative of the overall building stock in any location.

The National Field Trial evaluation criteria

Standard 1. National Scorecard tool and technical elements

- The assessment was reliable across a range of homes for all climate zones.
- The mobile tool provided a reliable interface and rapid way to enter data in the home.
- The data was appropriately collected, secured and made available for analysis.
- There were adequate technical supports that explain how the tool is to be used.

Standard 2. Training and accreditation process and quality controls

- The assessor training and accreditation provided transparent and robust quality controls.
- Assessor training can be delivered nationally.
- Assessors identified the benefits and potential for improvements.
- Aspects of the training could be managed by third parties through a future assessor accreditation protocol.

Standard 3. Delivery materials

- The delivery materials (e.g. fact sheets, website) provided a robust approach to inform stakeholders about the National Scorecard.
- The benefits and potential for improvements were explained in delivery materials.
- The materials identified aspects that could be managed by third parties under agreement.

Standard 4. Overall delivery

- The overall approach provided a robust way to deliver the National Scorecard program.

The low level of awareness of the Scorecard outside of Victoria allowed for testing all National Scorecard processes before any public marketing, communications or awareness building had occurred.

For a summary of results of the National Field Trial surveys and assessments, see Part 3 of this report.

National Scorecard tool and technical elements

The National Field Trial tested how the technical elements of the cloud-based tool performed in a range of locations across Australia. Technical testing included establishing whether:

- internet connectivity is widely available or there are connectivity gaps or impacts from lost connectivity
- using a range of devices and real-time data collection by assessors causes any issues
- the number, location or capacities of the users generate technical issues
- the real-time technical support provided by the National Scorecard team effectively aids assessors.

All assessments are securely stored on a central cloud database with best practice data security policies and regular testing against known intrusion approaches. The central national database allows for easy data collection, review and reporting by assessors and surveying of customer satisfaction. De-identified data (postcode only) is also used for research and to develop policy.

Training and accreditation process and quality controls

Thirty-three applicants with a range of backgrounds and experience undertook the training. Of these, 10 became fully accredited during the trial. The remaining 35 assessors who took part in the trial had been previously accredited.

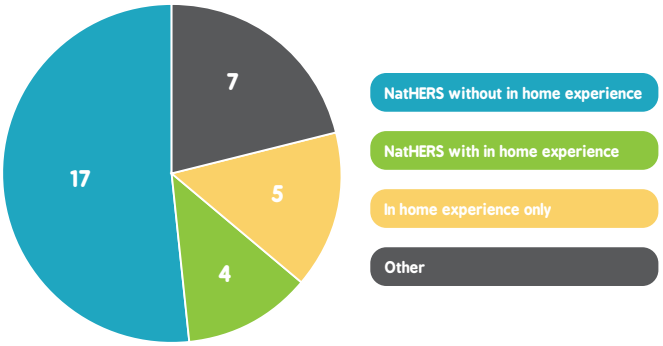


Figure 1: Experience of assessor applicants to the National Field Trial

Most applicants had received training from organisations that deliver NatHERS training. National Field Trial applicants are therefore not necessarily representative of the broader pool of potential National Scorecard assessors with other qualifications and experience.

Twenty-one per cent of applicants had a range of qualifications and experience, including several with the Certificate IV in Home Sustainability Assessment (superseded by Certificate IV in Home Energy Efficiency and Sustainability).

Training

All assessor applicants to the field trial were required to undertake Scorecard training, which consisted of a tool training day and a two-part examination that applicants were required to pass to progress to the next stage.

Throughout the training, applicants had access to the Scorecard tool and training resources, including videos, learning modules and written information. They were also required to submit two practice assessments for auditing by the Department of Environment, Land, Water and Planning (DELWP).

Examination

Part 1 of the final examination consisted of a multiple-choice online exam to test the applicant's knowledge of appliances and building materials as well as the National Scorecard program itself. In part 2 of the examination, National Scorecard examiners used live video links to review those aspects of the applicant's capabilities that could not be tested in written form. This included their ability to identify householders' needs and effectively communicate assessment outcomes and tailored upgrade advice.

Data measurement and collection was not included in the training and examination process. Instead, a practice audits approach was adopted during the field trial.

Accreditation

Fourteen applicants passed both parts 1 and 2 of the examination and were accredited, while four applicants were unsuccessful. Three of the four applicants who did not pass the exam had a Certificate IV in NatHERS; however, these applicants had no in-home experience.

My first role as a qualified assessor was helping people in financial hardship stay on top of their energy bills. I became a Scorecard assessor in early 2021 during the National Scorecard field trial. I strongly believe that the widespread culture of "out with the old and in with the new" is not a sustainable or environmentally friendly sentiment. Scorecard allows homeowners to take a closer look at how they can modernise their current home at a more affordable cost, and with less intensive use of energy and materials, than that of a new construction.

Alex Hawthorn
Assessor, South Australia

Delivery materials

The National Scorecard field trial tested how the available communications materials, which were Victoria-specific, would work nationally. The National Scorecard had low levels of community awareness at the time of the field trial, and no national marketing or awareness raising outside of Victoria had occurred before the trial.

Getting the message across

Website

A website hosted by DELWP was updated with a new short URL (vic.gov.au/energyscorecard). The website contains specific information for main user groups and a list of accredited assessors grouped by jurisdiction.

Fact sheets

Victorian branding was removed on seven fact sheets and the content revised with a national focus.

Privacy statements

Assessor, intermediary and researcher agreements were updated for national use.

Case studies

Householder and assessor case studies were reviewed and retained to provide personal stories from householders and tenants, property investors, and developers and builders.

Information for businesses

Business-specific information was reviewed and retained, with possible future inclusion of learnings from New South Wales market development work and a national focus.

National Scorecard News

A 'news' section on the website was developed to provide information on important current issues, such as managing COVID-19 risks during assessments.

Help service

A national help phone and email service was established to support users and monitor program quality. The help service continues to be available to all users including householders, assessors and other stakeholders with questions and concerns followed up and documented.

The National Scorecard Field Trial results

Fast facts

The National Field Trial showed that quality assessments could be delivered in all states and territories across different climate zones.

Assessors and householders were consistently positive regarding the value of the assessment.

The National Scorecard online tool's technical features and technical user support is suitable for national delivery.

The tool was found to be calculating correctly and as expected across Australia, with some minor technical issues resolved.

The National Field Trial surveys

Throughout the National Field Trial, householders, assessors and other stakeholders were encouraged to complete four separate surveys.

Table 1: The National Field Trial survey responses

Respondent	Timing	Information sought	Number of responses
General stakeholders (e.g. peak bodies, industry and consumer groups)	Before and during field trial	The perceived value of the National Scorecard program	19
Assessors	Survey 1: On completion of each assessment	Usefulness of rating for householder; whether the rating reflected their intuitive assessment; the main upgrade recommendations made to the householder; any technical tool or OH&S issues experienced during the assessment	218
	Survey 2: On completion of the field trial	Additional survey questions for newly accredited assessors seeking views on their training and accreditation experience and the accreditation requirements; phone interviews to seek views on which training materials were useful and whether any training gaps existed (via phone interviews).	18
Householders	At the completion of the assessment	The usefulness of the assessment information; how likely the householder is to act on this information	91

Stakeholder survey responses

Of those who responded to the general stakeholder survey, 15 had strong existing knowledge of the program. When asked about the benefits of a national transition, the most common response was that a consistent national approach would improve the outcomes on the ground, improve assessment quality, and reduce confusion. One respondent did not support the program until there was more technical development to accurately rate very high performing homes.

All respondents to this survey supported the Scorecard Quality Principles. Additional commentary noted the importance of maintaining and improving all elements of quality control – training, accreditation and audits – as part of a national transition. The hot and cold weather ratings, the ability to model potential upgrades and their impact on the ratings, and the ability to compare ratings in different jurisdictions were considered highly important. A single database for data storage, rapid and accurate data collection, and provision of upgrade suggestions were also strongly supported.

Stakeholders considered that National Scorecard delivery materials overall were appropriate and beneficial. They considered that providing a means for the public and assessors to interact via email, website and telephone is critical to manage questions and understand issues. The help email, website and phone support were seen as effective means of delivery for this support.

When asked about the disbenefits of a national transition, the most common response was that there were no disbenefits. However, some respondents were concerned there was a potential for a reduction in program quality.

96% of assessors who responded thought that the Scorecard assessment was either somewhat useful (27%), useful (39%) or very useful (30%) for householders

One-third of assessors who responded supported the introduction of fees for training and accreditation and an annual assessor accreditation fee. One-third of respondents did not support a 'fee per certificate' model.

Assessor survey responses

In the first assessor survey conducted after each assessment (Survey 1), 96% of assessors who responded thought that the Scorecard assessment was either somewhat useful (27%), useful (39%) or very useful (30%) for householders.

For the 'not useful' responses, the reason given by the assessor for their answer was that the house was currently being rented or about to be sold (see Figure 2).

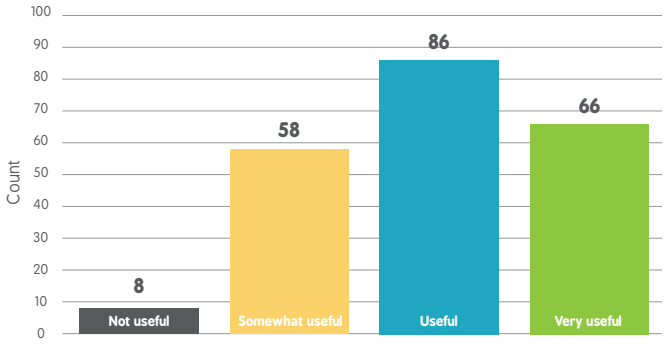


Figure 2: Assessor survey responses to: Overall, how useful do you think the assessment was for the householder? (n=218).

In 71% of responses, assessors felt that the householder was likely to undertake one or more of their top three recommendations. The most common reasons given were that the householder wanted to improve their level of comfort (30%), the householder was already planning to implement changes (24%), and the recommendations are easy to implement or low cost (17%) (see Figure 3).

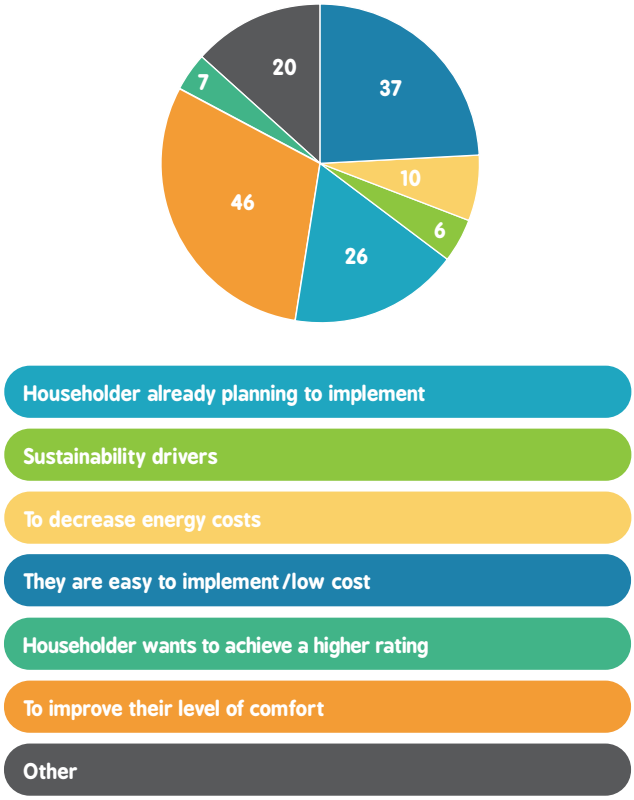


Figure 3: Assessor survey responses to: Why will the householder implement your recommendations? (n=152).

In 19% of responses, the assessor felt that the householder would not undertake one or more of their top three recommendations. The most common reasons given were that the householder was comfortable with the status quo and has low motivation (30%), the householder was likely to sell or move (30%), or the householder was renting (19%) (see Figure 4).

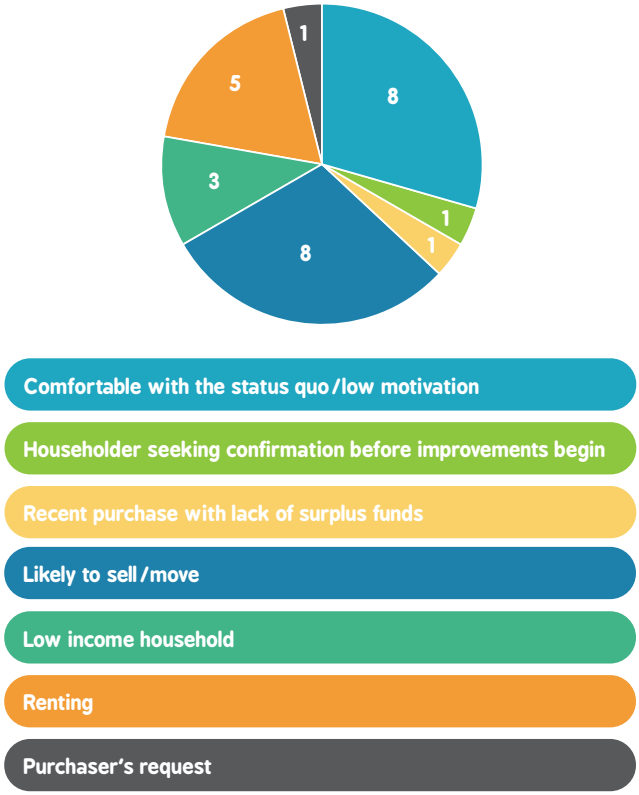


Figure 4: Assessor survey responses to: Why won't the householder implement your recommendations? (n=27).

The most common resources provided to customers were the Scorecard website (28%) and the assessor's own customised reports (28%). National Scorecard fact sheets and information videos were each responsible for 17% of total information resource sharing (see Figure 5).

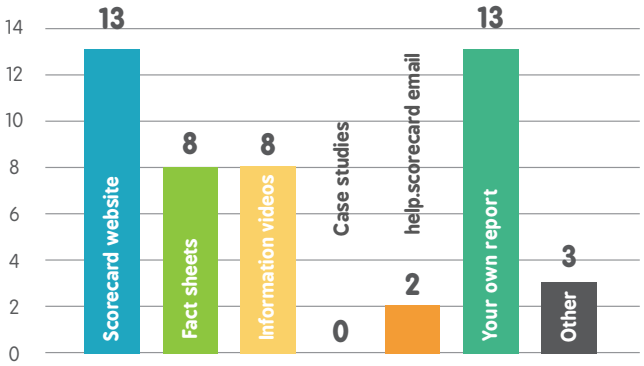


Figure 5: Assessor survey responses to: Which of the following resources did you provide or refer your customers to during the field trial? (n=18 multiple selection permitted).

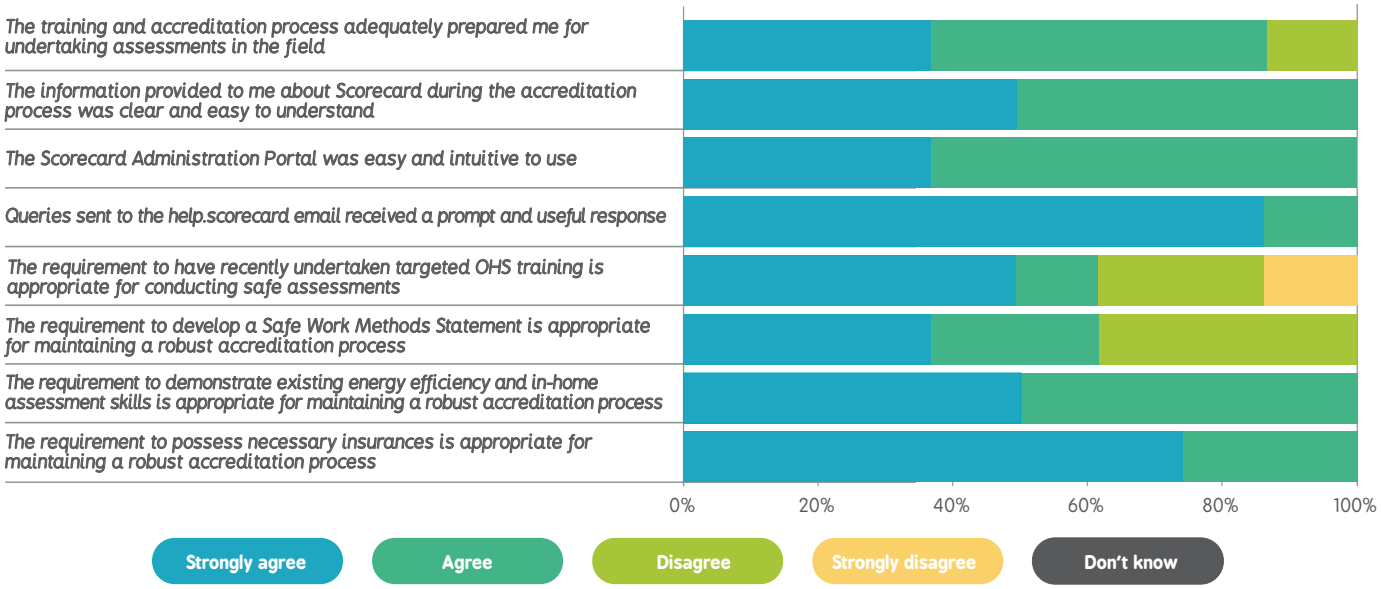


Figure 6: Assessor survey responses to supplementary questions about assessor experience of the training and accreditation process.

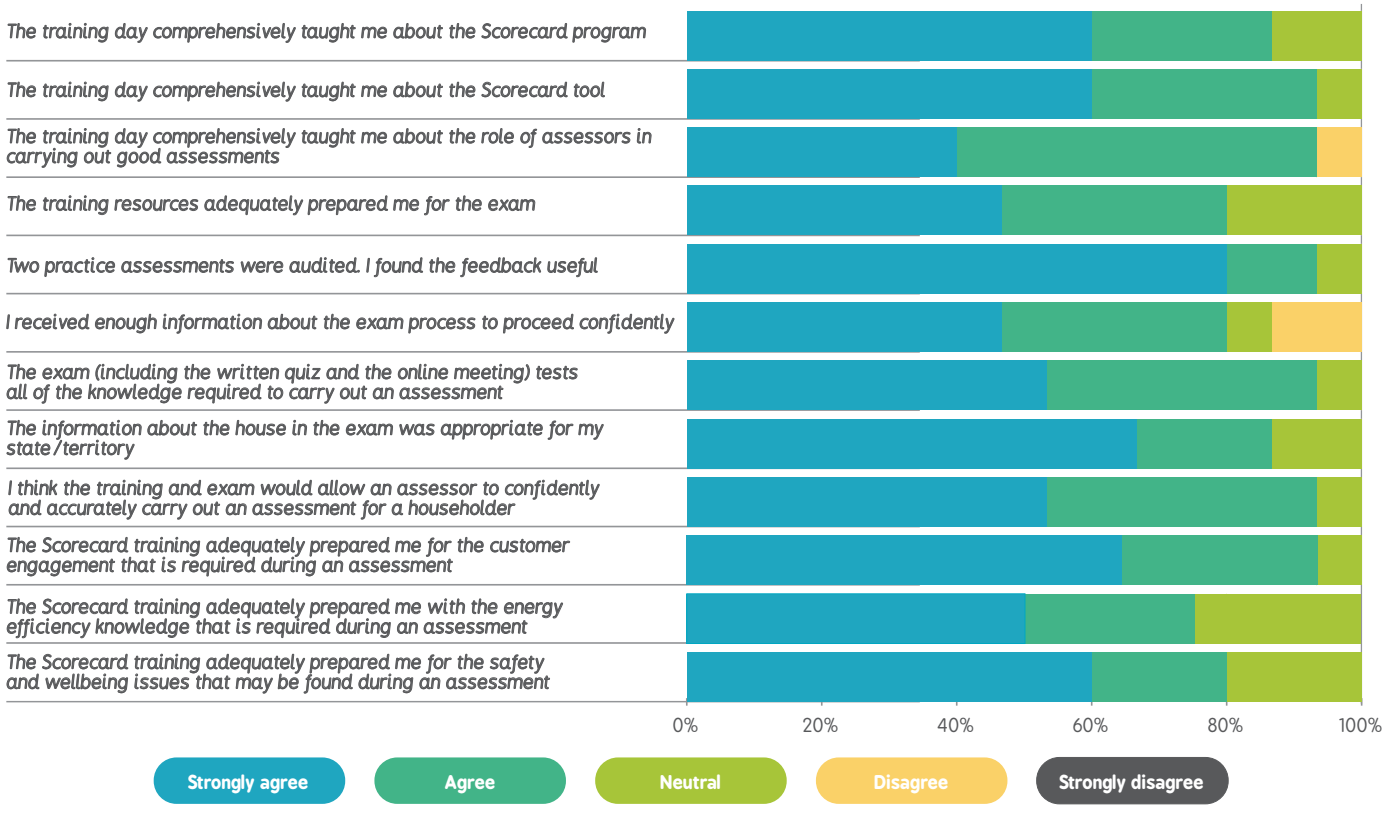


Figure 7: Assessor survey responses to supplementary questions regarding Scorecard training.

The results from the supplementary questions (Figure 7) indicate that the new online training and exam process is highly satisfactory from an assessor's point of view. This will allow the program to uphold the high quality of assessors required to carry out assessments.

Householder survey responses

The leading reason given by householders for why they had a Scorecard assessment was because they were curious about the energy rating of their home (29%). The next most common reasons were to improve the comfort level of their home (21%), to reduce energy consumption and greenhouse gas production (19%), and to reduce energy bills (19%).

Householders largely felt that the certificate gave them the information they needed to start upgrading their home (79%), while a small number indicated that they believed that it didn't (9%). In terms of the Scorecard certificate, 89% of respondents found it easy to understand, while 3% didn't. Of the 76% of customers who confirmed they had been provided with paper or digital information resources, 79% of customers who received resources found them to be useful.

Ninety per cent of householder respondents felt that they understood more about energy efficiency in their home as a result of having a Scorecard assessment, while 7% did not. Almost all customers surveyed said that the assessment met their expectations (92%), it was a good use of their time (90%), and they would recommend it to their friends and family (85%).

For those 8% who indicated that the assessment didn't meet their expectations, some were uncertain, others had not yet seen the certificate, and several were seeking more detail than had been provided.

Householders were overwhelmingly happy with how assessors explained the Scorecard to them (99%), and in almost all cases customers felt that they received useful ideas to help them upgrade their homes (94%). They were largely satisfied with answers provided by assessors to any questions they had (96%).

The top three recommendation areas were insulation (25%), windows (20%), and draft sealing (15%). Installing solar PV was one of the least recommended improvements. Generally, householders were motivated to make improvements in the areas the assessors recommended. They were

As an architect, I design comfortable energy-efficient homes built from materials with low chemical content. Even though I have a Masters in Science, a Bachelor of Architecture and have completed several other courses in sustainable design, I learned a great deal from the Scorecard training. It gave me the practical knowledge to help reduce energy consumption in Australian households.

Bridget Puszka,
National Scorecard applicant
(assessor in training), Victoria

most motivated to make improvements in insulation (41%), draft sealing (32%) and windows (28%). No householders reported being motivated to install solar PV as a result of their assessment.

The National Field Trial assessments

Assessment data analysis

Field trial assessments were compared within the jurisdiction and then compared to other jurisdictions. This allowed for visibility of discrepancies within each jurisdiction as well as between jurisdictions.

The data was analysed to confirm whether the tool was calculating as expected and whether there were any unexpected house results for a particular jurisdiction when viewed alone or compared to houses in other jurisdictions. The data was also checked for any input errors by assessors.

For the field trial, tropical assessments included all assessments in the Northern Territory and 23 of the Queensland assessments in Cairns and Townsville. No cold weather rating is provided by the Scorecard for homes in tropical climates.

It was found that all houses were modelled as expected based on the assessor inputs in the tool.

Three stars is the modelled average of houses across Australia

Scorecard certificate ratings

Star ratings

During the National Field Trial, homes were given an overall star rating out of 10 as well as a hot and cold weather bar rating out of five. The star rating is a measure of the cost to run the fixed appliances of a house, including the contribution of solar PV, if it is present.

To determine the star rating, the tool calculates energy loads from each fixed appliance and multiplies these by a fuel tariff for that state or territory[1] according to the inputs from the assessor. The tariff is drawn from surveys of consumer fuel costs for that state or territory.

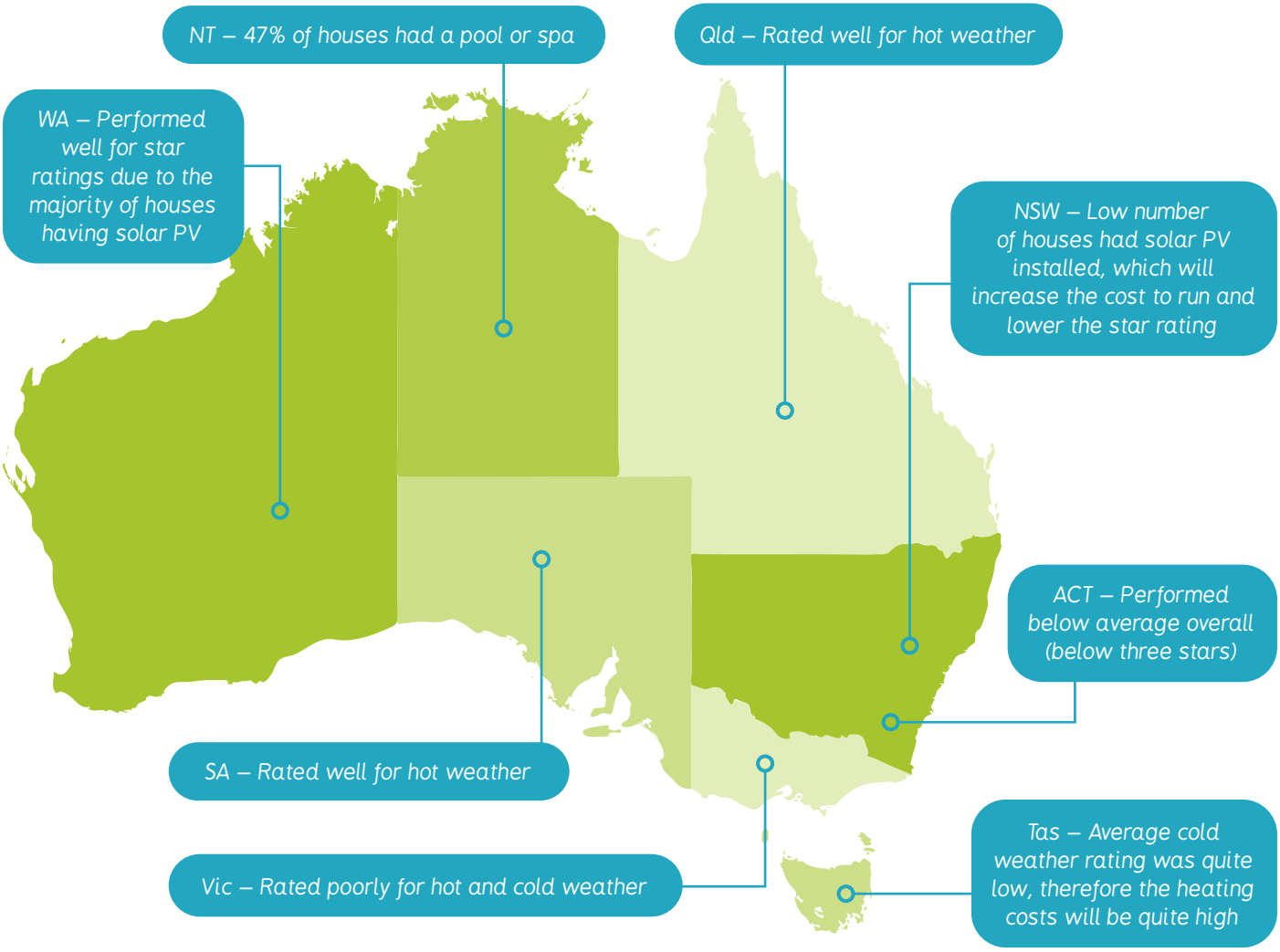
The amount of energy required for each appliance is determined by the efficiency of the appliance as well as what the appliance needs to do. For example, a fixed heater in a small room that is heavily insulated with minimal air leakage will cost much less to run than the same heater in a large room that is not well insulated and has air leaks. Similarly for hot water, a large house with several occupants that has an inefficient shower head will have higher hot water heating costs.

Some inputs, such as ceiling fans, the colour of the walls and roof, and the ventilation from highly openable windows like louvres, also have a greater impact on the thermal performance of a house in tropical regions compared to temperate regions.

1 Tropical areas in Queensland had separate assumptions to non-tropical. These were based on surveys of fuel prices in Cairns.

Table 2: National Scorecard Field Trial assessments and average star ratings by jurisdiction

	Number of assessments	Average star rating (out of 10)	Average hot weather rating (out of 5)	Average cold weather rating (out of 5)	Number of houses with a pool or spa	Number of houses with solar PV
WA	17	5.5	3.5	2.5	4	12
Tas	15	3.5	2.6	2.1	1	5
SA	35	5.2	3.7	2.8	2	19
Qld	48	4.7	3.6	1.9	13	19
NSW	23	3.8	2.0	2.4	5	4
Vic	486	5.5	1.2	1.8	26	165
ACT	20	2.6	2.0	2.6	3	3
NT	15	4.2	2.7	N/A	7	6
National	**659**				**61**	**233**



Hot and cold weather ratings

The cold weather rating average was similar for all jurisdictions (1.8 to 2.8) with most jurisdictions having a majority of homes receiving a one-bar rating for cold weather (difficult to keep the home warm) through to the least number of homes receiving five bars (easy to keep the home warm). Darwin and northern Queensland assessments do not have a cold weather rating.

Those homes that rated poorly for cold weather would have higher energy bills or be uncomfortable to live in.

When looking at the hot weather rating, Victoria and New South Wales showed a predominance of one-bar houses (not easy to keep cool). Queensland, South Australia and Western Australia had a predominance of better performing homes for the hot weather rating. Northern Territory homes were more evenly spread.

Those homes that rated poorly for hot weather would be uncomfortable, or need substantial cooling to be comfortable, in hot weather.

Average energy costs

The annual house energy cost calculation uses many house inputs, including building features as well as fixed appliances.

ACT — highest total annual house energy cost

Influencing factors: a cold climate; assessed houses typically having a large area of the house heated; heating often with older, low efficiency gas ducted heaters.

SA — high annual energy cost (before PV)

Influencing factors: a higher electricity cost per kWh potentially leading to higher energy bills; significant impact from PV (55% of homes).

WA — lowest total annual house energy cost

Influencing factors: Significant impact of solar PV (70% of homes).

Qld — lowest annual energy cost

Influencing factors: Mild winter climate resulting in relatively small heating costs; significant impact of solar PV (36% of homes).

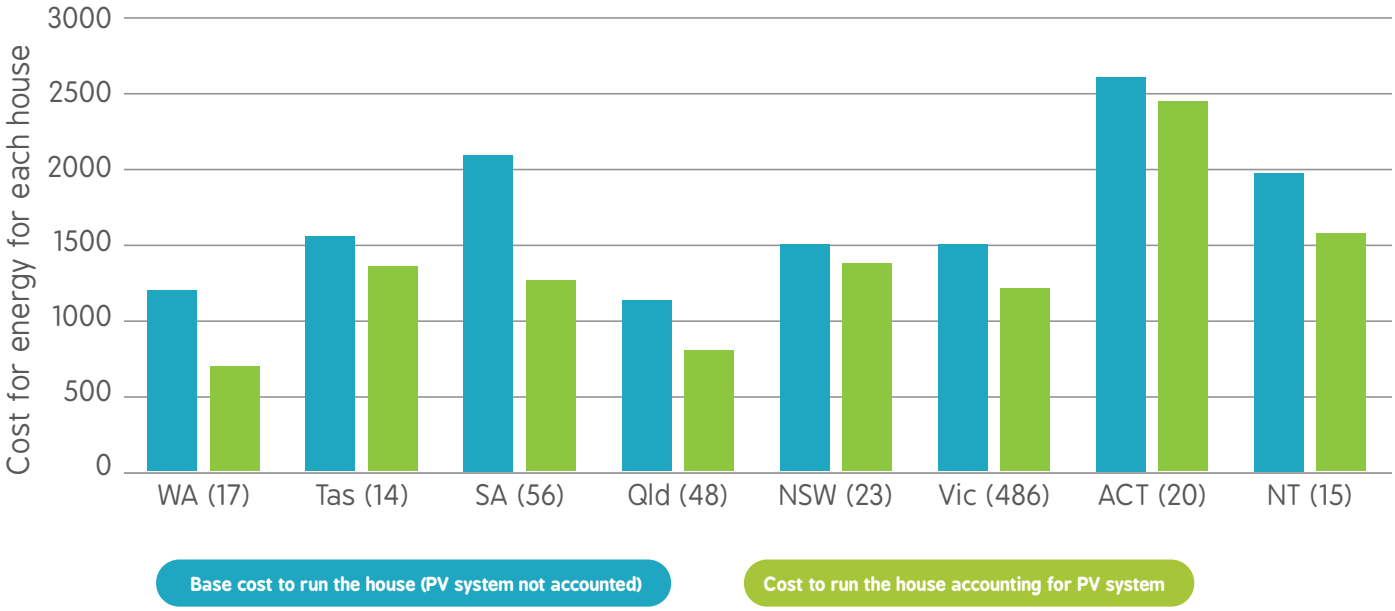


Figure 8: Average annual house energy cost for assessed homes by jurisdiction.

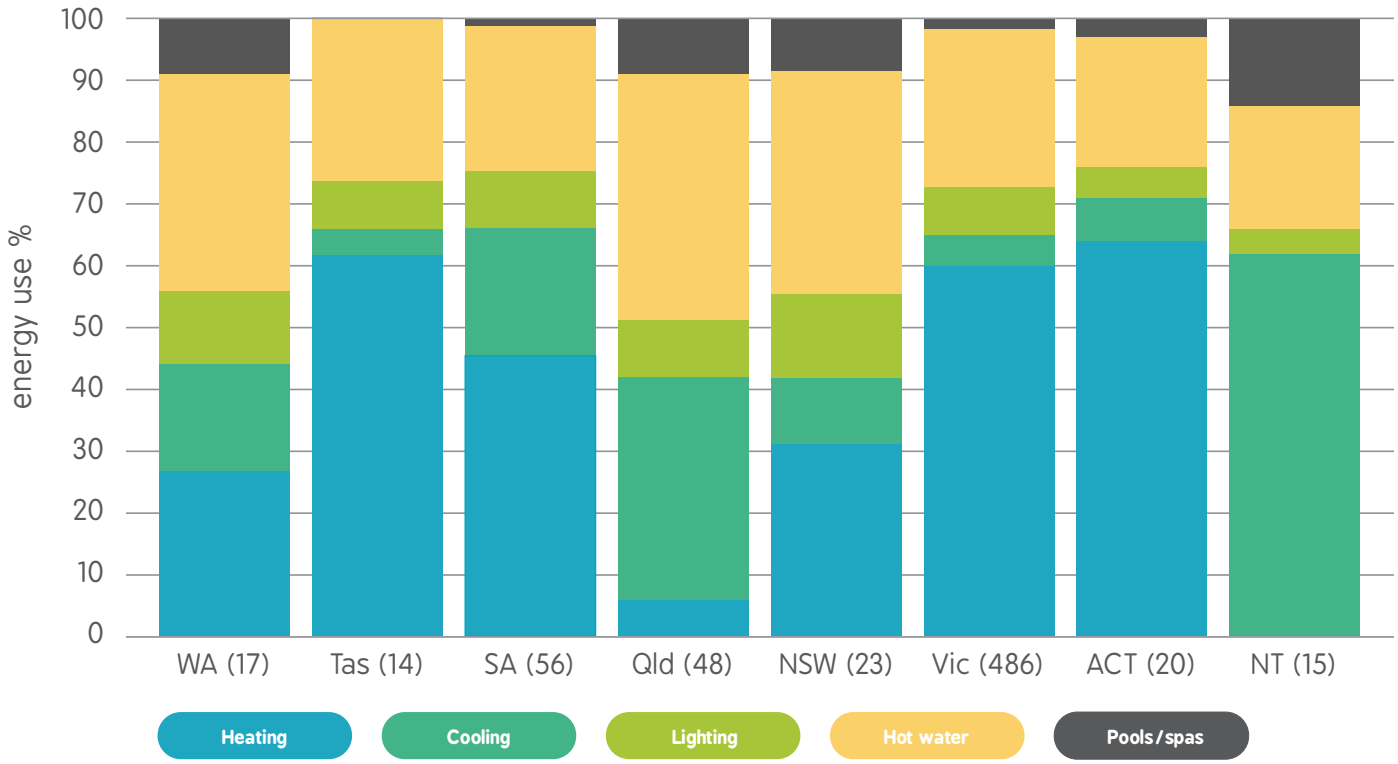


Figure 9: Fixed appliance average energy use.

One house in Tasmania was excluded from the data set of 15 as it was very large (525m^2 floor area), with a particularly large floor area subject to artificial heating and cooling. It was considered an outlier that was shifting the average results for Tasmania significantly given the small sample size and hence was excluded from this graph, Figures 8, 9, 10 and Table 3. Therefore it was disregarded in the following data analysis.

When the energy costs are broken down to the main fixed appliance energy use in these houses, it can be seen that the colder climate houses (ACT, Tasmania and Victoria) had very high heating cost with about 60% of their energy cost being heating. The Northern Territory had the highest cooling energy cost (60%) (see Figure 9).

Pools and/or spas were present in a small number of homes, and their relative energy use has been averaged for all homes sampled in each jurisdiction.

For lighting, around 90% of all houses received a 'very high' lighting rating, indicating efficient lighting. This reflects improvements made with energy-efficient lighting over recent years. About 10% of houses had a number of halogens present, but it was not a driving factor impacting on the overall star rating for most houses.

Building features energy costs

Floor area

Given that heating and cooling costs can be a significant proportion of house energy bills, smaller heated and cooled areas (in combination with efficient appliances and good insulation and air tightness) will lead to significant reductions in energy costs.

Table 3: Building shell – percentage of cooling and heating

	House area (m^2)	Heated percentage	Cooled percentage	Main wall type	Main floor type
WA	141	64	60	Double brick	Concrete slab
Tas	130	55	33	Weatherboard	Timber enclosed
SA	122	67	67	Double brick	Concrete slab
Qld	138	53	61	Weatherboard	Concrete slab
NSW	147	61	55	Brick veneer	Timber enclosed
Vic	126	74	57	Brick veneer	Timber enclosed
ACT	140	77	60	Brick veneer	Timber enclosed
NT	111	n/a	82	Concrete precast panel	Concrete slab

In all jurisdictions, assessed homes had an average floor area of between 110m^2 and 150m^2. ACT houses had the largest area of the homes heated (77%). The Northern Territory had smaller homes, with 82% of the home cooled. Heating was not recorded for these homes.

Types of building materials

Double brick was the main wall type in Western Australia houses. Tasmania, Queensland, New South Wales and Victoria had a mixture of brick and weatherboard. South Australia and Western Australia had no weatherboard houses assessed. The predominant house type in the Northern Territory was concrete precast panel.

Types of flooring

Western Australia, New South Wales and Queensland houses mainly had concrete slab for the floor type. New South Wales had a mix of timber or concrete flooring. Victoria had mainly homes with timber flooring, with 25% as concrete slab.

Ceiling insulation

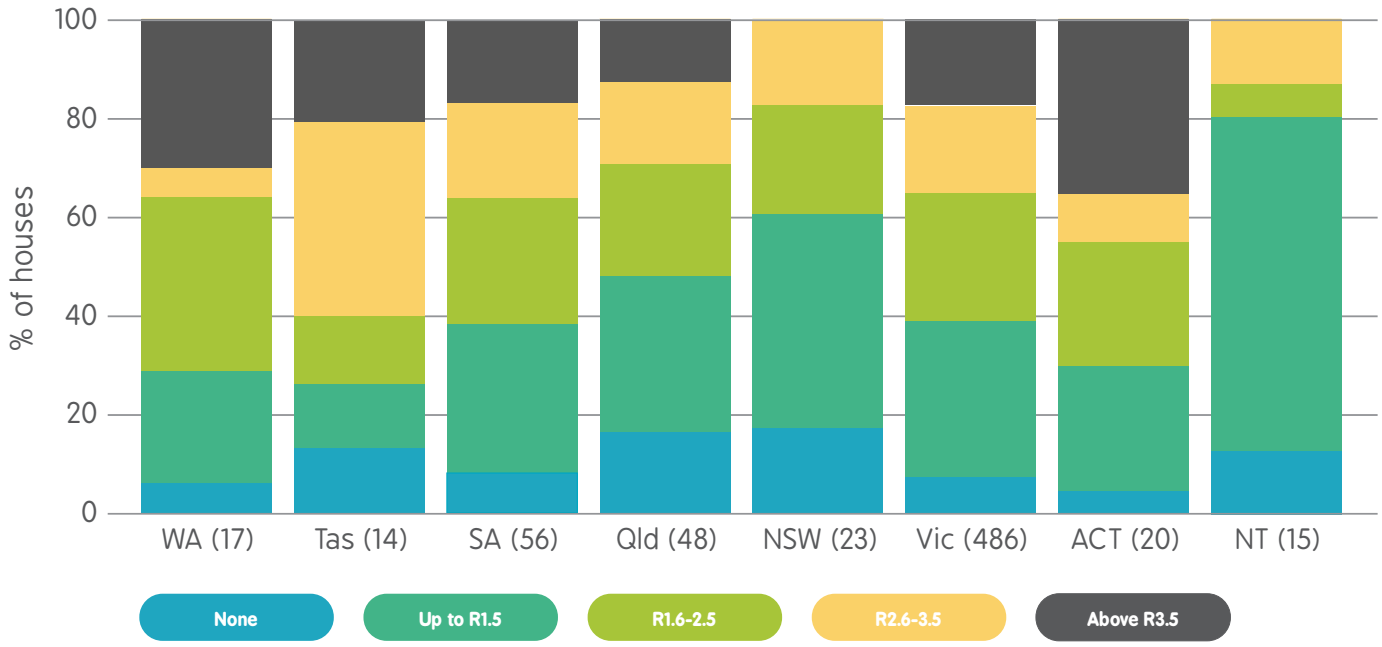


Figure 10: Ceiling insulation percentages and R-levels by jurisdiction.

Houses in the Northern Territory and New South Wales had low ceiling insulation levels, with most houses having less than R1.5. The R-value is a measure of how quickly heat flows through insulation. A low R-value (less than R1.5) indicates the house does not retain heat or cool; a high R-value (R5) means the house retains heat or cool very well. Queensland and New South Wales had the highest percentages of houses with no ceiling insulation. ACT had the highest percentage of good insulation levels (more than R3.5), followed by Western Australia.

Fixed appliances energy costs

Table 4: Main type of fixed appliances and shower flow rates in households

	Heater type 1	Heater type 2	Cooler type 1	Cooler type 2	Hot water system type 1	Hot water system type 2	Percentage of showers below 9L/min
WA	RCAC	Ducted RCAC	RCAC	Ducted RCAC	Natural gas instant	Natural gas storage	76
Tas	Electric fan or radiator	Ducted RCAC	RCAC	None	Off-peak electric	Solar off-peak electric	40
SA	Ducted RCAC	RCAC	RCAC	Ducted RCAC	Natural gas instant	LPG instant	58
Qld	RCAC	Ducted RCAC	RCAC	Split system cooling only	Off-peak electric	Natural gas storage	64
NSW	RCAC	Ducted RCAC	RCAC	Ducted RCAC	Natural gas instant	Off-peak electric	82
Vic	Natural gas ducted	RCAC	RCAC	Ducted evaporative	Natural gas storage	Natural gas instant	60
ACT	Natural gas ducted	RCAC	RCAC	Ducted RCAC	Peak electric	Natural gas instant	55
NT	n/a	n/a	Split system cooling only	RCAC	Peak electric	Solar with off-peak electric	0

Heating and cooling

Western Australia, Queensland, South Australia and New South Wales houses had reverse cycle air conditioners (RCAC) – either ducted or single room – as the predominant heater type. For Victoria, the most common type was gas ducted heaters. Tasmania had some wood heaters and electric radiators.

Western Australia, Queensland, South Australia and New South Wales houses used mainly RCACs (ducted or single room units) for cooling. Tasmania also had a high percentage of these, but they would be used mainly for heating rather than cooling.

Hot water systems

Western Australia, South Australia and New South Wales houses had mainly gas hot water systems (either storage or instantaneous). Tasmania had 80% off-peak electric systems. Queensland had almost one-third off-peak electric, with the next highest being natural gas storage. Victorian houses had a high predominance of gas storage hot water systems.

Showerhead flow rates

Showerhead flow rates have a significant impact on energy use. The average showerhead flow rate is the highest for the Northern Territory at 13L/min. If 9L/minute (3-star WELS rated), and below, showerhead flow rate is considered efficient, then it can be seen that the Northern Territory and Tasmania have more inefficient shower heads than efficient.

Technical elements

Cloud-based tools such as the National Scorecard tool require constant internet connection and can therefore be impacted by IT issues at user, device, connectivity, cloud or programming level.

No technical issues were identified with the number of concurrent assessors using Scorecard or the availability of internet connectivity at particular locations. The general technology skills of the assessors undertaking assessments were also not an issue.

The email and helpline allowed for rapid resolution of technical issues. User feedback through the help channels also allowed for the technical robustness of the tool to be directly monitored. One assessor contacted the helpline with connectivity issues. This was determined to be a local issue with the assessor's phone, which was quickly resolved.

Photographic evidence is required as part of the assessment. However, several assessors experienced barriers to uploading photographs. This issue was resolved during the trial. The rapid advancement of phone camera technology will result in the need to continually enhance the underlying photo handling subsystem.

Post National Field Trial upgrades

- The ability for the assessor to select postcodes and jurisdictions across Australia was added.
- Existing assessments and assessors were merged from the separate servers to a new, single server.
- Climate coverage was extended to cover the areas of Australia not covered by the pilot version.
- The underlying calculation code for all climates was updated to take account of shading and ventilation features previously only available in the tropical version of the tool.

Future actions

All the elements covered in The National Scorecard Field Trial demonstrated that the National Scorecard is capable of delivering assessments nationally with suitably qualified assessors. Assessments were successfully carried out in different climate zones, including tropical locations, and in all jurisdictions.

However, building greater awareness of the National Scorecard is critical. Greater awareness will encourage more householders to take up this new way to reduce their energy costs and increase home comfort.

The cycle of awareness and uptake will create a strong business model that will attract assessors to become accredited, build data sets, and increase assessment numbers. It also allows for ongoing technical testing and data analysis.

As the number and distribution of assessments grows, it will be critical to maintain feedback loops from householders, assessors and other stakeholders to ensure continuous improvement of the program.

As part of the National Scorecard field trial in 2021 in Tasmania, I assessed a home in the beachside suburb of Taroona. Despite being careful and aware, their annual energy consumption was 15,500 kWh (after including the solar generation used on site). The initial National Scorecard rating of Anna's house was 2.3 stars. Anna used the results of the assessment to inform her on improvements that would improve her overall rating and received a 9.4 rating on the subsequent assessment. These improvements will significantly reduce their electricity bills.

Rebecca Boyle,
Assessor, Tasmania

Enhancing customer experience – future actions

Action area 1. Technical elements

- Further develop, correlate and accredit the tool against a national benchmark (NatHERS InHome).
- Continue to provide timely technical support for assessors so the technical robustness of the tool can be directly monitored through user feedback.
- Add updated photo upload formats.
- Continue to seek feedback from householders and assessors and review home assessment data to continuously improve the tool, including technical elements.
- Review capability of the National Scorecard tool to handle a much higher number of simultaneous users.

Action area 2. Training and accreditation

- Continue to apply accreditation requirements, including skills training and insurance.
- Continue to survey trainees, evaluate their responses and skills, and fill any training gaps.
- Work with assessor accrediting organisations (AAOs), Registered Training Organisations (RTOs) and the Australian Government as AAOs and RTOs take on greater roles in accreditation and training under the national framework.
- Review the accreditation process to provide for future high volumes of accreditation while maintaining quality of assessors, efficient processes and a good applicant experience.
- Consider cost recovery options once the market is strong.

Action area 3. Quality control

- Maintain the quality of assessors and assessments through continued quality checks and monitoring of the tool and assessors.
- Develop an auditing process that allows for bulk checking of inputted data.
- Continue to use the Scorecard Quality Principles to direct program quality.
- Include in the Scorecard Quality Advisory Panel (SQAP) assessors from a broader range of jurisdictions. The auditing of assessments and feedback loops provided important information and quality checks, and they will need to be further developed and standardised.

Action area 4. Delivery materials

- Review the National Scorecard website as a central resource to ensure it is well presented for a national audience.
- Continue to provide a means for the public and assessors to manage questions and understand issues.

Glossary of terms

energy load	The annual energy use of a space, such as to maintain a temperature in a room, or an appliance. This may be in terms of direct energy use (megajoules) or in terms of fuel use (e.g. kWh electricity or MJ gas).
fixed appliance	A gas or electric appliance that is permanently fixed in position (e.g. to a wall or floor). Excludes portable appliances, such as portable heaters and 'plug in' appliances such as fridges.
grid	The electricity grid, including generation, transmission and distribution to individual houses and businesses.
National Construction Code (NCC)	A performance-based code that sets the minimum requirements in relation to structure, fire safety, access and egress, accessibility, health and amenity, and sustainability. All new buildings, new building work, and new plumbing and drainage systems must comply with the NCC.
Nationwide House Energy Rating Scheme (NatHERS)	A national scheme, introduced in 1993, that uses a computer program to assess a home's thermal performance based on its location, structure, design and materials. Typically used for compliance with building codes when building new homes or significant additions to existing homes. Requires detailed home plans and specifications. https://www.nathers.gov.au/
outlier	A value or point in statistical analysis that differs substantially from the rest of the data.
reverse cycle air conditioning (RCAC)	A fixed electrical appliance that cools the home in summer and heats it in winter.
R-value	A value used to measure an insulating material's resistance to conductive heat flow in terms of its thermal resistance or R-value. The higher the R-value, the greater the insulating effectiveness.
Scorecard Quality Advisory Panel (SQAP)	A group of stakeholder representatives who advise on the program's development and growth, including assessor training and accreditation and program quality.
thermal	Relating to or caused by heat or by changes in temperature.
Whole of Home	Assessment and rating of the energy performance of the whole home including thermal performance and performance of main fixed appliances of a home. This provides a comprehensive understanding of the energy cost, greenhouse gas emissions and comfort of the entire home. https://www.nathers.gov.au/WholeofHome
solar photovoltaic (PV) system	An energy system that uses the sun to generate electricity.

Residential Efficiency Scorecard

Contact us

Please email your enquiry to scorecard@delwp.vic.gov.au