



Residential Efficiency Scorecard Research Pilot Evaluation Report

November 2019

A collaborative project of the Commonwealth, State and Territory Governments

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Executive Summary

In 2018-2019, Council of Australian Governments (COAG) Energy Council funding was provided to pilot the Victorian Residential Efficiency Scorecard (Scorecard) in all capital cities – the activity covered by this evaluation report.

This project supports the COAG Energy Council agreement in 2016 to a National Collaborative Approach to Residential Building Ratings and Disclosure, by providing the means for jurisdictions to consider the features of the Scorecard tool currently being delivered in Victoria to inform future policy development.

The Scorecard program was initially developed by the Victorian government in response to an analysis of policy need. Household energy bills were rising, and there was a general lack of knowledge of residential energy efficiency and ways to improve it at the household level.

The Scorecard program has been available to households in Victoria since April 2017 and was piloted in other capital cities in 2019. The Scorecard program is designed to inform householders about the energy performance of their dwellings and advise potential measures that could be undertaken to reduce energy costs, improve home comfort and reduce carbon emissions. It achieves this by:

- providing a meaningful comparison between houses using a star rating system, focusing on the home's design, construction and the fixed appliances, and including an indicator of the home's performance in very hot conditions;
- using software and an experienced assessor to undertake the assessment in the home; and
- recommendations of potential improvements by the assessor, including behavioral advice for householders.

Aspects of the Scorecard program were piloted in the capital cities of Western Australia (WA), South Australia (SA), New South Wales (NSW), Australian Capital Territory (ACT), Queensland (Qld), Victoria (Vic) and Tasmania (Tas). Further pilots are currently underway in tropical areas (Cairns, Darwin and Broome).

The pilots provided insight into how the Scorecard performed when tested by different accredited assessors in the range of built forms found in capital cities across Australia. Pilots also covered:

- application of the accreditation process,
- feedback from participants,
- comparison with the SA Retailer Energy Efficiency Scheme (REES) audit process,
- comparison with FirstRate 4 outputs,
- off plan data entry,
- targeted industry pilot, and
- use in the real-estate sector at the point of sale.

Summary of pilot findings

The pilot assessed a total of 136 houses on-site using the Scorecard tool. The key house features of an additional 1870 houses that have been assessed in Victoria over 24 months to April 2019 are included in this report, to provide a useful comparative dataset.

Scorecard assessor accreditation:

Nine assessors who attended the training in March 2019 passed all accreditation stages. This consisted of assessors from WA (2), Qld (2), Tas (2) and NSW (3). Four SA assessors were previously accredited through the same process. Key findings from this were:

- Before the pilot it was not clear if jurisdictions had existing skilled house assessors, however a high standard of assessors was found.
- All assessors passed all accreditation stages; the Scorecard Quality Principles provided a transparent, effective and consistent approach to accreditation.
- The existing processes can be scaled easily to cover jurisdictions.
- The Scorecard program administrative and quality control processes applied easily to jurisdictions and were supported by assessors.
- Participation of jurisdictions in the accreditation process added valuable local knowledge.
- Variations in built form (i.e. appliances or house features that may not be common in all areas) were not found to be an issue for assessors, although some house features were less common in a given jurisdiction.
- Working with Children Check (required for all assessors in Victoria), is inconsistent across jurisdictions.
- Keeping the category of 'intermediary' in the accreditation process (an intermediary employs assessors and may manage their insurance, legal documents, marketing and work activities) is helpful as many assessors operate in this way.

House assessment results:

Outside of Victoria, a total of 136 Scorecard assessment results were analysed in this project. This consisted of 8-ACT, 31-NSW, 34-Qld, 28-SA, 17-Tas and 18-WA. Whilst this is not enough to provide definitive state, territory or national-based trends, the results were examined for outliers and inconsistencies with assessor and jurisdictional understanding of the built form. Key findings were:

- The results were found to be consistent with broad expectations of the built form. No significant outlier datapoints were identified.

Technical outcomes:

The pilot also involved testing the Information Technology (IT) aspects of the Scorecard tool. Key findings were:

- The pilot demonstrated the value of testing the Information Technology (IT) aspects of a tool.
- Minor programming bugs were identified and resolved. One issue was the inconsistencies between NatHERS assumptions on postcodes and community assumptions on postcodes
- There were no significant issues related to internet connection to the tool.

Retailer Energy Efficiency Scheme (REES) pilot:

The SA pilot used the Scorecard for 28 REES assessments. REES requires a level of home assessment to priority (low income) households. Key findings were:

- Scorecard assessments were found to take more time and be more focused on building upgrades than current REES assessments. While the Scorecard identified slightly different opportunities to assist low income households (the objective of REES assessments), it was thought that the Scorecard would be more accessible if delivered in conjunction with financial support for upgrades which were not available for this pilot.

- All SA assessors would like to see Scorecard assessments tied in with other programs that provide financial assistance to low income households.

FirstRate 4 comparison:

The ACT has Australia's only mandatory energy disclosure scheme for homes. Energy assessments are required at the time of sale and are voluntary at the time of lease. The ACT scheme uses FirstRate 4 software and is the only user of FirstRate 4. In addition to the on-site assessments, a comparison was conducted between the Scorecard and FirstRate 4 for 8 ACT homes. Key findings were:

- There is a strong correlation between the Scorecard building shell rating and the FirstRate4 rating.
- The Scorecard provides an indication of how many stars a home could improve by, through running variation reports. Whereas the FirstRate 4 output provides this indication of improvement as part of the certificate.

Off-plan pilot:

In addition to the on-site assessments, the Queensland pilot assessed 8 houses entirely off-plan, with no house visit. Key findings were:

- Some older house plans can be hard to read, and information required for the Scorecard rating can be missing from the house plans e.g. appliances and insulation levels.
- It is expected that on-site assessments would provide a more accurate representation of the houses and their energy efficiency, as the houses are likely to have changed since the plans were drawn.

Social housing, project home builder and renovator pilot:

The NSW pilot took an industry-oriented approach and tested the Scorecard for social housing providers, project home builder and householders planning to renovate their homes. 31 assessments were conducted in total. Key findings were:

- Participants were positive to the experience of the assessment process, especially the knowledge and advice from assessors to inform the priority of energy efficiency upgrades.
- Most participants were not willing to pay for the Scorecard assessment (only 3 out of 8 were willing to pay), as the Scorecard certificate did not meet their expectations and was thought to not be specific to their needs.
- The following improvements to the Scorecard certificate were suggested to address these needs:
 - Prioritise improvement options in the Scorecard certificate to identify 'quick wins';
 - Make impacts of suggested improvements to the star rating outcomes more visible on the certificate;
 - Make the Scorecard certificate available in a more editable format (such as a spreadsheet);
 - Give full access to the inputs underlying the assessments to the participants – especially the social housing providers; and
 - Better integrate the Scorecard into the existing development process for new homes.

Real estate pilot:

The Victorian pilot assessed 20 houses at point of sale to see the impact of a rating on the sales process. Key findings were:

- Once explained, householders with houses rating 5 or 6 stars and above found it beneficial to advertise the rating, they did not wish to advertise ratings at 4 stars or below.
- The low community awareness of the Scorecard was a barrier to uptake. Assessors found that buyers, sellers and agents needed to be educated on what the Scorecard was and what the star rating represents.
- Promoting high performing properties was a matter of pride and an effective way to communicate tangible benefits of the property that are often discovered after the purchase.
- Assessors thought that house energy ratings were considered to benefit buyers predominantly.
- Awareness raising and education of the buyers, sellers and agents within this sector is necessary to increase the uptake in the market, along with clear communication on the value proposition for each stakeholder.

Householder survey results:

Feedback was received from 91 households who received Scorecard assessments in this pilot. This consisted of feedback from 7-ACT, 12-NSW, 32-Qld, 10-SA, 14-Tas and 16-WA. Key findings were:

- The overwhelming majority of the 91 householders surveyed were very positive about the pilot.
- 89% (81) of householders said the Scorecard assessment was both a good use of their time and they would recommend it to family and friends. The same percentage of householders found the Scorecard certificate easy to understand.
- The overall knowledge, experience and advice the assessors provided was extremely positive. 96% of householders said the assessor provided useful ideas for efficiency upgrades.
- Householders stated the most common reasons for having the assessment was to improve the comfort of their home (22%, 53 householders), followed closely by reducing energy use/emissions (20%, 48) and reducing energy bills (17%, 40).
- Overall, 82% of householders reported the assessment motivated them to upgrade their home with another 5% being somewhat motivated.
- Areas that could be considered for improvement included providing:
 - more tailored information alongside the Scorecard certificate that better reflects the advice provided by the assessor; and
 - an indication of the impacts of the recommended actions, on both improving the Scorecard result and the costs to implement the action.

Assessor survey results:

Based on 13 assessors who participated in the pilot (the 9 accredited as part of the pilot plus 4 SA assessors already accredited), key findings were:

- Assessors thought the Scorecard assessment was useful in 97% of assessments.
- Assessors estimated the main benefits would be a reduction in energy use and bills, followed by comfort related benefits.
- For the majority of assessments (74%) assessors stated the star rating on the certificate reflected their intuitive assessment.
- There were no risks reported for 91% of assessments, the remaining risks identified were managed by assessors.

- Overall, assessors found the Scorecard tool easy to use, became easier over time, taking an average of 2 hours to complete. Assessors reported no technical issues in 69% of assessments, with poor internet coverage being the most commonly reported issue.
- When asked how the tool compares to other energy rating tools, in 15 (of 20) responses assessors reported the tool was better than others and 5 reported that it was similar.
- Window treatments and insulation were the most commonly recommended upgrades, followed closely by draught proofing.
- Assessors estimated around 83% of the householders were going to undertake their first and second recommendations and 68% would undertake their third recommendation.
- Assessors thought having no or limited disposable income was the most likely reason for householders not taking action, followed by moving or selling soon.

Introduction

All Australian governments are working together to facilitate energy efficiency through the Council of Australian Governments' (COAG) Energy Council National Energy Productivity Plan (NEPP), that was released in December 2015.

The NEPP is assisting energy markets to deliver better services and assist households and businesses in all sectors of the economy to make better choices about how to manage their energy consumption. The NEPP Measure 5 is to “improve residential building energy ratings and disclosure”.

In 2018-2019 COAG Energy Council funding was provided to pilot the Victorian Residential Efficiency Scorecard (Scorecard) in all capital cities – the activity covered by this evaluation report.

This project supports the COAG Energy Council agreement in 2016 to a National Collaborative Approach to Residential Building Ratings and Disclosure, by providing the means for jurisdictions to consider the features of the Scorecard tool currently being delivered in Victoria to inform future policy development.

The Scorecard program was initially developed by the Victorian government in response to an analysis of policy need. Household energy bills were rising, and there was a general lack of knowledge of residential energy efficiency and ways to improve it at the household level. In summary, household energy bills are high and existing homes are often poorly performing in their energy use as most were built before energy building standards came into effect. The Scorecard was developed because:

- Energy performance solutions can be complex.
- Householders are often uncertain why their home is poorly performing, and what the improvement options are
- Householders are uncertain where to find upgrade information and seek a trusted source to assist them.
- Improving the home's energy performance can have positive health impacts on householder's comfort, including reduced hospital admissions and reduced deaths.

More recently, the Cooperative Research Centre for Low Carbon Living (CRC LCL)¹ has found a national voluntary disclosure system is needed, to ‘provide authoritative, accessible and reliable consumer information that facilitates step transformations in the energy efficiency of Australia's existing homes’ (p. 12). ‘The system must drive uptake of both energy efficiency ratings and energy saving actions’ (p. 53) and ‘requires governance to ensure the relevance, accessibility, integrity and reproducibility of information’ (p. 12). It is believed ‘an endorsed assessor, accredited by a credible governance body, must provide the certificate’ (p. 42). The Scorecard program is aligned to these findings.

The Scorecard program shows how a home rates on a 10-star scale – the more stars the lower the energy bill is likely to be. To enable meaningful comparison between houses, the Scorecard focuses on the home's design, construction and the fixed appliances. The Scorecard also suggests potential improvements and rates the performance of the house in very hot conditions.

Aspects of the Scorecard program were piloted in the capital cities of Western Australia (WA), South Australia (SA), New South Wales (NSW), Australian Capital Territory (ACT), Queensland (Qld), Victoria (Vic) and Tasmania (Tas). Further pilots are currently underway in tropical areas (Cairns, Darwin and Broome).

¹ Low Carbon Living CRC 2016, Enhancing the Market for Energy Efficient Homes Final Report
<http://www.lowcarbonlivingcrc.com.au/sites/all/files/publications_file_attachments/rp3016_enhancing_the_market_for_energy_efficient_homes_final_report.pdf>

This evaluation report outlines the findings from these pilots. The pilots provided insight into how the Scorecard performed when tested by different accredited assessors in the range of built forms found in capital cities across Australia. The pilots also covered:

- application of the accreditation process,
- feedback from participants,
- comparison with the SA Retailer Energy Efficiency Scheme (REES) audit process,
- comparison with FirstRate 4 outputs,
- off plan data entry,
- targeted industry pilot, and
- use in the real-estate sector at the point of sale.

The pilot assessed a total of 136 houses on-site using the Scorecard tool. The key house features of an additional 1870 houses that have been assessed in Victoria over 24 months to April 2019 are included in this report, to provide a useful comparative dataset.

1 Assessor Accreditation

1.1. Scorecard accreditation purpose and foundation

The assessments in this pilot were undertaken by assessors accredited under a standard process. Victoria's experience in the development of the Scorecard found that assessors need a range of skills, including technical understanding, adherence to Occupational Health and Safety standards (OHS) and skills in engagement with householders. The Victorian accreditation process has been designed to ensure assessments are carried out safely, accurately and generate a positive customer experience.

The NSW government undertook a Work Health and Safety (WHS) risk analysis before the pilot commenced in NSW. This highlighted the accreditation process and the requirement of OHS training as essential to address the WHS risks identified.

The purpose of accrediting assessors for the Scorecard program is to ensure the Scorecard Quality Principles are supported. These principles were developed as the foundation of the Scorecard program, based on stakeholder feedback and policy objectives:

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 upgrade 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.

1.2. Scorecard accreditation approach

For the national pilot of the Scorecard tool, accreditation was offered to a small number of assessors (9) in WA (2), Tas (2), Qld (2) and NSW (3). Victoria had already accredited 40 assessors and SA four. Accreditation was undertaken following the established Scorecard process.

This allowed:

- piloting to be undertaken by assessors with local knowledge, and
- testing of an intensive accreditation process, where potential assessors were offered as a group intensive training, practice and exam in Melbourne.

The 5-day intensive accreditation process consisted of the Scorecard training, practice on a number of previously assessed homes, tutorials and an exam in a test house. This allowed the facilities for accreditation already established in Melbourne to be utilised (trainers, tutors and exam houses). This approach reduced pilot costs, reduced the time required to accredit, and increased the quality of assessors by providing tutoring and practice houses.

The standard process for assessor accreditation in Victoria is over a longer timeframe driven by the assessors, with training provided, but practice is arranged by prospective assessors, and tutorials are not required unless skills improvements are needed. Exams are then arranged when assessors nominate that they are ready.

1.3. Assessor identification and accreditation

The pilot tested the availability of skilled assessors with a sufficient range of skills to become accredited.

All applicants were considered by the Scorecard Quality Advisory Panel (SQAP), made up of four experienced and accredited Scorecard assessors. The SQAP recommended that all applicants were sufficiently skilled to pass through to the next stage.

In March 2019 nine assessors completed intensive Scorecard accreditation in Melbourne. The accreditation activities included:

Day 1: Scorecard tool training day. Standard training that all assessors must undertake. Applicants must pass a test before continuing onto the next stage.

Day 2 & 3: Scorecard tutorial covering the assessment process, appliances and building materials, provided by an accredited assessor, followed by practice in houses.

Days 4 & 5: Scorecard exam, a full 3-hour house assessment of a house already assessed, so the correct assessment results are known.

The Scorecard program has found that examinations against all the Scorecard Quality Principles, listed previously, are a critical part of quality control. Assessors may lack certain capabilities which then can be addressed.

After the examination, applicants submit their assessment for the exam house and the results are reviewed by the SQAP. All applicants are provided with extensive feedback on their strengths and any areas for improvement.

All assessors that pass this exam are then required to sign an Assessor Agreement. This document outlines the requirements for participation in the Scorecard program, and includes:

- Code of Conduct
- Complaints policy
- Audits
- Use of branding
- Intellectual Property
- Penalties
- Insurance requirements
- Confidentiality
- Relationship to government
- Privacy requirements

1.4. Feedback from assessor accreditation

Skilled assessors were found in all states, demonstrating that although the sector may not be well developed, there is an existing cohort of individuals with the skills and capabilities to become assessors in Australia.

The Scorecard accreditation week was evaluated through feedback from assessors, accreditation providers and the results of the various tests and exams.

Assessors were surveyed, and the findings were generally very positive about the accreditation process:

- Positive comments about the Scorecard team (knowledge, attitude, friendliness, helpfulness).
- Minor changes to the training week were suggested, including extra reading materials, video of the tool in use, access to the tool before training, more on evidence collection and data entry.

Accreditation processes were considered effective and were scaled easily. The assessors had no difficulty learning a new Scorecard tool.

One paperwork requirement, the Working with Children Check, was inconsistent across jurisdictions. This check was not available in some states due to differences in state legislation, and where it was available, the application process, coverage and requirements were variable. Hence the Working with Children check was provided for only some jurisdictions.

1.5. Assessor audits

During and after the Scorecard pilot, assessors were audited through the standard audit processes for Scorecard assessors. This involves examining a number of assessments and checking the results against the photos that assessors are required to attach to their assessments and other sources of information and evidence.

Desktop audits were carried out on eight of the 13 assessors, usually for their first or second assessment, and the findings provided to them to prevent similar issues during the remainder of the assessments. The main audit issues found were:

- Insufficient evidence photos (e.g. insulation and appliances)
- Zoning difficulties (splitting rooms into zones, adding granny flats)
- Star ratings of appliances not found or incorrect
- Incorrect identification of heaters

The remaining assessors were not audited due to time constraints.

1.6. Public feedback

To monitor program quality, the Scorecard provides support services (via email and phone) where householders and assessors can ask questions and register complaints. All complaints and questions are followed up and responses documented.

During the national pilot no householders registered issues. Some requests were received to extend the pilot to assess further households.

2 House assessment results

Outside of Victoria, a total of 136 Scorecard assessment results were analysed in this project. This consisted of 8-ACT, 31-NSW, 34-Qld, 28-SA, 17-Tas and 18-WA. Results from 1,870 houses assessed in Victoria over 24 months are also provided as a useful comparison. Whilst this is not enough to provide definitive state, territory or national-based trends, the results were examined for outliers and inconsistencies with assessor and jurisdictional understanding of the built form.

Renew (previously known as the Alternative Technology Association) provided a list of householders willing to participate in the pilot for Qld, Tas and WA. SA, ACT and NSW requested targeted house types and hence either sourced their own houses, or sourced colleagues' houses.

Houses were selected based on:

- availability during the pilot period
- 'average' or 'representative' house features
- easy for assessor to travel to without excess cost/time
- located in Canberra, Sydney, Brisbane, Adelaide, Hobart and Perth

About half of the houses for SA and NSW were identified as low income as this was an element of the trial in these locations – this impacts on the results as these houses are usually quite small, with small heated and cooled areas.

Table 1 Number of houses for each jurisdiction assessed with Scorecard

	Number of assessments analysed	Number of low-income houses	Number of houses that have PV	Average star rating
ACT	8	0	1	2.5
NSW	31	17	3	4.2
QLD	34	0	17	4.9
SA	28	15	12	4.9
TAS	17	0	4	2.6
WA	18	0	12	3.8

2.1. House materials

The Scorecard assessment requires inputs of wall and floor construction types and insulation levels, window details, any gaps and eave details. These are used to determine how effective the building shell is at reducing heat flow (keeping heat in during winter, and out during summer), as well as solar heat gain through windows, etc. From the data analysis, general trends in the house types can be identified.

The primary floor type and percentage of houses that are detached (do not have any shared walls or floors) is shown in Figure 1 and the primary wall types are shown in Figure 2.

From these graphs, it can be seen that:

- a predominance of houses assessed were detached, rather than apartments or units
- WA houses were mainly double brick on concrete slab
- Tas and Qld houses were mainly timber framed

- SA had mixed housing typologies
- ACT and Vic had mainly brick veneer, on either concrete slab or timber stumps.

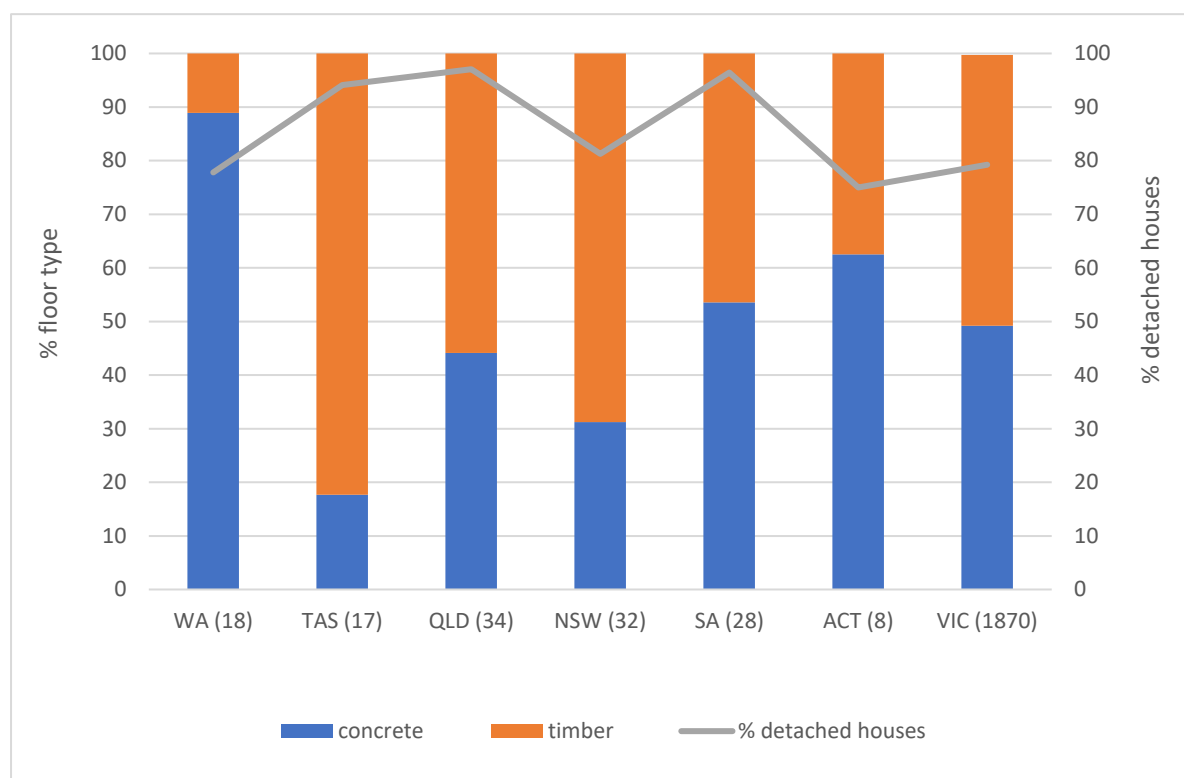


Figure 1 Primary floor type and percentage of houses that were detached

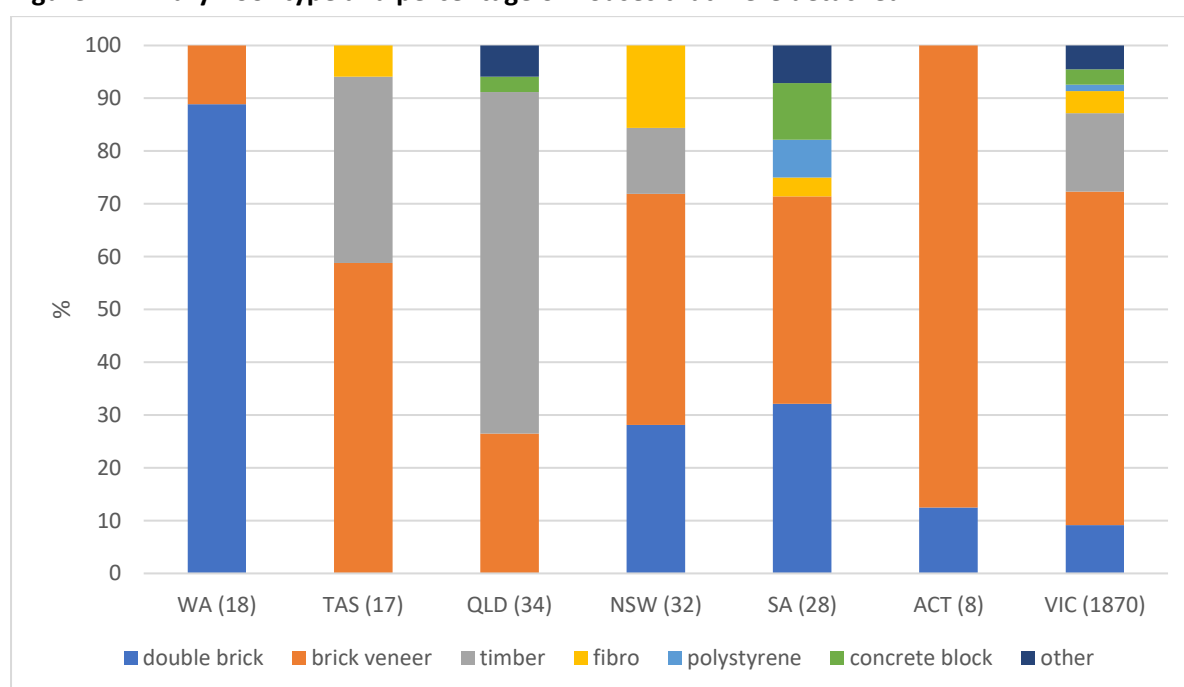


Figure 2 Primary wall type

Assessed houses in most jurisdictions had an average floor size of around 120 m², apart from Qld that had a higher average of just over 150 m² (see Figure 3).

The Scorecard tool records when rooms or zones have a heater or cooler present. Across jurisdictions, an average of about 70% of the house area had a heater present, and about 60% had a cooler present (red and grey lines respectively in Figure 3. ACT had the highest percentage of house

area with both a heater and cooler present, SA had the highest house area with a cooler present. Tas and NSW had the lowest percentages.

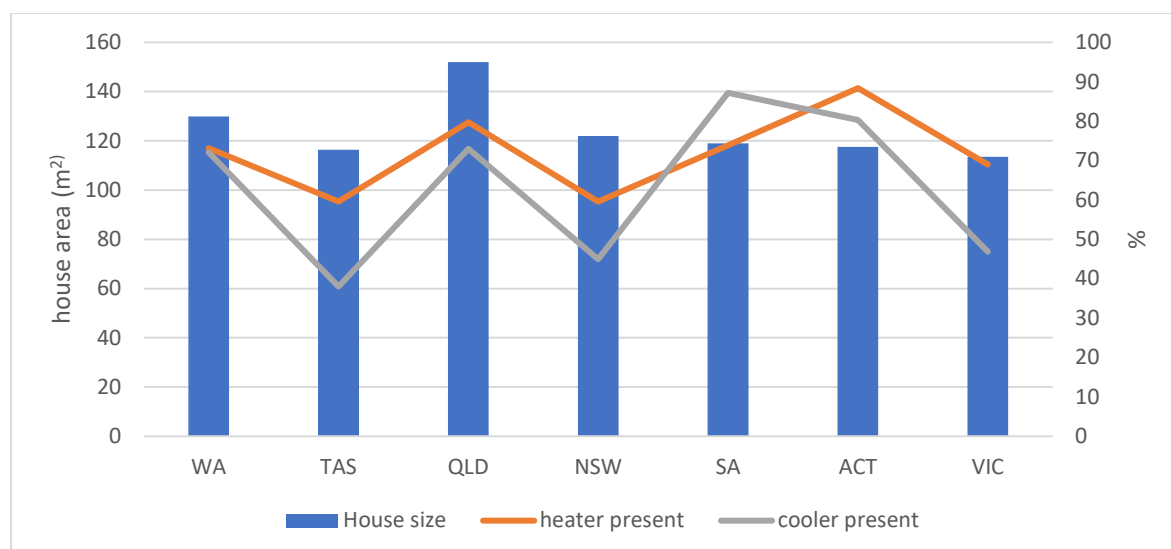


Figure 3 Average house floor area and percentage of floor area that has a heater or cooler present

2.2. House elements

Part of the Scorecard certificate output is an efficiency rating for individual elements, including lighting, building shell and hot weather performance. The rating scale runs from 'very low' to 'very high' (with the higher the rating scale, the better the energy performance). The results of these individual elements are presented in Figure 4.

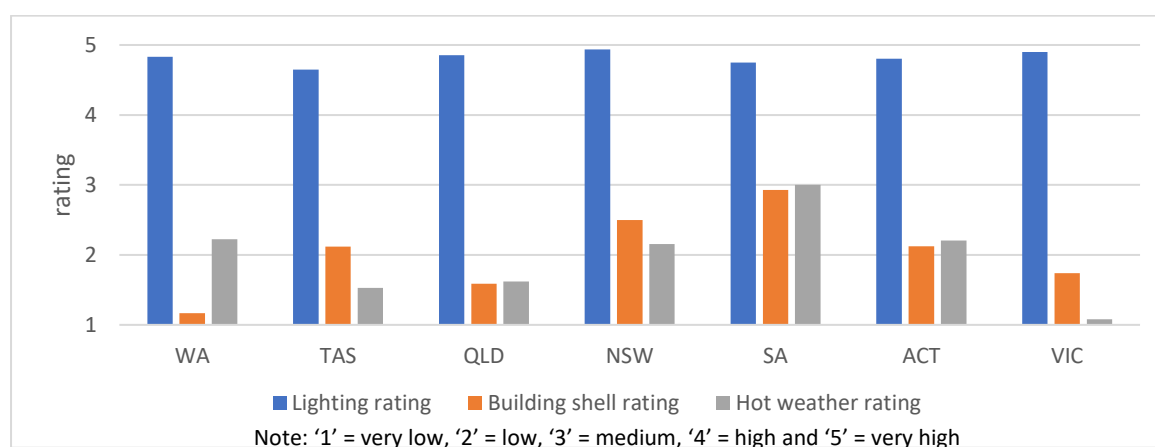


Figure 4 Average ratings for lighting, building shell and hot weather.

The average **lighting rating** is consistently high for all jurisdictions. This is calculated based on the energy required to light a house to the required lighting levels, as well as any halogen downlights (more energy intensive). A high rating for lighting indicates there are not many halogen downlights in these houses.

The average Scorecard **building shell rating** varies from very low in WA, to medium in SA. The building shell rating is a combination of insulation levels (including building materials), thermal mass (e.g. bricks and concrete), solar heat gain through windows, as well as any gaps (leakiness) recorded. The building shell rating indicates how much heating and cooling is required for householders to feel comfortable.

The Scorecard **hot weather rating** is determined by modelling the house during hot weather, which is shown on the Scorecard certificate as how easy it is to keep the house cool during hot weather. SA has a medium rating, with Vic receiving the lowest rating at very low (i.e. it is not easy to keep the

houses cool during hot weather). A very low rating indicates houses have not been designed or built to be comfortable during continuous days of hot weather.

Tas has a higher building shell rating than hot weather rating, indicating the houses will perform better in colder weather than in hotter weather, whereas WA houses perform better in hotter weather (mainly due to having high mass houses made of concrete slab and double brick).

2.3. Energy use and generation

Another output on the Scorecard certificate is an indication of where energy is being used in the house. This allocates energy use to the categories of heating, cooling, hot water heating, lighting, pools/spas and PV energy production. The average for each jurisdiction is shown in Figure 5

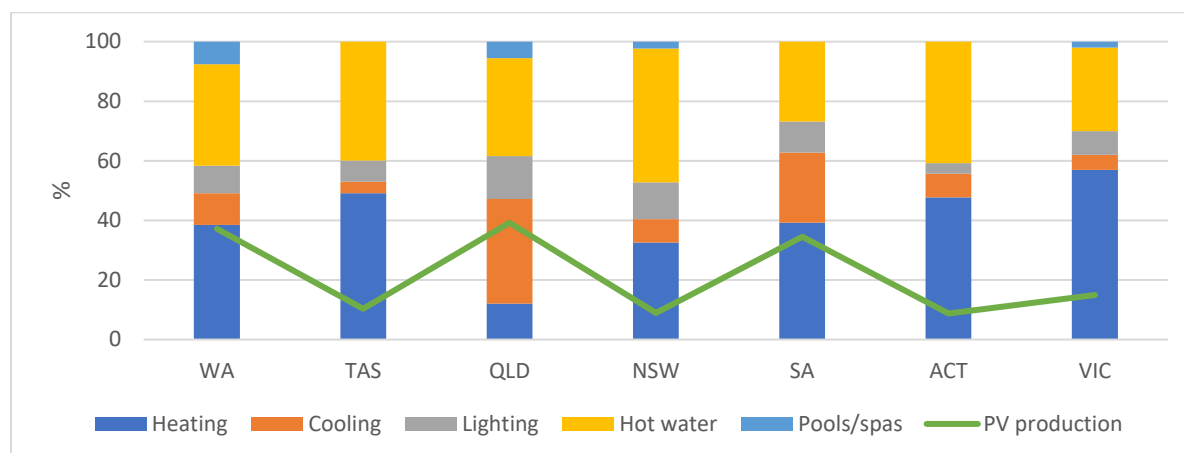


Figure 5 Household energy used by domestic functions and percentage of energy use met by solar production

The energy used to heat water (about 30-40% of total energy use) and lighting (about 10%) is fairly consistent across the jurisdictions.

Heating and cooling energy use varies considerably due to climatic conditions; Vic and Tas have the highest heating load, Qld has the highest cooling load. NSW shows quite high energy use for heating, which is discussed in the following section under heater types.

Pools and spas can be high energy users in a house. WA, Qld and NSW have houses assessed with pools and/or spas, with the average energy use in those houses of 36%.

A house with a photovoltaic (PV) system will cost less to run as the energy used in the house is offset by the energy produced by the PV panels. This will usually result in a higher overall Scorecard star rating. Two thirds of the WA houses had PV installed, while half of the Qld houses and just over one third of SA houses had PV. The other jurisdictions have much lower numbers of PV installed on the houses assessed.

The energy use that is met by PV production is highest for WA, Qld and SA. While WA has the highest percentage of houses with PV, SA has slightly bigger PV systems installed (average size of installed systems is 4kW for SA, 3kW for Qld and 2kW for WA).

2.4. Heating types

The most common primary heater type found in the assessed houses was reverse cycle split systems, as shown in Figure 6.

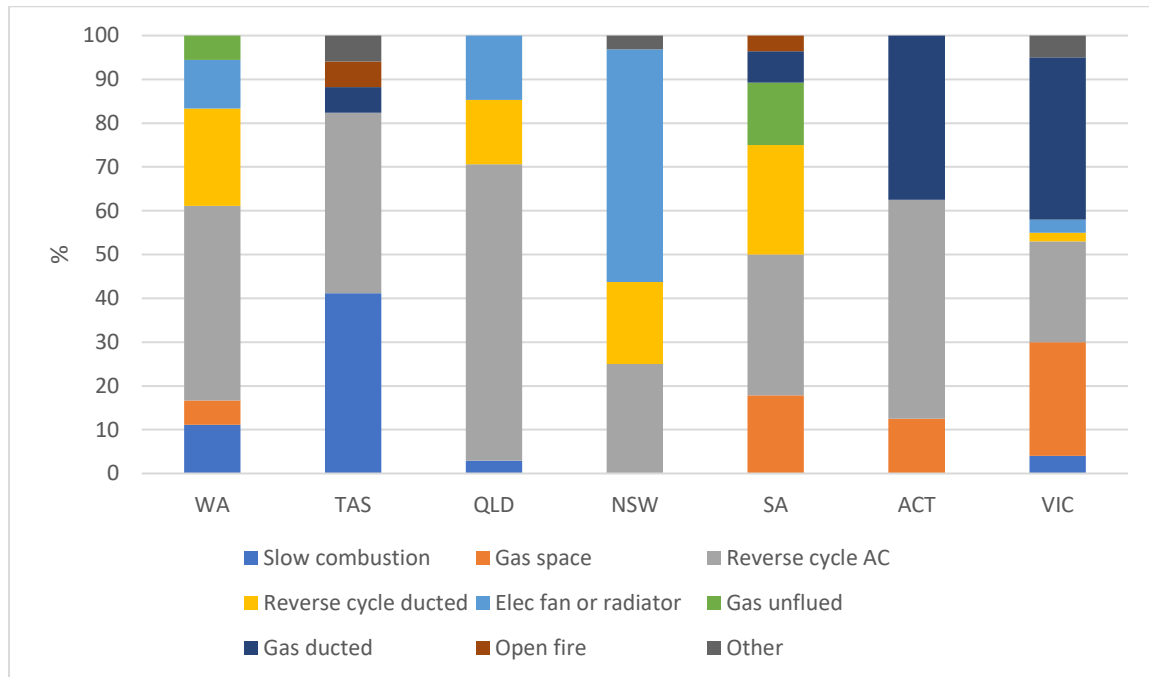


Figure 6 Primary heater type as a percentage (note: no fixed heating is reported as 'electric fan or radiator')

Wood is a common fuel source for heating in Tas ('slow combustion' heaters or 'open fire'); gas is used in SA, WA, Vic and the ACT.

The Scorecard ranks the cost efficiency of the fixed appliances against the best in the market based on the type and age of the appliance, the appliance's star rating and the cost of the fuel that it uses. This allows appliances to be ranked according to running costs. The results can be seen in Figure 7.

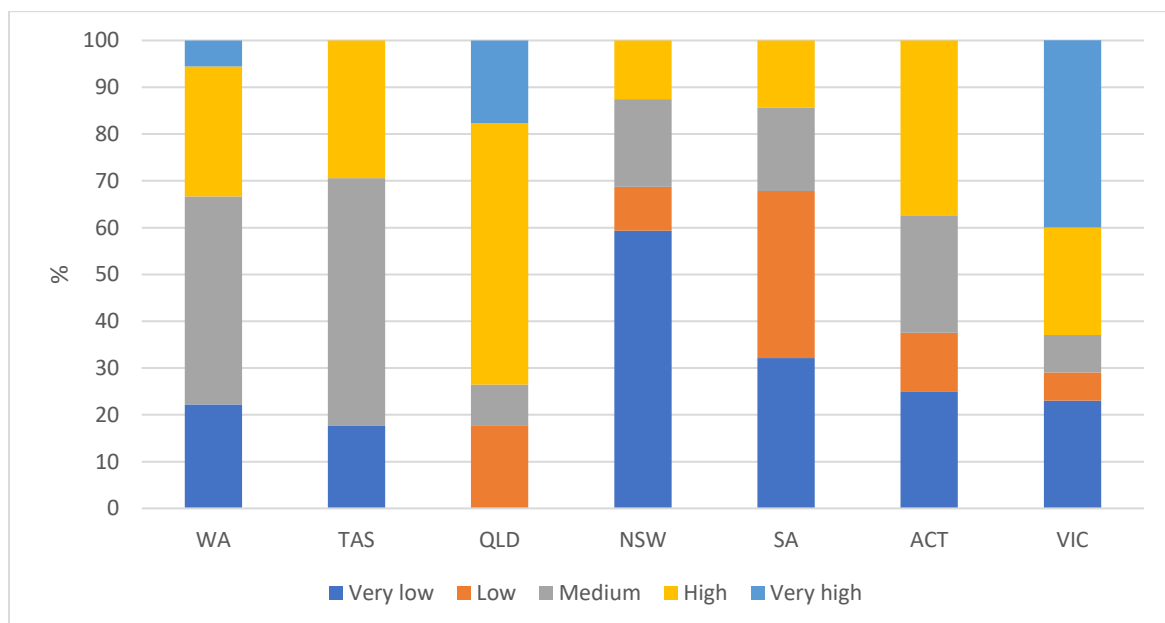


Figure 7 Cost Efficiency of the primary heater

Qld has the greatest number of primary heaters that have a high cost efficiency, although due to the climate, they only operate a small amount of the time given the milder winter. Both NSW and SA have nearly 70% of their heaters rated as very low or low efficiency.

In NSW the results differed, as the pilot focused on low income housing which had no fixed heating or cooling (13 out of the 17 houses). In this case the assumption is that a portable heater (electric fan or radiator) is installed in the largest zone in the house as, for most Australian houses, heating is required for at least part of the year. The amount the assumed heater is used is mainly dependent on the climate zone, so in hotter climates, the heater would be used less.

2.5. Cooler types

As seen with the primary heater type, the primary cooler type was found to be reverse cycle air conditioners, as seen in Figure 8.

Evaporative coolers are more common in SA, with some ducted reverse cycle air conditioning also installed (which usually cools the living areas and bedrooms in a house). As noted previously, NSW has a high number of houses that have no fixed cooling appliances (over 50%).

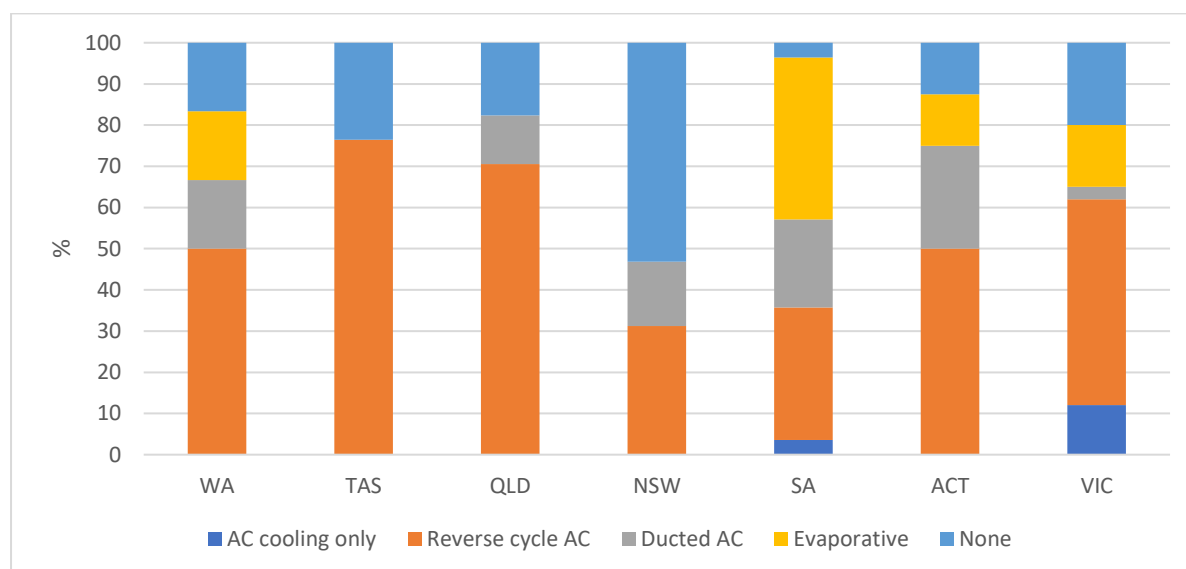


Figure 8 Primary cooler type as a percentage

The cost efficiency of the coolers that are present in the houses as compared to best on the market can be seen in Figure 9. SA has a larger number of very high cost efficiency coolers due to evaporative cooler use. The efficiency of the coolers in the other jurisdictions is variable and no general trends can be seen.

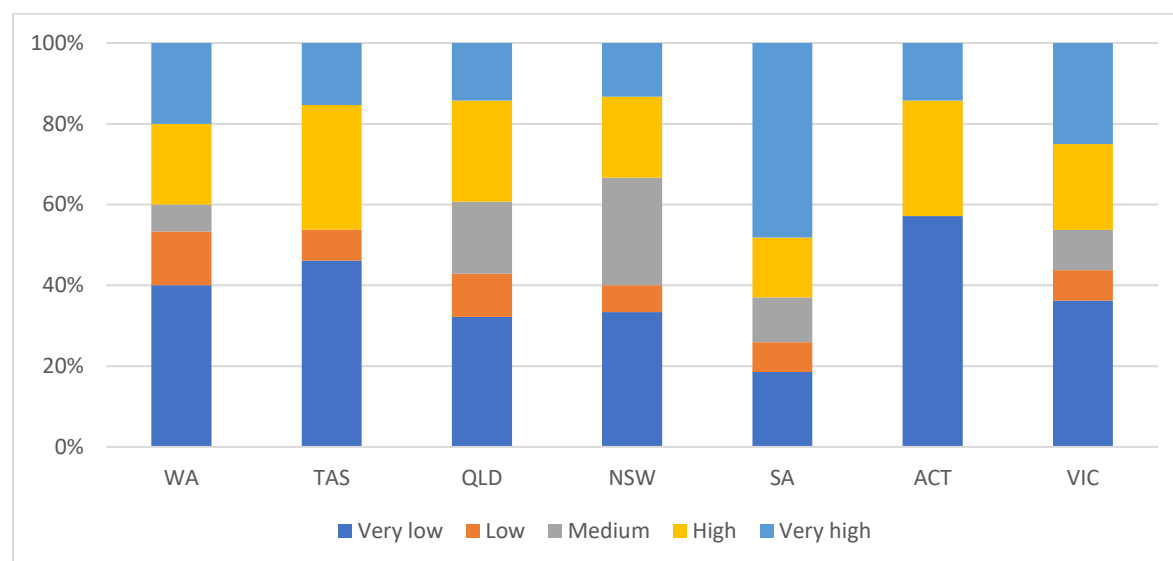


Figure 9 Cost Efficiency rating of the primary cooler when present

2.6. Hot water types

The other fixed appliance the Scorecard assesses is hot water systems (Figure 10).

The predominant hot water system types are gas instantaneous and gas storage for WA, NSW, SA, Vic and ACT. There are high numbers of off-peak electric storage systems in Tas, Qld and NSW, with high numbers of peak electric in Tas and ACT. Solar hot water systems account for just less than 20% of the systems in WA and Tas, and much lower numbers in the other jurisdictions, with ACT not recording any solar hot water systems.

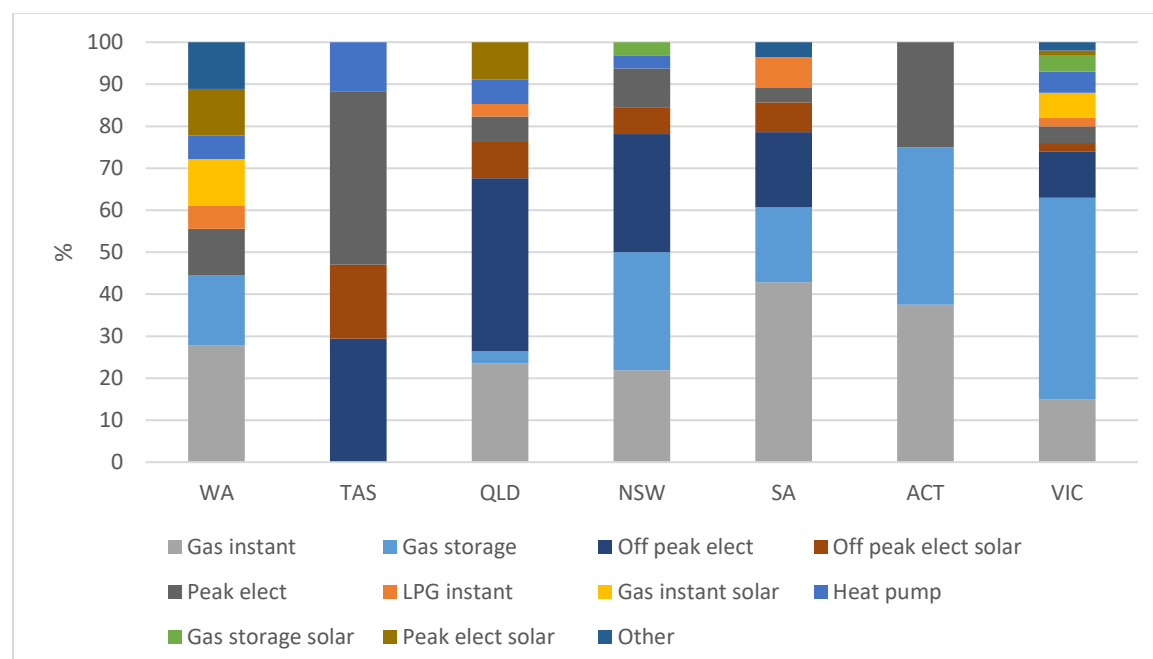


Figure 10 Hot water systems by percentage

A majority of the hot water systems were rated as at least medium cost efficiency (Figure 11). Tas recorded the lowest average efficiencies, due mainly to a very high number of storage electric hot water systems being found (not heat pump-type systems).

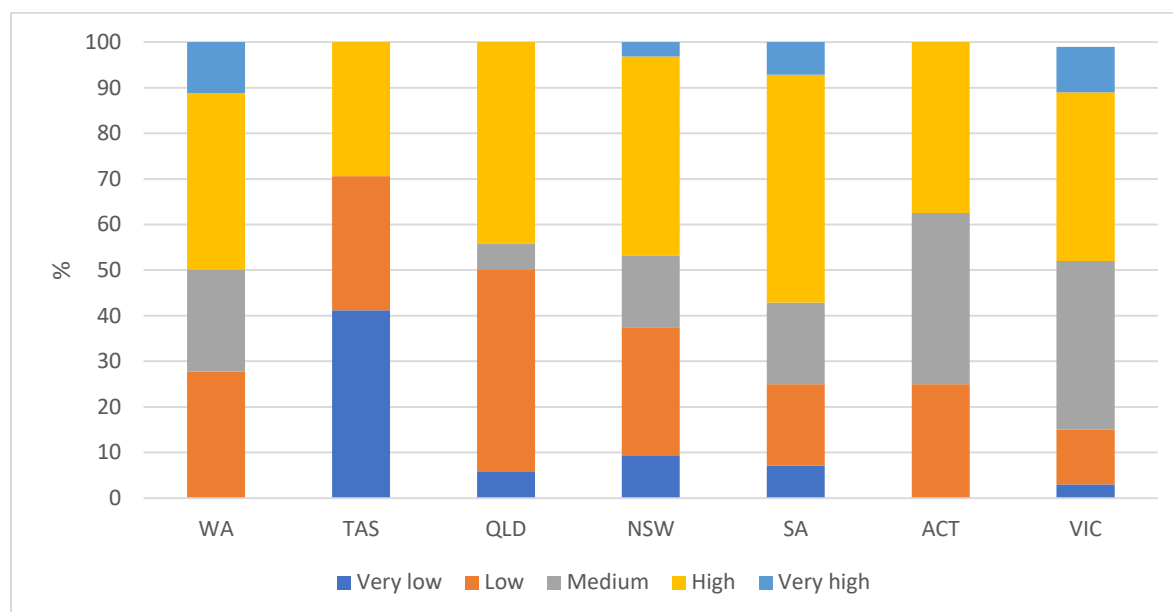


Figure 11 Cost efficiency rating of the hot water systems

2.7. Fuel type

Figure 12 shows the total estimated energy used in a house broken down by fuel type.

Electricity is the predominant fuel used for appliances, except in ACT which has higher use of gas from heaters and hot water systems. Off peak electricity use is from hot water heaters (and in some cases pool pumps). Tas has some more expensive fuels used (LPG, wood), which will drive down the star rating for those houses.

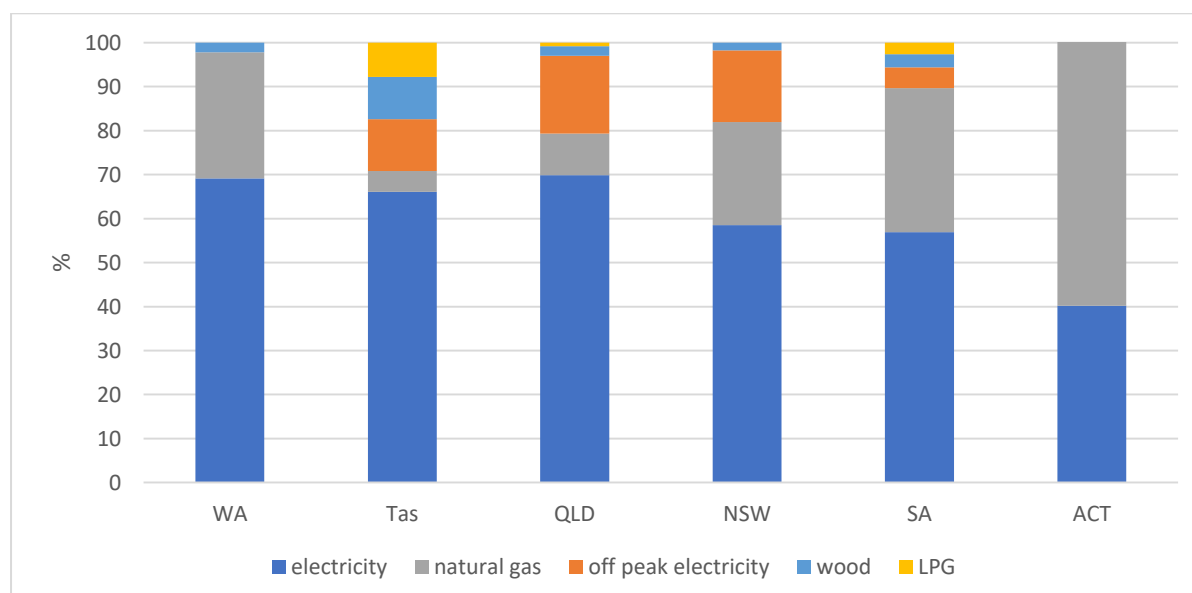


Figure 12 Fuel type in the assessed houses

3 Technical outcomes

The Scorecard tool is delivered as a cloud-based web-app. Assessors use a tablet device to access a website and use the software tool. Assessors have to log-in (authenticate) to the Scorecard server to access the tool.

The cloud delivery model has several advantages and disadvantages:

Advantages:

- **No requirement for a particular hardware type** – all modern tablets, personal computers and laptops are able to run the Scorecard software tool. The only limitation is the web browser must meet recent standards and it has enough memory and processor performance to run at an acceptable speed.
- **Consistent versions** – as the tool is ‘in the cloud’, all users access the same version at all times. This supersedes the traditional model where users download and install a piece of software on their device. This removes the possibility that some users are not using the current release of that particular software.
- **Centralised data storage** – all assessments are stored in the cloud. This allows for simple reporting of assessment data and can efficiently facilitate the auditing of assessors.
- **Easier user support** – since the program administrators can view assessments in the same way that assessors can, it is easier to provide technical support to users as the support team can view the particular assessment and see the same inputs and outputs as the assessor.

Disadvantages:

- **Off-line use is limited** – since the tool is internet based, in general a connection to the internet must be maintained at all times. The tool does have a limited ‘off-line’ mode which allows data entry to be undertaken when no connection is available, however an internet connection is still required to create a new assessment, to save the assessment or to generate a Scorecard certificate.
- **Hardware integration is harder** – since the tool is a web-app, there are more limitations to how the tool can interact with local device hardware. This is especially applicable to accessing the camera for taking evidence photos. This situation is improving as newer browser standards become more widely adopted.

The main findings related to the technical aspects of the tool were:

- The pilot demonstrated the value of piloting the Information Technology (IT) aspects of a tool.
- Three minor programming bugs were identified and resolved. One issue was due to inconsistencies between NatHERS assumptions on postcodes (which are used in the Scorecard) and community assumptions on postcodes).
- There were no significant issues related to internet connection to the tool.

4 Retailer Energy Efficiency Scheme pilot

The SA component of this project focused on the how the Scorecard may support low income assessments under the Retailer Energy Efficiency Scheme (REES).

For further details on the REES visit:

http://www.energymining.sa.gov.au/energy_and_technical_regulation/energy_efficiency/retailer_energy_efficiency_scheme

The REES includes energy audits carried out by home assessors as follows: 'Energy Audits will be made available for a number of low-income households in the "priority group", to help assess current energy use practices, compare usage to energy efficient practices and identify practical ways to be more energy efficient at home.'²

These were undertaken in SA by REES assessors who were also accredited Scorecard assessors. Assessors assessed houses that were eligible under the REES or found houses from other sources. The assessors indicated that 15 of the houses assessed would be classed as low income. The data analysis and assessor and customer survey results have been included in the main body of this report.

An additional survey of the SA assessors was undertaken to gain information about Scorecard assessments relative to REES assessments.

REES assessors found that:

- Scorecard assessments take more time and are more focused on building upgrades than REES assessments. Assessors thought that this provided other opportunities to assist low incomes houses (the objective of REES assessments), if access to financial support for upgrades was available to low income households.
- Scorecard assessments could be tied in with other programs to provide financial assistance to low income households.

² <https://www.escosa.sa.gov.au/industry/rees/faqs>

5 FirstRate 4 comparison

5.1. Background

The ACT has Australia's only mandatory energy disclosure scheme for homes. Energy assessments are required at the time of sale and are voluntary at the time of lease.

The ACT scheme is underpinned by the FirstRate 4 software, which is the last version of the "first-generation NatHERS" tools. It was developed by the Victorian government. While FirstRate 4 was not designed specifically as a disclosure tool, the relatively low level of data required to undertake a rating made it a valid choice.

In 2005, the current second-generation NatHERS tools were introduced and replaced the first-generation tools in the National Construction Code for new houses. These later tools allow more detailed modelling of new houses; however, they also have much greater data requirements than the earlier generation tools and have significantly different operating assumptions. The second-generation tools were therefore not a viable direct replacement for FirstRate 4.

The ACT uses FirstRate 4 software and is the only user of FirstRate 4. The software has not been updated for many years and is not well supported.

5.2. Methodology

In addition to the on-site assessments, a comparison was conducted between the Scorecard and FirstRate 4 for 8 ACT homes. To provide the best comparison, FirstRate 4 assessments were developed from the data collected by the Scorecard assessor in the house, as well as from the floor plans of the houses.

The Scorecard assessments were undertaken by an accredited Scorecard assessor on-site. The FirstRate 4 assessments were undertaken by the original developer of FirstRate 4.

5.3. Comparing Building Shell metric and FirstRate Stars

The Scorecard produces a Building Shell rating on a scale of 1 to 5 on the certificate. This rating is based on the modelled building heating and cooling load per square metre of floor area and is intended to inform the householder of how well their house's building shell performs.

The scale metric is set to provide differentiation between 'good' houses and 'poor' houses. As the Scorecard is focussed primarily on existing houses, the scale does not differentiate between 'good' and 'high performance' houses. A Building Shell rating of 5 on the Scorecard would be approximately equivalent to a 6 star NatHERS rating.

The star rating used in the NatHERS tools, and in FirstRate 4, is also based on modelled building heating and cooling load per square metre of floor area. The Scorecard Building Shell rating is therefore broadly comparable to the star rating in FirstRate 4.

5.4. Results

The Scorecard building shell rating, Scorecard building shell load (MJ/m²), Scorecard star rating, and FirstRate 4 star ratings are shown in Table 2 Comparison of Scorecard and FirstRate 4 ratings.

Table 2 Comparison of Scorecard and FirstRate 4 ratings

House	Scorecard building shell rating (out of 5)	Scorecard building shell MJ/m ²	Scorecard stars (out of 10)	FirstRate 4 stars (out of 6)
1	2	579	1	1
2	2	510	3	1.5
3	4	212	10	4.5
4	4	296	3	6
5	2	523	2	0.5
6	2	447	1	2
7	4	308	6	3.5
8	2	544	3	0

Since the Scorecard building shell rating and FirstRate 4 stars are reported on different scales, the underlying Scorecard building fabric load was compared to the FirstRate 4 stars (Figure 13). This provides a strong correlation with a R² value of 0.81, suggesting the Scorecard building shell rating is very similar to the FirstRate 4 star rating.

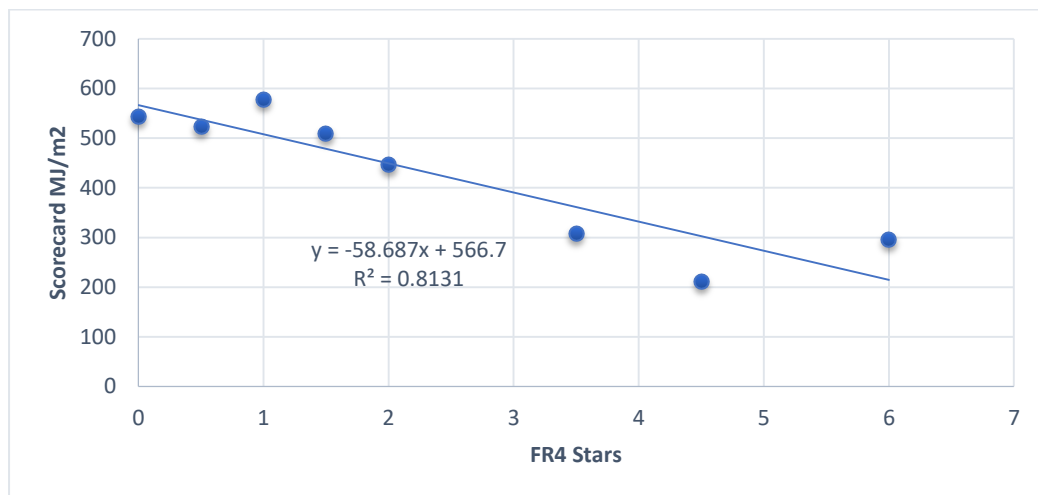


Figure 13 Scorecard building shell (MJ/m²) versus FirstRate 4 star results.

The primary metric of the Scorecard is the star rating on a scale of 1 to 10. Scorecard stars are based on *total* energy cost and are not normalised by floor area. Figure 14 shows the Scorecard stars compared to FirstRate 4 stars.

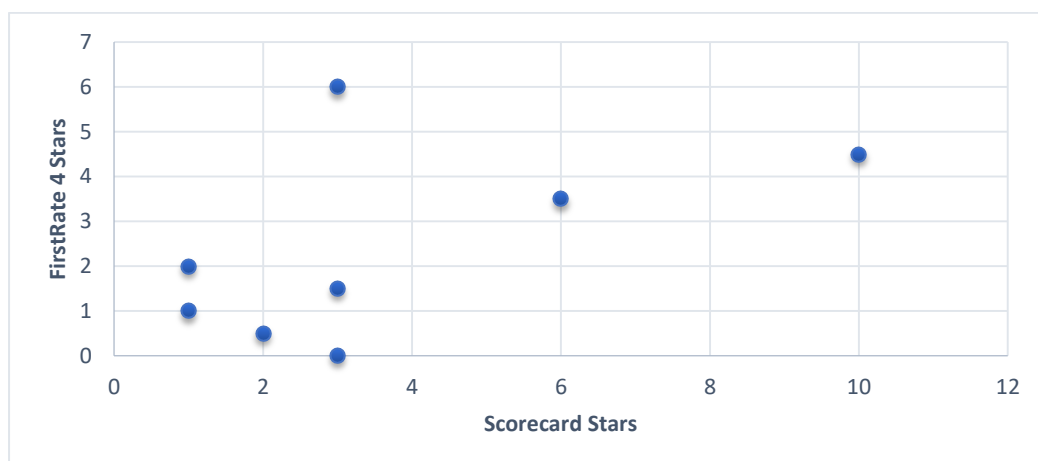


Figure 14 FirstRate 4 stars vs Scorecard stars

As expected, there is little correlation between the Scorecard star output and the FirstRate 4 star output, as the fundamental basis of the two ratings is quite different.

Despite the lack of an overall correlation, it can be seen there is a clustering of houses at the low performance end of both scales. This suggests that houses with lower building shell performance also have overall higher energy use.

6 Off-plan pilot

In addition to on-site assessments carried out in Qld, Scorecard assessments were carried out for eight houses using only house plans. Although Scorecard assessments were completed for all of these houses as seen in Table 3, heating and cooling information was not available. Therefore, two alternative scenarios were tested for each house, one being a higher efficiency reverse cycle air-conditioner and a lower efficiency system. A summary of the results is in Table 4. These Qld houses were not included in the main data analysis of this report, due to the limitations of the dataset and no on-site assessment undertaken.

Table 3 Off-plan house information for Qld

	Type	Year of construction	Floor area (m ²)	Heated and cooled area	Hot weather rating
H1	Studio	2009	27	15	1
H2	House	1990	83	33	2
H3	House	1994	105	32	1
H4	Townhouse	1981	81	41	4
H5	House	2017	117	39	3
H6	House	1978	77	25	2
H7	House	1952	93	31	1
H8	House	2004	122	36	3

Table 4 Summary of Scorecard assessment results for Qld

	Lower efficiency			Higher Efficiency		
	Overall star rating	% energy cooling use	% energy hot water use	Overall star rating	% energy cooling use	% energy hot water use
H1	6	51	36	6	39	48
H2	3	37	51	4	26	60
H3	2	45	42	3	34	52
H4	2	18	72	2	12	79
H5	3	32	53	4	22	62
H6	3	26	64	3	17	73
H7	2	30	59	3	20	69
H8	2	21	68	3	13	75

It was found that:

- Some older house plans can be hard to read, and information required for the Scorecard rating can be missing from the house plans e.g. appliances and insulation levels.
- On-site assessments would provide a more accurate representation of the houses and their energy efficiency, as the houses are likely to have changed since the plans were drawn.

7 Social housing, project home builder and renovator pilot

A small pilot was undertaken in NSW with an industry-oriented approach, including social housing providers, project home builders and householders planning to renovate their homes. 31 assessments were conducted in total.

Results from this pilot are included in the previous sections on accreditation, surveys of householders and assessors, and house assessment results.

Additional analysis was undertaken by surveying these cohorts.

The main findings of the NSW industry targeted survey include:

- Participants were positive to the experience of the assessment process, especially the knowledge and advice from assessors to inform the priority of energy efficiency upgrades.
- Most participants were not willing to pay for the Scorecard assessment (only 3 out of 8 were willing to pay), as the Scorecard certificate did not meet their expectations and was thought to not be specific to jurisdictional needs.
- The following improvements to the Scorecard certificate were suggested to cater to the needs of the participants taking part in the pilot:
 - Prioritise improvement options in the Scorecard certificate to identify ‘quick wins’;
 - Make impacts of suggested improvements to the star rating outcomes more visible on the certificate;
 - Make the Scorecard certificate available in a more editable format (such as spreadsheet);
 - Give full access to the inputs underlying the assessments to the participants – especially the social housing providers; and
 - Better integrate the Scorecard into the existing development process for new homes.

8 Real-estate pilot

The Scorecard has been publicly available in Victoria since April 2017 after extensive piloting. Therefore, piloting in Victoria for this NEPP process focused on extension of the Scorecard to the real estate industry sector. The Victoria pilot assessed 20 houses at point of sale to see the impact of a rating on the sales process.

The high-level objectives were to examine the value proposition of the Scorecard in the house sales process, through engaging with the market. This consisted of:

- Recruiting real estate businesses that were interested and willing to use the Scorecard in house sales campaigns.
- Through this connection, recruiting house sellers who were willing to undertake a Scorecard assessment as part of selling a house.
- Undertaking approximately 20 Scorecard assessments on houses, using accredited Scorecard assessors, and including the Scorecard rating, certificate, and any other relevant materials in the subsequent sales campaign.
- Conducting a survey on views and the value of the Scorecard in the sales process, including areas where the Scorecard program could be improved.

8.1. Results

The pilot was carried out from April to June 2019 by two Scorecard assessors.

Table 5 Number of properties assessed for the Vic real estate pilot

Total number of properties assessed	20
Properties advertised with the Scorecard rating	14
Properties sold to date	7
Properties currently under offer	2
Properties taken off the market	3
Number of participating real-estate agencies	5
Average star rating of all properties	6.6 stars
Lowest advertised star rating	5 stars
Star rating considered adequate for advertising	6 stars and above

The real-estate industry has been experiencing a downturn since the beginning of 2019, therefore some properties remained on the market, while some were taken off. This made it difficult to measure any price and time impacts from the utilization of the Scorecard as a tool to promote energy efficient properties.

The distribution of the star ratings for the twenty properties assessed is shown in Table 6.

Table 6 Distribution of star ratings for the Vic real estate pilot

1 star	2 stars	3 stars	4 stars	5 stars	6 stars	7 stars	8 stars	9 stars	10 stars
0	3	1	2	1	6	5	2	0	0

8.2. Promotional materials

Assessors were provided with the following materials to help them carry out the pilot:

- Presentation - to introduce real-estate agents to the Scorecard
- Website - to help assessors direct agents to videos and case study links
- Scorecard real-estate logo and guidelines for use for use on agent's advertising material (sale boards, etc.)



The main findings from the real estate pilot were:

- Once explained, householders with houses rating 5 or 6 stars and above found it beneficial to advertise the rating, they did not wish to advertise ratings at 4 stars or below.
- The low community awareness of the Scorecard was a barrier to uptake. Assessors found that buyers, sellers and agents needed to be educated on what the Scorecard was and what the star rating represents.
- Promoting high performing properties was a matter of pride and an effective way to communicate tangible benefits of the property that are often discovered after the purchase.
- Assessors thought that energy house ratings were considered to benefit buyers predominantly.
- Awareness raising and education of the buyers, sellers and agents within this sector is necessary to increase the uptake in the market, along with clear communication on the value proposition for each stakeholder.

9 Householder Survey Results

Of the 136 households that undertook an assessment and were requested to feed back on their experience, 91 responses were received. This consisted of feedback from 7-ACT, 12-NSW, 32-Qld, 10-SA, 14-Tas and 16-WA.

9.1. Householder feedback

The overwhelming majority of the 91 householders surveyed were very positive about the pilot.

89% (81) of householders said it was both a good use of their time and that they would recommend it to family and friends. The same percentage of householders found the Scorecard certificate easy to understand.

"I found the assessment really valuable and I'm looking forward to implement the changes. Our assessor was great and explained everything well."

"It was useful to have direct advice from someone who knew what they were talking about. I would 100% get this done if I bought a house as it would be even more useful then."

9.2. Location of houses

The surveyed householders were located in all states except the NT (which is currently undertaking a tropical pilot). The number of households surveyed is shown in Figure 15.

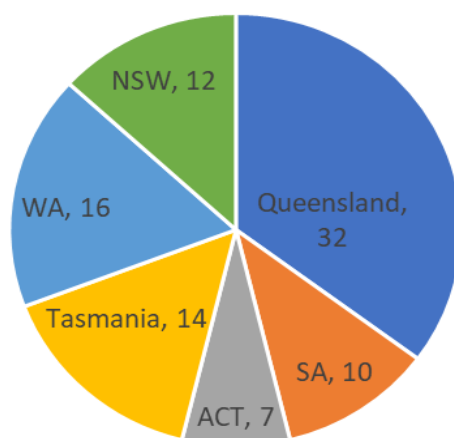


Figure 15 Location of householders surveyed

Almost all householders surveyed owned and lived in the houses assessed, with only three of the responding householders renting.

9.3. Reasons for having an assessment

Householders stated the most common reasons for having the assessment was that they were curious about their homes' efficiency (24%, 57 householders), followed closely by wanting to improve the comfort of their home (22%, 53) and reducing energy use/emissions (20%, 48) and reducing energy bills (17%, 40), as shown in Figure 16. Note that householders could nominate more than one reason.

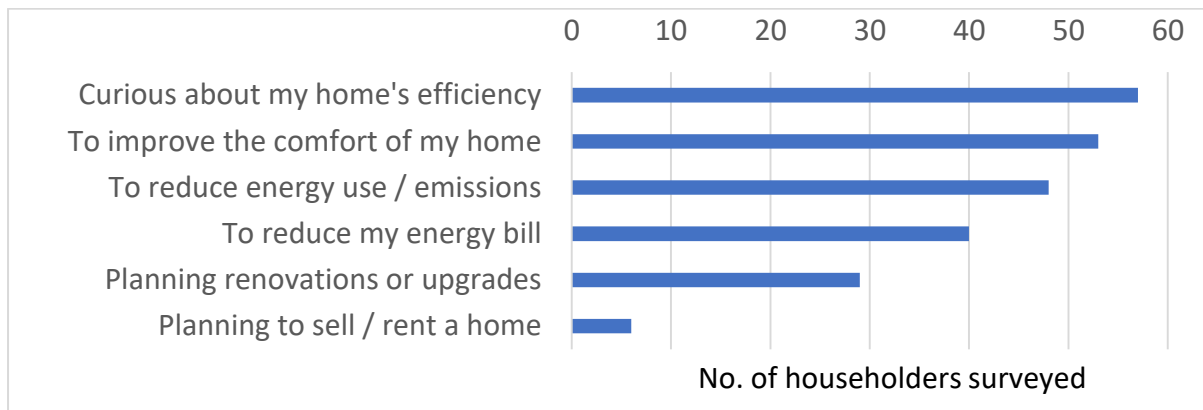


Figure 16 Reasons for Scorecard assessment

9.4. Feedback on assessor performance

Feedback on the overall knowledge, experience and advice the assessors provided was extremely positive.

96% (87) of householders said the assessor provided useful ideas for upgrades. Some examples of the comments provided include:

"Very impressed with professionalism of your agent. Went out of his way to ensure that we knew what he was talking about. Very pleasant person."

"Our assessor was VERY knowledgeable with years of experience. It was certainly a worthwhile exercise. We appreciate the opportunity very much indeed!!"

As can be seen in Figure 17, the following summary of 'experience' responses shows the majority of assessors were described as punctual, professional and friendly, and acting in the best interest of the householder.

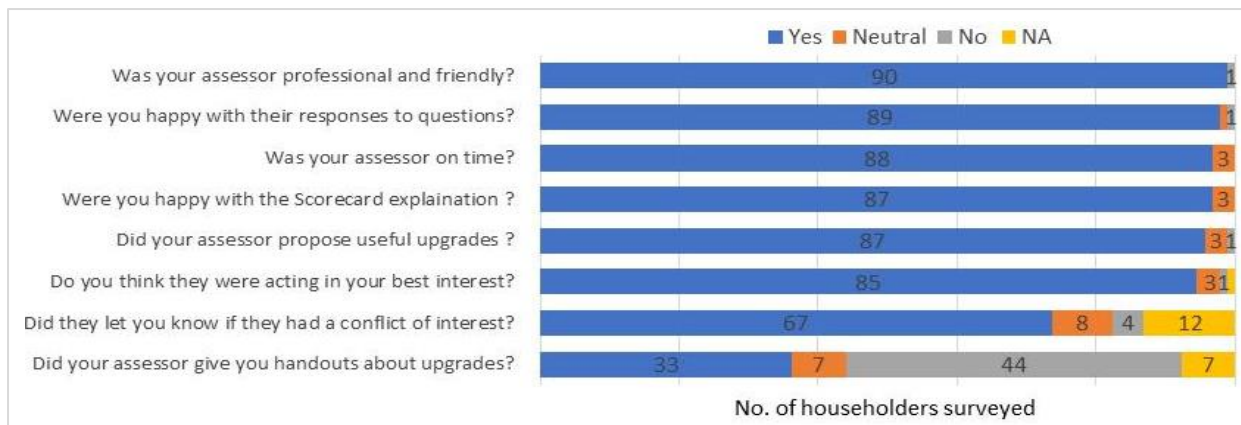


Figure 17 Feedback on assessor performance

A high percentage of householders responded "yes" to the question: *Did your assessor let you know whether they had a conflict of interest?* Only four households answered with "no". The remaining 20 responded with "not applicable" or "neutral", which may suggest they could not remember if the assessor had discussed conflict of interest with them or not.

Nearly half of the householders reported that assessors did not provide handouts. However, assessors were not asked to provide handouts as part of this pilot – it was an optional extra that assessors could provide, therefore this result is not an indicative measure of the performance of the assessors.

9.5. Feedback on the Scorecard process

92% of householders reported the assessment met their expectations. With regards to the entire Scorecard process, the majority of householders were very positive about key aspects of the assessment, with only two householders stating the assessment was not a good use of their time.

Some examples of the comments provided, relating to the assessment process, include:

“Was a professional service and gave some useful high-level tips about energy efficiency for my home.”

“It's an excellent service and I hope it's rolled out statewide. Understanding energy consumption is complex because each building has different needs due to a range of factors. Personalised advice is essential.”

77% of householders stated they understood more about their home's efficiency after the assessment. A summary of the responses to questions about the process is shown in Figure 18.

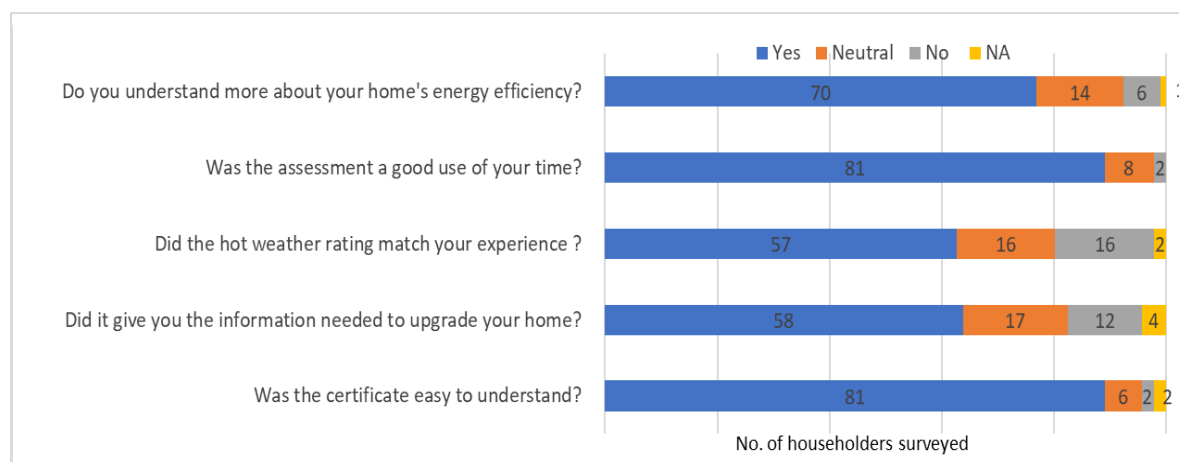


Figure 18 Satisfaction with the assessment

The results suggest the hot weather rating did not always reflect the homeowners experience (in 16 of the 91 responses), particularly in WA (7 of 16 household surveys) and in Qld (4 of 32). The general comments suggest this could be due to the fact that:

- The tool does not assume that shade from vegetation is permanent (because the survival and retention of vegetation is dependent on who is living in the house)
- This version of the tool was not designed for houses in warm humid climates and where significant ventilation is used for cooling. A tropical version of the tool is currently being piloted.

12 of the 91 householders stated the assessor did not provide the information needed to upgrade their home. Half of these were the same householders who reported that information provided was not useful for the above reasons. The other householders had other reasons, all of which are illustrated in the section **Analysis of general comments**, included at the end of this chapter.

9.6. Time taken to undertake the assessment

Based on the householder survey, the average time taken for the assessment was approximately 2 hours, which matches the average duration reported by the assessors. Approximately one third of the assessments were less than 1.5 hours and one third over 2 hours, as shown in Figure 19.

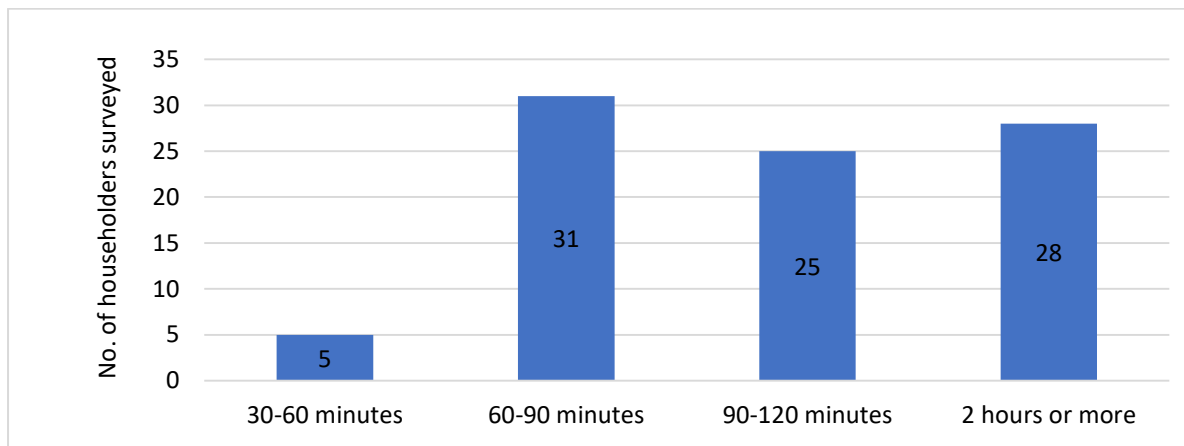


Figure 19 Time taken to undertake Scorecard assessments

9.7. Upgrade recommendations and householder motivation

Figure 20 shows that many householders were motivated to undertake a significant proportion of the recommended upgrades provided by assessors and that no upgrade types appeared to be particularly unpopular with householders.

Overall, 82% of householders reported the assessment motivated them to upgrade their home with another 5% being somewhat motivated.

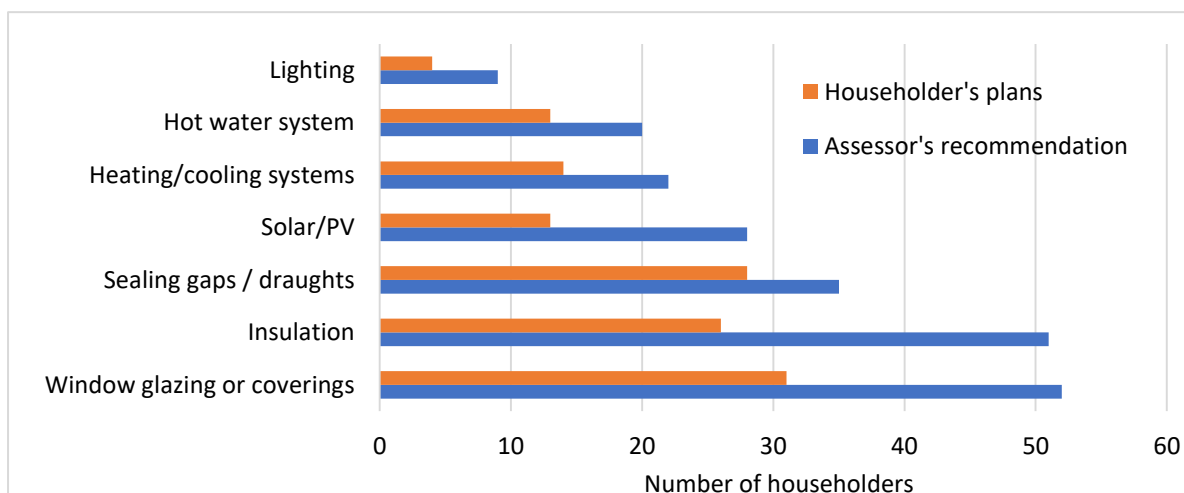


Figure 20 Commonly recommended upgrades and householder plans to undertake these upgrades

Of interest, two of the renting householders that responded to the survey stated they were planning to make upgrades to their homes, whereas the assessors assumed that all the renters would not make upgrades.

Of the 11 householders who stated they were not planning to undertake upgrades, the most common reasons for not wanting to take action can be categorised as:

- financial (4 of the 11),
- the home was recently built or renovated (2), or
- they were planning to sell and or move soon (2).

9.8. Analysis of general comments

Other feedback provided in the general comments section has been analysed for common themes, as presented in Figure 21.

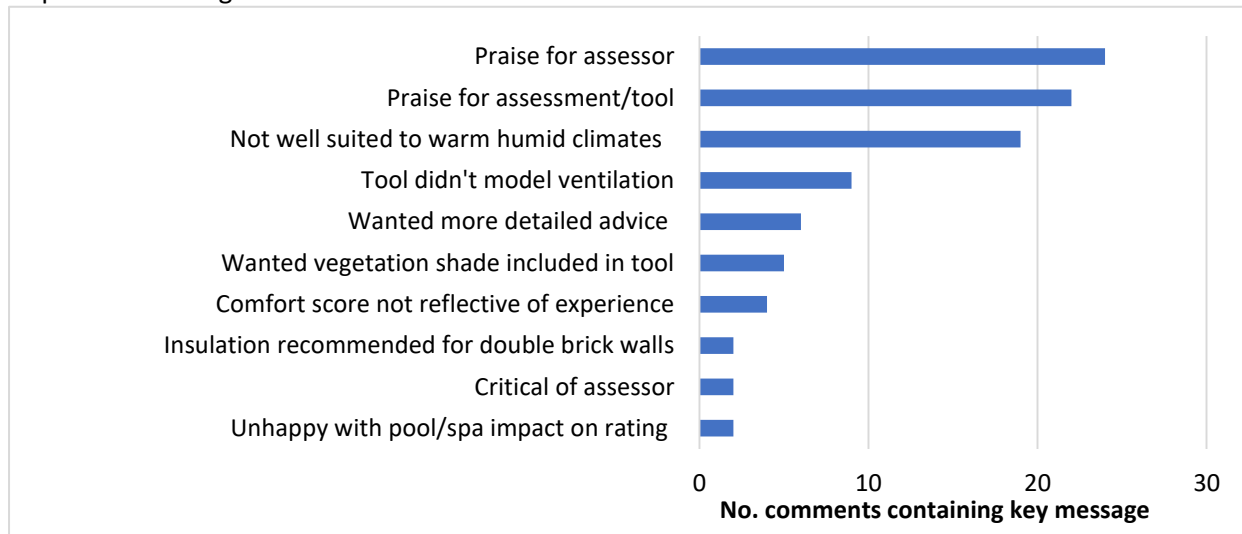


Figure 21 Key messages from general comments

10 Assessor Survey results

All assessors (13) completed a survey after each assessment and also when all the assessments had been completed. This consisted of the 9 assessors accredited as part of the pilot plus 4 SA assessors already accredited. There were 146 responses to the assessor survey.

10.1. Overall experience and benefits

The assessor survey captured:

- 13 untenanted (including off-the-plan) assessments (these assessments were excluded from the analysis of responses to questions relating to the householder); and
- At least 5 houses that were rented at the time.

Overall feedback from assessors suggests they found the scorecard to be a very useful tool for informing residents of, and prioritising, energy efficiency upgrades.

"The sequence of entering data seems logical and flows well."

"Assessment process and outcomes are easy to explain."

"The certificate is easy to follow and provides sound recommendations."

"The Scorecard is a great tool."

10.2. Usefulness of the assessment

Excluding assessments for houses with no homeowner present, assessors thought the assessment was useful in 97% of assessments. More specifically, this includes:

- 65% of assessments considered to be very or extremely useful;
- 32% of assessments considered somewhat useful; and
- 3% not considered at all or not so useful.

Some of the reasons assessors found the assessment to be very or extremely useful include:

"We suggested some things that client didn't know / hadn't thought about."

"House is uncomfortable, and they were unsure what was best to do next."

The comments provided for assessments considered to be only 'somewhat useful' suggest that many of these householders were already highly knowledgeable about energy efficiency.

"Already confirming what they have been thinking about. Helped to target the big items that will make the most difference."

"The owner has significant plans for building upgrades, and these had been previously researched. My input was valuable for him to prioritise the process of upgrading specific components."

Assessors' reasons for the four assessments that were considered as 'not useful' included:

- the person was elderly and not in a position to take action (2)
- the client was focused on energy saving and not concerned about the energy bill (1)
- Landlord asked for only behavioral recommendations to be spoken about to tenant (1)

10.3. Expected householder benefits

The reported householder benefits from following the assessors' first recommendation are shown in Figure 22.

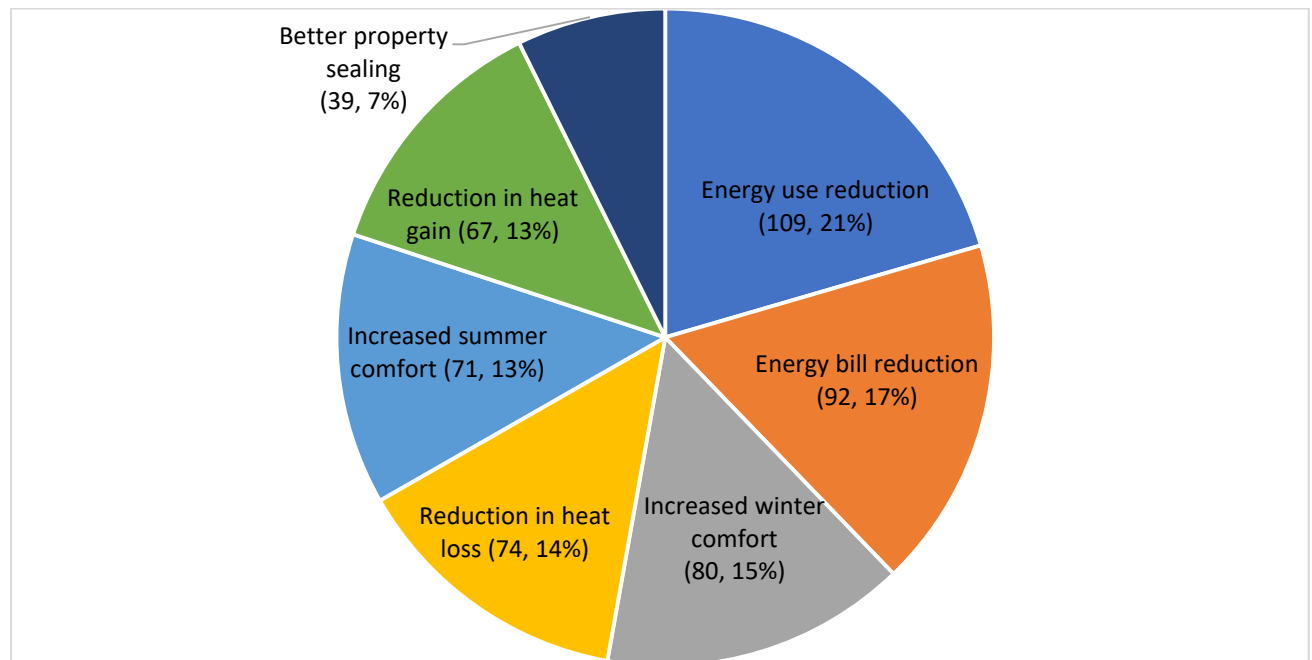


Figure 22 Breakdown of the most commonly expected benefits for the householders (number of households, % of households)

10.4. Assessment risks

There were no risks reported for 91% of assessments.

For the remaining assessments, some of the more common risks include:

- Pets (including “small dog being too friendly”)
- High ceilings and other issues related to gaining access into roof cavity
- Physical obstacles (i.e. clutter) within the house

All risks were managed by the assessors, with the most common methods including:

- Requesting that dogs be isolated (or befriending them)
- Following the Safe Work Method Statement (SWMS) and taking extra care
- Obtaining insulation evidence from house plans instead of entering the roof cavity
- Requesting the owner move physical obstacles.

10.5. Alignment with assessor expectations

Given that only assessors with house and energy efficiency knowledge were considered for this pilot, the assessors were asked if the information provided by the tool to the householders aligned with their expectations. For the majority of assessments (74%) assessors stated the star rating on the certificate reflected their intuitive assessment.

The most commonly reported aspects assessors looked for to predict good alignment with the overall star rating include:

- The date of construction - new houses have better standards, old leaky houses are typically of a lower standard
- The size - smaller houses are easier to predict the rating
- The existence of solar panels
- The amount of insulation
- Leakiness of the house
- Heated pools / spas
- The material of construction
- Heating type or cooling
- Building design

Hot weather ratings

In most assessments (79%) assessors were able to predict the hot weather rating. Of those assessments where the assessors' prediction of the hot weather rating did not align, SA had the highest number (8 of 31), followed by Qld (6 of 35). Those unable to predict the rating assumed the house would get a higher hot weather score because:

- It was a double brick house (in a temperate climate)
- The building or living areas were well shaded
- The dwelling was well ventilated (either above or under floor)
- The householder reported that there were no issues relating to hotter conditions

Building shell ratings

In 91% of assessments the building shell rating aligned with the assessor's intuitive assessment. For most of the assessments where the building shell rating was lower than expected, the assessor reported this was due to the amount of insulation in the house (i.e. The house had high levels of insulation, but the rating was brought down due to elements such as air leakage or lots of large windows). In this group, WA had the highest number of lower building shell ratings than expected (7 of 21) followed by SA (4 of 31).

10.6. Usability of the Scorecard tool over time

Assessors found the tool easier to use over time and gained confidence as they performed more assessments, as shown in Figure 23. This graph shows the assessors' ease of using the Scorecard tool and confidence in communicating program details with increasing numbers of assessments.

"I am finding my way around the Scorecard much faster than the first 10 assessments that I have done."

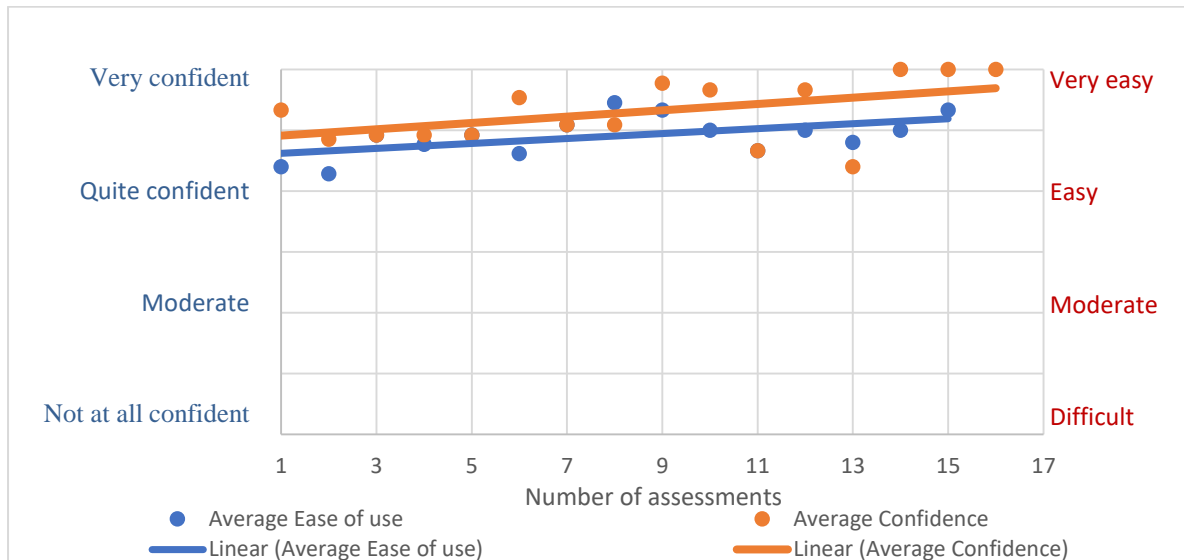


Figure 23 Assessor confidence and ease of software tool use with increasing numbers of assessments performed

10.7. Scorecard technical issues, tool and process

In 69% of assessments assessors reported they did not experience any technical issues. In most of the assessments for which issues were reported, assessors experienced internet coverage related issues.

10.8. Comparison with other energy assessment tools

When asked how the Scorecard tool compares to other energy assessments the assessors may have carried out, in 15 (of 20) responses assessors reported the tool was better than others and 5 reported that it was similar. No one stated it was worse than other software tools. Other tools that assessors may have used include NatHERS tools or state-based tools (e.g. REES assessments).

“Very good. It is good to have a point of reference and calculations based on fact rather than just given my opinions. It is simple enough to understand but gives the information required.”

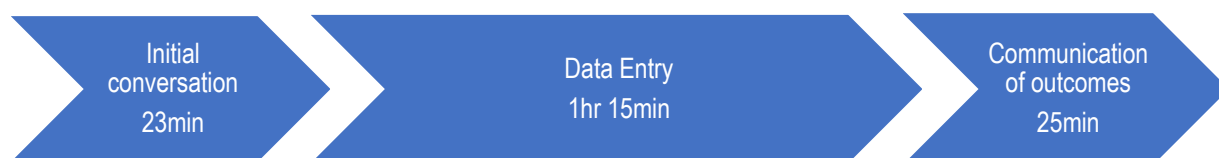
“More meaningful outcomes and practical solutions delivered.”

Some of the general comments report the tool is not well-suited to warm / humid climates and does not account for ventilation and shade from vegetation or structures (as per the householder survey). These issues will be explored further with the pilot of the tropical Scorecard tool.

10.9. Average time to generate Scorecard rating

Across the 133 assessor responses (excluding vacant and off-the-plan assessments), the average time required to undertake the assessment was approximately 2 hours. Note this refers only to the time spent at the house and excludes any additional follow-up work to check numbers and further research on star ratings for appliances, etc.

The average duration of the three stages of the (on-site) assessment are shown in Figure 24, which shows the data entry and recording stage took the longest.



*Note: for the 23 assessments that fell into the “90+ minutes” category it was assumed the average time taken was 2.5 hrs.

Figure 24 Average time taken to complete the three stages of the Scorecard assessment

10.10. Recommendations made to householders

The upgrades most commonly recommended by assessors are summarised in Figure 25

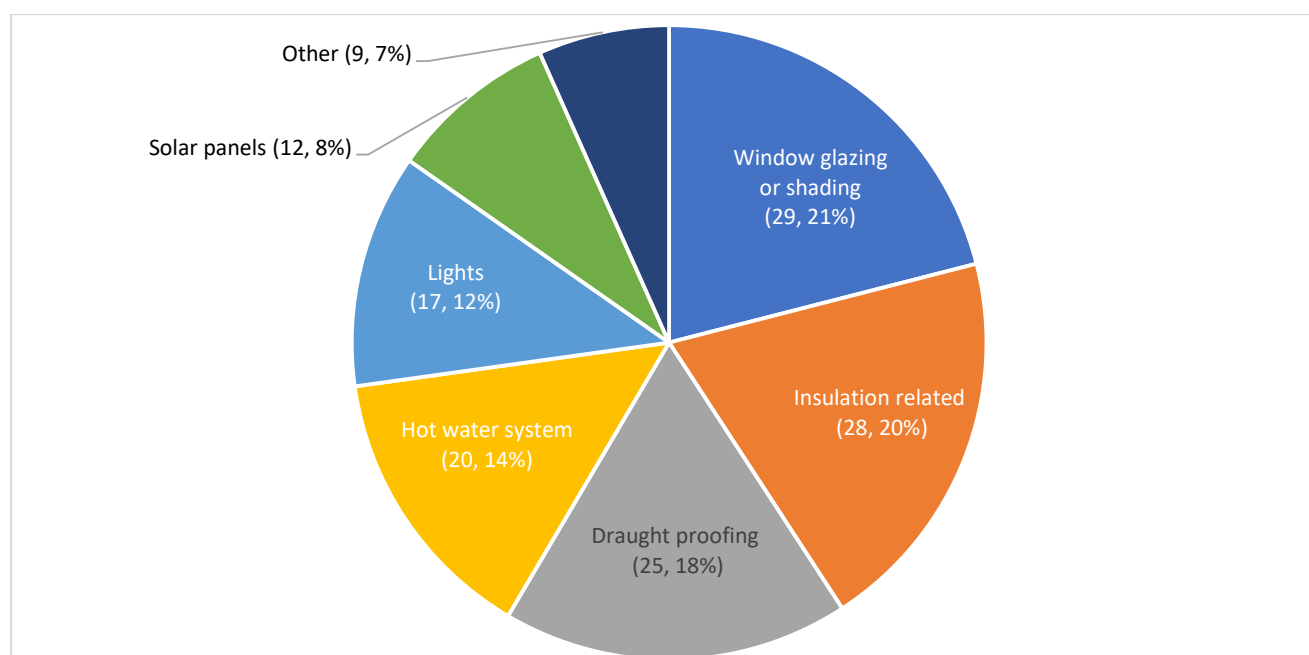


Figure 25 Breakdown of the most commonly recommended upgrades (number of assessments, % of assessments)

This feedback on the most common recommendations from the assessor survey is slightly different to that collected from the householder survey (presented in Figure 6) as not all householders responded to the survey and some assessors did more assessments than others.

Figure 26 shows the first three upgrade recommendations. Window glazing and shading was the most commonly recommended upgrade, but improving insulation was more often the highest priority upgrade.

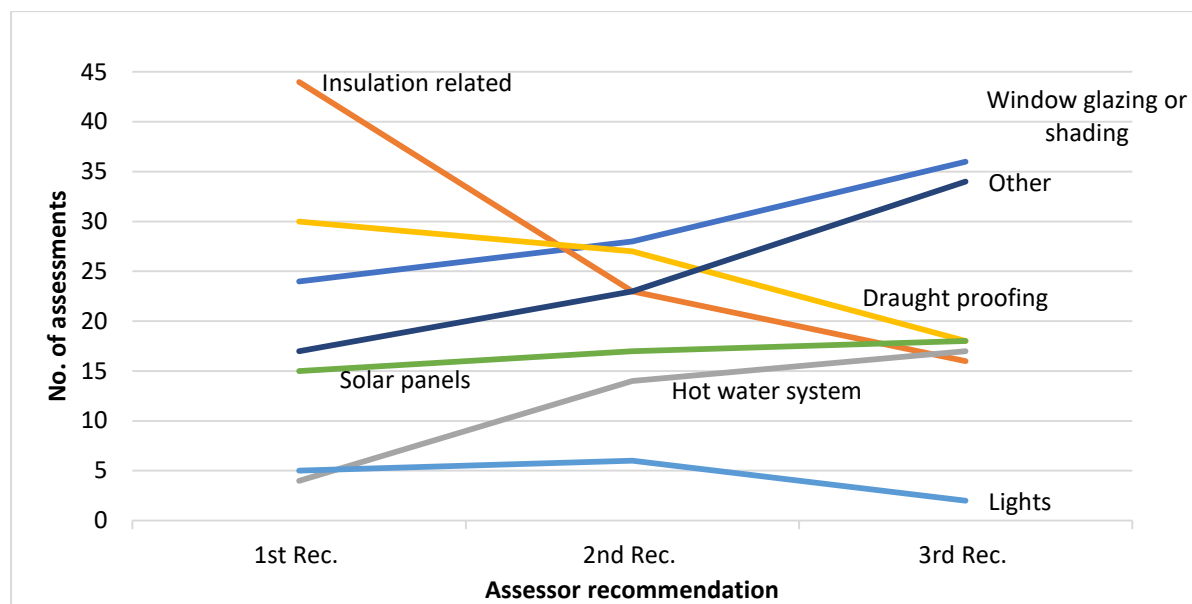


Figure 26 Prioritisation of assessor recommendations

10.11. Householder motivation to upgrade

Assessors estimated that around 83% of the householders were going to undertake their first and second recommendations and that 68% would undertake their third recommendation.

The assessors reported the main reasons householders would undertake their primary recommendations to be:

- because they were motivated and knowledgeable
- it was easy to do / low cost, or
- because the householder wanted to improve the comfort of their home.

A breakdown of the householders' most common motivations is shown in Figure 27.

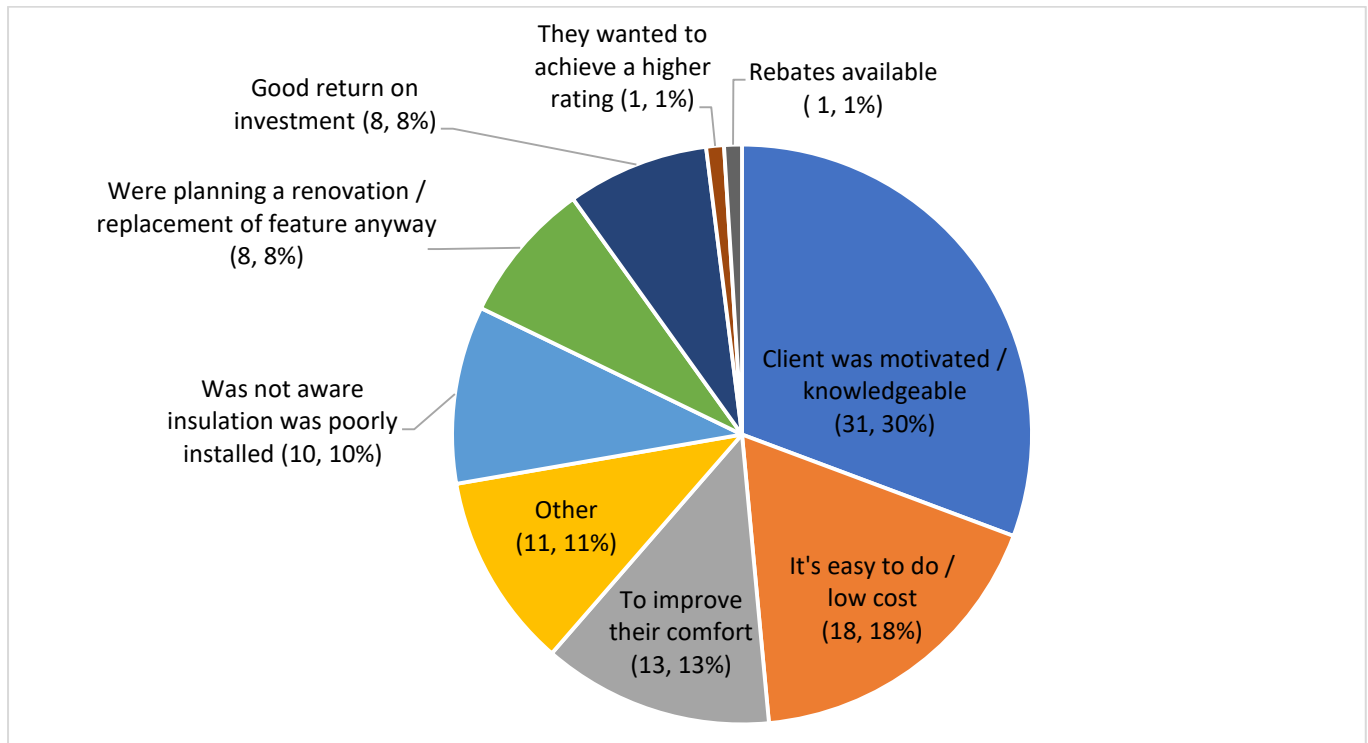


Figure 27 Most common householder motivations for undertaking an upgrade (number of assessments, % of assessments)

The main reasons assessors reported householders would not undertake the first or second recommendation are summarised in Figure 28.

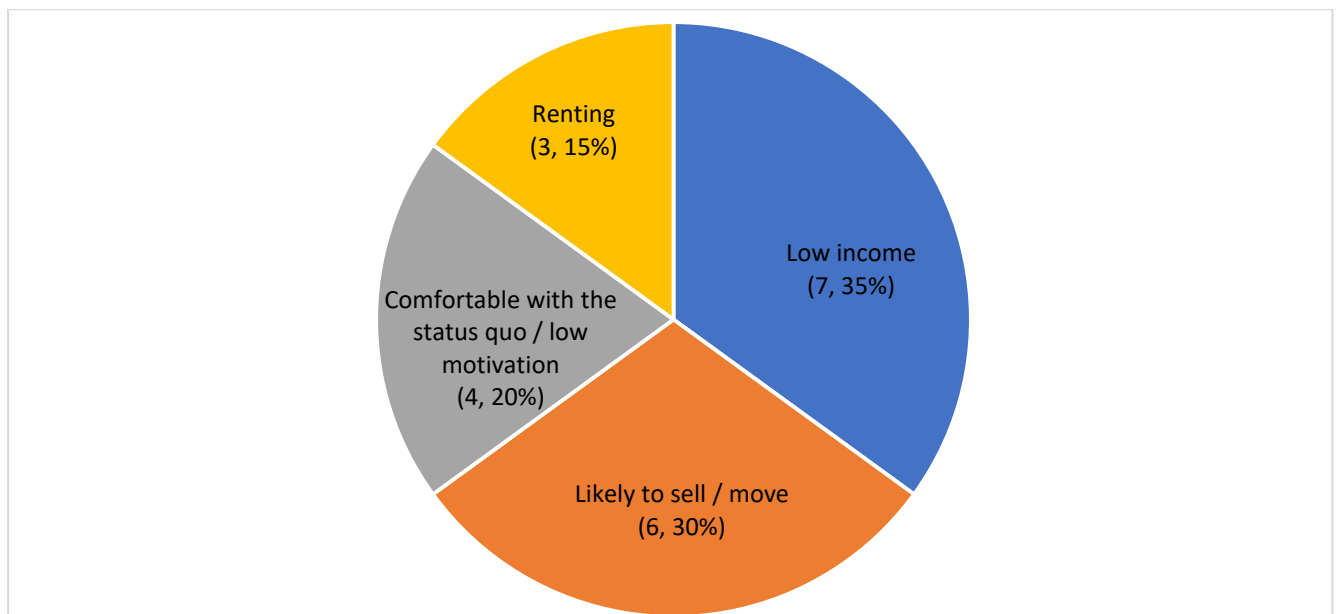


Figure 28 Most common householder reasons for not undertaking an upgrade (number of assessments, % of assessments)

11 Next Steps

This report provides the results of the pilot the Scorecard in all temperate capital cities. During 2020 there will be consultation based on these findings to inform future actions to progress this measure.

Appendix: Acronyms and definitions

Building shell	The key (external) elements of a house, including walls, roof/ceiling, floor and windows.
COAG	Council of Australian Governments. COAG is the peak intergovernmental forum in Australia. The members of COAG are the Prime Minister, state and territory First Ministers and the President of the Australian Local Government Association.
COAG Energy Council	The COAG Energy Council, chaired by the Commonwealth Minister for the Environment and Energy, is the body responsible for supervising and reforming Australia's energy markets.
Energy efficiency	Using less energy to provide the same service or achieve the same result.
Heating and cooling load	Annual energy output of heating/cooling devices required to maintain certain thermal comfort conditions inside the home.
kWh	Kilowatt hour (unit of power measurement across time)
m ²	Square metres (unit of area measurement)
MJ	Mega joule (unity of energy measurement)
NatHERS	Nationwide House Energy Rating Scheme. NatHERS is a star rating system (out of ten) that rates the energy efficiency of a home, based on its design. Its scope is limited to the thermal performance of the building structure and is intended to indicate the heating and cooling requirements. It excludes other home energy use such as hot water, lighting and appliances.
NEPP	National Energy Productivity Plan. The NEPP is a COAG Energy Council agreed package of measures to improve Australia's energy productivity by 40 per cent between 2015 and 2030.
OHS	Standards for Occupational Health and Safety protection
PV	Solar photovoltaic power (photovoltaics)
Residential buildings	Residential buildings include detached houses, attached dwellings and buildings containing two or more sole occupancy units.

Residential Efficiency Scorecard	Program is designed to inform householders about the energy performance of their dwellings and to advise of potential measures that could be undertaken to reduce energy costs, improve occupant comfort and reduce the carbon emissions from the home. Available in Victoria since April 2017
REES	Retailer Energy Efficiency Scheme
SQAP	Scorecard Quality Advisory Panel
WHS	Standards for Work Health and Safety