



Learnings from the Energy Savvy Upgrades program for vulnerable householders



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.

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The 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. 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.

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This program demonstrates best practice in reaching vulnerable households, including renters, while reducing upgrade and program management costs.

Households reported a reduction in energy costs and an improvement in health and comfort. These outcomes were attained through use of the Residential Efficiency Scorecard and can be achieved at scale.



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About the program

What is the Energy Savvy Upgrades program?

The Energy Savvy Upgrades program (Phase 2 of the Affordable Retrofits program), involved assessing 792 Victorian homes, including rental homes, whose residents were experiencing energy poverty. Following a home assessment by an accredited Residential Efficiency Scorecard (Scorecard) assessor using the Scorecard tool, householders were offered a part-subsidised home energy upgrade package. The recommendations were based on a combination of building shell upgrades, appliance replacement, and energy advice.

The upgrade package recommended by the Scorecard assessor was specific to the house as well as household needs and was based on a combination of the Scorecard home assessment¹ and discussions with the householders. Households were then supported to install upgrades, with surveys and energy consumption data used to evaluate the results. Assessors collated information on recommended and selected upgrade options, value of subsidies and co-contributions. Nineteen different types of upgrades were delivered in the program.

The program took place between October 2018 to June 2022 and was delivered by the Victorian Department of Environment, Land, Water and Planning (the department). The program was core funded by the Victorian Government. Five additional organisations (councils, community groups and state government) later decided to contribute extra funds to extend the program as it was seen as an effective way to help their target households. Of the 792 homes that were assessed, 612 homes were upgraded.

¹<https://www.homescorecard.gov.au/>



What were the program's objectives?

The Energy Savvy Upgrades program aimed to increase energy literacy. It also provided advice and financial assistance to enable householders to proceed with upgrades that would generate long-term cost of living benefits. The goal was to minimise program management costs while maximising community benefits.

Informing future policy direction on energy efficiency for low income and other vulnerable households was a key focus. The program built on previous work by trialling recruitment methods, developing messaging appropriate to householder demographics and trialling various financial incentives.

Program objectives were to:

1. Reduce the energy bills of participating vulnerable households.
2. Reduce energy related greenhouse gas emissions in participating households.
3. Improve comfort levels of participating householders.
4. Test delivery models that could be replicated and scaled in the future.



Key learnings summary

These key learnings provide best practice approaches for similar programs of any scale.

1. Well-managed home energy efficiency programs are a cost-effective way to support vulnerable people	2. Programs at scale can improve quality but need careful planning	3. Assessor skills and knowledge is vital to program success
4. Rental homes can be reached with well-managed energy efficiency programs	5. Health benefits of home upgrades are a major program outcome and are under recognised	6. Scorecard assessments and accredited assessors reduce costs and improve outcomes
7. Participant ownership of decision-making is important to deliver benefits	8. Householders are more confident in information that comes from a trusted source	9. Program design needs to consider retention of participants
10. Lack of technology access can be a barrier to accessing government programs	11. Subsidy levels matter, vulnerable householders require appropriate financial support for upgrades	12. Currently available financing is unattractive to vulnerable households
13. A whole-of-government approach ensures government requirements, standards, rebates, incentives, and concessions work together	14. Flexible eligibility requirements help ensure the project reaches vulnerable households	15. Evaluation is a priority to deliver quality programs, and learn for future programs



How was the program designed?

The Energy Savvy Upgrades program design team considered learnings from the many preceding home energy upgrade programs in Australia. The program was designed to specifically target households experiencing difficulty managing their energy bills. Participants needed to be able to contribute to the costs of an upgrade but be unable to fully self-fund an upgrade. This was considered a specific sector of the community that could materially benefit from support and potential future large-scale programs.

Scorecard assessments

Scorecard assessments were used to guide home energy upgrades to provide a trusted, objective and qualifiable basis for decision-making and evaluation. Scorecard is a nationally endorsed program, where accredited home energy assessors use the Scorecard tool in the home to provide home energy performance ratings specific to the home (ratings cover energy cost, greenhouse gas emissions, and comfort). To clearly show the benefits of the upgrades, assessors provide a before and after upgrade assessment. Assessors also discuss the needs and priorities of the householders to inform their advice.

Tranches of work

The program was divided into five tranches of work. Four of the tranches targeted specific geographic areas with known socioeconomic hardship. One tranche incorporated all other areas of Victoria in recognition that there are pockets of hardship across Victoria. This robust and flexible design incorporating five tranches of work allowed for learnings to inform later tranches. This design also helped program managers and providers mitigate the impacts of the COVID-19 pandemic from March 2020 onwards.

Each tranche was the responsibility of a delivery provider, usually an accredited Scorecard assessor. In recognition that there is a small market able to deliver this type of project well, each tranche had a targeted number of households to meet what was considered manageable within the time frames.

The delivery provider developed relationships with a variety of retrofit businesses. Tranches were tendered separately over time to allow for iterative adjustments to the delivery model. Installers and products were selected by the providers. To reduce warranty issues, good quality upgrades were essential and required in the delivery design. A good level of efficiency combined with reasonable pricing affordable for this cohort was also required.



Safety and quality

Safety and quality of work was prioritised throughout the program. All installer information and product proposals were approved before work began. Installers were required to hold applicable licences and insurance. Insulation installers were also required to use a checklist for electricians and installers with mandatory submission of photographic evidence to the provider. Similar requirements were developed for other products where this was considered appropriate.

How were participants selected for the program?

Rather than including or excluding participants on strict criteria, program eligibility was relatively broad and was based on householders self-declaring that they found managing their energy bills difficult. As the situation of each household differs in terms of their cost pressures, the number of people in a household or change-of-life events, there was no firm income limit.

Recruitment of participants was the responsibility of the provider of each tranche who interviewed the householder to ensure they were genuinely in need of this assistance. Campaigns were designed to give clear information about program requirements and expectations. Materials offered examples of circumstances that might make a household eligible, such as managing long-term illness or disability, being unemployed, living on a low income, or having a large family. Materials also included the requirement for householders to contribute financially.

How were householder processes and co-payments managed?

During initial discussions with providers, each participant was clearly informed that they would be expected to pay a fee for the energy assessment and that the Scorecard assessment would be completed by accredited Scorecard assessors. They would need to make a co-payment towards the cost of upgrades and would receive a subsidy towards both the assessment and upgrades from the project. The level of subsidy and percentage of co-payment required varied by tranche.

Each participant was offered the opportunity to receive assistance (at no additional cost) to claim the Power Saving Bonus (originally at \$50, then later at \$250). This involved checking they were on the best energy plan through Victorian Energy Compare (Victorian Government website). Rental properties were eligible for upgrades, with the owner of the property responsible for paying for the upgrades. Additional advice was given to the occupant in terms of how best to use the features in the house to minimise energy costs.



How was the program monitored and evaluated?

The Scorecard program regime ensures Scorecard assessments are audited. This existing process was used to ensure the quality of Scorecard assessment in the Energy Savvy Upgrades program. There were four main points of monitoring and evaluation: auditing Scorecard assessments, auditing installed upgrades, conducting householder telephone surveys, and measuring the impact on energy bills.

An independent organisation was recruited to conduct safety and quality audits of 25% of all upgrade installations. Audits focused heavily on ceiling and underfloor insulation, heating, and hot water appliances. Auditor checklists were developed and converted to electronic forms with functionality to upload photos. The auditor checklists reflected the expected standards included in the insulation checklist used by installers as well as Australian Standards requirements for electrical work.

Audits were intended to be carried out at the mid- and end-points of delivery in each tranche. However, interruptions as a result of COVID-19 health restrictions meant that all audits for Tranches 3, 4 and 5 had to be completed at the end of upgrade work. All audits that revealed safety and significant quality issues were referred to the providers for resolution by their installers.

At the conclusion of each tranche of work, householders were surveyed by telephone by an external organisation, with feedback informing future tranches and program evaluation. On completion of upgrades, outcomes in relation to energy and greenhouse gas emissions savings, comfort and householder perceptions were evaluated along with costs and benefits.

In addition, data on energy bills was collected to monitor actual impacts on energy costs. This was effective for the first two delivery tranches. Subsequently, impacts from COVID-19 stay-at-home orders meant that this approach was not useful for the later tranches as there were major changes in year-on-year householder behaviour.



Key learnings

1. Well-managed home energy efficiency programs are a cost-effective way to support vulnerable people

The Energy Savvy Upgrades program was cost effective and generated strong returns to households. Despite substantial challenges, such as managing the impact of COVID-19, the program achieved higher than projected benefits. The total program cost, including overheads and management costs, was \$2,240,000 (around \$3,600 per upgrade). Administration costs for internal and provider staff represented 25% of the overall program costs indicating that future administration costs could feasibly target similar levels.

The focus of the program was on infrastructure to ensure upgrades benefits would continue over multiple years. Of the 792 assessments, 612 progressed to upgrades. Annual householder energy bill savings after upgrades are currently an average of \$550 per annum.² As energy costs rise, householders will continue to achieve greater savings as a result of more efficient appliances.

Householders experience strong return on their investment



There was a 21% reduction in energy costs (program design targeted 10% reduction).



Over 80% of householders experienced improved comfort and resilience to extreme weather.



Annual householder energy bill savings after upgrades are currently an average of \$550 per annum.



There was a 16.5% reduction in associated greenhouse gas emissions (project design targeted 10% reduction).

Working with delivery providers

To deliver this outcome, program design considered the on-ground situation which is dominated by small businesses. These businesses were generally led by Scorecard accredited assessors, who developed local delivery networks that could provide upgrades at the required quality and cost standards. These businesses benefited from a collaborative approach with the department, who set clear quality standards and feasible delivery schedules.

² Based on an average energy bill of \$2,600 per annum.



Delivery providers typically underestimate the time it takes to work with vulnerable households and to work with government procedures. Setting objectives, outputs, tasks, processes, and expectations early with providers minimised uncertainty and ambiguity for providers and allowed them to set up their business to manage them from the beginning. Uncertainty and lack of clarity on success parameters is costed into delivery by providers.

Delivering upgrades by location was found to be the most efficient way to reduce costs, establish suppliers, increase referrals, and build trust. To reduce delivery costs and the number of home visits required, as well as improve delivery times, assessors worked with product installers to prepare quotes for most upgrades.

Partnering for a collaborative approach

The approach to managing delivery partners included framing discussions with the department as opportunities for all parties to learn about delivering this type of project and for resolving issues as they arise. This created trusted relationships. Providers felt they could freely raise issues and incidents and be supported to resolve them in a positive way.

Partnering with other organisations to fund additional upgrades was a key aim of the program and delivered strong results. In total, three local governments, one community organisation and one other state government department decided to contribute additional funds towards upgrades for specific groups of vulnerable households. These organisations saw a significant benefit in assisting their residents directly without having the cost and overheads of running their own small program. As the program was run by the Victorian Government, these partner organisations were confident that it would be well managed.

Improving safety

Improving safety was an added community benefit delivered by some upgrades. Several houses were identified as having structural issues that required attention before standard upgrades were installed, such as holes in walls, broken windows and leaking roofs. Some households need both more efficient appliances and the building shell to be addressed. Some upgrades required specific work such as making a roof space safe for insulation and switchboard upgrades to meet the latest Australian Standard. These added to the total package cost. Although in some cases this cost was significant, the upgrades substantially improved safety.



Delivering the upgrades

Learning by doing was part of the program design. This included staged delivery to allow program design to continually improve and prioritising collection of data to support program monitoring, evaluation and learnings. This approach created a program that delivered clear benefits, managed the impacts of COVID-19 as well as contributed to the design of future programs.

The Energy Savvy Upgrades program delivered a high level of conversion from assessment to upgrade, and attracted a significant level of additional financial support from other organisations.

2. Programs at scale can improve quality but need careful planning

The Energy Savvy Upgrades program was designed to examine opportunities and issues for larger scale programs. Businesses are not able to easily scale to deliver short-term programs which drives program costs higher. Longer term programs can therefore be more cost effective than short-term projects. A large-scale government program attracts immediate interest, and businesses build capacity to deliver. However, without effective planning at each stage of the scale up process there is the risk of price increases, product shortages and installation quality issues.

When announcing a large-scale program enough detail and lead time needs to be included to give potential providers and installers the opportunity to attract and train staff, pre-order stock, apply for approved status and set up their business models. Supply chain issues, cost and quality benefits of planning a large-scale upgrade program must be considered. This includes the pre-approval of quality products, training and support for installers, especially in regions.

Build market capacity

Building market capacity to deliver high quality upgrades at scale includes considering whether delivery sectors are regulated and have quality control oversight. In the absence of these, the program may need to develop processes such as provider entry requirements, installation checklists with evidence collection (photos), and on-ground audits.

Establishing requirements and pre-approving providers against these requirements can generate substantial efficiencies. Sectors considered as lower skilled, such as insulation and draught proofing, must be specifically supported to deliver quality outcomes. This includes providing training, approving products and setting quality criteria.



Consider community needs

The needs of the community participating in the program, and how these needs may impact project implementation, must be considered. For example, in many participating culturally and linguistically diverse (CALD) and vulnerable households, there was a clear need for female assessors and upgrade installers. This was due to some CALD households requiring the husband to take a day off work while a non-familial male was in the home. In some vulnerable households, due to a history of domestic violence, having female assessors and installers was essential to keep these households in the program. This presented a challenge as there was only a small pool of female assessors and upgrade installers to draw from.

For further information and recommendations for developing similar programs see 'Setting up similar programs' on page 46.

3. Assessor skills and knowledge is vital to program success

Accredited Scorecard assessors played a key role in the success of the program. The Scorecard assessment was valued by participants and helped them determine the best upgrades. Deciding the right upgrades is technically difficult, arranging quality upgrades is very time consuming and vulnerable households have significant difficulties committing the required time and effort to this task. Once an assessor is trusted, upgrades become achievable – even those funded by landlords.

Feedback from the on-ground providers and funding partners indicated that some further training would be beneficial for Scorecard assessors on how to deal with vulnerable householders including those living in challenging conditions and those with mental illnesses (such as hoarding disorder). Skills and knowledge to refer householders to an organisation that can offer financial counselling and financial assistance would also be beneficial. For CALD communities, having a trusted and respected community leader available for translations and issue resolution may also be of benefit.

Most survey respondents stated the Scorecard assessment provided a good experience and useful information that helped them to determine the best upgrades.

As well as collecting data about the house and appliances, part of each assessment included skilled assessors discussing upgrade opportunities with the occupant. This increased householders' energy and climate change literacy. For rental properties, the owner was included in discussions. These conversations allowed the assessor to share information such as the relative efficiency of appliances, why improving the home's



thermal shell is so important, and other actions they can take. This contributed to increased capacity of householders to make future decisions about upgrades or their behaviour. Such conversations become even more important for programs that aim to help householders transition from gas or firewood because of the variety of questions most households have about such changes.

4. Rental homes can be reached with well-managed energy efficiency programs

Providers in this program installed 145 upgrade packages into rental houses (24% of homes assessed), with the owner paying the costs. For the first 100 homes tranche there was a requirement for providers to reach private rental homes; for this tranche 42% of upgrades occurred in private rental properties generating a 23% decrease in total energy consumption (26% gas, 17% electricity).

Uptake for the rental sector declined thereafter due to reduced available budget, including COVID-19 cost increases and delays. Reaching rental homes did increase costs as both tenant and landlord had to be involved in decision-making.

Owners were able to see the benefit to their renters and themselves with increased ability to retain their tenants, without the overhead of arranging upgrades.

Traditionally, the rental sector has been seen as too hard to reach despite the clear needs in this sector, with sectors such as home-owning retirees often being the main beneficiaries in previous programs. To participate in the Energy Savvy Upgrades program, owners were required to have a limited ability to upgrade their property. There is an appreciable cohort of rental property owners in this category.

Finding a property manager who understood the value to property owners was key in being able to upgrade rental properties. An engaged property manager could contact their entire database of owners and facilitate contact with those who were interested. The introduction of minimum standards for rental properties in Victoria increased interest from property agents and landlords. However, not all rental property owners believed they should be installing the best energy efficient product for tenants and wanted to install cheaper, inefficient appliances.



5. Health benefits of home upgrades are a major program outcome and are under recognised

Program objectives did not include improving householder health and it was not one of the top factors in the decision of households to participate. However, when householders were surveyed on completion of the upgrades, 62% of householders thought their health had improved due to the upgrades. The program also ensured that 39 unflued gas heaters, which can be a health and safety risk, were either decommissioned or serviced and a carbon monoxide detector installed.

Linking home energy upgrades to climate adaptation and health benefits would give a more complete picture of the overall benefits of this type of program. In a recent Victorian-controlled study of houses that received energy upgrades based on Scorecard home assessment, the Home Energy Assist Healthy Homes program³ found improved health outcomes for householders.

6. Scorecard assessments and accredited assessors reduce costs and improve outcomes

Using the Scorecard model to deliver the Energy Savvy Upgrades program addressed a range of quality, evaluation and probity challenges. Scorecard assessors are trained, accredited and quality controlled. All assessment data is collected and held on a secure government database and is quality checked. For all assessments, assessors use a standard Scorecard tool that is nationally endorsed and that is designed to be objective, accurate, comparable and consistent.

The Scorecard tool provides upgrade options that are best value for money, ensuring that upgrades are transparent and not driven by subjective views or financial gain to the provider. As well as managing probity risks, using the Scorecard tool for the Energy Savvy Upgrades program made the design, management, monitoring and evaluation easier and lower cost. At program conclusion the before-after house performance, and cost of upgrades and benefits could be simply and objectively calculated. An invaluable dataset of home attributes and upgrades was collected.

All Scorecard assessors used in the Energy Savvy Upgrades program had a known high level of skills. As poor performance leads to de-accreditation, there was an incentive to provide a high level of service. There were very few delivery issues with providers throughout the program. Most were related to issues outside provider control such as impacts of COVID-19. All contracts were delivered and there were no contract disputes or cost overruns.

³ The Victorian Healthy Homes Program Research findings, August 2022



The delivery of assessments was robust, with assessors seeing great value in the project. The assessors rose to the challenge of finding innovative approaches to reach the vulnerable and householders reported a very high level of trust in assessors.

Trust, skills and presence in the home allowed assessors to alert participants to other programs such as Solar Homes, Home Heating and Cooling Upgrade Program, Victorian Energy Upgrades (VEU) and Victorian Energy Compare (VEC). This ensured households had access to a comprehensive range of options they may not otherwise have been aware of. Having skilled and trusted assessors help participants access rebates and subsidies from other programs which helped ensure best value for money.

7. Participant ownership of decision-making is important to deliver benefits

Accredited Scorecard assessors in the Energy Savvy Upgrades program helped participants make informed decisions about which upgrades, and behavioural changes would bring the best benefits in terms of comfort and cost. This approach focusing on householder need and positive outcomes ensures people feel respected and contributes to program uptake.

Programs that offer 'take it or leave it' rebates do reduce the complexity of delivery. However, this approach does not allow householders to decide which upgrades are suitable for their circumstances. They may therefore accept the solution on offer, which could be inappropriate for their needs, or they may be excluded from participating altogether.

The Energy Savvy Upgrades program provided 19 different types of upgrades indicating a single package of upgrades will not be suited, or of interest, to most householders.

The ability for assessors to understand householder needs, develop the right upgrade package for their circumstances and finally agree a package is critical. By providing householder focused advice on both reducing energy cost and increasing home comfort, assessors in the Energy Savvy Upgrades program were able to increase householders' energy literacy. This approach encouraged householders to plan future upgrades, with over 77% of participants saying they planned to install further upgrades when this was possible.



8. Householders are more confident in information that comes from a trusted source

Householders often see offers of financial support as potentially inauthentic, based on their previous experience of cold callers and door knockers. Ensuring reputable government programs are clearly differentiated from product and energy marketing that dominates this sector is therefore critical. In the Energy Savvy Upgrades program, involving councils, state government, government accredited Scorecard assessors and trusted partners helped overcome barriers of trust.

Many communication avenues were used in the program to reach households and generate leads. No individual approach was consistently successful with different approaches being effective in different locations. This indicates the importance of not imposing prescriptive outreach strategies, but rather working flexibly to find what works in different communities.

Each geographical area has its own barriers and favoured recruitment partners. For example, in one location, only three of 64 participants were recruited through the local council even though the council ran extensive communications and door knocked via their health team. In a different area, 140 of 174 participants were recruited through their local council. The Energy Savvy Upgrades program found the most generally effective way to generate referrals was for Scorecard assessors to build trust in a location and leverage trusted local networks and connections.

After local councils, referrals from other businesses such as installers who had a relationship with a program provider, real estate property managers and social housing providers, were the second highest source of leads. Local newspapers in some regional areas were a common source of leads. In one location where there was an existing trusted relationship with the local community energy group, Facebook ads generated a high proportion of leads. For rental properties, finding a Property Manager who understood the value to property owners was key.

Different groups will have different cultural expectations and allowances in delivery processes need to account for these. Feedback from providers and local government partners indicate that seeking out trusted community leaders is the best way to reach culturally and linguistically diverse groups. However, the provider must first form a relationship with that trusted leader.

9. Program design needs to consider retention of participants

Quality project management with attention to appropriate communications and expectation setting is needed to retain participants. Despite lengthy COVID-19-related delay, careful program design meant almost all participants remained in the Energy Savvy Upgrades program.



Potential participants were given as much information as possible to help them decide whether they could commit to the program. This included informing householders of the steps they needed to take, how much time each step would take and what costs would be involved.

Householders were given realistic expectations that an assessment on its own will not make as big a difference to the householders as completing upgrades, and that most people are expected to complete upgrades. The requirement to pay \$100 upfront ensured participants were genuinely engaged and valued the assessment.

The relationships accredited Scorecard assessors built with householders created trust and resulted in more householders remaining in the program, even under the substantial unexpected impacts of COVID-19.

As householders are busy, the assessment and upgrade process needed to be efficient, without excess delays and touch points. For example, some householders, especially occupants of rental properties, can become annoyed or financially impacted by multiple visits to their home by different people.

10. Lack of technology access can be a barrier to accessing government programs

Many participants in the Energy Savvy Upgrades program did not have access to smart devices or computers. This impacted their ability to learn about this program, and to access other complementary programs such as Solar Homes, the Home Heating and Cooling Upgrade Program, and Victorian Energy Compare (VEC).

Assessors visiting the home provided an important service by informing householders of the range of other available support. They were also able to access services on behalf of householders in need. Scorecard assessors assisted 142 householders to use the VEC website to both claim the Power Saving Bonus and to find a better energy deal.

11. Subsidy levels matter, vulnerable householders require appropriate financial support for upgrades

Lack of funds is a major barrier to home upgrades for vulnerable people. The program tested a broad range of incentives and co-payment options. Requiring a small upfront contribution of \$100 from households for the assessment that was refunded later, substantially increased conversion from assessment to upgrade.

The level of financial support varied between tranches. Delivery tranches with low subsidies, such as \$800 per household, were ineffective. With such a low subsidy, it was



almost impossible to recruit households into the project as they did not see enough value. A subsequent increase to \$1,200 immediately increased the number of participants. Average householder co-payments ranged from \$1,341 to \$2,014 suggesting this might be a contribution ceiling for this cohort, regardless of the subsidies offered.

This Energy Savvy Upgrades program focused on reaching householders who were having difficulty managing their energy bills but with the capacity to part-fund upgrades (which includes landlords providing the funding). The program showed that it is valid to target vulnerable householders for support, as the interest from this sector and benefits are clear. The financial support required to generate these benefits is manageable at scale.

12. Currently available financing is unattractive to vulnerable households

The Energy Savvy Upgrades program was designed to test the capacity and interest of vulnerable households to access finance to complete upgrades. Participants could choose how they wanted to make their financial contribution – there was no requirement to access finance.

It was found that third-party finance is not attractive to this cohort. Householders generally did not want to take on extra debt, even if they were told they could service the debt from their energy savings. Although not tested, Environmental Upgrade Finance⁴ could be a better mechanism to fund deeper retrofits for low-income households as the debt would stay with the property, not the owner, and the interest rate with such finance is generally lower than commercial rates.

13. A whole-of-government approach ensures government requirements, standards, rebates, incentives, and concessions work together

Home energy upgrade-related supports can range from financial incentives and rebates to existing or proposed mandatory requirements or standards. Considering how these supports can work together, rather than operate as silos, has substantial benefits.

During the Energy Savvy Upgrades program, several rebates were available which helped householders make important home improvements they would not have otherwise completed. Using Scorecard assessments meant that the right upgrade, rather than simply an easily available upgrade, was implemented. The barriers to accessing these incentives were partially overcome by informed assessors who knew the incentives were

⁴ <https://www.energy.gov.au/rebates/building-finance-environmental-upgrades>



available and helped householders fulfill requirements. In some regions there was a lack of incentives as they did not have the population or business diversity to support access.

Lack of sectoral quality controls and consistent standards are a barrier to upgrades, increasing costs and reducing trust in the energy efficiency sector. The Energy Savvy Upgrades program designed checklists and audits to ensure quality and safety standards were met. While this did increase quality, it also increased program costs and reduced the capacity to use local trades. In some sectors, many providers were not prepared to meet the requirements, especially in the semi-skilled trades. This was likely due to competitive pricing and because quality requirements are not standard practice. Better outcomes can be achieved by increasing oversight of these sectors to ensure quality is part of standard practice.

Mandatory programs increase awareness of the opportunities for energy efficiency and drive interest in related government programs. Foreshadowing of rental energy standards improved uptake of retrofits in rental properties in this program. Stakeholder engagement for future mandatory requirements can be an effective way to increase interest in programs that support home upgrades and generate mutual benefits.

14. Flexible eligibility requirements help ensure the project reaches vulnerable households

Inflexible eligibility requirements can exclude vulnerable people. The Energy Savvy Upgrades program found a self-assertion of energy poverty approach effective.

Householders self-asserted they were having difficulty managing their energy bills. Of all householder enquiries received, only 1.2% were from people not eligible to participate. Previous projects, which used concession card eligibility requirements, eliminated a large cohort of householders experiencing energy poverty and included a large cohort with comfortable means. These programs had a much lower conversion rate to upgrades, especially from retirees who had a low interest in upgrades. Self-assertion was effective as few households with means were comfortable to assert that they needed assistance.

This approach was manageable for a small-scale project such as this. However, a large-scale program would need the right oversight to ensure that self-assertion was not used inauthentically. For example, validation by third-party referral from a GP or energy retailer may be required. In addition, ineligible applicants need a pathway to some form of assistance.

Feedback from providers recommended a sliding scale of eligibility which could be a combination of income level and other issues being managed by the household. For example, the ratio of cost of medical and pharmaceutical intervention per annum to



annual income, or a ratio of the number of dependent children in a household and annual income.

15. Evaluation is a priority to deliver quality, and learn for future programs

Energy Savvy Upgrades used ongoing evaluation to ensure learnings improved delivery during the program and allowed future programs to benefit. Auditing using the Scorecard as a national standardised measurable rating of home energy performance (energy consumption, cost and greenhouse gas emissions) before and after upgrades, allows the value of upgrades to be measured and compared with past and future programs.

Auditing also allows programs to deliver to program and government targets such as contributing to emission reduction targets. Collecting home data on a single ongoing privacy protected database, allows collection and secure management of data on homes to inform future policy and projects. Completing audits throughout the program, rather than relying solely on modelling, provides more useful and realistic data.

All households that participated in the Energy Savvy Upgrades program were surveyed by telephone, ensuring evaluation included the perspectives of participants. To encourage continuous improvement, program providers were encouraged to learn by doing and to share successes and failures throughout the program. This helped identify patterns of issues and gave providers or installers time to rectify, or change installers.

Energy retailer energy consumption data was also used for evaluation. While the data was useful, significant planning was required to collect this privacy protected data and analyse it to exclude unrelated biases, such as changes to occupancy and varying weather conditions.



Evaluation

Results against expected outcomes

Evaluation data was gathered from Scorecard assessments, energy billing data, provider reports, and household surveys.

Results against program expected outcomes by tranche

Benefit	Measure	Unit of measure		Tranche					Total
				1	2	3	4	5	
Scorecard assessment	Delivered	Numeric	Target	64	43	189	76	363	735
			Result	64	43	253	104	328	792
Retrofit	Delivered	Numeric	Target	61	39	169	70	361	700
			Result	61	39	203	64	245	612
Reduction in energy bill	10% household compared to BAU	Dollars	Target	10%	10%	10%	10%	10%	10%
			Result	30%	18%	26%	16%	19%	21%
Reduction in greenhouse gas emissions*	10%	Tonnes CO ₂ -e	Target	10%	10%	10%	10%	10%	10%
			Result	12%	12%	24%	13%	13%	17%
Improved comfort in dwelling	80% of retrofitted houses	Householder perception	Target	80%	80%	80%	80%	80%	80%
			Result	69%	85%	86%	81%	82%	81%

*Greenhouse gas emissions were calculated based upon the 2019 factors incorporated into the Scorecard software.

All tranches except Tranche 5 met or exceeded targets for both Scorecard assessments and retrofits. Tranche 5 was conducted solely within the period where there were multiple periods of stay-at-home COVID-19 orders and work restrictions limiting in-home upgrade work. This amounted to 48 weeks of no assessments or upgrade work. Several additional weeks were needed to reschedule assessment and installation appointments. When restrictions lifted, several householders chose not to have people coming into their homes. This impacted substantially on the ability of providers to recruit households and retain their interest through the delay periods.



In the two tranches completed before COVID-19 restrictions, the retention rate of participants was high, with 95% and 91% of households completing upgrades after they had received their Scorecard assessment. In the later three tranches, the retention rates dropped to 80%, 62%, and 75% respectively.

Reduction in energy bills, consumption and greenhouse gas emission was originally designed to be calculated from householder energy bills obtained for the same year-on-year period before and after upgrades. For households not completing upgrades, a study of their energy bills would determine the impact of the Scorecard assessment alone. This was possible for the first two tranches, which were completed before the introduction of COVID-19 restrictions and yielded a combined result of a 23% reduction in energy consumption (electricity and gas).

This method of analysis became ineffective during the COVID-19 health restrictions as participants were predominantly at home every day, particularly throughout the winter months, which produced spikes in energy consumption that were outside their normal patterns. For consistency and comparability, the results included in the table above have all been calculated using notional energy consumption and costs, and greenhouse emissions factors used in the Scorecard software. Unfortunately, this method does not allow for comparison with the results of households that did not complete upgrades.

Calculating costings for work completed

There were five tranches of work. Tranche 5 was further split into smaller geographical areas which gave organisations tendering for the work, the ability to tender for one, two, or three areas.



Home upgrade costings breakdown

	Tranche 1 Dandenong	Tranche 2 Bendigo	Tranche 3 Victoria-wide	Tranche 4 Hepburn	Tranche 5 Local Gov
Upgrade subsidy value	\$3,500 to \$4,500	\$3,500 to \$4,500	\$1,400	\$880	\$800 to \$3,000
Average total upgrade value	\$5,274	\$6,503	\$3,543	\$3,044	\$3,683
Average contingency cost	\$1,031	\$549	\$451	\$100	\$536
Average upgrade cost minus contingency	\$4,579	\$6,197	\$3,519	\$3,006	\$3,900
Lowest upgrade value	\$1,350	\$1,006	\$1,264	\$1,279	\$724
Highest upgrade value	\$12,642	\$12,484	\$18,552	\$5,948	\$12,673
Average co-payment	\$1,341	\$1,989	\$1,791	\$2,014	\$1,693
Lowest co-payment	\$250	\$251	\$70	\$639	\$109
Highest co-payment	\$4,439	\$7,266	\$16,202	\$4,586	\$9,673



Other delivery highlights

	Tranche 1 Dandenong	Tranche 2 Bendigo	Tranche 3 Victoria- wide	Tranche 4 Hepburn	Tranche 5 Local Gov	Total
Number of rental properties upgraded	27	6	46	8	58	145
Number of VEC assists	6	36	45	32	23	142
Value of VEECs claimed through VEU						\$75,306
Value of rebates claimed through Home Heating and Cooling Upgrades Program (HHCUP)						\$102,000
Number of rebates claimed through Solar Homes PV program						11
Number of unflued gas heaters decommissioned or serviced and CO detectors installed						39
Average pre-upgrade star rating	4.7	5.3	6.1	6.7	5.3	
Average post-upgrade star rating	5.7	5.8	6.8	7.2	6.0	
Average increase in star rating	1.0	0.6	0.7	0.5	0.7	

The project installed 987 individual energy efficiency upgrades across the 612 households.



Upgrades installed

Type of upgrade	Number of individual upgrades
Reverse cycle air conditioner	306
Insulation – ceiling	172
Draught proofing	134
Hot water heat pump	66
LED lighting	61
Efficient gas heating	42
Window awning	33
Internal window covering	29
Efficient gas hot water	29
Insulation – underfloor	17
Low flow showerhead	15
Insulation – wall	13
Ceiling fan	11
Solar PV system	7
In-home display	5
Evaporative cooling	4
Double/secondary glazing	2
Water pump	1
Repair to roof	1



Managing, administering, and coordinating the program

As a result of program design, program managers were able to test how administrative costs were minimised. One senior project manager, with experience in on-ground energy efficiency upgrade programs, delivered project management activities that included project design and approvals, procurement, audit, and evaluation. These are typically the most labour-intensive stages of this type of project.

The project manager was the main point of contact for all providers. Fortnightly progress meetings were found to be the right frequency to raise and discuss emerging issues as well as risks and corrective action. These scheduled meetings were supplemented with additional meetings if a matter was urgent. During the COVID-19 restrictions, these meetings helped ensure businesses and staff were managing financially and personally and allowed for responsive re-setting of time frames and targets.

All providers had underestimated the amount of time needed to coordinate appointments for assessments and upgrade installations. This included the unexpected need to reschedule appointments due to the impacts of COVID-19 as well as householders' personal circumstances. Many householders in this cohort have additional needs and needed the opportunity to decide which upgrades to install without feeling rushed.

Percentage of project administration costs per tranche

	Tranche 1 Dandenong	Tranche 2 Bendigo	Tranche 3 Victoria-wide	Tranche 4 Hepburn	Tranche 5 Local Gov	Total
Administration as a percentage of delivery costs	29%	21%	20%	26%	34%	29%

Tranche 5 contracts required significant extension. Additional funds were needed to ensure the businesses were paid for the extra work associated with rescheduling appointments and keeping householders engaged during long periods of stay-at-home orders and work-from-home requirements. The results suggest that project management costs in the vicinity of 25% would be adequate to manage this type of project delivery under normal circumstances.

Almost every key person involved in program management and delivery experienced significant life issues. This is the nature of working with small business and, while these events did not cause significant delays, they have the potential to impact on constrained timelines. Applying contingency time to contract dates can account for this. These events should also be noted as a management risk.



Procuring energy efficiency products and installers

Procurement of installers to supply hot water systems, lighting, heating, and cooling and window coverings was relatively easy in the early stages of the project, especially in metropolitan Melbourne. Installers who could generate Victorian Energy Efficiency Certificates (VEECs) and allow some discounting of products, were able to be sourced in metropolitan Melbourne. In the regional areas of Bendigo and Hepburn there were no installers capable of generating VEECs. This meant a higher product cost for the program as well as householders.

Electricians and insulation installers who could provide high quality work and were willing to work with the checklist system were difficult to find for providers in all areas. Several insulation installers said they had enough current work commitments without having to comply with the extra requirements. As a result, local installers could not be sourced in the regional areas and a single installation company provided installation for all tranches.

Recruiting, engaging, and retaining participants

Recruiting participants was difficult in the initial stages of every tranche. Householder feedback indicated some level of distrust and scepticism when approached directly by the providers or through their advertising. Advertising through social media channels was largely unsuccessful except in Hepburn where local community energy organisations have a well-established reputation within that community.

In some areas, communications coming directly from the council generated the vast majority of leads and in others, virtually none. In Tranche 5, one council sent letters signed by the mayor to concessional ratepayers which proved a highly successful tactic. However, newsletter advertising for all other tranches was not successful.

In regional tranches, advertising in local newspapers generated a high percentage of leads. The tranches delivered in metropolitan Melbourne mainly began work in March 2020 and the beginning of the COVID-19 pandemic when local newspapers all but disappeared.

One provider had a longstanding network of businesses, with whom they regularly work. This network referred many of their customers to the program. Property managers within selected real estate agencies also became integral in sourcing rental property owners willing to contribute funds towards the upgrades. Reaching landlords through property managers is a key method of communicating with rental property owners for future upgrade work that aligns with any established minimum rental energy performance standards.

Reputation and word of mouth became an important source of participants once the work started and participants experienced positive outcomes. This was evident in all tranches except Tranche 5 which was conducted over a short period and across metropolitan Melbourne rather than a discrete geographic area.



Recruitment channels

	Tranche 1 Dandenong	Tranche 2 Bendigo	Tranche 3 Victoria- wide	Tranche 4 Hepburn	Tranche 5a & b Local Govt	Tranche 5c Morn Pen
Council	3	3			269	
Department		1	138		2	
Referrals*	33	1	197	12	12	69
Existing customers	10		5	8		
Website			3		47	
Facebook	7	17	8	49	15	1
Google					2	
Newspaper ad		22		15		1
Trade show/info session					1	
Other/unknown			2	14	61	
Word of mouth	11	19	22	20	29	2

**Includes businesses, not-for-profits, social housing providers and real estate property managers.*

Recruitment, engagement, and retention displayed a clear pattern that was directly related to two main factors:

1. The level of upgrade subsidy.
2. The delays caused by the COVID-19 restrictions.



Retention rates

	Tranche 1 Dandenong	Tranche 2 Bendigo	Tranche 3 Victoria- wide	Tranche 4 Hepburn	Tranche 5 Local Govt	Total
Value of upgrade subsidy	\$3,500	\$3,500	\$1,400	\$880	\$800 to \$3,000	
Enquiries	87	61	379	176	543	1,246
Lost before assessment	3	14	130	73	215	435
	3%	23%	34%	41%	40%	35%
Lost after assessment	3	4	46	39	80	172
	5%	9%	18%	38%	24%	22%

From the table above we can see that Tranches 1 and 2, where the upgrade subsidy was at its highest, had excellent retention rates of (95% and 91% respectively). The lower the subsidy value, the lower the retention rate became.

A subsidy valued at \$800 per household was offered to Tranche 5 areas that fell outside of the three local government areas that were offering additional financial support for upgrades. This led to very low levels of recruitment and required an increase in the subsidy to \$1,200 per household. This has an immediate positive impact on the provider's ability to recruit.

In one local government area where the subsidy was \$3,000 per household, and the council assisted with advertising the project, recruitment and retention rates were very high. In another where the subsidy was \$1,240, the retention rate was on par with Tranche 3 which had a subsidy value of \$1,400.

In a third local government area, where the subsidy was \$2,000, recruitment and retention were still difficult. The reason for this could be related to several possible causes specific to this council area. Council communicated to householders that they did not need to proceed with upgrades following the assessment. However, in all other areas across all tranches, the expectation was that householders would install one or more upgrades following their assessment. Some people disengaged from the program when told they were told they would need to contribute a co-payment for the upgrades, or when they received the quotes following the assessment. Council targeting of concessional ratepayers, rather than adopting a more flexible recruitment, suggests that this model does not work well for that cohort as these householders do not have savings to put



towards the cost of upgrades. Some cultural norms may have meant that the householder did not value the information provided or the proposed upgrades. Trust was difficult to build without support of community leaders in the different culturally and linguistically diverse groups. As this group did not engage in meaningful numbers in the telephone survey, it is not possible to draw conclusions based on community feedback.

Delivering Scorecard assessments and advice

A total of 792 Scorecard assessments were delivered throughout the project by nine accredited Scorecard assessors. The nationally endorsed Scorecard program is delivered by accredited home energy assessors. The focus is on the specific needs that existing homes face in improving energy, comfort, and carbon performance. The Scorecard assessments are conducted within the participant's home and assess the construction of the building and major fixed appliances and also consider the needs and priorities of the householders. The information is fed into the Scorecard software which generates a rating for cost, emissions, and comfort. This is provided on a certificate that includes:

- An overall star rating that reflects the energy efficiency of the home in terms of cost.
- Hot and cold weather ratings which reflect how easy it is to keep the house comfortable without mechanical cooling or heating in extreme weather.
- An efficiency rating for each major fixed appliance (heating, cooling, hot water, lighting, and pool pump).
- What percentage of the home's energy cost is generated by each appliance.
- Options for upgrades and actions that will improve comfort and reduce energy costs.

Assessments are subject to random desktop audits under the Scorecard program. This is part of the Scorecard Quality Assurance program which includes desktop audits by an independent auditor. Assessors are subject to the existing Scorecard compliance requirements and penalty regimes for non-compliance.



Satisfaction survey responses following assessment

Question	Tranche 1 Dandenong	Tranche 2 Bendigo	Tranche 3 Victoria-wide	Tranche 4 Hepburn	Tranche 5 Local Gov	Total
The assessor answered your questions to your satisfaction	90%	96%	83%	95%	85%	90%
The assessment was a good use of your time	92%	93%	70%#	85%	77%	83%
The assessor provided personalised and useful information	92%	89%	70%#	85%	73%	82%
The assessor helped you to choose the most appropriate upgrades	82%	89%	63%#	80%	73%	77%
Your knowledge of energy efficiency in your home has improved	79%	81%	60%#	90%	71%	76%
The assessor explained the ratings and certificate*	77%	70%	67%	85%	65%	73%
Householders who would not have installed upgrades without this program	61%	65%	64%	63%	53%	60%
Householders that would have installed different upgrades if they had not had advice from the assessor	21%	39%	14%	31%	18%	23%

#The relatively low rates in Tranche 3 may be due to a technique used by the provider to conduct assessments during the COVID-19 pandemic at a time when work restrictions had been lifted but before vaccines had become available. The technique included having the assessor gathering data and taking measurements inside the house and another assessor inputting data at another location while the two were in constant phone contact. This was done to minimise the time spent inside the home by the assessor to reduce risk associated with transmission of COVID-19. Also, assessors conversed with householders by telephone, this method may not have been as effective as sharing information in person with the householders.



*This result may reflect the percentage of rental properties assessed within the program where the owner received the certificate explanation. The occupant had a more general discussion about how they could save energy and make the home more comfortable using what was in the home already.

One of the benefits of using accredited Scorecard assessors was that they could talk through short- and long-term plans with the householder and match their advice to the householder's goals. This is evidenced by survey results that indicate:

- 23% of householders would have installed different upgrades without the advice of the assessor.
- 21% of householders did not know what upgrades they would have installed.
- 74% of respondents planned to install further upgrades in the future with only 8% saying they would not install further upgrades and 17% unsure.
- The responses were a mix of upgrade type which is further evidence that the advice was tailored to the needs of the individual households.

Planned future upgrades

Type of upgrade	Number of planned upgrades
Solar panels or batteries	150
Window awnings	116
Insulation	111
Hot water heat pump	96
Reverse cycle air conditioner	61
Draught proofing	33
Lighting	9
Pool pump	4

Providing supplementary advice

Assessors were asked to assist householders to use the Victorian Energy Compare website to find out if there was a better retail energy deal available and to claim the Power Saving Bonus (PSB)⁵ where applicable. In earlier tranches where the \$50 PSB was available to all householders, uptake was around 30% of households.

In later tranches where the PSB was set at \$250 for concession card holders only, the uptake was considerably lower either because the householder had already claimed it, or they were not eligible. For householders without a computer or internet access, or for

⁵ The Power Saving Bonus (PSB) is a one-off \$50 to \$250 payment to Victorian households who look for a better energy deal on Victoria's Energy Compare website.



those having difficulty following the instructions, it was an excellent added service. The cost to the project for this service was \$50 per household.

Installing upgrades

Insulation

Insulation installers were not required to be Clean Energy Council accredited for this program, but they were required to follow program procedures, including checklists. Providers spent some time sourcing installers who were prepared to conduct electrical safety checks and install insulation using the program's checklists. This resulted in regional tranches being serviced by a company based in metropolitan Melbourne. Since providers were aiming to source as many local installers as possible, this was not an ideal outcome.

Electrical inspections of roof and subfloor spaces were also required before insulation installation. Remediation was completed to ensure electrical cables were in good condition and not subject to a safety recall, cables were clipped to timbers to prevent encapsulation by insulation and being dislodged by being stepped on, any wiring joints were enclosed in junction boxes and ceiling protrusions were safely enclosed. Other hazards were identified during this process and communicated to the insulation installer.

Window coverings

Internal and external window coverings were a popular upgrade request. Several households were disappointed when the type of window covering they wanted to install was not offered due to it being energy inefficient (e.g. roller blinds). Window coverings require a lead time of six weeks and were not offered towards the end of each tranche due to the time constraint.

Appliances

Installation of appliances was mainly smooth. There were few major issues with installers; however, regional installers could be unresponsive to the need to have work completed within time frames resulting in the provider need to source several installers to achieve deadlines.

Despite concerns regarding supply chains, there were only minor issues with product supply. Delays did occur due to slower than expected establishment of related government programs subsidising upgrades. Many households did receive benefits from these government programs. Based on anecdotal feedback it is unlikely they would have installed upgrades without the combination of the Energy Savvy Upgrades program and the availability of further support from related programs.



Victorian Energy Upgrades⁶

All providers were able to access some products attracting VEECs, with a total amount of \$75,306 passed on to householders in the form of product discounts. Most products attracting VEECs were heat pump hot water units replacing electric storage units, 5-star gas heaters replacing inefficient gas heaters, a small number of reverse cycle air conditioners and a small amount of lighting, mainly PAR38 lamps.⁷

In the regional areas of Greater Bendigo and Hepburn, it was very difficult for providers to source installers who worked within the VEU program. The only VEECs generated in the Hepburn tranche came from a Hepburn Z-NET bulk purchase program for heat pump hot water systems.

Designing quality assurance

Quality assurance was designed using a multi-pronged approach to ensure that all aspects of the program were being delivered well.

The relationship between the department's program manager and providers was set up to establish trust between all parties and that communication channels were always open, conversations were honest, and emerging issues, risks and benefits were framed as learning experiences for all parties. This proved to be very successful as the providers alerted the project manager to issues well in advance and a plan to address the issue was formed together. This may seem difficult to replicate for a large-scale program; however, a contact manager could be assigned to each provider that would help to form these trusted relationships, rather than having a new contact point every time a new issue arises.

Standards were established for providers and installers, with applicable trades requiring correct licences and insurance. Providers and installers required Public Liability Insurance of \$10 million and Professional Indemnity Insurance of \$2 million, plus WorkCover, personal accident insurance and vehicle insurances as applicable. Electricians and plumbers required correct licence levels.

Quality and safety checklists were set up for use with insulation installations to minimise the risks around electrical safety, falls, and dangerous substance management (asbestos, dust, insulation fibres). Quality of installation was also included in the checklist as a reminder to installers that coverage and safety around ceiling protrusions was critical. Photographic evidence was required to be inserted into the checklists at various points in the process so that subsequent checks would reveal whether installers were adhering to the process.

⁶ <https://www.energy.vic.gov.au/for-households/victorian-energy-upgrades-for-households/about-the-veu-program>

⁷ PAR38 lamps are primarily used for outdoor lighting.



Two forms of audit were used. Scorecard assessments are routinely audited as part of the Scorecard program. This existing process was leveraged, with assessors receiving random desktop audits to ensure data quality and to check that appropriate upgrades were being recommended.

In addition, specific quality and safety audits of installations were carried out for approximately 25% of all upgrades, with a heavy focus on insulation and electrical safety. Audit checklists were designed to mimic the installation checklists and to ensure that upgrades were installed according to any relevant Australian Standard. Audits were completed at the end of each tranche in time for providers to remediate any issues.

Towards the end of the project under pandemic conditions, an increasing number of householders declined the audit. As surveys were already underway it was not possible to establish why. However, it could have been related to the householders not wanting to have another person in the house. Another reason could be the long delay of several months between installation and audit.

Independent auditors with the required skills were difficult to source at a reasonable cost. Initial quotes received were in excess of the value of the upgrade per household and not considered a viable approach. A provider working within the Victorian Energy Upgrades system was eventually appointed and provided excellent advice on how to set up the audits, with the cost per household at around \$400. This is a market weakness that requires development.

Collecting and evaluating data

Privacy collection statements were combined with consent forms and quoting templates to minimise the paperwork burden. This is important as paperwork is always a barrier for households and providers. An existing part of Scorecard quality assurance is that the assessor must upload a Privacy Statement into the software to verify that this has been discussed with and signed by the householder. These are subject to a regular audit regime by the Scorecard program.

All providers were given data reporting requirements at the beginning of their tranche which enabled them to set up their own systems to collect the data before work began. Fortnightly progress meetings were held between each provider and the department project manager to discuss progress, results, and emerging issues. Feedback from providers was used to tweak delivery methodology.

Information about the house is entered into the Scorecard software and each entry contributes towards the Scorecard calculating the efficiency of the house and appliances, and options to improve the results for cost and comfort. This data is downloadable for project evaluation in a de-identified form to reveal the annual energy cost, energy consumption by fuel type and greenhouse gas emissions as well as the comfort rating in hot and cold weather.



The initial measure of energy consumption before and after upgrades was designed to be measured through actual energy bills compared over the same time of year for the period immediately after upgrades were installed. This was time consuming to set up but revealed results consistent with those predicted by the pre- and post-upgrade results modelled by the Scorecard tool data. In Tranches 3 to 5, using actual consumption data was not possible as results were skewed by changes to usage patterns in the COVID-19 pandemic. Scorecard data was then used across all five tranches to compare consistent data and allow for comparison of results between the tranches.

An independent organisation was engaged to conduct quality and safety audits of around 25% of installations, with an emphasis on the high-risk upgrades of insulation and appliances. Audits that revealed safety or significant quality issues were referred to the provider to engage the installer on resolving the issue.

A telephone survey was designed at the beginning of the project seeking responses to questions that would feed into the Evaluation Plan. A new question was added for survey conducted after the start of the pandemic to identify the impacts the pandemic had on this cohort. Unfortunately, many of the householders who had disengaged with the project either before assessment or before upgrade stages, did not wish to participate in the survey either. They frequently just disappeared and did not respond to enquiries from the providers so we will never know the reason for their decision. This survey broke down results by tranche and over the whole project. This is a relatively minor cost for the project and is highly recommended as a method of gaining participant feedback as it yields a much higher response rate than an electronic or paper-based survey and allows for participation where the householder does not have access to the internet.



Evaluation against objectives

Objective	Result	Comment
1. Reduce the energy bills of participating households	Achieved	Tranches 1 and 2 were measured by comparing energy bills of households over a three-month period at the same time of year once upgrades had been installed. Tranches 3 to 5 were measured by assessing the difference in annual energy consumption between the pre-upgrade and post-upgrade Scorecard certificates. The Scorecard produces an annual energy consumption and cost for a house based upon the thermal efficiency of the building and major fixed appliances, such as heating, cooling, and hot water.
2. Reduce greenhouse gas emissions associated with stationary energy consumption in participating households	Achieved	Relevant Victorian emissions factors for gas and electricity were used to calculate the emission reductions across all tranches.
3. Improve comfort levels of participating householders	Achieved	Measured by householder telephone surveys across all tranches.
4. Test delivery models that could be replicated and scaled in the future	Achieved	Delivery models included through private enterprise and not-for-profit organisations, tranches of varying sized targets, varying the upgrade subsidy per household and across different geographical locations.



Objective 1: Reduce the energy bills of participating low-income households. ACHIEVED

1. Overall reduction in energy consumption of the households participating in the project.

Benefit	Measure	Unit of measure		Tranche					Total
				1	2	3	4	5	
Reduction in energy bill	10%household compared to BAU	Dollars	Target	10%	10%	10%	10%	10%	10%
			Result	30%	18%	26%	16%	19%	21%
			Energy bill result	27%	18%	NA	NA	NA	NA

In Tranches 1 and 2, which were completed before the COVID-19 pandemic was declared in early 2020, householders were asked to sign an authority for a single department officer to collect energy data for the sole purpose of calculating the change to their energy costs because of the upgrades installed. To enable an accurate comparison, energy consumption was used to measure the result which eliminated Consumer Price Index or plan price rises.

The comparison was made over a three-month period that began immediately after the upgrades had been installed and during the same time period in the previous year. This proved to be difficult for several reasons:

- Not all householders wanted to provide the authority, and some were worried that providing authority would enable the authorised party to change their provider.
- Incorrect information was sometimes placed in the authorisation form which rendered the request invalid.
- Householders who had not been living in the property for the previous year or had moved out of the property shortly after upgrades were installed, could not be compared as data was no longer available from their energy retailer.
- Householders who changed their energy providers could not have their gas bills compared as the provider at the time of request only had access to bills they had generated.
- Electricity data was relatively easy to obtain through the distribution businesses that have processes set up to cater for these types of requests, although each process was different and was time consuming to set up.
- Gas data was extremely difficult to obtain as data must be requested from the customer's retailer and none of them have a well-defined process to respond to these types of requests. An authority form had to be developed in-house and often it took several requests for the data to be sent.



In addition, COVID-19 restrictions had a dramatic effect on householders' energy consumption throughout the periods of stay-at-home orders, particularly over winter and summer. Initial analysis performed on bills in Tranche 3 revealed that winter bills for 2020 were all much higher than the same period in 2019. This was due to householders running their heating all day every day, instead of being out of the house and not using their heating during the day.

To enable accurate comparison between all delivery tranches, the results of post-upgrade Scorecard assessments were compared to the results of pre-upgrade Scorecard assessments (which calculated the annual amount of energy consumed for those fixed appliances by an average household). The Scorecard uses the average cost of each fuel type to calculate the total annual cost of running the major fixed appliances in the home.

2. Retrofitting products or combination of products that produced the largest reduction in energy consumption in the participating households.

There is no single product or combination of products that produced the largest reduction in energy consumption. This is because every house is different in terms of its starting point.

Inefficient appliances that consume a high proportion of an individual household's energy (such as heaters and hot water units) and are replaced with an efficient appliance typically produce the greatest savings. The savings are even greater when combined with draught proofing and/or insulation if these are not present initially. If a house has a very low initial star rating, any significant upgrade (insulation, draught proofing, heating, or hot water) will produce a reduction in energy consumption.



Objective 2: Reduce greenhouse gas emissions associated with stationary energy consumption in participating households. ACHIEVED

1. Overall reductions in greenhouse gas emissions associated with energy consumption in participating households.

Benefit	Measure	Unit of measure		Tranche					Total
				1	2	3	4	5	
Reduction in greenhouse gas emissions*	10%	Tonnes CO ₂ -e	Target	10%	10%	10%	10%	10%	10%
			Result	12%	12%	24%	13%	13%	17%

*Victorian 2019 greenhouse gas emissions factors for each fuel type used in the Scorecard software were applied to calculate the reduction in emissions for the program. Given the increasing level of renewable energy in Victoria's power supply, it is likely these figures are higher.

2. Products or combination of products that produced the largest reduction in greenhouse gas emissions in the retrofitted households:

Replacement of wood or gas appliances with efficient electric appliances produced the greatest greenhouse gas emission reductions.

Objective 3: Improve comfort levels of participating householders. ACHIEVED

Benefit	Measure	Unit of measure		Tranche					Total
				1	2	3	4	5	
Improved comfort in dwelling	80% of retrofitted houses	Householder perception	Target	80%	80%	80%	80%	80%	80%
			Result	69%	85%	86%	81%	82%	81%

3. Optimal retrofit intervention or combination of retrofit interventions that made the most significant change to comfort levels of participants.

From householder surveys, 81% of participants stated that their upgrades had improved comfort in their home. Since these were blind surveys, there was no way to correlate the type of upgrades received with this response.



Analysis of the greatest increases to the Hot Weather Rating and Cold Weather Rating (ratings that broadly represent comfort without appliance use) in the pre- and post-upgrade Scorecard assessments indicated that the result depended upon what is in the house at the time of the initial assessment. One of the highest increases in rating had only ceiling insulation installed. Another had underfloor insulation and double glazing in one room, another had ceiling insulation and draught proofing completed.

Generally, retrofits that improve the building shell result in the greatest level of comfort improvement. This includes ceiling, wall and underfloor insulation, draught proofing, and window coverings (internal for cold weather rating and external for hot weather rating).

Objective 4: Test delivery models that could be replicated and scaled in the future. ACHIEVED

1. Difficulties involved with procurement of services required to deliver the program safely, on time and on budget.
 - a) The Scorecard program had 60 accredited Scorecard assessors at the end of July 2022. To complete 50,000 assessments per annum would require 116 assessors completing nine assessments per week. The Scorecard is currently working on strategies to scale up the number of assessors, particularly in regional areas. It has been found that the easiest way to increase the number of assessors is to provide them with the reasonable assurance that there will be forward business opportunities. Longer term and diverse business opportunities are substantially more attractive than short-term projects.
 - b) There were important learnings on efficient delivery, with small businesses being the most effective delivery partners. There is a small number of organisations in the market prepared to deliver this type of project and with the required skills. In Victoria, many of these types of small-scale projects have been delivered by not-for-profit organisations that work with the low-income cohort in other ways or in the energy-efficiency space. Project overheads contained in their tender responses were higher than those for commercial businesses and they expressed uncertainty around risk management in some areas where they don't have previous experience (such as sourcing high-quality installers or installing insulation). The commercial businesses engaged in this project were aligned with the objectives of the project and were relentless at finding solutions to issues as they arose, which created positive outcomes for all parties. Project overheads for community energy groups were



much lower, but the tender responses were lacking sufficient information to award contracts to some that applied.

- c) Very few insulation installers are prepared to work with additional requirements such as checklists that are used in government programs. Even when they are, compliance with minor requirements is patchy. There are not enough installers prepared to retrofit insulation as many only perform installations on new builds (they are easier and cleaner and no electrical or asbestos safety issues to deal with). Another possible reason for this is, it is seen as an unskilled trade and pricing is competitive, with the installer reluctant to charge extra to manage difficult installation circumstances or the additional time required to use checklists.
 - d) Large-scale government incentive programs create high levels of product demand which may not be able to be met without advanced planning. This was the case with the availability of reverse cycle air conditioners during 2021 when there were few shipments arriving in Australia and government subsidy programs stimulating demand.
 - e) Regional installers who participate in the Victorian Energy Upgrades program are rare.
 - f) Installers for all energy efficiency products are in short supply and a lead time is required to provide standards and training for projects at large scale.
 - g) Highly experienced and knowledgeable trades who could be used to audit installations are in short supply. There are not many companies who deliver this type of service at a reasonable price.
2. Delivery method used by Energy Savvy Upgrades is scalable to meet a broader target cohort than the initial delivery volume.

The model itself is scalable in many respects once market capacity is resolved.

- a) The eligibility criteria worked well with very few householders trying to gain entry when they were clearly not in financial need once the aim of the project was explained to them.
- b) The Residential Efficiency Scorecard is an excellent way to measure pre- and post-upgrade results and caters for the circumstances in individual homes rather than subsidising the replacement of one product when it may not be the right product to improve outcomes. It also provides an objective basis for recommending upgrades. If upgrades are offered based on the Scorecard options, upgrades that are motivated by assessor or installer benefit are excluded or reduced. Assessors are experienced, knowledgeable, accredited, and accountable. Their accreditation can be removed for breaches of the code



of conduct or actions that don't meet the Scorecard Quality Principles.⁸ In addition, householders paid a small amount towards the assessment so that they felt they had a level of commitment, and this meant they listened to the advice. A free assessment is not valued as much and would therefore not lead to the best possible outcome.

- c) Recruitment was the responsibility of the providers, with mixed results. In all tranches, recruitment at the beginning was difficult and became easier as word-of-mouth spread and in the tranches that provided higher upgrade subsidies. In some areas, recruitment was extremely difficult without another trusted body to confirm that the project was legitimate. People are wary of scams and a lot of people thought this project was another one. A large-scale project would need significant government advertising to ensure its success.
3. Opportunities for improved efficiency at a larger scale.
- a) Create a scale of subsidy levels available to households. The levels are based upon a set of questions about household income and other relevant circumstances that may be impacting upon the household's ability to manage their energy costs. This would allow for a more structured eligibility criteria that would reduce time spent determining individual eligibility.
 - b) Consider how to break work into smaller tranches to avoid duplication and inefficiencies of travel. Generally, it is most efficient to deliver upgrades by location: reducing costs, establishing suppliers, increasing referrals, and building trust. Market capacity to deliver large volumes of work is currently low. Potential exists to allow for providers to nominate geographical areas that they will provide services to, for example, by local government area. Set targets and review points so that the provider works to generate business in line with government objectives.
 - c) Pre-approve installers at the project management point (e.g. government) so that the provider organisations can seek quotes from any of those installers depending on geographical area, workload, and product availability. Pre-approved installers must have qualifications, licence and insurances checked and must agree to work within the government's procedural requirements.
 - d) Create all checklists and audit forms in a standard electronic format with the capability of uploading geotagged photos during the inspection, installation and audit. Create a portal to upload forms to allow for compliance audits.

⁸ Scorecard quality principles: <https://www.homescorecard.gov.au/become-a-scorecard-assessor/the-scorecard-assessor-accreditation-process>



- e) Set fixed values for some elements of the work being delivered. These include the assessment fee subsidy, the fee for other household assistance paid to the provider, audit fee based upon the type of upgrade being audited, and the electrical inspection fee. Due to the slightly higher costs of managing renter and landlord, the value also needs to include the fee for managing a rental property upgrade. The fee must reflect reasonable market rates to ensure that work is completed correctly and thoroughly.
- f) Automate the measurement and calculation of pre- and post-upgrade data by including additional fields in the Scorecard reporting tool.
- g) Consider a whole-of-government approach to give the best possible outcomes to householders bearing in mind how government requirements, standards, rebates, incentives, and concessions work together.
- h) Consider how:
- Current individual product rebates could be best targeted.
 - A retrofit program can assist with boosting compliance with any minimum rental energy standards.
 - A retrofit program can assist with any future mandatory disclosure requirements so that the low-income/ vulnerable/disadvantaged cohorts do not end up living in the worst performing housing.
 - To involve energy retailers in a retrofit program that would meet their obligations under the energy hardship provisions and make tangible improvements for the customer.
- i) Marketing conducted by the government to ensure that householders know it is a legitimate program and to provide consistent information about eligibility and process. Consider how to reach CALD communities and regional areas using trusted leaders within those communities.



Setting up similar programs

Lessons learned from the Energy Savvy Upgrades program will help inform implementation of future small and especially large-scale programs.

Lessons learned	Implementation recommendations
Eligibility	
<ul style="list-style-type: none"> • Self-assertion that a householder was having difficulty managing energy bills worked well at this small scale. The alternative of holding a concession card as an eligibility requirement was found to exclude households often in great need, such as those with large families, uncertain income, and those managing long-term medical conditions or disabilities, or carer responsibilities. • An upfront contribution of \$100 was an effective way to ensure householders were genuinely interested in upgrades. • Co-payments for upgrades were required from all households towards the Scorecard assessment and the upgrades, including the electrical inspections and any remediation required to make a space safe before installing insulation or an electrical appliance. This was beneficial in increasing ownership of the results. However, this model is not appropriate for those most in need as they do not have funds to contribute. 	<ol style="list-style-type: none"> 1. Consider market capacity to deliver high quality retrofits at scale to account for the small and episodic nature of energy efficiency upgrade programs. 2. Support sectors considered as low skill, such as insulation and draught proofing, to ensure quality outcomes. 3. To avoid duplication of effort, pre-approve installers against set quality criteria which the provider can access, providing set processes and minimum standards of work and consistent risk management across the program. 4. Provide an avenue to report direct to the government poor quality of work and integrity issues of pre-approved installers. 5. Update Victoria Energy Upgrades (VEU) to ensure registered products are available within the program for the major upgrade opportunities and replacement of gas appliances with electric appliances to achieve the climate change and renewable energy objectives. 6. Pre-approve a range of energy efficient products (e.g. reverse cycle air conditioners using Minimum Energy Performance Standards (MEPS) as they enter the market ensuring they are accessible to installers without delay. 7. Include sufficient detail and lead time when announcing large-scale programs to allow potential providers and installers to attract and train staff, pre-order stock, apply for approved status and set up their business models. 8. Prepare large-scale government programs in advance to increase the capacity in insulation, draught proofing, and Scorecard. 9. Provide incentives to regional installers to become involved in the VEU program to ensure equity for regional households.



Project management, administration, coordination

- Delivery providers typically underestimate the time it takes to work with vulnerable households and to work with government procedures.
 - Setting objectives, outputs, tasks, processes, and expectations early with providers minimised uncertainty and ambiguity for providers and allowed them to set up their business to manage them from the beginning. Uncertainty and lack of clarity on success parameters will be costed into delivery by providers.
 - Framing discussions with the department as opportunities for all parties to learn about delivering this type of project and for resolving issues as they arise worked well and created trusted relationships. Providers felt they could freely raise issues and incidents and be supported to resolve them in a positive way.
 - Empowering providers to optimise their processes was more effective than trying to forward design detailed workflows in procurement documents.
 - Understanding the needs of the participant communities, and how these may impact project implementation is important to avoid delays. Some CALD and vulnerable households had additional needs, such as a requirement for female assessors and installers.
1. Continue to use accredited Scorecard assessors to manage project and have a quality control role in home upgrade programs.
 2. Set clear and achievable, but not micro-managed expectations, to improve tender outcomes: itemise tender and set fixed values for performance of some elements or work (e.g. quoting specific rates for individual goods or services, including different rates for metro and regional Victoria, considering travel).
 3. Contract with commercial businesses to deliver to minimise costs and deliver process improvement and cost reductions over the life of the program.
 4. Split larger areas into smaller geographical areas and allocate areas to individual providers (e.g. multiple providers rather than one per area) and implement procurement rounds by area.
 5. Ensure government staff assessing tender responses are experienced at delivering this type of program and come from a range of specialist areas so they understand where responses are not adequately specified or costed.
 6. Involve not-for-profit organisations that work with low income and vulnerable households as a referral agency and compensate them for each referral.



Procurement of delivery providers

- Delivery providers were most often accredited Scorecard assessors who developed relationships with a variety of retrofit businesses. This was an effective model as assessors demonstrate the breadth of knowledge required to develop upgrade packages and they must maintain standards to remain accredited.
 - Due to the lack of ongoing projects, and low development of the sector, small businesses and organisations are currently the only feasible delivery options. This can be beneficial as such businesses often have strong local networks.
 - Procurement of large numbers of upgrades (>300) within the same contract did not attract multiple responses and were too large for most small businesses and not-for-profits to manage.
 - Limited market capacity to deliver these types of projects was evidenced by the quality of some tender responses and/or limited tender responses.
 - To building industry capacity, multiple procurement rounds for different regions aimed to attract multiple delivery agencies for a small number of upgrades, resulting in numerous responses from a variety of organisations, including Scorecard assessors.
1. Consider market capacity to deliver high quality retrofits at scale to account for the small and episodic nature of energy efficiency upgrade programs.
 2. Include sufficient detail and lead time when announcing large-scale programs to allow potential providers and installers to attract and train staff, pre-order stock, apply for approved status and set up their business models.
 3. Prepare large-scale government programs in advance to increase the capacity in insulation, draught proofing, and Scorecard.



Procurement of energy efficiency products and installation services

- Sourcing suppliers through contacts and knowledge where a provider has an established network of high-quality suppliers worked well. However, this can duplicate work across providers and may mean that installers travel long distances to perform their work.
 - Victorian Energy Efficiency Certificates (VEECs) –incentives for energy efficiency upgrades- are not always available, with gaps for some highly efficient products, and in some locations not being able to access this financial support.
 - Installers working within the VEU program that provides incentives for energy efficiency upgrades are rare in regional areas, presenting another level of disadvantage for regional householders. Some locations were not able to access this financial support.
1. Consider market capacity to deliver high quality retrofits at scale to account for the small and episodic nature of energy efficiency upgrade programs.
 2. Support sectors considered as low skill, such as insulation and draught proofing, to ensure quality outcomes.
 3. To avoid duplication of effort, pre-approve installers against set quality criteria which the provider can access, providing set processes and minimum standards of work and consistent risk management across the program.
 4. Provide an avenue to report direct to the government poor quality of work and integrity issues of pre-approved installers.
 5. Update VEU to ensure registered products are available within the program for the major upgrade opportunities and replacement of gas appliances with electric appliances to achieve the climate change and renewable energy objectives.
 6. Pre-approve a range of energy efficient products (e.g. reverse cycle air conditioners using MEPS) as they enter the market ensuring they are accessible to installers without delay.
 7. Include sufficient detail and lead time when announcing large-scale programs to allow potential providers and installers to attract and train staff, pre-order stock, apply for approved status and set up their business models.
 8. Prepare large-scale government programs in advance to increase the capacity in insulation, draught proofing, and Scorecard.
 9. Provide incentives to regional installers to become involved in the VEU program to ensure equity for regional households.



Participant recruitment, engagement, retention

- The process of recruiting, assessing and upgrading a household worked best when it occurred within a short period of time (i.e. 2–6 weeks). Delays due to the COVID-19 pandemic resulted in many households dropping out of the project either because their circumstances changed, or lost interest.
 - The prime time to gain agreement to proceed with upgrades was found to be immediately after the assessment, and often while the assessor is still in the home.
 - Recruitment of rental properties was best managed through a cooperative property manager who could contact the entire database of owners and facilitate contact with those who were interested.
 - Owners were required to have a limited ability to upgrade their property to participate and it was found there is an appreciable cohort of rental property owners who need this support.
 - Completing qualification of participant eligibility and ability to co-fund before accepting the household into the program resulted in high conversion from assessment to upgrades.
 - The level of upgrade subsidy is crucial in retaining participants. The subsidy of \$800 was too low to fund more than one significant upgrade and were not seen as being of enough value to householders when they had to contribute a much higher amount.
 - Regardless of the level of subsidy, co-payments from householders did not vary significantly. Average co-payments ranged from \$1,341 to \$2,014 and suggest that this might be a ceiling for this cohort, regardless of the subsidies offered.
 - Some householders, especially occupants of rental properties, were annoyed or financially impacted by multiple visits to their home by different people and this resulted in some householders dropping out of the project.
1. Consider recruiting partners across all geographic areas.
 2. Pay compensation for services where required, including:
 - not-for-profits that regularly run programs to assist low-income, disadvantaged and vulnerable householders
 - community energy groups
 - local governments
 - energy retailers through their hardship programs
 - social housing providers
 - real estate property managers for rentals
 - community leaders in CALD communities.
 3. Provide information and training to recruitment partners and ensure a high number of staff are briefed with information about the project so they can maximise recruitment effectiveness and efficiency.
 4. Provide recruitment collateral in plain English and translated into several relevant languages according to the target community.
 5. Before they commit, give householders entering a large-scale program, clear and easy to understand information about what level of assistance they would be eligible for (e.g. automated via a website, although this function also needs to be able to be completed by someone other than the householder when the householder does not or cannot access the internet).
 6. Consider in design stage a positive householder experience by minimising the duration and number of home visits by upskilling Scorecard assessors to provide quotes for a range of frequently offered upgrades.
 7. Consider the appropriate level of financial support provided to vulnerable households.
 8. Record attrition of participants at each stage as this is an indicator that there may be an issue with processes, providers, or installers.



Provision of energy efficiency upgrade support (including energy assessments)

- Scorecard provided a consistent objective assessment process and metric between homes and provided a trusted basis for the assessor to recommend specific upgrades that would meet the householder's goals.
 - Scorecard assessments are delivered by highly skilled and knowledgeable assessors who can provide solutions in unusual circumstances and are tailored to the individual householder's needs. Assessors can also provide information and advice on other aspects of the home that may be driving energy bills but that don't appear on the rating certificate (e.g. plug-in appliances and user behaviours).
 - Scorecard includes an overall star rating representing the cost efficiency of the home, but also includes comfort ratings which indicate how easy it is to keep the house at a comfortable temperature in cold or hot weather without the use of mechanical heating or cooling. This can be the main issue of importance to some households.
 - Requesting participants to make a commitment on the upgrade package while the assessor is still in the home prevents decision-making delays. However, this is not always possible if an accurate quote cannot be immediately generated. Some participants could not decide at the time, either because they had information processing issues, or they needed to seek agreement from a partner or finance.
 - The provision of Scorecard results to rental property owners resulted in upgrades to 145 rented homes, 24% of all upgrades. The discussion with the assessor was crucial in gaining the trust of owners and approval to proceed with upgrades. Upgrades completed in rental properties were mainly appliances rather than thermal shell improvements. This outcome is supported by department research into motivations of rental property owners who value this
1. Use Scorecard assessors and assessment tool in upgrade programs to provide an accurate measure of pre- and post-upgrade energy consumption, costs, and greenhouse gas emissions for reporting.
 2. In conjunction with more efficient appliances, include improvements to the building to increase comfort and achieve health outcomes for occupants and further reduce energy consumption.
 3. If electrification is a program objective, use the Scorecard features that eliminate recommendations for upgrades that use gas and wood. This needs to be supported with further information for households to understand the benefits of transitioning off a familiar fuel.
 4. Continue to ensure that Scorecard assessor accreditation and quality assurance is maintained to support large-scale programs and maintain a good consumer experience and beneficial upgrades.
 5. Incorporate the Scorecard into related programs, such as VEU, to improve coordination and lower delivery costs.
 6. Ensure more and better-quality draught proofing products are available in subsidy programs such as VEU, without excess administrative burden, supported by installation audits and skills and training for the sector, to maintain quality and develop the sector to its potential.



<p>type of upgrade over interventions that aren't easily seen or understood.</p> <ul style="list-style-type: none"> • The Scorecard assessment was valued by participants with the overwhelming majority of survey respondents stating that it provided a good experience and useful information that helped them to determine the best upgrades. 	
<p>Provision of other energy advice</p>	
<ul style="list-style-type: none"> • Scorecard assessors engage with householders to understand their needs, explain rates from the Scorecard software, and advise householders on how best to use their home to achieve their goals. • Being in the home, Scorecard assessors can also deliver related services. In the Energy Savvy Upgrades program 142 householders were assisted to use the Victorian Energy Compare website to both claim the Power Saving Bonus and to find a better energy deal. • Energy literacy training (using Victorian Energy Compare) used home visits to add value for participants (taken up by 66%) and was considered useful by participants. 	<ol style="list-style-type: none"> 1. Use experienced and skilled Scorecard assessors to assess energy consumption, building construction and major fixed appliances, which drive cost and comfort in the long term and are generally the biggest contributors to energy use. 2. Have assessors identify behaviours and items in the home which may be contributing to high energy bills (e.g. oven use) and uncover the root cause/s and offer solutions. 3. Have assessors provide advice on other ways to reduce energy use and improve comfort such as how householders use the house and appliances. 4. Have assessors assist vulnerable householders in using government programs that require digital access (e.g. many rebates or the VEC website).
<p>Installing upgrades</p>	
<ul style="list-style-type: none"> • Home upgrades are often highly desired by households, but the hassle factor of identifying suitable trades and coordinating the installation of upgrades is a major barrier. The Scorecard assessor-facilitated approach removes significant barriers for householders. • Some householders are not able to work out how to use their new appliances without assistance. • Some upgrades required additional work such as making a roof space safe for insulation and switchboard upgrades to meet the latest Australian Standard. These added to the total package cost and in some case this cost was significant. There 	<ol style="list-style-type: none"> 1. Develop a consistent approach to booking installations between providers and installers using software designed for large-scale programs. 2. Consider household circumstances and offer a range of product option needs that consider householder limitations (e.g. poor sight, arthritis or other physical conditions that reduce strength or agility). 3. Train assessors to identify householder special needs in advance so they can be communicated to installers. 4. Train installers to seek information from householders on any usage barriers, select appropriate products and teach the



<p>are significant safety benefits to the community from these upgrades.</p> <ul style="list-style-type: none">• Several houses were identified as having structural issues that required attention before standard upgrades were installed, such as holes in walls, broken windows, leaking roofs. Installing more efficient appliances in these circumstances gives no benefit to the occupant and the basic building shell needs to be addressed first. There are significant benefits generated through this approach as upgrades will then generate substantial benefits in real world (rather than simply modelled) conditions.• Where apprehended violence orders were in place and the property was either jointly owned or owned by the other party, upgrades could not be installed. Permission to install upgrades needed to come from the other party but there was no way to communicate with the other party without breaching the order or privacy of both parties.	<p>occupant how to use before they leave the house.</p> <ol style="list-style-type: none">5. To provide genuine benefit to the householder, consider building repairs and upgrades to electrical elements of the home as part of an upgrade.6. Investigate how to include families experiencing domestic violence, in the program.
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Quality assurance

<ul style="list-style-type: none">• Auditing of the home upgrade works was essential to identify areas of underperformance, communicate these to providers, and have issues rectified.• Auditing of early upgrades was beneficial to identify any patterns of issues and give providers or installers time to rectify the work or to change installers.• Early audits to inform later upgrades were not always possible due to COVID-19 health restrictions. Upgrades occurred in a compressed time frame which created a lag to scheduling audits. Audit feedback came later than desired and in later tranches this resulted in identification of issues that could have been rectified earlier.• Scorecard assessments were subject to normal auditing regimes within the	<ol style="list-style-type: none">1. Leverage audit capacity from programs such as VEU and Scorecard where they exist, and where this does not impose any cost to the program.2. For large-scale projects, develop capacity to perform audits in advance.3. In the absence of a regulated sector, use standardised electronic audit forms to manage identified risks and minimise costs using software that can identify issues and automatically notify the installer or provider.
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Scorecard program which minimised cost to the upgrades project.

- There is a very small audit industry with some organisations who are inexperienced in factoring risk into their costings resulting in several suppliers quoting very high prices.

Data collection and evaluation

- Scorecard enabled the collection and secure management of data related to building stock to inform future policy and projects.
- Scorecard enabled measurement of comparable energy consumption, cost, and greenhouse gas emissions for evaluation, including before and after upgrades, and for whole-of-project evaluation.
- Energy retailer energy consumption data can be useful for evaluation; however, there are substantial barriers to gaining statistically significant outcomes from actual energy data. Collecting such privacy protected data and analysing it excluding unrelated biases (such as changes to occupancy, and weather) is not trivial.
- Privacy forms and consents to share data were captured by Scorecard assessors with each form uploaded into the Scorecard software for checking and subsequently confirmed by audits.
- Checklists were used in both paper-based and electronic formats. Electronic versions allowed for easy use during the work procedure and for photos to be attached within the form.
- Telephone surveys were used to capture feedback from householders. Telephone surveys are an effective way of capturing participant feedback as they are more likely to respond than through a paper-based or electronic (email survey) version.

1. Evaluate the impact (e.g. energy cost, carbon and comfort) and, where possible, measure direct impact on energy consumption of home upgrades.
2. Evaluate using Scorecard metrics for cost, carbon and comfort at no additional cost to the program.
3. Provide ongoing direct surveying of participant experience of upgrades to measure key health benefits, comfort, and delivery to user needs.
4. Use the Scorecard data collection facility to minimise data collection costs and include additional data collection fields to enhance consistency and accuracy in relation to the specific project objectives.
5. Use the Scorecard database to minimise the cost of project monitoring and evaluation through use of the automated reporting capability.
6. Survey households by telephone to understand the customer experience and yield a greater number of responses than other methods and conclude people who do not use the internet.



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