Aukaha
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Houses Into Homes

Post-contract final evaluation report on the Otago Home Energy Retrofit Project

To the funder:
Energy Efficiency and Conservation Authority (EECA)

Aukaha (1997) Ltd | August 2024

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Otago Home Energy Retrofit Project

Ko te auahi tērā e tārewa mai nei
He tohu takata, he ohu, he ohu oneone
Ko te waihotaka tērā mā tātou
Kia rere ai te auora
Kia tautoro te aumoana
Mā wai, mā te hua mokopuna, mā tātou
Kia aua tonu atu
Me he rauawa o te waka
Kia Aukaha e

Executive summary

This report evaluates the Otago Home Energy Retrofit Project, an 18-month pilot project to retrofit 244 whare in Otago, a region with a legacy of poor quality, cold, damp housing. This was a highly successful initiative that delivered effective home improvements for a large cohort of at-risk whānau across Otago in a relatively short timeframe.

The project outcomes illustrate the importance of taking a whānau-centred, empowering approach to service delivery, building relationships of trust and seeing beyond a check-box of interventions to a full package of home improvements and whānau support. The report also demonstrates the clear need for flexible, multi-year, multi-agency funding for service delivery organisations with strong mana whenua and community connections.

The project was delivered by Aukaha (1997) Limited, a mana whenua-owned consultancy that delivers social, economic, environmental and cultural services across the takiwā of our five Papatipu Rūnaka shareholders: Te Rūnanga o Waihao, Te Rūnanga o Moeraki, Kāti Huirapa Rūnaka ki Puketeraki, Te Rūnanga o Ōtākou, and Hokonui Rūnanga. Funded by Crown Infrastructure Partners (CIP) through the Covid-19 Response and Recovery Fund shovel-ready initiative, the project was managed by EECA. It aimed to improve housing quality – leading to better health outcomes and alleviating energy hardship – and to stimulate the regional economy and create jobs. On both counts, it was a success.

The project had the right people and systems in place to reach and work effectively with whānau in energy hardship, taking a whānau-centred empowering approach that built trust and found solutions to complex problems. Our established relationships and connections with whānau, Māori and Pasifika businesses, other organisations and agencies enabled us to work creatively and at scale, leading to greatly improved outcomes for whānau and contributing to the strength and resilience of local networks and economies.

The project engaged 244 whānau and saw a spend of $1,856,332.32 across the region. The spend per whare averaged $8,352.71, with a minimum of just $126.90 and a maximum of $21,536.18. The most common interventions were installing ventilation systems; basic interventions such as installing curtains, LEDs and shower heads; and clean heat/insulation. The highest spend was on building, reflecting the essential need for improvements to the fabric of the house to make ventilation, heating and insulation interventions effective. We made innovations such as creating an entry portal for whānau, partnering with the Curtain Bank and Fire and Emergency, and collaborating with a major research project.

A comprehensive survey of 70 whānau found that Aukaha is well-positioned to offer this service. Our coordinated, relationship-based approach removes barriers, improves accessibility and has greater impact than more transactional approaches. It also found that whānau wellbeing is inextricably linked to home upgrades. Further resourcing a coordinated, collective impact approach would have significant benefits.

The survey and our experiences through this pilot project highlighted the complexity of housing issues. Many challenges are beyond the scope of this project and need to be addressed through systemic thinking and coordinated action. The project highlighted the challenges with siloed funding and the pressing need for more flexible, high trust and sustained funding to run comprehensive programmes to lift housing quality in Aotearoa. Our experiences showed the need to invest as much in the planning and evaluation of programmes as the delivery. The same is true for the education components for whānau. While we achieved great results within the scope provided, outcomes could be further improved with more lead-in time, planning and resourcing for evaluation, and more funding and time to work with whānau.

The right people, in the right place, with the right relationships can deliver life-changing outcomes for whānau, and there is potential to build on this pilot with transformative results.

We make seven recommendations to improve the delivery of energy efficiency and home upgrade programmes.

Table 1: Report recommendations

RECOMMENDATION 1: Develop and resource flexible funding arrangements

Fund flax-roots Māori, Pasifika and community providers and social enterprises with the autonomy and discretion to apply deep retrofit solutions and education for energy wellbeing.

RECOMMENDATION 2: Increase the funding pool available overall and per whare

Raise the cap for funding per whare up to $50,000, with discretion to go beyond this in addition to the new standard WKH interventions.

RECOMMENDATION 3: Resource solutions for whare beyond scope

Resource Māori, Pasifika and community organisations and social enterprises to mediate discussions between the Government and whānau using alternative solutions for whare that are beyond scope.

RECOMMENDATION 4: Invest in coordinated approaches and action for collective impact

Resource the Energy Wellbeing Evaluation Consortium to build a more collaborative culture, increase partnership and enable programme improvements including consistent administration, reporting and evaluation.

RECOMMENDATION 5: Increase the resourcing for empowering education

Allow for more resources and time to be allocated to the education and follow-up components of projects.

RECOMMENDATION 6: Invest in high quality ongoing evaluation

Include an action research component in all multi-year contracts to support the continuous improvement of programmes. This should include resourcing for coordination with a researcher or research agency, and resourcing for participation in the Energy Wellbeing Evaluation Consortium.

RECOMMENDATION 7: Provide resourcing for multi-disciplinary approaches

Ensure funding allows for frontline staff to be provided with the training and toolkits to navigate complex social problems and to find whānau-centred solutions focused on empowerment and strengths.

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1. Project overview and background

1.1 The project in brief

The Otago Home Energy Retrofit Project was a significant investment in housing energy efficiency upgrades across the Otago region. Aukaha delivered the project with Covid-19 Response and Recovery funding from Crown Infrastructure Partners (CIP), managed by the Energy Efficiency and Conservation Authority (EECA).

The aim of the pilot project was to improve the energy efficiency of people's whare and to empower whānau to make changes that will keep their whare warmer and drier. From the outset, it also aimed to provide valuable insights that can inform policy and practice both in our local community and at a national level.

EECA provided funding for basic home repairs to secure the thermal envelope of the whare and allow effective energy efficiency interventions to bring it up to a Healthy Homes standard. It also provided funding for educating whānau on efficient home living practices. A list of repairs and interventions in the scope of the contract is provided in Appendix C.

The project set a target of supporting 250 whare with interventions and whānau education over a two-year period ending in May 2024. These targets and the completion date were adjusted from the original deadline of December 2023. Up to $20,000 per whare was budgeted, with a total intervention budget of $1,950,000. The project was open to low-income Otago owner-occupier households. This was a pilot project with the potential for expansion in terms of both scope and scale.

We assessed 244 whare for this project and were able to accept 222 for upgrades, with a further 22 whare declined, ineligible, out of scope or unable to proceed for other reasons as discussed further in this report. The total spend across the region was $1,856,332.32, with an average spend per whare of $8,352.71. Of the total spend, 73% was invested directly in housing upgrades and 25% was spent on operational costs to run the project. Spending on evaluation, including monitors, was 2% of the project cost.

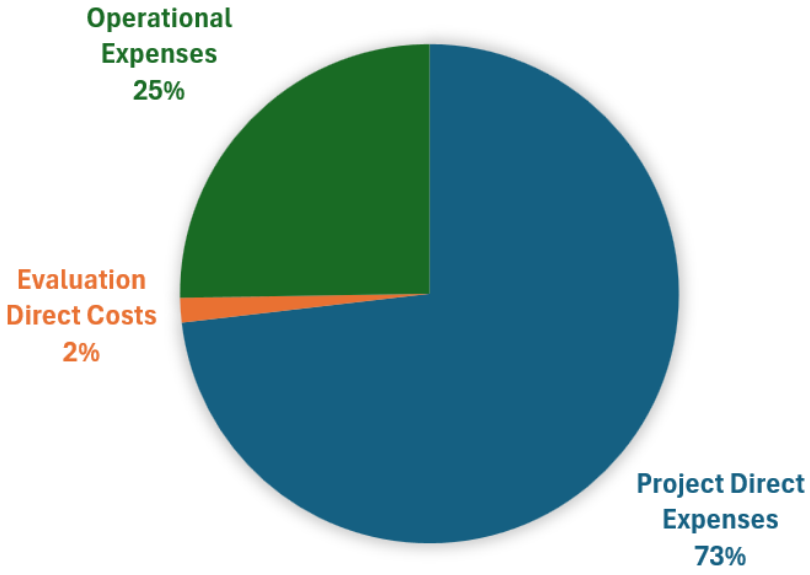


Figure 1: Breakdown of project expenses

The process for each participating household started with a technical home assessment that informed the work plan. Basic repairs and material interventions were carried out by contractors. Staff worked with each household through the process, which included whānau education, follow-up and referrals. Monitoring was carried out to evaluate the impact of interventions in whare.

1.2 Project objectives

The project had two core objectives:

1. Improved housing quality leading to better health and energy hardship alleviation outcomes

2. Regional economic stimulus/job creation

This project evaluation provides insights to what went well and what could be improved. Our aim is for these insights to contribute to government policy and help improve both energy hardship programmes and more systemic work to upgrade Aotearoa's housing stock.

1.2.1 Improved housing quality leading to better health and energy hardship alleviation outcomes

This project delivered upgrades focused on the four principles of a healthy whare: insulation, ventilation, moisture control and heating.

Our target households were those in energy hardship.[1] Using broad low-income criteria ensured the project could reach high-need households. We also designed the project to overlap with the Warmer Kiwi Homes[2] (WKH) owner-occupier criteria to make it easier to access co-funding where needed.

Improving housing quality locks in health benefits, reduces carbon emissions, and reduces or eliminates energy hardship (see the outcomes map below).

1.2.2 Regional economic stimulus/job creation

The second focus area for this project was job creation to improve productivity, ensure sustainability and increase inclusion. The project was expected to create eight full-time equivalent jobs.

The project created and supported more durable employment for staff, apprentices and contractors. It also created new jobs for dedicated home performance advisors and educators. Based on internal roles and information provided by contractors, we estimate that the project created six FTE roles between internal appointments and contractor roles.

We note that we are not reporting on two of the outcomes as they are not directly relevant to this project:

- Increasing regional/national resilience by improving critical infrastructure and/or growth and diversification of the economy
- Contribution to New Zealand's climate change commitments and environmental sustainability

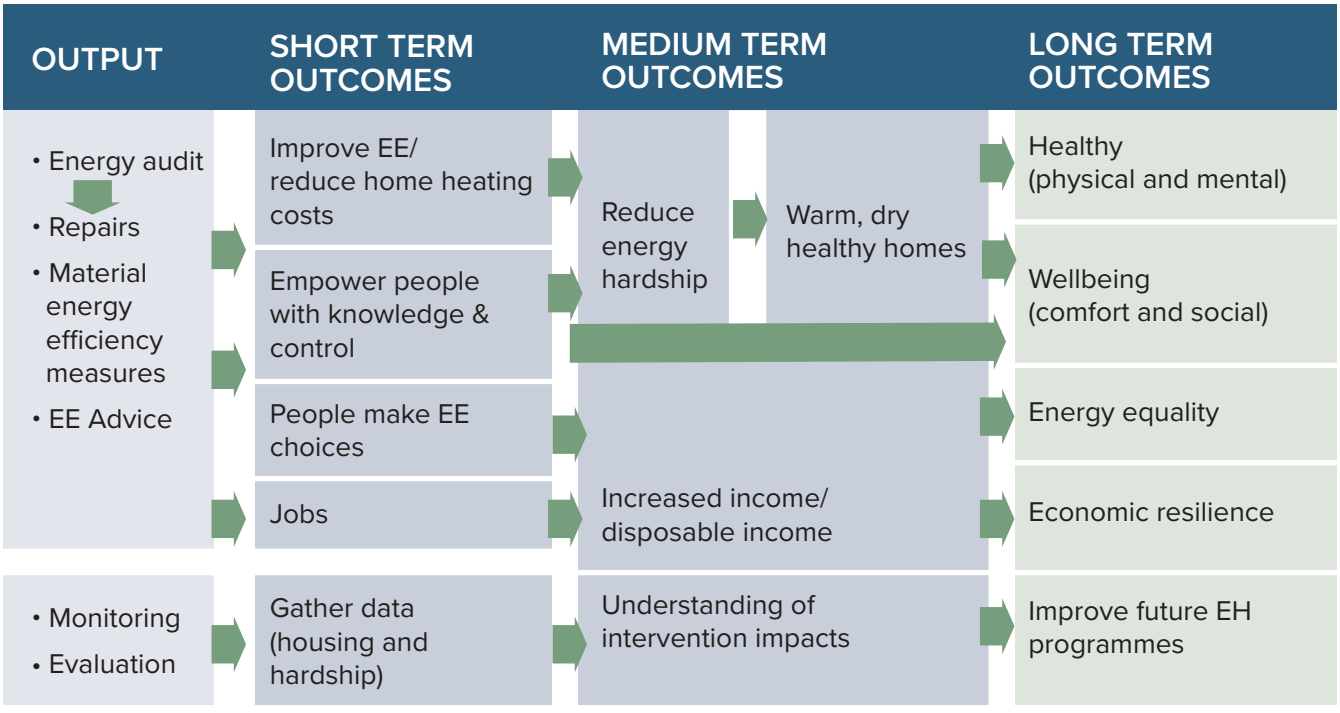


Figure2: Outcomes map

1 In response to a recommendation of the 2019 Energy Price Review, the Ministry of Business, Innovation and Employment (MBIE) defined energy hardship as being "when individuals, households and whānau are not able to obtain adequate energy services to support their wellbeing in their home or kāinga." The Energy Hardship Expert Panel noted that more work is needed to ensure this definition is clear and measurable. See Energy Hardship Expert Panel, Te Kore, Te Pō, Te Ao Mārama: Energy Hardship: The challenges and a way forward, p. 27.

2 See https://www.eeca.govt.nz/co-funding-and-support/products/warmer-kiwi-homes-programme/.

2. Aukaha at a glance

Aukaha is a not-for-profit company owned by kā rūnaka: Te Rūnanga o Waihao, Te Rūnanga o Moeraki, Kāti Huirapa Rūnaka ki Puketeraki, Te Rūnanga o Ōtākou and Hokonui Rūnanga. We deliver services across the takiwā of our Papatipu Rūnaka shareholders. Our name combines kia kaha, au kaha – unite, bind together – and reflects the range and breadth of our services and expertise.

The key function of Aukaha is to support the aspirations of the rūnaka and ensure mana whenua values are appropriately and authentically woven through the cultural, economic, social and environmental fabric of the respective takiwā.

The vision, mission, values and objectives of Aukaha are set out in our strategic plan.

The Aukaha team works across four pou:

- **Mana Taiao** (environmental and natural resource management)
- **Mana Takata** (health, social services and trades training)
- **Mana Ahurea** (design and identity)
- **Mana Aukaha** (business support services)

This programme sits with the Mana Takata Better Homes team.

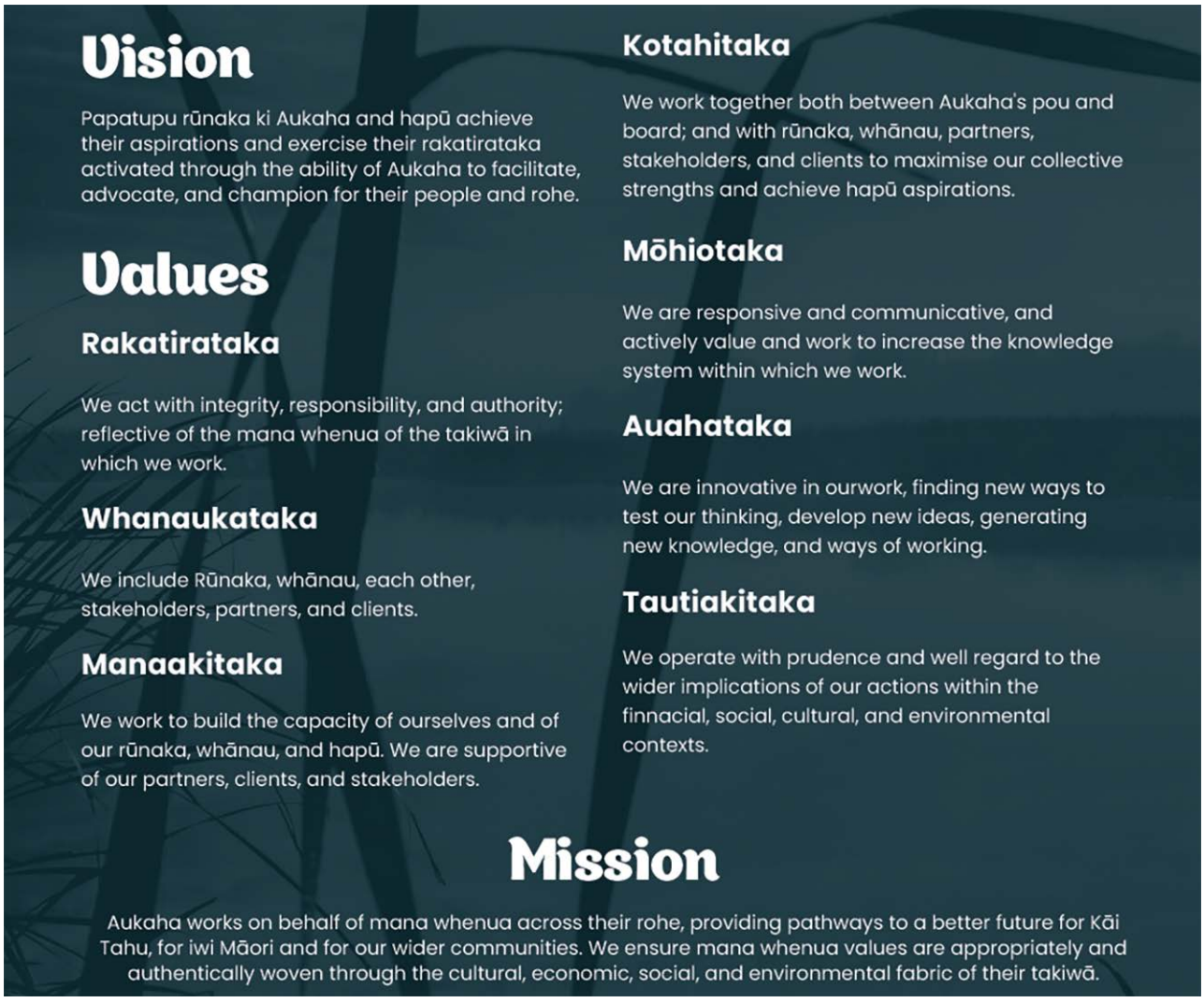


Figure 3: Aukaha's vision, mission and values

3. Why is this mahi needed?

3.1. Otago's cold, damp housing

Many of Otago's whare were built in the late 1800s or early 1900s, their character and charm hiding a history of poor building quality and maintenance. Cold, damp whare in the region are responsible for a range of poor outcomes in health and wellbeing, and contribute to broader social issues.

Our Better Homes team ran a quick survey between August and October 2023 to gather data on whānau energy hardship and the extent to which whare are warm and dry. We received 34 responses from participants in the project. Most people completed the survey before work was completed on their whare – the survey provides a snapshot of the issues whānau face with energy efficiency and costs in their whare. The results are shown in the table, with key findings in the bullet list below.

- Just over half of households (53%) had problems paying their electricity or gas bills (receiving a late payment notice, being disconnected or needing to make an arrangement for payment).
- Three-quarters of households sometimes (50%) or always (26%) had to cut back on groceries or juggle bills to afford electricity.
- More than half of households (56%) found their home colder than they wanted in winter. Adding in those who said this was often (15%) or sometimes (26%) the case, the percentage who wanted a warmer home rose to 97%.
- When asked whether their house got cold enough to see their breath in winter, 36% said this was often or always the case. A further 24% could sometimes see their breath indoors in winter.
- Just under half of the respondents could see mould covering an area larger than an A4 sheet of paper somewhere in their dwelling (sometimes = 29%, always = 18%).
- Just over a quarter of respondents found it very easy (3%) or pretty easy (24%) to heat their home in winter and keep it warm.

Table 2: Better Homes quick survey

QUESTION	COUNT[3]	PERCENT
1. In the last 12 months, have you or anyone in your household:		
a. received a late payment notice from your electricity or gas company?	7	21%
b. been disconnected from electricity or gas services for late or non-payment?	1	3%
c. been in contact with your electricity or gas company about a payment arrangement?	10	29%
2. Do you ever cut back on groceries or juggle other bills to pay for electricity?		
Yes – always	9	26%
Yes – sometimes	17	50%
No	8	24%
Don't know	0	0%
3. In winter, is your house or flat colder than you would like?		
Yes – always	19	56%
Yes – often	5	15%
Yes – sometimes	9	26%
No	1	3%
I have not spent a winter living in this house or flat	0	0%
4. In winter, does your house or flat get cold enough that you can see your breath?		
Yes – always	8	24%
Yes – often	4	12%
Yes – sometimes	8	24%
No	14	41%
5. Can you see mould in any part of this dwelling that, in total, is larger than an A4 sheet of paper?		
Yes – always	6	18%
Yes – sometimes	10	29%
No	18	53%
Don't know	0	0%
6. How easy is it in winter to heat your home and keep it warm?		
Very easy to heat	1	3%
Pretty easy to heat	8	24%
Not easy to heat	19	56%
Difficult to heat	4	12%
Very difficult to heat	2	6%

These qualitative experiences are backed up by results from Tether monitors[4] installed in selected whare. These monitors record temperature, humidity and atmospheric pressure in the whare. The monitors are usually located in the hallway or another place most likely to represent the overall temperature of the whare, and are not near a heating device. These readings are not necessarily before or after interventions.

The graph (opposite page) is an empirical cumulative distribution of the average temperatures of monitored whare over winter. An example reading would be that 80% of whare have an average temperature of below 18°C during winter and 39% below 14°C.

3.2. Alignment with national findings

The findings from this project align with the findings in Te Kore, Te Pō, Te Ao Mārama: Energy Hardship: The challenges and a way forward, the Energy Hardship Expert Panel Report to the Minister, which was released in July 2023. Many of our recommendations align with those made by the panel. Following recommendations from the Electricity Price Review in 2019, the Energy Hardship Expert Panel and the Energy Hardship Reference Group were set up to investigate energy hardship in Aotearoa.

The Energy Hardship Expert Panel Report presents a framework for "ensuring every whānau can access and afford the energy they need to live, thrive and prosper."[5] The report is clear that systemic change underpinned by a recognition that affordable energy is a human right will be needed to achieve this goal.

Key findings from the report on energy hardship are below. Please note that the report identifies the limited but growing body of literature, data and evidence on energy hardship in New Zealand:

110,000 households across the country could not afford to keep their homes adequately warm (figures from year ending June 2022).

- 4-6% of households (77,000 to 115,000 households) experienced at least one of the five proposed measures of energy hardship.
- Māori and Pacific peoples experience greater levels of energy hardship.
- Renters experience greater energy hardship than owner-occupiers.
- Low-income households are struggling the most to achieve energy wellbeing.[6]

The costs of energy hardship are astronomical. The year 2017 saw 6,276 hospitalisations attributable to damp and mouldy housing, which represents a cost of $36 million. Every year, approximately 229 deaths can be attributed to poor housing, representing a cost of around $1 billion annually.[7]

The report found that much stronger leadership and action is needed to achieve energy wellbeing. This would look like "purpose-driven, and collective action at a government, industry and community level to lead, drive and achieve change."[8]

The report also found a need for more comprehensive, coordinated, consistent and effective gathering of data, information and research insights about energy hardship drawing on a wide range of sources and voices. Submitters demonstrated support for the Energy Wellbeing Evaluation Consortium (EWEC, see 4.3.4) and its potential to develop more consistent data and tools.[9]

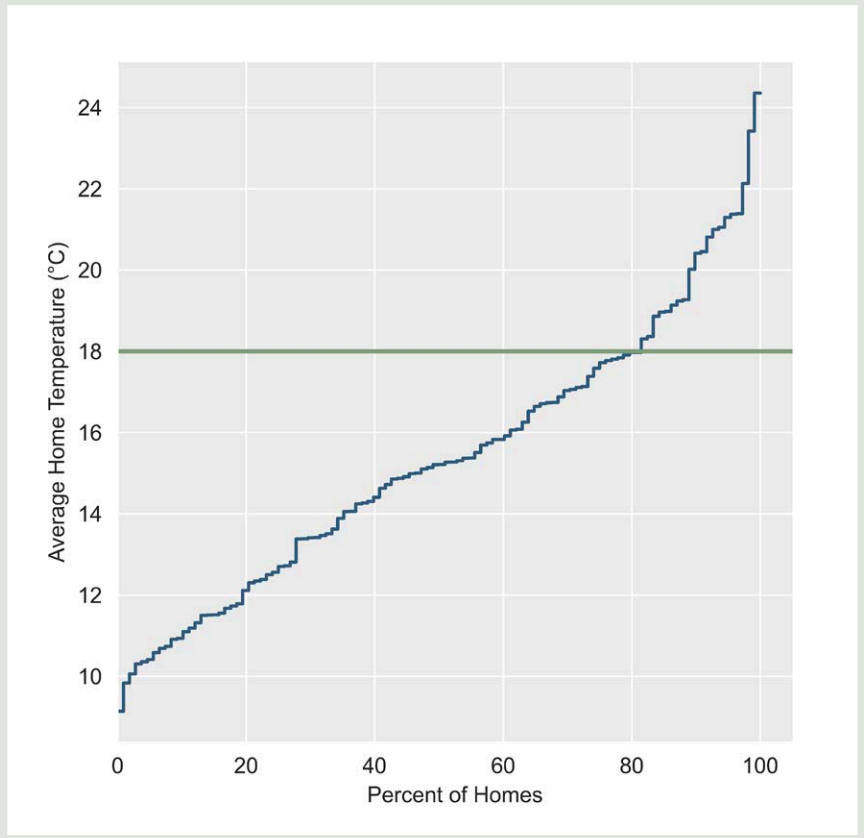


Figure 4: Empirical cumulative distribution of average temperature

3 The survey received 34 responses
4 Find out more at https://www.tetherhq.com/.
5 Energy Hardship Expert Panel, Te Kore, Te Pō, Te Ao Mārama: Energy Hardship:
The challenges and a way forward, p. 3.
6 Ibid., p. 30.
7 Ibid., p. 31.
8 Ibid., p. 53.
9 Ibid., p. 54-56.

4. Why Aukaha was right for this project

4.1 The right support for whānau

The breadth of Aukaha as a service provider was an advantage to the project. Our whānau-centred and empowering approach enables us to care for whānau holistically and beyond the duration of this specific project.

The project was part of the Better Homes suite of programmes, which sits within the scope of the Mana Takata Pou at Aukaha. The housing programmes complement each other, meaning we can often build a package of support to achieve better outcomes for whānau. For example, participating whānau were often eligible for support from the Otago Home Energy Retrofit Project, Healthy Homes Initiative (HHI) and Te Puni Kōkiri (TPK) Essential and Critical Repairs Programme, which we could coordinate for them.

Aukaha is well positioned to navigate the complexity of these different funding pools on behalf of whānau. Previous feedback has indicated that whānau find the criteria for different programmes confusing, and they often don't know where to go to get help or support.

In response to this concern, we created a portal for whānau, through which we could tailor support from across different funding pools to suit the needs and contexts of each whānau.

Being a provider through the HHI expands our reach into rental properties, and we aim to continue seeking solutions for whānau housing issues in emerging areas such as climate safe housing.

The suite of funding programmes and pools we worked with as part of the project is below.

Essential and Critical Home Repairs Programme, funded by TPK. The focus of this programme is Māori homeowners who are low income and Otago based. Following a technical assessment, interventions with a value of up to $80,000 can be completed. This programme does not have an education component but whānau can be referred to other social programmes.

Healthy Homes Initiative (HHI), funded by Te Whatu

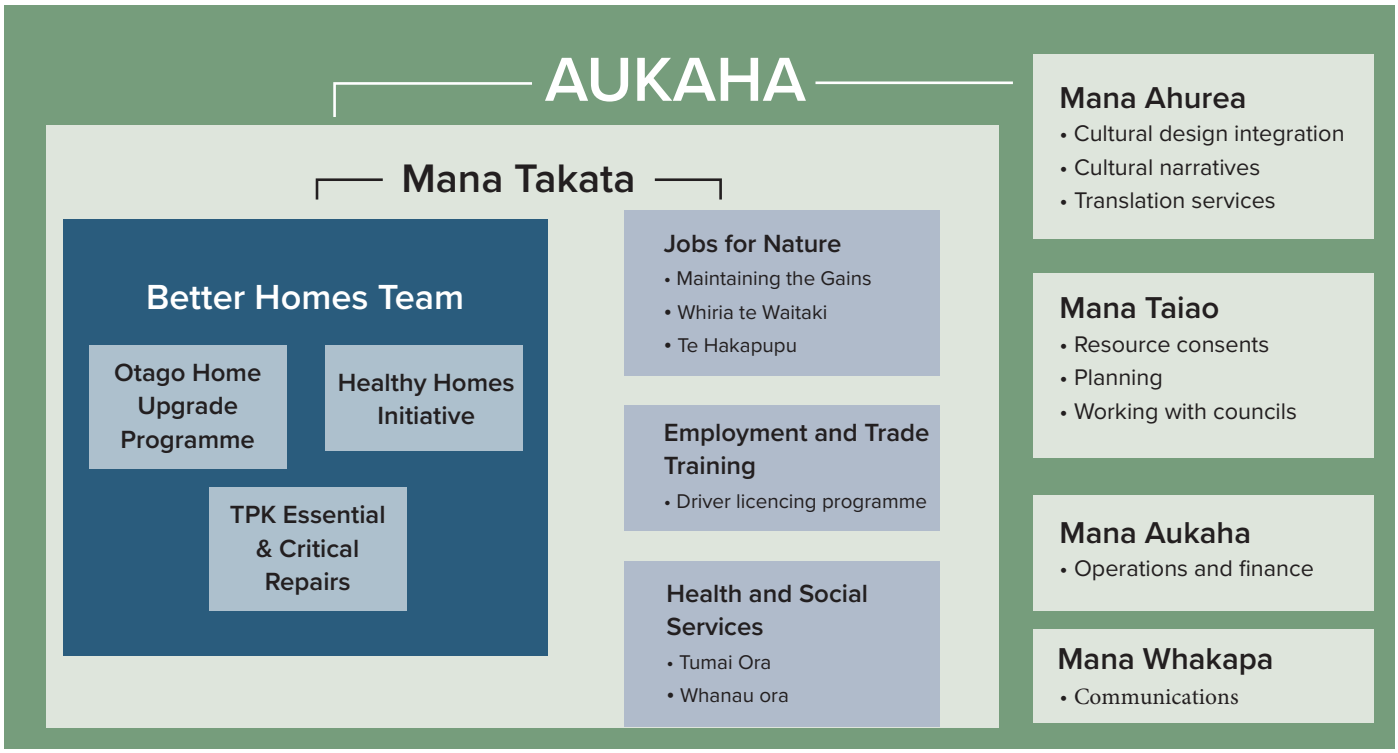


Figure 5: Aukaha organisational diagram

Ora. This programme supports renters and owner-occupiers where members of the household have health vulnerabilities and are on a low income. The programme focuses on helping homeowners to navigate complexity and provides education to improve health and living conditions, particularly for families with young children.

Support for Energy Education in Communities (SEEC) funding pool. This funding pool provides targeted, specialist energy advice or training to those experiencing energy hardship so that they can keep their whare warmer and reduce their energy bills.

Kia Haumaru Te Kaika Programme. This was a pilot project run jointly by Te Whatu Ora and Aukaha that supported whānau to make their whare warmer and drier, with the aim of reducing hospital admissions for children with housing-related respiratory illnesses. This project was a precursor to the Otago Home Energy Retrofit Project, helping to identify that there was a need for the larger project.

The project benefited from relationships with the Employment and Trade Training team and the Health and Social Services team, who were able to provide in-kind support. For example, our navigator team was able to help build trust and work with whānau where needed to provide support with non-housing challenges.

Aukaha is committed to using procurement mechanisms to play an active role in the creation of a thriving Māori economy in Otago. We have a comprehensive database of Māori and Pasifika businesses, which we use for all our projects, including this one. In turn, the sustained work we offer can enable these businesses to create opportunities for Māori and Pasifika employees and apprenticeships. Aukaha is a partner in the Regional Apprenticeships Initiative and has created the Aukaha Managed Apprenticeship and Work Ready Trust to support and transition whānau into sustainable quality employment. Broader outcomes such as these are integral to how we conceptualise, plan and run service delivery projects.

Aukaha also has partnership agreements with the Queenstown Lakes District Council, Dunedin City Council and Otago Regional Council and a range of funding partners, including Te Whatu Ora, Te Pūtahitanga o Te Waipounamu, the Ministry of Social Development, TPK and Te Rūnanga o Ngāi Tahu. Through these partnerships, we can expand the kōrero on eliminating energy hardship in our community and developing joint solutions beyond the life of this project.

4.2 The right people

To deliver this project, we built a small, highly skilled team with strong community connections, subject matter expertise, leadership experience and skills in project management. Team members were well connected across the community and at a government level. We also met regularly with EECA as a delivery partner to evaluate and fine-tune the project. Appendix A sets out key roles for this project and their responsibilities.

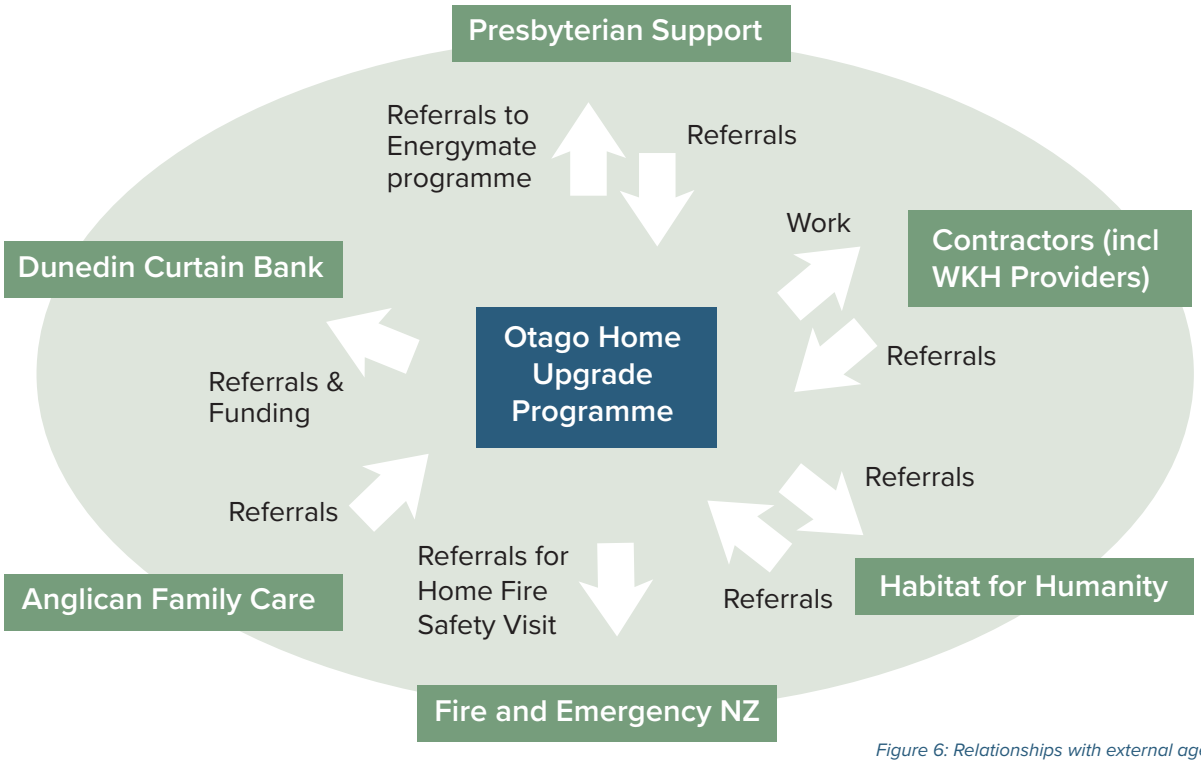


Figure 6: Relationships with external agencies

4.3 The right partnerships and relationships

Strong established relationships were significant in helping us to run this project successfully. These relationships set the groundwork to continue to expand our housing workstreams in the future.

Some of the key partnerships and relationships we formed are below. Figure 6 shows key relationships with external agencies that provide services relevant to this project. These relationships enabled us to set up channels for referrals (often two-way) and resources.

4.3.1 Curtain Bank

We referred 90 whare to the Dunedin Curtain Bank, a not-for-profit that up-cycles donated curtains into made-to-measure, double-layer curtains, free for whānau who have a Community Services Card. They also offer a custom curtain-making and alteration service and have an Enviroshop that offers things like draught stops, lined shopping bags, children's swimming bags and produce bags.

Through our building intervention funding with HHI, we provided resources and a new sewing machine to help support this important service, as curtains are one of our biggest interventions. We also enabled two of their staff to complete the Principles of Home Performance training and gain an understanding of home performance.

4.3.2 Fire and Emergency New Zealand

Part of the HomeFit assessment looks at smoke alarms in the whare. As we found more and more whare without the required alarms, we approached Fire and Emergency and partnered with their programme providing free smoke alarms alongside a home safety visit to install the smoke alarm and give advice on fire safety and escape plans.

Fire and Emergency completed 144 home fire safety visits through this partnership and replaced expired smoke alarms in several whare.

The partnership with Aukaha improved fire safety awareness and preparedness among high-risk households in Otago. We were able to identify areas where whānau needed more knowledge about fire safety, smoke alarms and escape plans. All 144 whānau received personalised fire safety advice, had smoke alarms installed, and developed customised escape plans. This increases the safety of these households and empowers them with the knowledge and tools to respond effectively in case of a fire.

In the words of Marty Jillings, Senior Advisor Community Readiness and Recovery for the Otago District, "This collaborative effort demonstrates the positive impact that partnerships within Otago can have in enhancing community fire safety."

4.3.3 Energymate

We referred 86 whare to Energymate, who provided education about electricity use and could suggest switching providers for savings. In the Otago region, Energymate is delivered by Presbyterian Support Otago.[10]

4.3.4 National networks

Aukaha is a part of the Community Energy Network (CEN), a national network of organisations working to remove energy hardship and increase energy efficiency in their communities.[11] Many of the CEN members run similar upgrade programmes to ours, and a major benefit of belonging to this network is the opportunity to share experiences and knowledge. CEN partners with the Zero Waste Network[12] and Environment Hubs Aotearoa[13] network – in 2023 Aukaha hosted the three groups' annual Strengthening Communities Hui,[14] with the theme of "Catalyst For Collective Action".

Aukaha is also a member of EWEC, an informal consortium of researchers, policy-makers and programme delivery organisations that aims to enable:

- sharing of experience, expertise, evaluation tools and methodologies more comparable approaches to
- evaluating projects – understanding what works
- continuous improvement of programmes – doing more of what works.

4.4 The right approach

In part, the success of this project is due to the care taken to select and integrate approaches that both reflected our worldview and values and established a strong foundation for our planning, delivery and evaluation.

4.4.1 Risk management

Given the tight timeframe and the importance of reducing disruption and uncertainty for whānau, it was critical to manage the work programme carefully and to ensure that tradespeople and materials were available as needed for the work to progress smoothly and efficiently. The work programme was designed to manage the coordination of contractors and whare, with scheduling controls and reminders.

We also took care to identify and mitigate risks. At the outset of the project, we developed plans to mitigate potential shortages of materials and disruptions due to Covid-19 or other major events. While these measures were not needed in the delivery of the project, it was important to have the plans in place for ready activation.

4.4.2 Te Korekoreka

As a mana whenua-owned consultancy, our research approach reflects our values. We use the Te Korekoreka model as a practical guide for our cycle of improvement.[15]

Te Korekoreka provides access to a holistic worldview grounded in Te Ao Māori. It is inspired by the famous Kāi Tahu karakia 'Kei a te pō', composed in 1849 by the rakatira and tohuka Matiaha Tiramōrehu. 'Kei a te pō' tells the Kāi Tahu creation story of how the universe was called into being through song. It describes four key realms of creation – starting with Te Pō (the darkness) and moving into Te Ao Mārama (the light), then Te Ao Tūroa (the physical world), before returning to Te Kore (the nothingness) before returning to Te Pō and the cycle repeating. Through Te Korekoreka, Kāi Tahu can reconnect with mātauraka and apply traditional knowledge of creation to complex challenges today.

This model takes us through the four realms, activating our ability to understand the now, learn from our past, imagine a new future, and commit to a deliberate course of action:

- Te Ao Tūroa (knowing-doing-reviewing)
- Te Kore (seeking-reflecting-understanding)
- Te Pō (imagining-designing-making)
- Te Ao Mārama (achieving-completing-celebrating).

10 Find out more at https://www.energymate.nz.
11 See https://www.communityenergy.org.nz/about-us/.
12 See https://zerowaste.co.nz/.
13 See https://www.environmenthubs.nz/.
14 See http://www.communityenterprise.org.nz/hui.
15 For more information, go to www.tekorekoreka.co.nz.

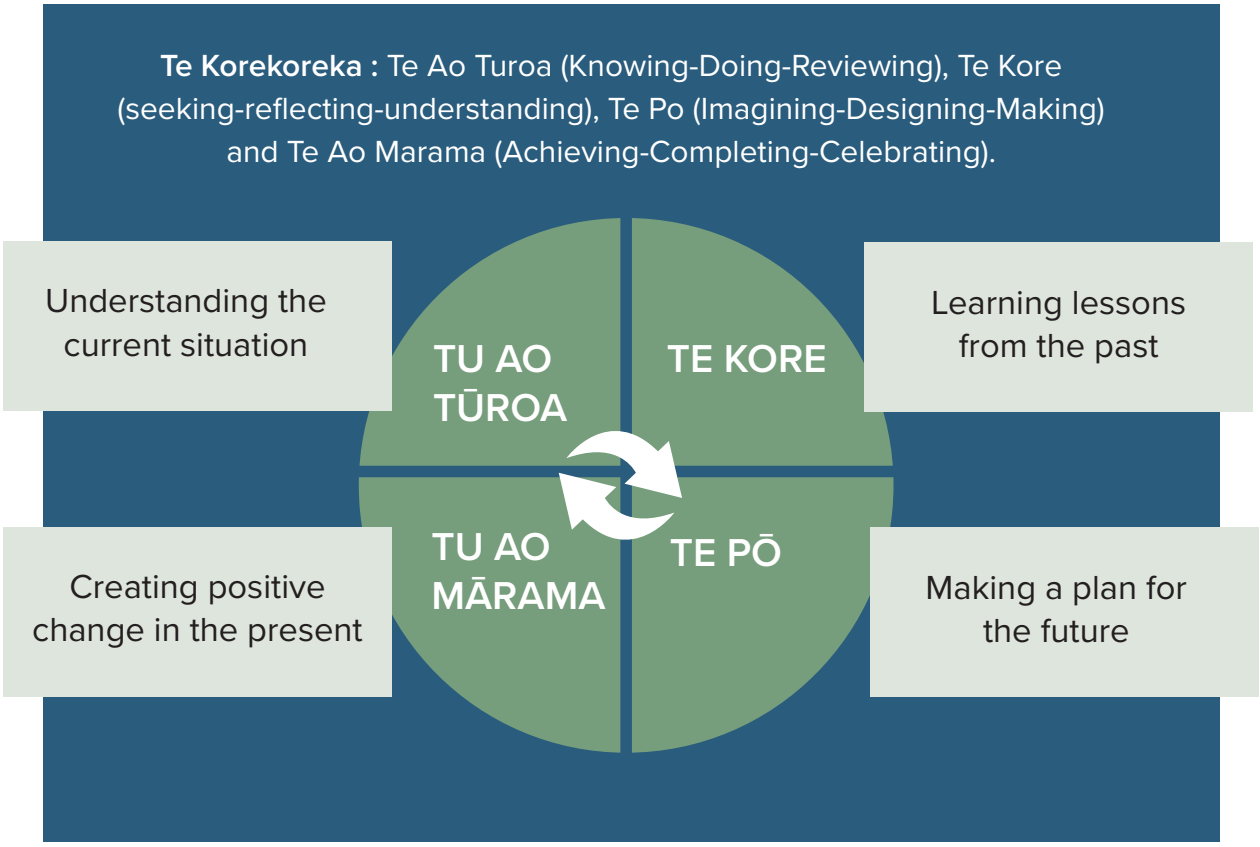


Figure 7: Te Korekoreka

4.4.3 Energy Cultures Framework

We used the Energy Cultures Framework[16] to shape how we ran this project and to evaluate what worked. This theoretical framework suggests that cognitive norms, material conditions, and energy practices form an interacting system that is a whānau's energy culture. To change this culture to get a positive outcome, you must be aware of the interaction between these parts, as well as the effect of external influences.

For example, to change the energy practice of using a bathroom extractor fan when showering, the whānau must have the material conditions present (an extractor fan installed), and they must be motivated by their norms: the expectation of a drier whare and the understanding that using the extractor fan will help achieve that. Figure 7 shows how we applied this framework to the interventions we provided in this project.

4.4.4 Material conditions

The material conditions of the whare are the physical systems and structures in it. For example, the insulation systems, weathertightness systems, ventilation systems, and heating systems. We used the HomeFit tool to do a comprehensive assessment of these material conditions. We then made material improvements designed to lift the performance and energy efficiency of whare.

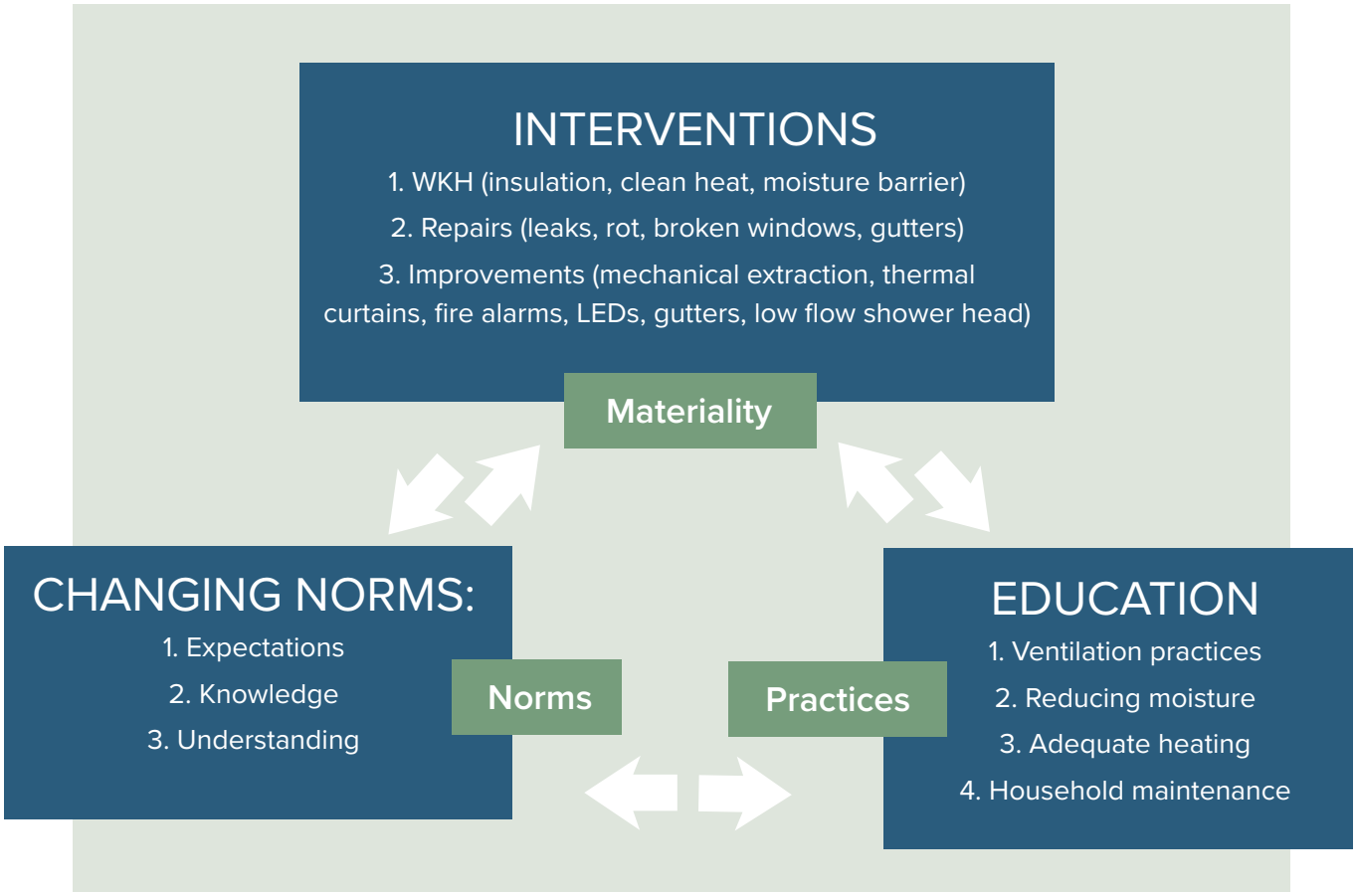


Figure 8: Material interventions, norms and education for this project

4.4.5 Norms

Another aspect of energy culture is the norms, values or motivators that shape how people think and feel. We first gained an understanding of the current whānau values and the beliefs they have about their whare and energy use. We then aimed to adjust these by explaining and showing people how to reduce energy bills, explaining the health risks of mould and showing how good practices can save money and improve wellbeing.

4.4.6 Behaviours and practices

This aspect of the framework is about understanding and influencing the things people do in their whare in relation to energy. We first discussed with the homeowner what their current practices are, and then we provided information and education to help people make good choices and improve the way they do things – examples are not drying washing inside and adopting good maintenance practices like cleaning gutters.

16 See Janet Stephenson, Barry Barton, Gerry Carrington, Daniel Gnoth, Rob Lawson and Paul Thorsnes, "Energy cultures: A framework for understanding energy behaviours," Energy Policy, 38:10 (October 2010) 6120-6129.

5. What we did – client process

5.1 Referral generation

To initially get the word out about the project, we spoke at place-based community group events, spoke to community providers that we had relationships with, put adverts in community pamphlets and posted on social media. We also spoke on local radio and advertised in a local paper. Information about the success of these methods is in Appendix B.

We developed an online portal for all three programmes, which meant whānau could access as many programmes as they were eligible for with one referral form. Referrals were then triaged in accordance to eligibility and, if eligible for more than one programme, were discussed and actioned by the wider housing team.

5.2 Eligibility

To be eligible, participants had to be low-income Otago owner-occupiers. Proof of low income could be shown through being a Community Services Card holder or through another objective indicator of energy hardship such as below median income or referral through a GP or budget advisory. This approach ensured we could reach high-need households. Aligning with the criteria for the larger WKH programme meant we could pay the portion of the upgrade cost that the homeowner would usually have to fund over and above the WKH subsidy.

5.3 Whare assessment

Once eligible households were confirmed as participants, they received a home performance assessment that identified the material repairs and interventions that could improve the energy efficiency of their whare. Drawing on the Energy Cultures Framework, we worked with whānau to understand their situation, what their whare is like and how they live in it.

5.4 Interventions

From this assessment, we worked with each whānau to develop a tailored package of measures that would bring their whare up to or above the Government's Healthy Homes Standards. We delivered both basic repairs to the structural elements and weathertightness of the whare and material interventions to improve its energy efficiency. Monitoring devices were installed in some whare to measure temperature, humidity and CO2 levels.

5.5 Education

The assessment also identified behavioural changes that could complement these physical improvements. Through our engagement with whānau, we provided advice and information about how people could keep their whare warmer and drier. We also provided several education pamphlets to supplement this education – these are provided in Appendix H.

The flow diagram (figure 9) shows the details of the process we followed for each client.

5.6 Research project

We were fortunate in the conception, delivery and evaluation of this project to be aligned with a significant piece of research being conducted by a PhD student at the University of Auckland.

Luis Medrano is conducting the research as part of his PhD programme from the School of Architecture and Planning. The aim of the project is to understand New Zealand householders' experiences of and opinions about home upgrade programmes and measures and how well they respond to household needs and everyday routines. The research project is designing a new home evaluation process that gives more weight to householders' opinions. It will also make recommendations for home upgrade programmes and policies in Aotearoa.

Whānau in our project were invited to take part in the study, with six to ten adults being selected in total. The study involved a face-to-face in-home interview, followed by a walk-through to see the interventions we had made. The researcher also analysed energy bills and ran a focus group.

Luis' final PhD thesis will be uploaded in the University of Auckland's Research Space[17] database once he has graduated, most likely in September 2025. It is possible that journal articles containing parts of the thesis will be published earlier.

17 See https://researchspace.auckland.ac.nz/.

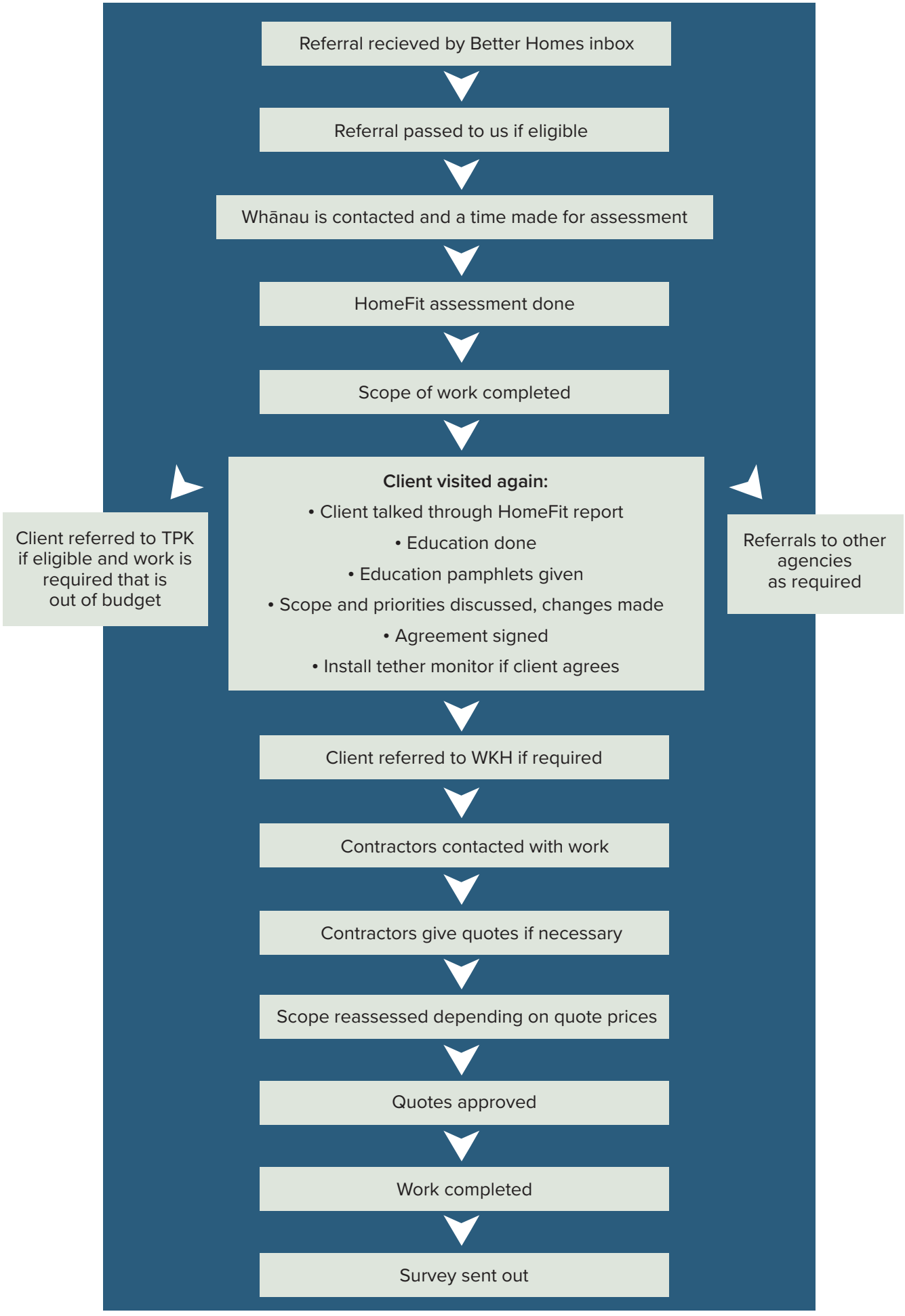


Figure 9: Client process

6. What we achieved – project results and outcomes

6.1 Key metrics

We came close to reaching our targets for this project, engaging 244 whānau and spending $1,856,332.32 on housing upgrades across the region. The key metrics from the project are presented in the table and a full breakdown is in Appendix D.

Table 3: Key project results

MEASURE	RESULT
Number of whare assessed	244
Whānau education complete	242
Whare interventions complete [18]	222
Tether monitors installed	138
Whānau survey responses	70
Minimum spend per whare	$126.90
Maximum spend per whare	$21,536.18
Average spend per whare	$8,352.71
Total spend on interventions	$1,856,332.32
WKH	
Whare that had previously received WKH insulation	71
Whare referred to WKH for insulation	64
Whare that had previously received WKH clean heat	18
Whare referred to WKH for clean heat	49
Whare referred to WKH for both insulation and clean heat	23

6.2 Whānau and whare

The graphs in this section give some key demographics related to the project. The following points are worth noting:

- Of the 244 whānau who took part in the project, just over two-thirds (69%) were in Dunedin. The remaining 31% were split fairly evenly between the Clutha and Waitaki districts.
- Looking at the figures by main urban area, we can again see that urban Dunedin predominates, accounting for 60% of the participants.
- The Dunedin suburb with the most interventions was Caversham (18). Green Island (11) was next, followed by Liberton (9), North East Valley, South Dunedin and Corstorphine (all 8).
- Just over half of the participants (56%) were Pākehā. Almost a third (31%) were Māori, with a much smallerpercentage (2%) being Pasifika.[19]

18 No interventions were completed for 22 whare, six due to becoming ineligible after the initial assessment, six declined interventions, five were referred to TPK with no interventions from this programme due to large issues out of scope, and five were out of scope and not eligible for other programmes.

19 Note that people could select more than one ethnicity, so the numbers do not add up to the total.

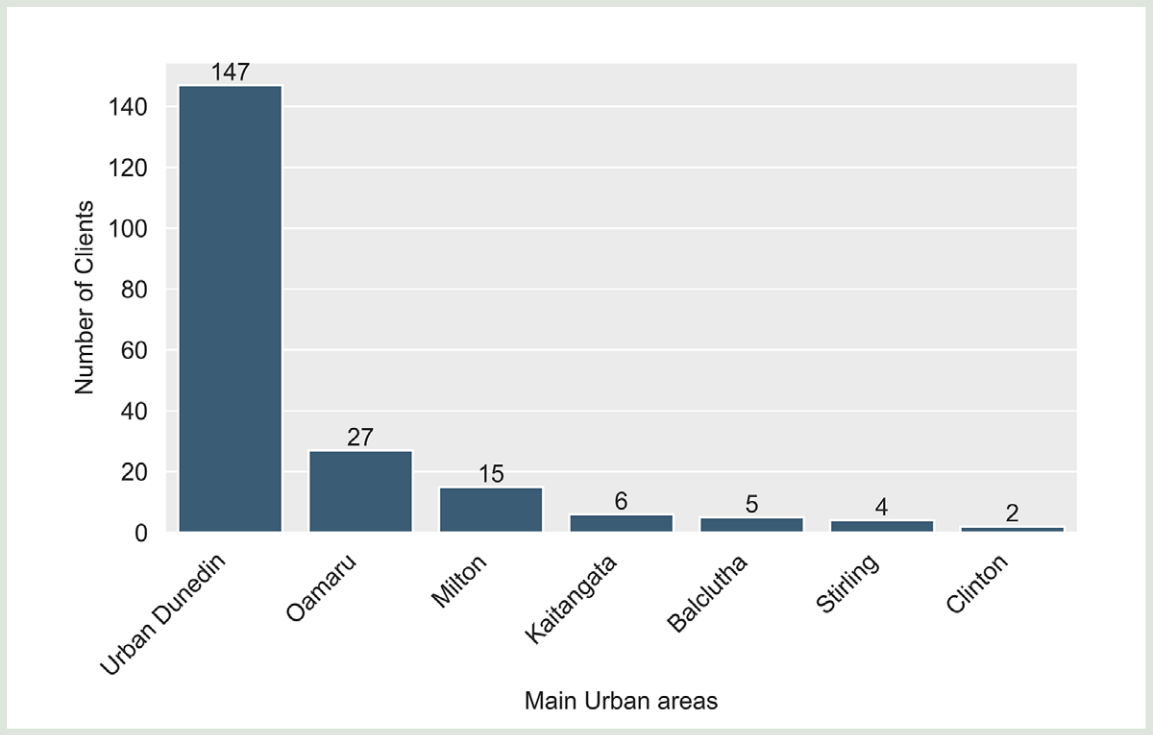


Figure 10: Number of clients in each main urban area

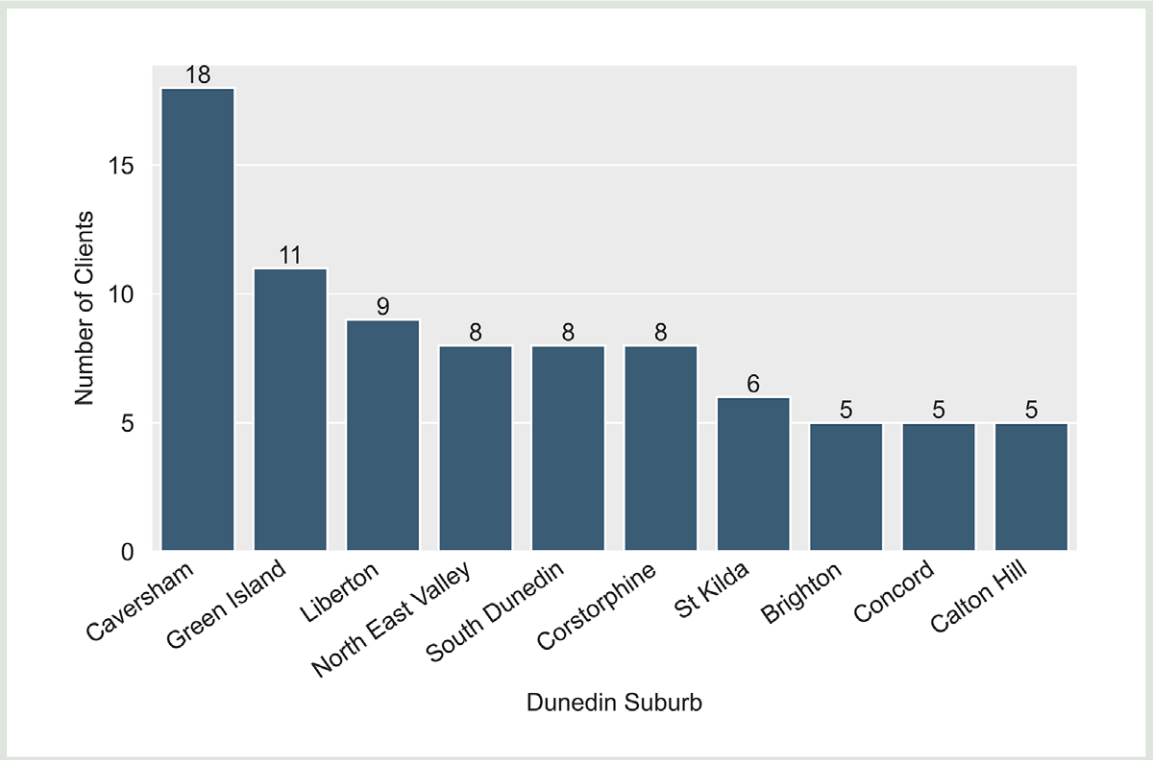


Figure 11: Number of clients in the top 10 Dunedin suburbs

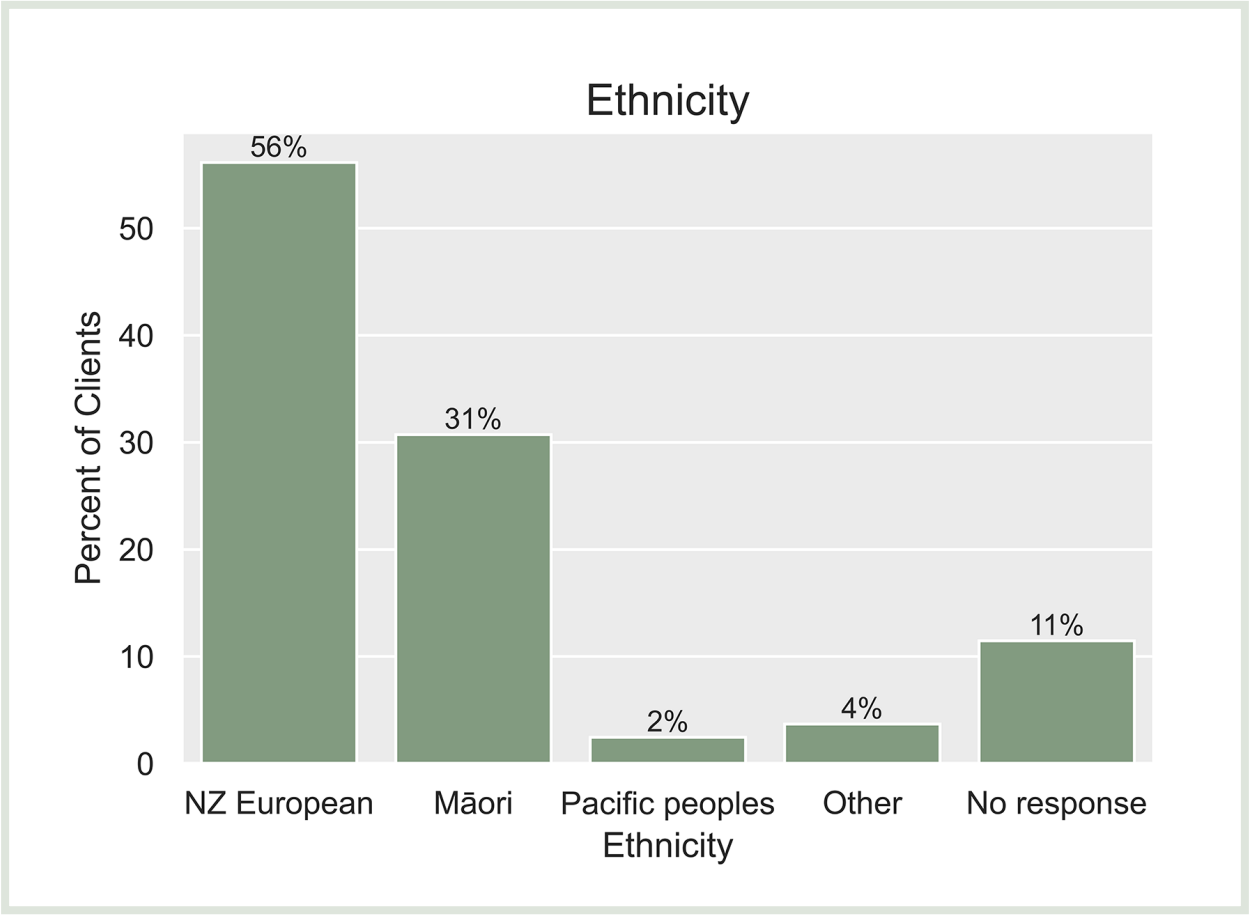


Figure 12: Ethnicity of clients

6.3 Intervention summary

Table 4 and Figure 13[20] summarise the repairs and interventions made across the project. The most common interventions were:

- installing ventilation systems (151)
- basic interventions such as installing LEDs, shower heads and curtains (124)
- clean heat/insulation (90).

The areas of highest spend were:

- building ($300,496.78)
- installing ventilation systems ($268,565.55)
- door and window repairs ($266,686.33)
- roof repairs ($260,611.21)
- basic interventions ($200,875.03)
- clean heat/insulation ($181,100.87).

20 The percentage spend on incidentals (0.1 %) is not shown in the pie chart.

Table 4: Summary of interventions

INTERVENTION	TOTAL NUMBER	TOTAL SPEND
Building (pelmets, repair rot, floor repairs, hot water cylinder cupboard repairs, etc)	76	$300,496.78
Ventilation system installation	151	$268,565.55
Door and window repairs	77	$266,686.33
Roof repairs	55	$260,611.21
Basic interventions (LEDs, shower heads, curtains)	124	$200,875.03
Clean heat/insulation	90	$181,100.87
Plumbing	43	$168,767.91
Wall cladding repairs	18	$101,306.46
Water heating system installation or repair	21	$72,189.19
Electrical	24	$33,702.16
Incidentals (contractor supplies)	–	$1,381.56
TOTAL	679	$1,856,332.32

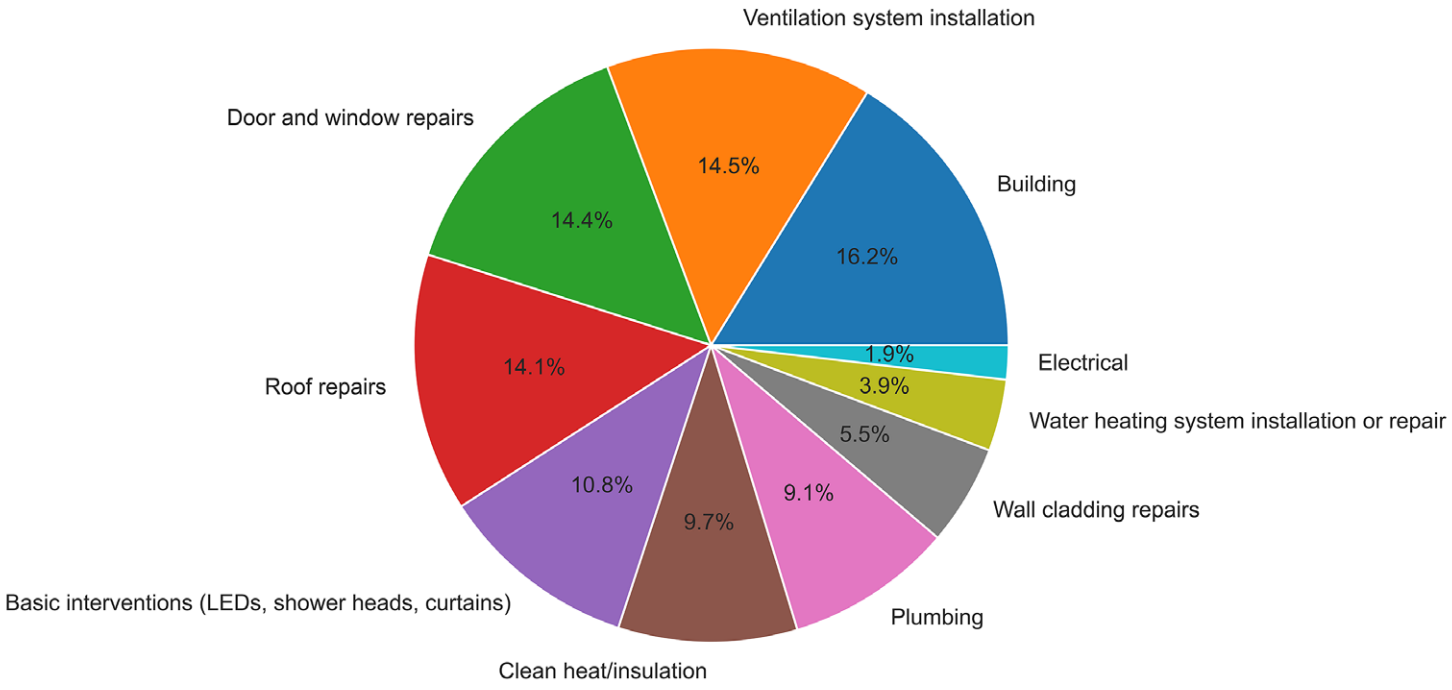


Figure 13: Intervention spend

7. What the project meant to whānau

The analysis in this section is based on a comprehensive survey of project participants. The survey was sent to each participating whānau when the work on their whare was completed. It garnered 70 responses, a 29% response rate.

We collected basic household information about location and the numbers of adults and children in the whare. Whānau were asked about how they came into the programme and how easy it was to access.

We collected information about issues that had been present in the whare and their feelings about their living situation before we did our interventions. We also asked about what work Aukaha had done and what remained to be done. Whānau were asked to share their perceptions of the impact of interventions on the warmth, dryness and ventilation of their whare, along with their experiences of using the Tether monitor if they had one installed.

We asked a series of questions about wellbeing, covering physical health and mental health and wellbeing. Whānau had space to comment on anything they were doing differently now, and on whether they still had things they would like to do to their whare. A final set of questions gathered data about whānau experiences of our service and asked if they would like to be referred to any other agencies for support. Our high-level analysis of the survey provided the following findings:

- Aukaha is well-positioned to offer this service. Our coordinated, relationship-based approach removes barriers, improves accessibility and has greater impact than a more transactional approach would have.
- Whānau wellbeing is inextricably linked to home upgrades. Further resourcing a coordinated, collective impact approach would have significant benefits.
- Successful projects of this nature turn houses into homes. At the same time, housing issues are incredibly complex. The scope of this project has been a significant improvement, but much more could still be done.
- The way that education is offered by Aukaha – taking an empowerment approach – is the key to change. It is warm, non-judgmental, relationship-based education that puts whānau in the driving seat for change.

In the following sections, we outline key themes from the survey.

7.1 Whānau value the accessibility and quality of the service Aukaha provides

Eighty-six percent of respondents agreed or strongly agreed that the Aukaha service was easy to access. All respondents agreed or strongly agreed they had a great service from Aukaha staff.

"We had a easy path to follow for great service."

Several elements make a service more accessible for whānau:

- **Accessibility and removal of barriers:** Several comments emphasised the ease of accessing services, whether it was through referrals, emails, phone calls or other means. The simplicity of the process and the quick responses were appreciated.
- **Empathy and understanding:** Comments indicated that participants experienced the service as welcoming, respectful and understanding of individual/whānau needs and circumstances.
- **Clear communication:** Participants appreciated the efficiency of the process, clear communication, quick responses, informative interactions, and warm, supportive guidance through the process.

Whānau expressed gratitude for the assistance they received and gave positive feedback about the services provided, indicating a high level of satisfaction with the overall experience. A question about potential changes to the service received overwhelmingly positive responses.

This theme highlights the importance of accessible, supportive and community-oriented services that prioritise efficiency, empathy and clear communication to meet the needs of whānau.

"Quite honestly, I can see no room for improvement in the service you offer."

7.2 Whānau were overwhelmed by issues with their whare pre-intervention

Before the project interventions, 72% of whānau felt negative about their whare and how it was affecting their family.

"My baby was always sick"

Across the respondents, we note these key areas of concern for whānau:

- Health of tamariki: Whānau were primarily concerned for the health and wellbeing of their children due to living in a cold and damp environment. Throughout the survey, there is a recurring worry about the impact of living conditions on the children's health, such as getting sick due to cold bedrooms.
- Struggle and frustration with the complexity of issues: Whānau faced overwhelming challenges in maintaining and repairing their whare, including issues with condensation, leaks, mould, draughts, lack of hot water, and overall discomfort in the living environment. Comments in the survey express a sense of real struggle in addressing these issues due to financial constraints and the complexity and magnitude of repairs needed. For many whānau, issues such as leaks persisted despite attempts to fix them, leading to a sense of futility in trying to make the whare more comfortable and safe.
- Financial hardship: Many whānau had financial difficulties with affording necessary repairs and improvements to the whare. The cost of repairs was often described as being out of reach, causing stress and uncertainty about how to fund the necessary work.

Whānau described the impact of these complex issues on their overall sense of wellbeing. Overall, whānau paint a picture of a difficult and overwhelming living situation characterised by a constant battle to improve living conditions amidst obstacles.

7.3 While there is more to do, the interventions helped whānau feel more positive about their whare

Aukaha completed a variety of tasks to improve the whare of the whānau involved, including fixing leaks, installing new heat pumps, fans, curtains, repairing windows, improving insulation, replacing hot water cylinders, fixing roof issues, and addressing various maintenance issues.

"Aukaha have been amazing. We have had a new heat pump installed an extractor fan in the kitchen and door draft stoppers and hot water pipe wrapping. We are very grateful it has made a huge difference to our health and wellbeing."

"Aukaha went beyond my expectations, I had electrical ventilation installed in kitchen and bathroom and building work to block up a major source of drafts."

Overall, whānau felt much more positive about their whare as a result of the interventions, although many acknowledged that there was still much more work to do. When asked, "Would you say that your home is just as you like it?", 59% said yes.

Here is a brief summary of their comments:

- Gratitude for assistance received in making improvements to the home.
- Appreciation for improvements made so far and a desire for continued progress.
- Recognition of the need for major repairs and ongoing maintenance.
- Challenges in keeping up with maintenance due to health issues, fatigue and financial constraints.
- Financial constraints limiting the ability to address all necessary repairs and upgrades.
- Pride in the improvements made to the home and the sense of accomplishment in maintaining it.
- Hopefulness about future improvements and the ability to live comfortably in the home despite its age and condition.

"There's more to do, but we love our whare."

While Aukaha accomplished a significant amount of work, whānau identified additional tasks that need attention. Examples are insulating the whare, levelling

the floor, fixing a leaking hot water tap, addressing draughty windows, replacing gutters, repairing or replacing windows, addressing mould issues, and renovating the bathroom and kitchen areas.
Overall, while whānau acknowledged that there is more to be done, they appreciated the improvements that make their whare safer, healthier and more comfortable.

7.4 Whānau are experiencing their whare as warmer and drier

The survey highlights a significant increase in the warmth of whare and a reduction in mould, leading to a more comfortable living environment. Many whānau who responded to the survey are finding their whare warmer and drier as a result of the interventions. Whānau are finding their whare less damp and mouldy, and better ventilated.

Warmer and drier home	
Strongly agree / agree	87%
Neither agree or disagree	7%
Disagree	1%
Did not answer	5%
Less damp and mould	
Strongly agree / agree	83%
Neither agree or disagree	15%
Disagree	2%
Better ventilated home	
Strongly agree / agree	81%
Neither agree or disagree	16%
Disagree	3%

The comments on these physical improvements often highlighted the service's profound impact on the quality of life for whānau, particularly for those in need and going through difficult times, making them warmer and happier. For some, the work has been life-changing, with participants likening it to living in a different, much improved environment.

The recipients generally feel satisfied and grateful, with many expressing that the changes have transformed their houses into homes.

The interventions most commonly mentioned as making a significant difference for warmth are:

- insulation (including roof, underfloor and wall insulation)
- installing heat pumps
- fixing draughty windows and ensuring they are properly sealed
- installing a new fireplace or replacing an existing one
- fixing leaks in the roof or replacing the roof
- installing thermal curtains or curtain linings to retain heat
- adding ventilation in bathrooms and kitchens to reduce moisture and improve indoor air quality
- fixing draughty doors and adding draught stoppers
- installing double-glazed windows for better insulation
- installing a moisture barrier to prevent dampness and mould issues.

7.5 Improving the energy efficiency of people's whare greatly improves wellbeing

The survey revealed the extent to which improvements made under this project led directly to noticeable improvements in people's physical and mental wellbeing.

Physical health improved	
Strongly agree / agree	57%
Neither agree or disagree	42%
Disagree	1%
Mental wellbeing improved	
Strongly agree / agree	81%
Neither agree or disagree	19%
Disagree	0%

Key improvements in physical health mentioned by participants were:
•improvements in respiratory conditions such as asthma and breathing difficulties
•reduction in illnesses and infections, particularly among children
•the positive impact of a warmer, drier and fresher atmosphere on health
•reduction in the need for hospitalisation and medical interventions
•positive effects on chronic illnesses and conditions.

"I'm not worrying so much about being warm"
"My baby isn't as blocked up all the time."

Participants mentioned key mental health impacts:

- Financial relief: Several comments mentioned reduced stress and worries related to financial concerns, such as lower electricity bills and reduced maintenance expenses. This financial relief alleviated anxiety and improved overall wellbeing.
- Home comfort: Many whānau feel better knowing their whare is now healthier, warmer and cosier. This improvement in living conditions contributes to their sense of wellbeing and comfort.
- Connection and support: Comments highlighted the emotional impact of receiving support.
- Feeling encouraged, motivated, and supported by organisations like Aukaha has helped whānau overcome feelings of isolation, overwhelm and depression.
- Sense of security: Completing necessary repairs and maintenance tasks has provided a sense of security and relief in knowing that their living environment is now more stable and well-maintained. This contributes to an overall improvement in wellbeing.
- Empowerment and confidence: Many whānau mentioned feeling more confident and empowered to manage ongoing maintenance tasks and prioritise home improvements. This newfound sense of control and understanding contributes to their overall wellbeing.
- Reduction in stress and anxiety: Addressing issues such as cold temperatures, dampness and structural problems has relieved significant stress and anxiety for some people, leading to an improvement in their mental wellbeing.
  When people were asked about their physical wellbeing, many commented on their experience of relief from mental stress and improvement in overall wellbeing and a sense of control and peace.

Overall, these comments reflect the profound impact that home improvements and support can have on whānau wellbeing, sense of security and overall quality of life.

"Home is so warm and cosy makes us feel better."

"It feels like a massive worry weight has been lifted off our heads."

"We feel more confident that we will be able to stay in our lovely little castle."

7.6 An empowering education approach supports people to do things differently.

Aukaha had a warm, non-judgmental, relationship-based approach to the education elements of this project. The survey analysis indicates this approach was key for whānau in responding to education and achieving successes in their own whare. Eighty-six percent of whānau said they are now doing things differently to keep their whare warmer and drier.

When asked what they are now doing differently, whānau commented on these changes:

- Improved ventilation practices
  - Opening doors and windows for 5 minutes daily
  - Using fans and extractor fans

- Efficient heating strategies
  - Using more efficient and economical heating sources
  - Using heat pumps effectively

- Mould prevention and maintenance
  - Cleaning walls when mould appears
  - Wiping away mould
  - Maintaining a dry environment by not drying clothes inside

- Increased awareness and knowledge
  - Feeling more knowledgeable about heating issues
  - Implementing advice received effectively
  - Being more aware of ventilation and condensation issues

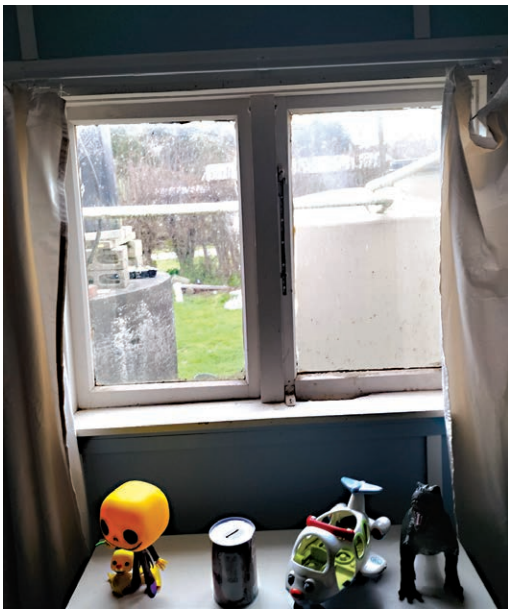
These themes reflect a proactive approach towards maintaining a warm, dry and healthy home environment through a combination of ventilation, heating efficiency, mould prevention and knowledge building. Overall, whānau were positive about the style of education and felt empowered to do more in their whare.

Case studies

Case study 1: Whare that are beyond upgrade

Two elderly brothers live in side-by-side whare. Both whare were built in 1880 and have been in the family with very few upgrades made since then. In one whare, only the bedroom and separate toilet are used, and the other whare has the kitchen and other bedroom. All cooking and heating comes from a coal range, and there is no fridge or freezer. Only one whare has a landline and neither brother has a cell phone.

These whare did not achieve any of the standards assessed in the HomeFit report (Residential Tenancies Act 2016, Healthy Homes Standards 2019 and the HomeFit Standard). The piles, roof and walls have major deterioration and neither whare can be upgraded to any reasonable standard.

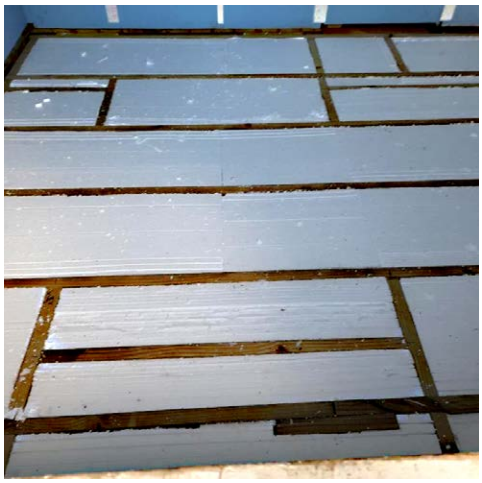


Case study 2: Upgrading a whare in poor condition

An elderly couple live with their granddaughter in this whare in a semi-remote location in Kaitangata. In its initial assessment, this whare did not achieve any of the standards assessed in the HomeFit report. The whare was in bad condition, the main issues being shaky piles, a leaking roof, a fireplace in poor condition, and rotten and deteriorated windows. The whānau were not eligible for other programmes.

We repaired the piles in two rooms, replaced two windows, repaired the roof, and installed insulation and a new fire with help from the WKH fund, making this whare significantly more healthy and energy efficient, especially for the granddaughter. However, there is significantly more to do at this whare as the bathroom and living room are still in poor condition.

AFTER



> We repaired the piles in two rooms, replaced two windows, repaired the roof, and installed insulation and a new fire with help from the WKH fund, making this whare significantly more healthy and energy efficient..."

BEFORE

Case study 3: Bringing a whare up to the HomeFit standard

This whare was in reasonable condition when it was assessed, with the main issues being poor ventilation, drainage and draughts, some areas of mould, a lack of good curtains/double-glazed windows and a lack of energy-efficient LED lighting. We installed a fan in the bathroom, replaced a window in the dining room and cleared gutters. We also installed draught-stopping at the front door, installed pelmets in the living area and one of the bedrooms, provided LED bulbs and referred the client to the Curtain Bank. These relatively simple changes brought the whare up to the HomeFit standard.

Below are some photos, as well as a HomeFit report summary before and after the changes, which show the whare being brought up to compliance with the Healthy Homes standard and the HomeFit standard.

CRITERIA	RESIDENTIAL TENANCIES ACT (2016)	HEALTHY HOMES STANDARDS (2019)	HOMEFIT
Adequate ceiling insulation	YES	YES	YES
Adequate underfloor insulation	YES	YES	YES
Smoke alarms	YES	N/A	YES
Fixed heating		YES	YES
Good ventilation		NO	NO
Moisture protection in subfloor		YES	YES
Good drainage		NO	NO
Draught free		NO	NO
No mould			NO
Water efficient shower flow rate			YES
Energy efficient hot water system			YES
Good curtains or double glazing			NO

AFTER

CRITERIA	RESIDENTIAL TENANCIES ACT (2016)	HEALTHY HOMES STANDARDS (2019)	HOMEFIT
Adequate ceiling insulation	YES	YES	YES
Adequate underfloor insulation	YES	YES	YES
Smoke alarms	YES	N/A	YES
Fixed heating		YES	YES
Good ventilation		YES	YES
Moisture protection in subfloor		YES	YES
Good drainage		YES	YES
Draught free		YES	YES
No mould			YES
Water efficient shower flow rate			YES
Energy efficient hot water system			YES
Good curtains *or* double glazing			YES

> We installed a fan in the bathroom, replaced a window in the dining room and cleared gutters. We also installed draught-stopping at the front door, installed pelmets in the living area and one of the bedrooms..."

BEFORE

Case study 4: Using TPK funding to achieve good results

The roof in this house was in need of replacement, and many minor upgrades were needed inside. Funding from TPK covered the cost of the roof replacement, and the EECA funding covered the rest. Between the two funds, we were able to bring the house up to a very good standard.

AFTER

> Funding from TPK covered the cost of the roof replacement, and the EECA funding covered the rest."

BEFORE

Case study 5: Going over budget to achieve good results

This whare is home to a single father of a young child under five. The whare had some bad weatherboard damage, and more damage was found after the cladding was removed. We were granted permission to go over budget on this one, achieving good results with EECA funding only.

CRITERIA	RESIDENTIAL TENANCIES ACT (2016)	HEALTHY HOMES STANDARDS (2019)	HOMEFIT
Adequate ceiling insulation	YES	YES	YES
Adequate underfloor insulation	YES	YES	YES
Smoke alarms	NO	N/A	NO
Fixed heating		YES	YES
Good ventilation		NO	NO
Moisture protection in subfloor		YES	YES
Good drainage		NO	NO
Draught free		YES	YES
No mould			NO
Water efficient shower flow rate			YES
Energy efficient hot water system			NO
Good curtains *or* double glazing			NO

AFTER

> We were granted permission to go over budget on this one, achieving good results with EECA funding only."

CRITERIA	RESIDENTIAL TENANCIES ACT (2016)	HEALTHY HOMES STANDARDS (2019)	HOMEFIT
Adequate ceiling insulation	YES	YES	YES
Adequate underfloor insulation	YES	YES	YES
Smoke alarms	YES	N/A	YES
Fixed heating		YES	YES
Good ventilation		YES	YES
Moisture protection in subfloor		YES	YES
Good drainage		YES	YES
Draught free		YES	YES
No mould			YES
Water efficient shower flow rate			YES
Energy efficient hot water system			NO
Good curtains *or* double glazing			YES

9. What we learnt – our findings

The Otago Home Energy Retrofit Project successfully delivered a suite of improvements for whānau across Otago, giving people warmer, drier whare and substantially improving wellbeing while contributing to a healthy local Māori and Pasifika economy. We brought many whare up to the Healthy Homes and HomeFit standards as shown in case studies 2, 3 and 5. Housing is a complex issue and, through this project, Aukaha was able to shift some of the burden of that complexity from whānau who were not sure where to start or how to access funding and support related to their whare. Our comprehensive network of services and relationships and our investment in a whānau-centred, empowering approach position us well to hold and navigate complex situations and requirements. However, there is considerable scope and need for systemic changes that would unlock the full potential of projects such as this. Based on these findings, our recommendations in the next section make a call for coordinated collective action and more holistic, flexible funding systems that put whānau at the centre.

9.1 Complex housing challenges are beyond the scope of this project

Our experiences in developing, delivering and evaluating this project highlighted challenges that this sort of funding and intervention is simply unable to fully address. There are two main issues: firstly, whare where an investment in upgrades would not be a good use of funds and a more comprehensive solution is needed and, secondly, whare that can be upgraded but not within the scope or budget of the funding provided.

9.1.1 Whare that need a more comprehensive solution

Some of the whare we encountered are in such poor structural condition that they could not be renovated to a reasonable standard with any budget. Improving the thermal envelope of whare with such structural damage is short-lived and not a good use of money. An example is case study 1.

Some whare we encountered were originally built as holiday houses that were never intended to be permanently inhabited, especially during the winter months. These often lack basic facilities such as flushing toilets and clean drinking water but have people living in them full-time. Often, no amount of renovations will turn these into good quality whare.

Some whare are in at-risk locations – either in flood-prone areas or in places known to be exposed to future climate-related damage. It is not a good use of public funds to repair whare that are at risk like this, but the whānau in them are in need now.

9.1.2 Whare that can be upgraded but not within funding limits

Some whare we encountered could be upgraded, but not within our budget limit of $20,000. In some of these cases, we did what we could within the budget limit, prioritising the worst things first. An example is case study 2, where we repaired the window and floor around the granddaughter's bedroom and replaced the fire, but had to leave the bathroom and dining room in poor condition. If the whānau were eligible, we used TPK funding to fix the larger weathertightness or structural issues so that we could upgrade the thermal envelope of the whare. An example of this is case study 4. The cost of replacing the roof was out of our budget, but improvements could not be made to the rest of the whare while the roof was leaking. With TPK funding, we were able to replace the roof, and then bring the whare up to a very good standard. If this whānau had not been eligible for TPK funding, it is likely that we would have had to walk away, leaving the whānau in a very poor situation.

Figure 13 shows how many whare, out of the 232 who were eligible and wanted interventions, could be upgraded to a reasonable standard with funding from this programme (EECA) alone, how many needed TPK funding, how many we could not upgrade to a reasonable standard, and how many could not be renovated with any budget. In this context, "upgraded to a reasonable standard" means we achieved most of the important interventions identified on the scope.

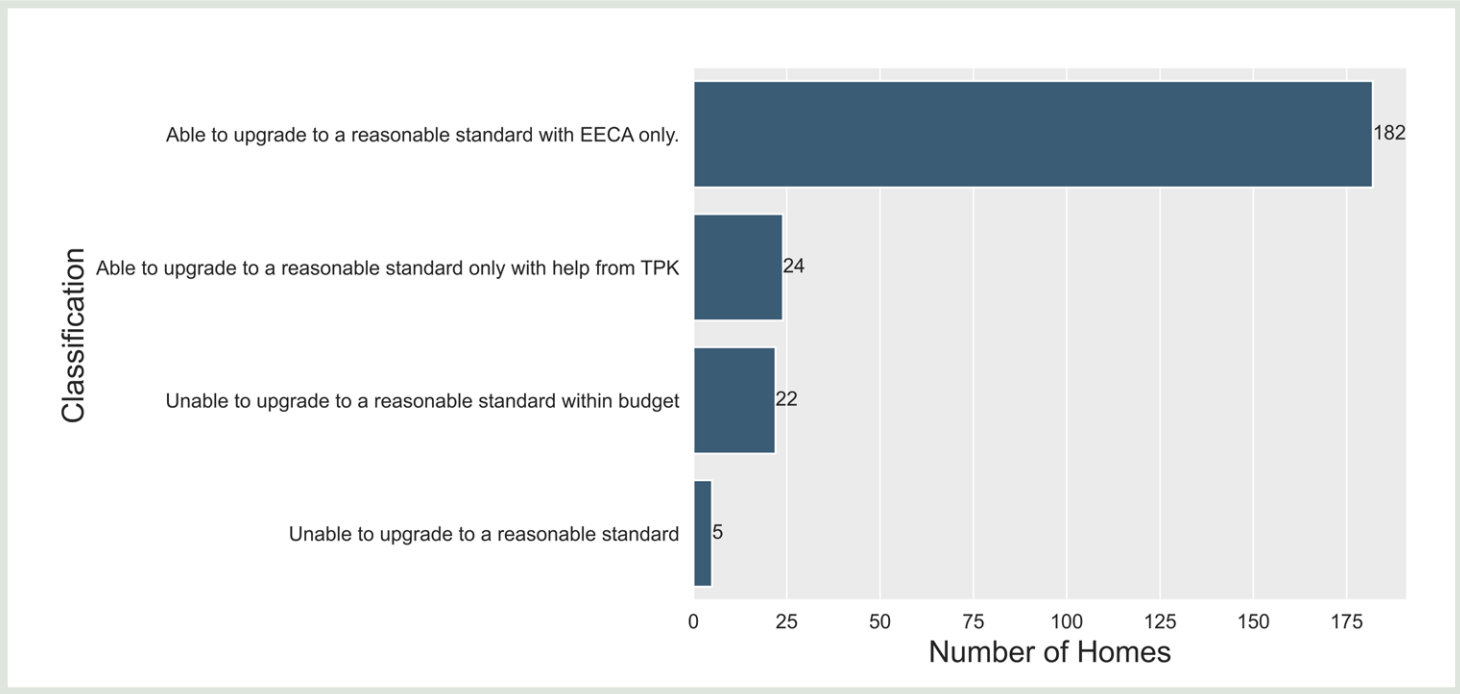


Figure 14: Classification of whare

9.2 Siloed funding creates complexity and inefficiency

While we were able to achieve good outcomes within siloed funding systems, our experiences highlight the potential to have much greater impact with more flexible and sustained funding.

The Aukaha Better Homes Programme offered support to whānau from three housing programmes:

1. TPK – essential and critical home repairs
   Eligible for Māori owner-occupier whare with low income

2. The Otago Home Energy Retrofit Project – creating warmer drier whare
   Eligible for Otago owner-occupier homes with low income

3. HHI – supporting whānau on their journey to a warmer, drier whare
   Eligible for renters and owner-occupiers with members of the household with health vulnerabilities with low income

As noted earlier, our creation of one online referral form for all three programmes meant whānau could access as many programmes as they were eligible for with one referral. In many cases, we were able to use EECA, TPK, and HHI funding to deliver more comprehensive interventions for whānau.

The online portal and cross-team approach shifted the burden of a complex funding structure from whānau to Aukaha as a service delivery provider. While this is a significant improvement, holding this complexity does create an administrative burden for service delivery providers. It would be more efficient if we could provide this holistic, wraparound support without needing to navigate multiple funding relationships and requirements.

Working with different funding pools also creates significant overlap in reporting and the need to package information for different reporting requirements. A higher trust environment would enable service delivery providers to track and evaluate the metrics that are most valuable for developing programmes that meet their communities' needs.

9.3 Time and resourcing are needed to plan and evaluate projects

Our experience highlighted that the start and end of projects (planning and evaluation) need as much attention as the middle (delivery). Key issues are listed below.

- The project scope and milestone timing constrained our ability to set up good systems and processes before starting delivery.

- At least three months are needed to set up processes, recruit a team, provide initial timing

and build up referrals – by the time the contract was signed, we were already behind delivery milestones. The programme would have run more efficiently if we had had time to set things up properly before starting home assessments.

- The lack of reporting requirements at the start of the project meant we spent time manually backtracking to find information that could have easily and more accurately been tracked from the start.

9.4 More time is needed for home assessments and visits

Feedback about our home assessor was very positive – people found him approachable, friendly and helpful, and most were very grateful for our assistance as noted in the survey results.

A key component of the programme was educating and changing behaviours, especially around things like heating to healthy temperatures and ventilation. This sort of change requires working closely with the client, making multiple visits to shift behaviours and expectations. Feedback about the education provided was positive and many whānau made changes in response to this advice.

However, the project funding did not allow for enough time to be spent at each whare. The hour-long re-visit involved working through the HomeFit report, the scope of works, signing the agreement and the education piece. This was often overwhelming, and having the resources to focus more on education or run an additional visit would be beneficial.

We would also have liked to revisit whare after the work had been done to check the quality and impact of the interventions and talk with the homeowner about how to effectively use new technology that had been installed, such as a heatpump or extractor fans, but the project funding did not allow enough time for this.

9.5 Multi-disciplinary teams build trust and achieve better outcomes

As we were working alongside homeowners in their whare, it was essential to build trust and develop relationships.

Complex mental health issues such as, intellectual disabilities and hoarding can contribute to the condition of the whare, and working with other external and internal teams to achieve better outcomes and to navigate complex situations was of great benefit. Being able to visit whare with social workers and agencies who already had trusting relationships with the homeowners meant we could navigate more complex situations.

While Aukaha is well placed to offer multi-disciplinary support, and has good relationships with other agencies, we note that the project funding and scope on their own didn't give our staff the time, resources and experience they needed to deal with complex issues. These whare require much more time and resources to effect change.

9.6 Knowledge of place is essential

To run projects like this effectively, local expertise and relationships with local community groups and support are key. We highlight the value in organisations like Aukaha partnering with place-based community groups – we can bring the capacity to work at scale and a whānau-centred approach, which aligns well with the local connections and trust held by place-based groups.

9.7 The right contractors make all the difference

This project clearly demonstrated the value of having contractors who could think outside the box and offer suggestions once they understood the nature of the programme. We also found it valuable to work with a good mix of business sizes, from handymen through to large contracting businesses. We had issues sourcing contractors in some areas, occasionally sending contractors from Dunedin to do the work. This increased the costs for those interventions but provided reassurance that the work would be completed.

When multiple types of work had to be completed at one whare (e.g. electrical, building, plumbing and minor interventions), it would have been more cost-effective to use multiple contractors. However, we found that it took considerable administrative resources to coordinate these contractors. This led us to decide to use bigger contracting firms to do the whole whare using their subcontractors. This was more expensive but necessary given the number of whare and the timeframes we had to work with.

In our experience of this project, service providers could work more efficiently and easily by engaging a 'one stop shop' contracting firm at the start of the project to carry out the interventions in every whare (or one in each geographic area if required). A builder or tradesperson should go with the home assessor to the initial visit to provide input to the scope of works as it is developed, bringing a technical eye alongside the energy efficiency approach of the home assessor.

Advantages of this approach would be that:

- work would be done quicker, meaning more whare could be completed in less time
- the scope could be co-created, incorporating improvements and solutions to problems
- administration time spent sourcing and coordinating multiple contractors would be reduced
- reporting would be more accurate and efficient
- it would be easier to ensure the quality of work as the team would be working closely with the contractors the home assessor could focus more on education and behavioural changes.

9.8 To be effective, research should have clear goals and be integrated with the project plan

While our project benefited from its association with a large-scale research project, a coordinated partnership from the start would enable both parties to gather the data needed to inform their future work. For example, we installed Tether monitors in most of our clients' whare before we had a research question and definite plan on how to use them, which meant that the information collected was not suitable for us to do the comprehensive analysis we wanted.

To evaluate the effectiveness of the interventions, the climate data from the Tether monitors would ideally be paired with electricity usage data, preferably broken down by appliance, detailed tracking of the timing of all interventions done, and interviews with the clients.

For effective research, climate data and electricity usage would need to be tracked a year before and after the interventions, which would be out of scope for a delivery project like this.

If we had coordinated with a researcher or research agency (e.g. BRANZ) from the start of the project we could have designed the monitoring to provide more valuable data and insights.

9.9 Warmer Kiwi Homes could be improved

Working with the WKH programme meant we could assist people with clean heat and insulation, avoiding the top-up funding needing to be paid by the homeowner. For insulation and heat pumps this amount is small (less than $400), but for wood burners it is $3,000-$4,000. Referrals from and into the WKH programme worked well.

However, there are some challenges with the WKH programme:

- Because different providers service different geographical areas, we needed to build relationships with four providers of varying quality.
- It had been deemed in the past that there wasn't enough access to install insulation in many whare. Using a builder to create access meant we could insulate many of these whare.
- Some whare have undersized heating systems in living areas, but they are not eligible for WKH assistance because it is still functional. These whare are cold, and additional or replacement heat would make a difference.
- It was inefficient for us to use a system designed for self-referrals to refer on behalf of clients.

Recommendations

To address these challenges, and the massive inequities and hardship across the housing sector, in general, we need to look at the system as a whole and take coordinated action. Our recommendations point to ways we can do that.

10.1 List of recommendations

- **Recommendation 1:** Develop and resource flexible funding arrangements
- **Recommendation 2:** Increase the funding pool available overall and per whare
- **Recommendation 3:** Resource solutions for whare beyond scope
- **Recommendation 4:** Invest in coordinated approaches and action for collective impact
- **Recommendation 5:** Increase the resourcing for empowering education
- **Recommendation 6:** Invest in high quality ongoing evaluation
- **Recommendation 7:** Provide resourcing for multi-disciplinary teams

Recommendation 1: Develop and resource flexible funding arrangements

There are no simple fixes for energy wellbeing – standardised solutions are not the answer to complexity. The existing Warmer Kiwi Homes programme is output-based and focuses on a small bundle of inflexible solutions that may not address the real causes or underlying physical problems with whare. Rather than siloed funding targeted towards prescribed interventions, our findings show that high trust, multi-year, multi-agency funding would unlock better outcomes for whānau, as well as broader social, environmental and economic gains (see 9.2).

More flexible funding would create more scope to engage in co-design processes, which directly involve the target communities through the entire process instead of relying on top-down decision-making. The perspectives, needs, and challenges of the community shape the project through workshops, interviews and collaborative activities.

Co-design solutions are far more likely to address the actual needs of the community they aim to serve. Directly involving the community in the design process means projects can avoid solutions that may have limited effect but miss the mark entirely in terms of practical application. Co-design fosters a sense of ownership and investment from the target group, which makes the project more sustainable and ensures better long-term outcomes.

As noted in the findings, upgrade programmes also run more smoothly when they are led by organisations that already have local connections and the community's trust (see 9.6). The diversity of whare and whānau situations requires place-based expertise and co-design to evaluate, assess and deliver interventions and education. Making funding more flexible would make it easier for local organisations to work together to serve their communities.

Recommendation – Fund flax-roots Māori, Pasifika and community providers and social enterprises with the autonomy and discretion to apply deep retrofit solutions and education for energy wellbeing.

This recommendation aligns with recommendation HH6 from the Energy Hardship Expert Panel report: EECA should develop targeted community-specific projects in collaboration with local organisations as part of its Warmer Kiwi Homes programme.

Recommendation 2: Increase the funding pool available overall and per whare

The funding available for housing upgrades and retrofits is insufficient to fully address all the issues with New Zealand's current housing stock. As we found with some houses, we could achieve better outcomes for whānau and more efficient energy solutions if the funding cap was higher (see 9.1.2).

Recommendation – Raise the cap for funding per whare up to $50,000, with discretion to go beyond this in addition to the new standard WKH interventions.

This recommendation aligns with recommendation HH7 from the Energy Hardship Expert Panel report: Government should increase funding for broader repair and improvement work to support home retrofit programmes, through EECA and through TPK.

Recommendation 3: Resource solutions for whare beyond scope

A proportion of whare are in such poor condition that energy efficiency upgrades to the existing structure are largely ineffective and may actually extend hardship at high cost (see 9.1.1). Some whare are exposed to flooding or sea-level rise and have a limited lifespan. In these cases, investment is needed in solutions developed in collaboration with whānau and community. Examples are new builds, climate-safe housing (full new builds of transportable, modular eco-homes and climate leases) and solutions informed by Dynamic Adaptive Pathway Planning.

Recommendation – Resource Māori, Pasifika and community organisations and social enterprises to mediate discussions between the Government and whānau using alternative solutions for whare that are beyond scope.

Recommendation 4: Invest in coordinated approaches and action for collective impact

Many different Government agencies fund separate energy hardship programmes, with little or no coordination between agencies and different reporting expectations. Aukaha holds three contracts from different agencies to deliver energy wellbeing outcomes.

A collective impact approach allows complex issues to be tackled by bringing together diverse stakeholders to work collaboratively towards a common goal. Through leveraging resources, expertise and networks of multiple stakeholders, collective impact initiatives achieve more effective and sustainable change than any one organisation or sector can achieve working on their own.

A way to enable this is to resource EWEC to coordinate this collective approach. One mechanism for funding this would be to establish an 'Energy Wellbeing Sector Secretariat' held within an NGO like CEN or academia. This secretariat would provide a fully funded coordination role for EWEC.

Recommendation – Resource the Energy Wellbeing Evaluation Consortium to build a more collaborative culture, increase partnership and enable programme improvements including consistent administration, reporting and evaluation.

This recommendation aligns with recommendation LA6 from the Energy Hardship Expert Panel report: MBIE, or the Interdepartmental Executive Board, should establish an energy hardship advisory group to provide expert advice on designing and delivering policies and actions to address energy hardship.

It also aligns with recommendation DI6: MBIE should develop, establish and maintain an online repository on New Zealand energy hardship research and evaluation. It also aligns with recommendation HH8: Government should commission, and fund, the development of a home energy needs assessment and referral tool that facilitates access to available support services.

Recommendation 5: Increase the resourcing for empowering education

Our project showed the value in providing well thought out whānau-centred education with a focus on building trusting relationships and empowering people to do things differently. While the impact we had with an hour was amazing, the timing was too tight (see 9.4).

Recommendation – Allow for more resources and time to be allocated to the education and follow-up components of projects.

Recommendation 6: Invest in high quality ongoing evaluation

Evaluation is a commitment to do better, to ask the questions – are we doing the right things, are we doing it in the right way, are we making a difference?

Coordination and setting clear goals with a researcher or research agency (e.g. BRANZ) from the start of the project would allow this evaluation to be evidence- and data-driven, while not impacting on the delivery of interventions (see 9.8).

It is essential that data is shared between programmes to allow comparison across different types of interventions and collective learning. This means comparable measures are needed across programmes and agencies. EWEC, supported by the proposed Energy Wellbeing Sector Secretariat, is well placed to support this kind of coordination.

Recommendation – Include an action research component in all multi-year contracts to support the continuous improvement of programmes. This should include resourcing for coordination with a researcher or research agency, and resourcing for participation in the Energy Wellbeing Evaluation Consortium.

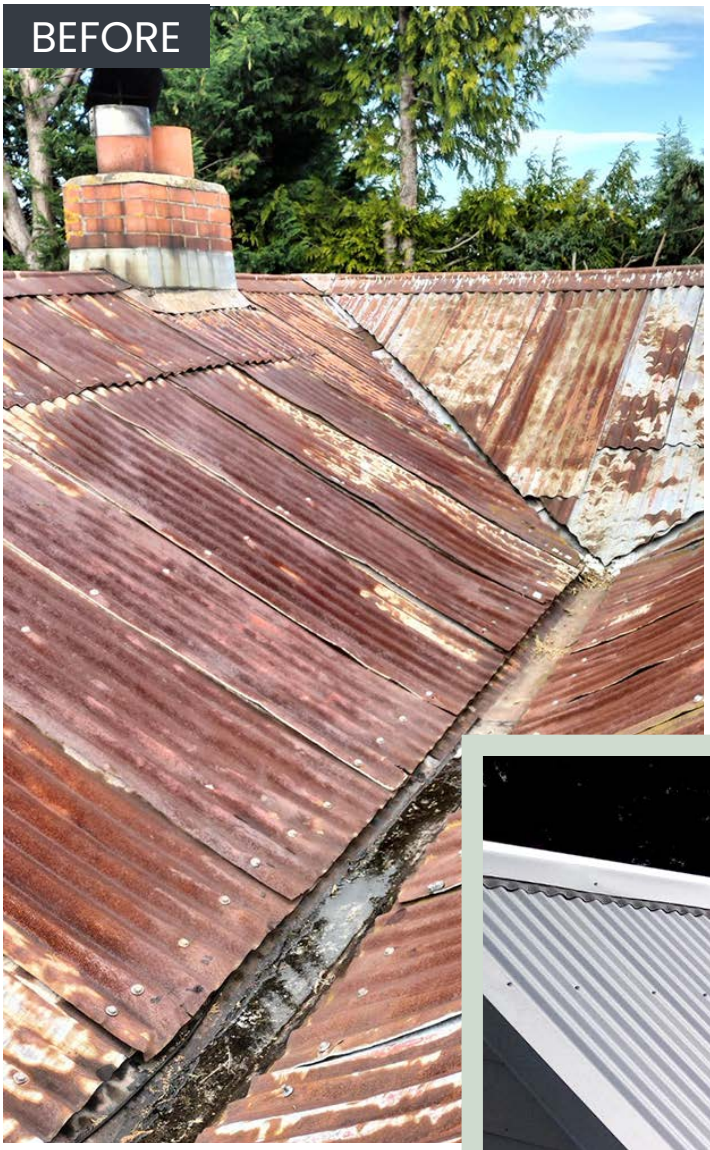
Recommendation 7: Provide resourcing for multi-disciplinary approaches

Projects often encounter constraints that necessitate a focus on specific outcomes, such as HomeFit assessments or interventions. This rigid focus can sometimes overlook the resources needed to help whānau navigate complex challenges. As we found in this project, having a wider team with the skills and experience to work with whānau complexity was better for both staff and clients. Our survey results back this up, with many whānau commenting on how much they valued the support from staff both with programme-specific interventions and with wider issues.

Recommendation – Ensure funding allows for frontline staff to be provided with the training and toolkits to navigate complex social problems and to find whānau-centred solutions focused on empowerment and strengths.

This recommendation aligns with recommendation HH9 from the Energy Hardship Expert Panel report: Government should establish an industry levy to provide funding for training of Home Energy Performance Advisors, as well as for the on-going development of the home energy needs assessment and referral tool.

BEFORE



IN PROGRESS

AFTER

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Appendices

Appendix A: Key roles and responsibilities

Table 5: Key project roles and responsibilities

Role	Name	Responsibilities
Manager – Mana Takata	Chris Rosenbrock	Oversees the project to ensure it is delivered on time and within budgets.
Project Manager	Scott Willis, then Keita McComb (did both roles for the final eight months)	Oversees the day-to-day work programme of the Project Coordinator
Finance and Operations Manager	Libby Evans	Supervises all funds and reporting on project financial performance.
Team Leader Housing	Jade Saville	Leads the Housing Team.
Project Coordinator	Keita McComb	Directs, organises and controls project activities, under the direction of the Project Manager, including: • project administration and scheduling, including invoicing • liaison with whānau coordinating contractors and suppliers • publicity and communications support.
Home Performance Advisor/Educator (including administration)	Zach Marshall	In conjunction with the Project Coordinator: • undertakes in-home assessments and manages the installation of monitors • provides advice and education • provides project administration in conjunction with the Project Coordinator and the Project Manager.
EECA Advisor	Charlie Hand	EECA liaison.

Appendix B: Referral generation

In our survey, we asked our clients, "How did you hear about the programme?" The table below shows the top responses.

Table 6: How clients heard about the programme

Response	Percentage of total survey responses
Friends/family/whānau	39.7%
Newspaper articles	13.2%
Social media	7.4%
Other Aukaha programmes	5.9%
Presbyterian Support Otago	4.4%
Aukaha visits to community groups	2.9%
Ministry of Social Development (MSD)	2.9%
Anglican Family Care	2.9%
Tumai Ora	2.9%

On our referral form, we asked, "Who is completing this form?" Forty-five percent of our forms were filled out by someone else on behalf of the whānau. Below are the top responses as a percentage of total clients. Please note it is likely that these agencies referred people to complete their own forms, and this will not be recorded here.

Table 7: Who completed referral forms

Referral agency	Number of clients referred	Percentage of total clients
Presbyterian Support Otago	29	11.9%
Internal referrals	28	11.5%
Place-based community groups	9	3.7%
Contractors	8	3.3%
Anglican Family Care	8	3.3%
MSD	4	1.6%
Healthcare centre/hospital	4	1.6%
Whānau Ora Navigator	4	1.6%
Friend or family	3	1.2%
Clutha Budget Advisory Service	3	1.2%

Appendix C: Scope of repairs and interventions

The basic home repairs and energy efficiency interventions allowed for in the contract are detailed below.

Basic home repairs

These are the minimum required repairs to bring the thermal envelope of a whare up to a standard that allows energy efficiency interventions to be effective. These measures could and will only ever include:

- Repairing broken windows
- Unsticking painted over windows to allow effective air flow into and out of the house
- Repairing damaged wall cladding
- Repairing leaking roofs
- Cleaning, repairing, or replacing blocked and ineffective guttering
- Repairing water leaks that may be impacting on the warm and dry internal environment of the house

Energy efficiency interventions

These are the interventions that will be undertaken, where necessary, once the whare has undergone any basic home repairs required and could and will only ever include:

- Insulation (including ground moisture barriers where required and able to be installed)
- An efficient heating device in the main living area
- Effective ventilation – particularly of kitchen and bathroom spaces
- Draught stopping
- Installation of curtain tracks and thermal curtains
- LED lighting
- Low flow shower heads
- Hot water cylinder and pipe wrapping and/or replacement of an end of life cylinder

Appendix D: Repairs and interventions

Each row in the table below represents a whare and the interventions that were done on it.

Roof repairs	Wall cladding repairs	Door and window repairs	Ventilation system installation	Water heating system installation or repair	Basic interventions (LEDs, shower heads, curtains)	Plumbing	Clean heat/insulation	Building	Electrical	Total
$3,269.66		$1,982.00	$1,973.00		$51.92					$7,276.58
			$1,524.00		$237.72					$1,761.72
	$1,280.00	$2,020.87					$412.84			$3,713.71
		$405.00	$994.00				$1,028.50			$2,427.50
							$3,595.64		$501.00	$4,096.64
		$3,770.22	$1,440.00							$5,210.22
			$1,009.00		$1,268.91					$2,277.91
			$1,988.00		$1,095.00					$3,083.00
							$693.96			$693.96
		$3,382.00	$2,771.71		$100.00					$6,253.71
			$2,186.35		$360.00					$2,546.35
	$110.00	$1,650.00	$2,118.35							$3,878.35
		$2,426.96	$994.00		$2,103.00					$5,523.96
			$2,260.75		$90.00		$676.00			$3,026.75
		$2,471.30	$1,614.00		$3,210.00					$7,295.30
			$994.00		$498.99					$1,492.99
	$4,180.00	$490.00	$2,918.35				$136.24			$7,724.59
			$1,343.45		$605.00					$1,948.45
					$785.30	$7,599.94		$2,390.44		$10,775.68
		$2,893.91	$119.00							$3,012.91
			$2,118.35							$2,118.35
	$1,250.00	$236.00	$2,118.35		$375.77					$3,980.12
							$6,531.30			$6,531.30
			$1,124.35		$240.00		$281.55			$1,645.90
$420.99					$360.00					$780.99
$17,202.40			$2,295.85							$19,498.25
$7,292.91			$2,242.35							$9,535.26
$2,796.34		$7,491.31	$1,096.00		$2,316.00			$1,725.00	$370.60	$15,795.25
		$1,216.52	$1,211.50		$300.00					$2,728.02
		$6,300.61	$1,615.20		$944.00					$8,859.81
			$994.00		$480.00					$1,474.00
			$1,179.45		$926.03					$2,105.48
					$2,714.75		$234.04			$2,948.79
			$1,388.13		$1,377.46		$1,323.20			$4,088.79
									$126.90	$126.90
	$4,303.91	$3,420.87	$646.11		$2,546.18		$1,244.01			$12,161.08
		$1,875.00	$1,591.86					$1,175.00		$4,641.86
$120.00			$666.36		$689.78	$12,580.05	$1,257.42		$766.88	$16,080.49
			$2,050.39		$1,234.26					$3,284.65
$3,808.58		$410.30	$2,082.76		$2,866.50	$492.04				$9,660.18
			$554.99		$1,542.76		$3,478.26			$5,576.01
		$13,919.71								$13,919.71
			$1,565.22	$3,121.74		$1,870.22	$4,553.68			$11,110.86
		$380.00	$1,633.08	$2,399.58	$1,377.28					$5,789.94
$3,836.00			$1,606.59				$3,834.79			$9,277.38
$8,940.48			$2,425.15							$11,365.63
$6,985.57							$591.77	$7,485.00		$15,062.34
		$5,800.00							$11,440.78	$17,240.78
			$983.27		$3,505.90		$2,147.83			$6,637.00
								$430.56		$430.56

Table 8: Repairs and interventions for each whare

Roof repairs	Wall cladding repairs	Door and window repairs	Ventilation system installation	Water heating system installation or repair	Basic interventions (LEDs, shower heads, curtains)	Plumbing	Clean heat/insulation	Building	Electrical	Total
$1,765.82			$1,220.00			$5,332.91	$940.68	$535.57		$9,794.98
		$760.00	$5,525.73							$6,285.73
					$5,030.00					$5,030.00
						$790.71		$8,025.50		$8,816.21
			$1,789.20		$403.94					$2,193.14
					$739.13	$5,566.00				$6,305.13
$1,453.68						$1,632.34		$4,281.08		$7,367.10
					$1,479.45		$2,914.00			$4,393.45
		$1,167.82	$1,116.12		$1,882.60					$4,166.54
$3,900.08			$1,194.75			$738.26	$3,062.44			$8,895.53
				$3,230.64	$1,082.36	$565.14	$379.33			$5,257.47
		$1,342.60	$1,668.92		$2,605.88			$4,032.00		$9,649.40
$4,687.82			$1,286.15		$4,117.35					$10,091.32
			$1,010.00							$1,010.00
		$1,094.78	$1,110.00				$2,176.55	$1,743.00		$6,124.33
			$2,015.44				$241.29	$1,260.00		$3,516.73
			$858.14		$1,511.01	$242.71	$212.47			$2,824.33
$10,061.42				$4,278.26			$4,308.70		$388.37	$19,036.75
			$2,932.61		$4,685.00					$7,617.61
			$515.96		$787.28					$1,303.24
			$2,250.35				$576.80			$2,827.15
					$1,680.75	$1,174.30	$9,956.50		$3,472.85	$16,284.40
$1,529.68		$1,870.44	$1,320.16		$348.00	$733.80				$5,802.08
			$1,080.00		$3,574.75					$4,654.75
			$617.03	$3,156.47	$1,703.78		$3,104.74			$8,582.02
$5,661.29		$1,140.00	$1,085.00		$195.00					$8,081.29
			$1,192.54		$1,178.01	$2,911.74				$5,282.29
					$401.14					$401.14
							$4,146.94	$2,773.44	$261.00	$7,181.38
			$1,080.00							$1,080.00
			$1,455.62				$704.07	$15,223.00		$17,382.69
					$592.64		$554.24			$1,146.88
					$3,045.01					$3,045.01
			$597.71					$894.48		$1,492.19
			$1,851.62			$12,290.33		$3,812.45		$17,954.40
						$2,371.35		$17,608.51		$19,979.86
		$5,738.48	$2,445.65		$1,505.25			$2,181.71	$267.95	$12,139.04
			$1,282.98		$2,316.91					$3,599.89
$3,545.32			$1,390.16		$3,312.02		$4,830.95			$13,078.45
$3,343.39			$1,010.00		$833.93		$3,822.61			$9,009.93
							$3,286.95	$3,415.80		$6,702.75
	$10,747.84	$3,039.61	$1,455.62		$1,232.00		$629.36	$2,902.00		$20,006.43
			$1,110.00	$3,186.95	$1,370.63	$451.44				$6,119.02
			$726.60		$213.30		$935.54			$1,875.44
			$2,023.53		$593.92		$740.35			$3,357.80
							$1,774.35	$19,509.00		$21,283.35
			$2,150.35		$4,320.94	$9,323.77				$15,795.06
			$1,069.12		$1,599.10			$697.10		$3,365.32
			$1,727.83		$322.65	$752.31	$1,199.26			$4,002.05
							$3,194.78	$7,560.84		$10,755.62

Roof repairs	Wall cladding repairs	Door and window repairs	Ventilation system installation	Water heating system installation or repair	Basic interventions (LEDs, shower heads, curtains)	Plumbing	Clean heat/insulation	Building	Electrical	Total
			$1,660.46		$2,284.51		$3,028.43			$6,973.40
$10,490.21							$144.45	$3,256.30		$13,890.96
					$1,731.50					$1,731.50
		$4,379.64	$2,788.86		$4,063.96			$5,711.05		$16,943.51
	$6,270.30	$4,368.00		$5,898.33			$654.07			$17,190.70
		$1,419.13	$1,023.45				$435.50	$6,068.50		$8,946.58
							$2,956.53			$2,956.53
		$7,341.30					$3,551.21	$7,519.30		$18,411.81
$7,000.00			$2,270.35	$3,966.00	$3,181.95					$16,418.30
				$6,163.10	$3,510.00	$633.15		$5,336.05	$626.60	$16,268.90
$2,131.30			$955.26		$305.47		$2,608.69			$6,000.72
		$200.00	$2,500.00		$2,285.00		$738.89	$8,000.00		$13,723.89
		$590.00			$145.00					$735.00
	$18,620.00		$2,272.35				$643.83			$21,536.18
			$1,500.00		$4,111.00			$8,500.00		$14,111.00
		$2,717.39	$904.76		$3,916.50					$7,538.65
$10,000.00		$3,000.00	$2,500.00		$4,590.00					$20,090.00
	$11,500.00	$2,500.00	$3,600.00		$2,375.00					$19,975.00
								$9,379.53	$6,529.00	$15,908.53
						$16,100.00				$16,100.00
							$950.00	$3,455.00		$4,405.00
		$1,676.60	$1,315.40					$3,353.40		$6,345.40
$15,000.00			$2,500.00		$1,410.44		$678.00			$19,588.44
					$185.50		$759.60		$452.48	$1,397.58
			$4,888.77		$6,029.00				$119.72	$11,037.49
	$7,900.00	$1,500.00	$3,600.00		$4,600.00					$17,600.00
		$1,020.00	$4,330.00		$3,700.00	$300.00	$2,300.00			$11,650.00
$4,536.52		$4,980.15	$3,712.00		$955.31			$2,533.08		$16,717.06
			$1,364.22		$1,786.30					$3,150.52
		$2,922.61								$2,922.61
			$1,605.90		$141.00			$2,352.83		$4,099.73
		$10,793.00	$2,276.51		$1,216.00	$5,236.30	$177.20	$450.00		$20,149.01
$1,800.00			$904.49		$85.00	$2,359.54	$808.29	$3,856.78		$9,814.10
		$7,607.82	$979.20		$1,499.80			$1,600.00		$11,686.82
		$2,500.00	$1,800.00		$1,039.19			$1,000.00		$6,339.19
$10,500.00		$5,000.00	$1,800.00		$2,250.00					$19,550.00
$1,300.00		$5,800.00	$3,700.00	$3,500.00	$1,085.00		$818.10		$500.00	$16,703.10
							$5,823.48			$5,823.48
			$1,610.64		$2,283.50					$3,894.14
			$1,179.56		$2,942.26		$721.00			$4,842.82
			$2,968.45					$2,967.60		$5,936.05
	$792.00		$994.00		$1,595.00	$2,469.00				$5,850.00
			$1,543.76					$5,828.50		$7,372.26
			$2,020.00				$297.36	$180.00		$2,497.36
		$884.58	$1,525.05					$967.55		$3,377.18
$780.00			$887.75	$6,294.44	$1,638.00		$165.35			$9,765.54
		$6,277.39					$483.12		$442.00	$7,202.51
$426.00			$1,872.09	$764.44				$2,358.51		$5,421.04
$1,200.00			$1,800.00		$1,250.00		$3,842.19	$3,550.00		$11,642.19
			$2,382.18		$2,100.00			$600.00	$115.64	$5,197.82

Roof repairs	Wall cladding repairs	Door and window repairs	Ventilation system installation	Water heating system installation or repair	Basic interventions (LEDs, shower heads, curtains)	Plumbing	Clean heat/insulation	Building	Electrical	Total
		$1,199.13	$823.85		$337.44			$1,000.00		$3,360.42
			$2,100.00		$1,050.00		$6,300.00	$645.00	$885.00	$10,980.00
$600.00	$5,500.00	$3,500.00	$3,600.00			$500.00		$5,700.00		$19,400.00
		$1,840.00			$225.00			$330.00		$2,395.00
		$597.20						$9,754.88		$10,352.08
		$10,759.13	$1,338.98				$4,995.65			$17,093.76
$2,814.63			$1,226.96				$5,141.02			$9,182.61
			$6,124.69	$4,550.18						$10,674.87
			$1,662.62		$1,922.82	$2,709.95				$6,295.39
		$4,400.00	$3,600.00		$4,150.00	$900.00				$13,050.00
			$1,358.13				$2,195.09	$3,832.50		$7,385.72
			$1,395.81		$336.07		$587.60			$2,319.48
			$2,298.50		$1,812.67					$4,111.17
		$13,451.52	$628.64							$14,080.16
			$1,851.35		$1,673.70	$9,707.32				$13,232.37
$7,546.40			$2,172.19					$11,000.00		$20,718.59
		$6,970.00	$511.32		$500.00			$2,075.26		$10,056.58
		$5,601.74	$1,602.44			$13,491.50				$20,695.68
$6,000.00		$1,000.00	$2,000.00		$2,736.00		$1,385.05			$13,121.05
			$2,498.95		$745.00		$249.10	$2,400.00		$5,893.05
$10,923.85			$1,500.00	$4,000.00	$1,129.69			$2,500.00		$20,053.54
$8,000.00			$1,800.00		$1,800.00			$3,800.00	$150.00	$15,550.00
			$1,402.06	$1,246.54				$3,432.00		$6,080.60
			$819.79				$831.97	$3,574.50		$5,226.26
$955.00		$1,600.00			$980.00			$3,825.00		$7,360.00
$5,250.00			$1,157.85		$2,371.00					$8,778.85
				$2,574.45			$375.59		$630.00	$3,580.04
$360.00			$600.00		$2,730.40		$1,860.40			$5,550.80
			$660.03		$410.88	$663.39		$5,802.00		$7,536.30
$1,000.00					$850.00		$3,116.52	$750.00		$5,716.52
$5,517.59										$5,517.59
								$5,000.00		$5,000.00
$3,600.00		$280.00		$3,200.00				$880.00		$7,960.00
						$4,896.49		$2,828.26	$3,908.40	$11,633.15
$9,548.60	$6,356.89	$3,127.70								$19,033.19
$6,103.00			$864.08				$577.27			$7,544.35
	$5,226.10				$306.00					$5,532.10
			$1,951.68				$323.50			$2,275.18
			$2,077.00		$375.00					$2,452.00
$8,200.00			$3,600.00		$685.00	$800.00		$1,200.00		$14,485.00
			$5,400.00	$4,000.00	$1,450.00		$2,544.00	$6,600.00		$19,994.00
			$633.20			$1,851.25				$2,484.45
			$1,324.33				$802.29			$2,126.62
		$2,907.00	$3,033.30							$5,940.30
			$990.43		$730.00	$5,682.60	$4,382.60	$3,945.00		$15,730.63
		$3,255.47				$301.89	$675.56			$4,232.92
		$4,207.82					$2,901.74	$1,826.09		$8,935.65
	$7,461.34									$7,461.34
$520.00		$2,575.00	$2,000.00					$4,845.00		$9,940.00
	$2,493.08	$550.00			$525.00					$3,568.08

Roof repairs	Wall cladding repairs	Door and window repairs	Ventilation system installation	Water heating system installation or repair	Basic interventions (LEDs, shower heads, curtains)	Plumbing	Clean heat/insulation	Building	Electrical	Total
$10,617.32							$8,630.43			$19,247.75
			$1,877.81	$1,900.12				$1,234.65		$5,012.58
		$13,053.94					$430.51			$13,484.45
$9,500.00						$9,400.00				$18,900.00
						$5,712.97		$2,158.50		$7,871.47
			$1,282.18		$1,685.76				$97.80	$3,065.74
$1,021.76			$3,045.54		$303.25			$1,832.16		$6,202.71
		$2,697.00	$2,200.65				$587.51			$5,485.16
$3,085.00		$1,515.00	$1,800.00		$1,545.00	$1,235.00			$1,000.00	$10,180.00
		$2,286.00	$3,562.53		$240.00		$2,406.00			$8,494.53
		$2,795.29					$713.08	$3,432.00		$6,940.37
								$4,500.72	$649.19	$5,149.91
		$3,841.75				$2,300.00	$2,841.75			$8,983.50
		$8,606.08			$2,529.32					$11,135.40
				$4,757.95						$4,757.95
$700.00	$5,750.00									$6,450.00
$150.00	$1,565.00		$750.00			$12,296.00				$14,761.00
							$3,347.83			$3,347.83
$2,314.00		$700.00			$2,260.00	$250.00	$2,000.00	$600.00		$8,124.00
		$4,317.00			$742.60	$1,552.20	$866.01	$707.80		$8,185.61
$498.60		$2,878.64								$3,377.24
			$1,301.04		$2,580.00		$1,733.58			$5,614.62
										$1,381.56 incidentals
$260,611.21	**$101,306.46**	**$266,686.33**	**$268,565.55**	**$72,189.19**	**$200,875.03**	**$168,767.91**	**$181,100.87**	**$300,496.78**	**$33,702.16**	
55 interventions	**18 interventions**	**77 interventions**	**151 interventions**	**21 interventions**	**123 interventions**	**43 interventions**	**90 interventions**	**76 interventions**	**23 interventions**	
Declined										-
Declined										-
Declined										-
Declined										-
Declined										-
Declined										-
Out of scope										-
Out of scope										-
Out of scope										-
Out of scope										-
Out of scope										-
Out of scope										-
Out of scope										-
Out of scope										-
No longer owner-occupied										-
No longer lives here										-
House for sale										-
Sold the house										-
Ineligible										-
Deceased										-
Referred to TPK										-
Referred to TPK										$649.27[21]
TOTAL										**$1,856,332.32**

21 For a small, urgent electrical job done before we referred the client to TPK.

Appendix E: Heating and insulation data pre- and post-intervention

About the data

This data has been collected as part of the Otago Home Energy Retrofit Project, an 18-month pilot project to retrofit 244 whare in Otago. The project was delivered by Aukaha (1997) Limited, funded by Crown Infrastructure Partners (CIP) through the Covid-19 Response and Recovery Fund shovel-ready initiative, and managed by EECA.

This data is a breakdown of the insulation and heat levels in each of our client homes before and after interventions by our programme.

Collection methods

The "before intervention" data was collected as part of a HomeFit assessment done on each whare by a qualified HomeFit assessor.

The "after intervention" data is deduced on the "before intervention" state plus any changes made to the whare by Otago Home Energy Retrofit Project and our other in-house housing projects: Te Puni Kōkiri Essential and Critical Home Repairs Programme and Health Homes Programme. As no post-intervention assessment was done, this relies on the data from invoices, and assumes that all work completed by contactors was done to current building code standards.

Notes

Clients where a HomeFit assessment was not done are not included on this spreadsheet.
The comments explain why a house was not brought up to the highest standard in each area by the programme. In some situations this is not known, as it was not recorded at the time.

Heating

Whether a heat source was classed as sufficient is not based on the Healthy Homes standards.

If it was clear that we were going to be able to install more insulation when the heat source was originally assessed, and that by adding that insulation then the heat source would go from insufficient to sufficient, the heat source has been classified as sufficient in the "before" state.

Woodburners were categorised as "Insufficient – undersized or faulty woodburner" if the woodburner was faulty or the maximum average heat output was less than 90% of the calculated heating demand.

Heatpumps were categorised as "Insufficient – undersized or faulty heatpump" if the heatpump was faulty, sized to heat less than 90% of the calculated heating demand after insulation was installed, or past their end of lifespan.

"Insufficient – open fire" include fires such as pot-belly stoves and coal ranges.

Underfloor insulation

Houses are only categorised as "Concrete slab" and "N/A another dwelling below" if there are no areas that could be insulated.

Table 9: Heating and insulation pre- and post-intervention for each whare

		Client Number	Client #112	Client #173	Client #89	Client #62
Heating	Before	Insufficient – Faulty gas fire				
		Insufficient – undersized or faulty heatpump		1		
		Insufficient – undersized or faulty woodburner				
		Insufficient – open fire				1
		No fixed heating	1			
		Sufficient			1	
	After	Insufficient – Faulty gas fire				
		Insufficient – undersized or faulty heatpump				
		Insufficient – undersized or faulty woodburner				
		Insufficient – open fire				
		No fixed heating	1			
		Sufficient		1	1	1
		Heating comments	House out of scope or not eligible			
Underfloor insulation	Before	At least 80% coverage foil				
		Concrete slab				
		Full coverage of bulk insulation				
		Less than 80% coverage bulk				
		More than 80% coverage bulk, *but not full*				
		N/A another dwelling Below	1			
		No insulation				1
		Unable to tell/No access		1	1	
	After	At least 80% coverage foil				
		Concrete slab				
		Full coverage of bulk insulation		1		
		Less than 80% coverage bulk				
		More than 80% coverage bulk, *but not full*				
		N/A another dwelling Below	1			
		No insulation				1
		Unable to tell/No access			1	
		Underfloor comments				Community service card.
Ceiling insulation	Before	120mm or more			1	
		70mm to 120mm		1		
		At least 80% Skillion Roof: uninsulated or unknown				
		Less than 70mm	1			
		N/A another dwelling above				
		No access or unable to tell				
		Partial coverage				1
	After	120mm or more		1	1	
		Less than 70mm	1			
		70mm to 120mm				
		No access or unable to tell				
		Partial coverage				1
		At least 80% Skillion Roof: uninsulated or unknown				
		N/A another dwelling above				
		Ceiling comments	Roof replacement needed but is out of scope			No Community service card.

Client #201	Client #43	Client #197	Client #235	Client #234	Client #157	Client #16	Client #172	Client #44	Client #19	Client #73	Client #34	Client #67	Client #21	Client #107	Client #3	Client #211	Client #84	Client #126	Client #45	Client #177	Client #20	Client #50	Client #146	Client #25
1			1					1								1						1		1
					1				1				1											
											1												1	
				1													1			1	1			
	1	1				1	1			1		1		1	1			1	1					
																						1		1
									1				1											
											1													
																				1				
1	1	1	1	1	1	1	1	1		1		1		1	1	1	1	1	1		1		1	
									No data on why heating not upgraded		No data on why heating not upgraded		No eligible for WKH as Heatpump is present, just not large enough							to do after they apptied for a Community service card.		Not eligible for WKH as heat pump present but undersize.		No data on why heating not upgraded

							1												1					1
1	1				1	1					1					1	1			1	1			
																		1						
								1						1										
				1						1			1		1								1	
		1	1						1			1										1		
							1												1					1
1	1	1		1	1	1		1		1	1		1			1	1	1		1	1	1	1	
														1										
			1						1			1			1									
														Budget exceeded										

1	1	1			1	1	1	1	1		1	1		1	1	1	1	1			1			
																			1					1
			1	1									1									1	1	
										1										1				
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	
																			1					1

Client #93	Client #36	Client #77	Client #192	Client #98	Client #26	Client #155	Client #164	Client #162	Client #105	Client #218	Client #168	Client #14	Client #171	Client #31	Client #29	Client #118	Client #82	Client #120	Client #30	Client #32	Client #51	Client #149	Client #18	Client #35	Client #205	Client #90
	1						1	1		1								1						1		
																					1		1			1
						1																				
1		1	1	1	1				1		1	1	1	1	1	1	1		1	1		1			1	
																					1		1			1
						1																				
1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1		1		1	1	
						House out of scope or not eligible															Out of funds		No data on why heating not upgraded			Lost contact with Client

	1																									
		1	1	1	1	1		1			1		1	1	1	1		1	1				1	1	1	
1									1											1						
							1			1							1									
												1									1	1				1
	1																									
1		1	1	1	1	1	1	1		1	1		1	1	1	1	1	1	1				1	1	1	
									1											1						
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									Some patching of insulation was needed but budget was exceeded.																	Manhole installed but lost contact with client before ceiling or underfloor insulation could be installed.

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																									Manhole installed but lost contact with client before ceiling or underfloor insulation could be installed.	

Client #139	Client #141	Client #184	Client #71	Client #199	Client #228	Client #225	Client #244	Client #143	Client #180	Client #123	Client #159	Client #113	Client #83	Client #132	Client #66	Client #88	Client #198	Client #210	Client #195	Client #33	Client #183
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										No data on why heating not upgraded		out of scope or not eligible									

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						only clearance under a small section. Homeowner has started and will finish.									Access hatch not possible to uninsulated areas.			the lining of a garage would need to be removed for this section to be insulated and the homeowner did not want this.			

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									No space for more insulation			House out of scope or not eligible									

Client #1	Client #150	Client #224	Client #56	Client #238	Client #74	Client #170	Client #219	Client #193	Client #134	Client #46	Client #15	Client #75	Client #37	Client #189	Client #11	Client #163	Client #207	Client #153	Client #104	Client #128	Client #68	Client #6	Client #202	Client #81	Client #39	Client #63	Client #196	Client #96	Client #97	Client #214	Client #241
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											No data on why heating not upgraded										out of scope or not eligible										

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							House out of scope or not eligible					House out of scope or not eligible									out of scope or not eligible	House out of scope or not eligible									

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Client #76	Client #156	Client #108	Client #17	Client #92	Client #158	Client #111	Client #181	Client #70	Client #227	Client #114	Client #213	Client #100	Client #167	Client #160	Client #136
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				Out of funds		Skip needed to clear underfloor so insulation could be done, so that heating could be done, but no remaining budget, homeowner will self-refer once they clear subfloor.				out of scope or not eligible					
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					House out of scope or not eligible	Skip needed to clear underfloor but no remaining budget, homeowner will self-refer once they clear subfloor.			No data on why insulation not upgraded			Most of the house was no access but there was a small part that had access, but it was deemed too small to bother			
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House out of scope or not eligible															

Client #240	Client #58	Client #229	Client #148	Client #212	Client #42	Client #161	Client #215	Client #175	Client #194	Client #110	Client #57	Client #53	Client #208	Client #243	Client #27	Client #5	Client #64	Client #178	Client #28	Client #12	Client #60
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Not eligible for WKH as heat pump present but undersize.						Client withdraw from contract		out of scope or not eligible		out of scope or not eligible											

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									This was a suspended concrete slab, which is a poor insulator. It can be insulated but not with WKH or the scope of the project	out of scope or not eligible											

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										House out of scope or not eligible			Not eligible as original insulation done through WKH		Not eligible as original insulation done through WKH						

Client #220	Client #115	Client #40	Client #129	Client #182	Client #165	Client #236	Client #226	Client #203	Client #151	Client #23	Client #24	Client #144	Client #242	Client #231	Client #147	Client #230	Client #239	Client #186	Client #233	Client #222	Client #116	Client #49	Client #38	Client #133	Client #117	Client #47	Client #209	Client #131	Client #103	Client #9	Client #185	Client #94
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Out of funds	out of scope or not eligible													Not eligible for WKH as there is a heater in the other space.						Out of funds												

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		House out of scope or not eligible																Not eligible as original insulation done through WKH														

Client #4	Client #69	Client #191	Client #80	Client #137	Client #109	Client #232	Client #10	Client #22	Client #140	Client #65	Client #187	Client #142	Client #72	Client #216	Client #190	Client #54	Client #2	Client #121	Client #86	Client #169	Client #125	Client #200	Client #179	Client #237	Client #8	Client #13	Client #102	Client #122
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	Not enough clearance for WKH					Referred on to TPK but work not complete yet		House out of scope or not eligible	Ran out of time to complete															House out of scope or not eligible				
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						Referred on to TPK but work not complete yet	Not eligible as original insulation done through WKH																	House out of scope or not eligible				

Client #85	Client #101	Client #7	Client #99	Client #188	Client #41	Client #152	Client #95	Client #52	Client #135	Client #166	Client #127	Client #87	Client #59	Client #55	Client #204	Client #176	Client #174	Client #78	Client #138	Client #154	Client #206	Client #48	Client #91
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			Out of funds, Client will apply for WKH himself after insulation installed.		House out of scope or not eligible				No data on why heating not upgraded														

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			work was put on hold indefinitely until homeowner cleared.								the lining of a garage would need to be removed for this section to be insulated and the homeowner did not want this.							No data on why insulation not upgraded					

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			Asbestos present, work was put on hold indefinitely until homeowner cleared.															Ran out of time to complete					

Client #106	Client #145	Client #223	Client #61	Client #124
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	Kitchen had a fire so not eligible for WKH			

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				Budget reached, and to small an area for WKH

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Appendix F: Aukaha Better Homes quick survey

Aukaha

Better Homes quick survey

Client ID

Introduction

This is a 1 minute quick fire survey. It helps us help you. Survey information is collected and stored so we can quickly identify any problems and to prepare a plan to help improve your situation. By filling in this survey you give us consent to help you. We guarantee to securely collect and store your personal information.

There are six questions with 4 – 5 options, please tick the response that best reflects your situation.

1. In the last 12 months, have you or anyone in your household:

( ) received a late payment notice from your electricity or gas company?
( ) been disconnected from electricity or gas services for late or non-payment?
( ) been in contact with your electricity or gas company about a payment arrangement?
( ) no, none of these happened

2. Do you ever cut back on groceries or juggle other bills to pay for electricity?

( ) Yes - always
( ) Yes - sometimes
( ) No
( ) Don't know

3. In winter, is your house or flat colder than you would like?

( ) yes - always
( ) yes - often
( ) yes - sometimes
( ) no
( ) I have not spent a winter living in this house or flat

4. **In winter, does your house or flat get cold enough that you can see your breath?**

( ) yes - always
( ) yes - often
( ) yes - sometimes
( ) no

5. **Can you see mould in any part of this dwelling, in total, is larger than an A4 sheet of paper?**

Mould (mildew) may grow on the walls, ceiling, floor, doors, window frames, curtains or blinds. Mould can be black, white, green, brown, red, etc.
An A4 sheet is the size of 1 page of this form.
( ) Yes - always
( ) Yes - sometimes
( ) No
( ) Don't know

6. **How easy is it in winter to heat your home and keep it warm?**

( ) Very easy to heat – it is warm most of the time and I hardly have to put on any heating.

( ) Pretty easy to heat – once I put on the heating the space heats up in an hour or so, and stays warm even after the heating goes off

( ) Not easy to heat – once I put on the heating the space heats up in an hour or so but it gets cold quickly after the heating goes off.

( ) Difficult to heat – even if I put on the heating the space doesn't really get warm

( ) Very difficult to heat – it's not worth putting on the heating because it doesn't make any difference to how warm it is inside

Ngā mihi nui!

Appendix G: Otago Home Upgrade Programme survey

Survey

Otago Home Upgrade Programme Survey

At Aukaha, understanding whānau experience is important to us. This survey will help us understand how well we are doing in meeting your needs. It is also a chance for you to tell us how we can change and/or improve our services.

Your privacy is important to us. Your name or contact details will never be shared in reports of this survey and any quotes will be presented using pseudonyms (fictional names).

Thank you for helping out with evaluation of the Otago Home Energy Upgrade Programme. At the end of the survey you have the option of entering a prize draw for a $100 gift card at the supermarket of your choice. If you would like to enter the prize draw please leave us your name and best phone number.

1. 1. Where do you live?

- ☐ Dunedin City
- ☐ Milton
- ☐ Oamaru
- ☐ Somewhere else? Please let us know.

2. What or who encouraged you to be involved? Or how did you hear about the programme?

- ○ MSD
- ○ Friends/Family/Whānau
- ○ Presbyterian Support Otago
- ○ Anglican Family Care
- ○ Social media
- ○ Otago Daily Times
- ○ Fire & Emergency
- ○ Habitat for Humanity
- ○ Te Puni Kokiri Critical Home Repairs Programme
- ○ Other (please specify)

3. It was easy to access Aukaha's services

- ◯ Agree
- ◯ Neither agree nor disagree
- ◯ Disagree
- ◯ Strongly Disagree
- ◯ Don't Know

Can you tell us more?

4. How many adults (aged 18 or over) live in your home?

5. How many children (aged 0-17) live in your home?

6. Before I/we worked with Aukaha, my/our home needed repair on (if any of the following issues were present in parts of your home please select all that apply).

- ☐ Damaged/leaking hot water cylinder
- ☐ Damaged/leaking roof
- ☐ Rotting window frames/broken windows
- ☐ Rotting/damaged weather boards/outside cladding of the house
- ☐ Damaged/blocked gutters
- ☐ Damaged flooring
- ☐ Other water leaks (e.g. kitchen or laundry or underfloor)
- ☐ Electrical problems
- ☐ Something else?

7. Before I/we worked with Aukaha, I had negative feelings (poor wellbeing) about my/our living situation.

- [ ] Strongly agree
- [ ] Agree
- [ ] Neither agree nor disagree
- [ ] Disagree
- [ ] Strongly disagree

Can you let us know more?

8. How much has Aukaha done so far? Is there much more for Aukaha to help with?

9. After I/we worked with Aukaha, my/our home is warmer, drier and easier to heat.

- [ ] Strongly agree
- [ ] Agree
- [ ] Neither agree nor disagree
- [ ] Disagree
- [ ] Strongly disagree

Do you have any other comments?

10. What intervention (i.e. insulation, heating or repair/fix-up) did you feel made the most difference for warmth?

11. What else do you feel made a difference for warmth? (i.e. have you changed the way you do things, was there another repair that helped?)

12. After I/we worked with Aukaha, my/our home feels less damp and there's less mould.

- ◯ Strongly agree
- ◯ Agree
- ◯ Neither agree nor disagree
- ◯ Disagree
- ◯ Strongly disagree

13. What intervention (i.e. leak repair/fix-up, roof repair, moisture barrier) did you feel made the most difference for dampness in your home?

14. What else do you feel made a difference to reduce dampness? (i.e. have you changed the way you do things, was there another repair that helped?)

15. After I/we worked with Aukaha, my/our home feels better ventilated

- ◯ Strongly agree
- ◯ Agree
- ◯ Neither agree nor disagree
- ◯ Disagree
- ◯ Strongly disagree

16. What intervention, if any (i.e. range hood installation, mechanical ventilation in the bathroom) do you feel helped with ventilation in your home?

17. What else do you feel improved ventilation? (i.e. do you practice blast ventilation?, do you open rooms up more?)

18. Do you have a Tether Monitor?

- ◯ Yes
- ◯ No

If 'YES', have you used the app to better understand your home and help you make positive changes in your home?

19. My/our physical health has improved since working with Aukaha

- ◯ Strongly agree
- ◯ Agree
- ◯ Neither agree nor disagree
- ◯ Disagree
- ◯ Strongly disagree

Do you want to let us know more?

20. My/our mental health (sense of wellbeing) has improved since working with Aukaha

- ◯ Strongly agree
- ◯ Agree
- ◯ Neither agree nor disagree
- ◯ Disagree
- ◯ Strongly disagree

Do you want to let us know more?

21. I/our whānau do things differently now, to make sure the home stays warm and dry

- ◯ Yes
- ◯ No

Can you tell us more?

22. Has all the work that you expected to be done by Aukaha been completed? If no, what's still to do?

23. Would you say that your home is just as you like it?

- ◯ Yes
- ◯ No

Can you tell us more?

24. Do you intend doing additional work yourself to make your home more comfortable, safer, warmer and dryer?

- ◯ Yes
- ◯ No

Can you tell us more?

25. Is there anything you could change about the service and what would that be and why?

26. I/We receive great service from Aukaha staff

- ◯ Strongly agree
- ◯ Agree
- ◯ Neither agree nor disagree
- ◯ Disagree
- ◯ Strongly disagree

Please put any other comments here

27. I/We would recommend Aukaha to others

- ◯ Yes
- ◯ No
- ◯ Other (please specify)

28. I/We would like more information about/referral for:

- [ ] Habitat for Humanity
- [ ] Presbyterian Support Otago / EnergyMate
- [ ] Anglican Family Care
- [ ] Budgeting/Money Saving Tips
- [ ] Home Repair and Maintenance Workshops
- [ ] More Information about keeping my home warm and dry
- [ ] Other (please tell us more in the comments box below)
- [ ] None of the above

Other (please specify)

29. Do you have any other comments about anything else? (i.e. specific health conditions, any improvements we could make, any other information you think we should know).

30. Can we contact you to invite you to participate in future research about the Otago Home Energy Upgrade Programme and Aukaha's support programmes? Ticking 'yes' allows us to contact you again, but does NOT mean you have to agree to participate in any research we ask you to join.

- [ ] Yes, you can ask me later about being involved in more research (Please provide best contact details below).
- [ ] No, please don't contact me about this

31. If you said we can contact you again, or you'd like to be included in the prize draw for a $100 supermarket gift card, please share your name and best contact details with us.

Name

Email Address

Phone Number

Appendix H: Education pamphlets

Aukaha Better Homes Program Key Tips

Aukaha

It is best to heat your home to 18 degrees or warmer, especially in living areas and bedrooms where people are sleeping.

Ensure that your curtains are double-layered and fit well to stop heat loss through the windows. Contact your local curtain bank for good curtains.

Set your heat pump between 18 and 21 degrees. Clean the filters at least once a month

Replace all light bulbs with LED bulbs when they blow to save money on power.

Use your kitchen extractor fan every time you cook.

Turn your bathroom heater on before you have a shower, start the extractor fan and leave the fan on for 15 min afterwards with the bathroom door closed.

Open all the doors and windows in the house for 5-10 minutes a day to get rid of stale air and moisture without losing too much heat.

Never dry washing inside

Scrub any mould with warm soapy water and dry well.

www.aukaha.co.nz 03 477 0071

CURTAINS & BLINDS

INFORMATION SHEET

WHAT TO LOOK FOR AND THINGS TO THINK ABOUT

Windows and glass doors account for substantial heat loss in most homes. Curtains and insulating blinds help retain heat, and if installed properly can be as effective as double glazing. Unfortunately, most curtains are not installed properly. Are yours?

STOPPING HEAT LOSS

No matter what type of windows you have, curtains can significantly reduce heat loss overnight. Even if double glazed, windows and glass doors should always have window treatments.

Too often New Zealanders neglect to install curtains or blinds in the following areas: kitchen, bathroom, toilet, and laundry, as well as front and back doors.

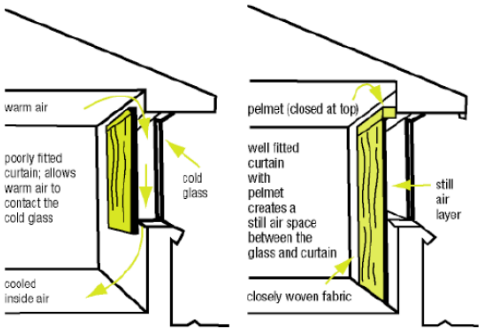
Curtaining some windows and not others is like bundling up for a walk on a cold day but rolling up your sleeves. We should dress our windows in winter the way we dress ourselves – in close fitting layers.

Venetians and slatted blinds are great for screening out sun and providing privacy, but ineffective at keeping heat in because there are too many gaps. If you're serious about reducing heat loss in winter, add curtains, Roman blinds or pleated blinds.

SNUGNESS OF FIT

When installed properly, curtains, Roman blinds, cellular blinds, and window blankets create trapped pockets of air that reduce heat loss. According to research by Consumer achieving a snug fit to reduce air movement is critical.

But first some simple science: glass is a poor insulator. During cold weather, the air close to the glass is cooled. This cold air is heavier than warm air and therefore sinks to the floor. Warmer air gets drawn in from the top to replace it. (See diagram). This cools and also sinks, creating a cycle in which warmer air at the top of the room is pulled down behind the curtains and drops out as cold air at floor level. The insulating effect of curtains and blinds is achieved mainly by the layer of still air it traps against the window. If that layer isn't adequately sealed, the convection cycle can resume, taking your precious heat with it.



Low versus high performing curtains

Rule One: Close off the bottom

Make sure the bottom edge of the curtain rests on the floor, and that blinds seal against the window sill. Consider using Roman or pleated insulating blinds if it is impractical to take curtains to the floor. The key is to make sure that the bottom of the window treatment rests on a solid surface.

Rule Two: Two-layer minimum

Use a minimum of two layers of fabric to provide adequate insulation. The more layers the better. The curtain fabric itself adds very little to the insulation value of the window – it's the layers of still air trapped in and between materials that provide the insulation. So the key is layers of material that will trap still air. Think of window treatments like clothing, would you go outside in winter wearing just a thin single layer? No you would put on multi layers and jackets. Cover the windows in a similar fashion.

Rule Three: Close off the top

Pelmets are an excellent way to seal off the top of this heating/cooling cycle, but the sides of the curtain should also fit snugly to the wall. Other options are: fit curtain brackets that are flush with the wall; fit a strip of hardboard between the wall and the curtain track to seal off the gap (paint a colour that matches the track and you won't notice it); or fit curtain tracks that attach to the underside of the window frame. Some people take the top of the curtain all the way up to the ceiling.

Thermal versus standard fabrics

The term "thermal drape" usually refers to a single-layer fabric with a rubberised backing. It gives a slight improvement in thermal performance, but is nowhere near as effective as standard curtain material with a separate lining. Remember, it's the layers of still air that provide the insulation. Another improvement is curtains containing a thick light layer (sometimes called "bumpf") between the curtain fabric and lining.

Blinds

Two-layer Roman blinds (decorative fabric on the front, with a separate lining behind) can be as effective as double-layer curtains, provided they are snug all around. Velcro dots at the bottom corners can help hold them snug. Another good option is multi-walled pleated blinds, also called cellular blinds, which trap layers of still air within them. These are generally made of moisture-tolerant fabrics and are a good option for wet areas such as bathrooms and kitchens.

Budget Options

If making window treatments yourself you can use cheap materials like polar fleece or woollen blankets as an insulation layer between the decorative fabric and the lining. They improve insulation (and help deaden sound), but only if there are no leaks around the outside. Heat, like sound, is sneaky and can get through the smallest gaps.

Mould and mildew

If mould and mildew appear on curtains, there's too much moisture in the house. This is a separate topic but should be addressed first before installing tight-fitting curtains all over your home. See Information Sheet: **Moisture and Condensation**.

You can get curtain fabrics and linings that have anti-microbial properties to reduce the likelihood of mould growing – talk to your curtain consultant. Remember, curtains only work when closed at night, so get into the habit closing them at sunset!

RULES OF THUMB

- Mount curtains as close as possible to the window frame.
- Make floor length curtains touch the floor and blinds seal snuggly against the sill and sides of windows.
- Use multi layers to achieve effective heat retention, just like clothing in winter.
- Close off the gap at the top of the curtain.

FOR FURTHER INFORMATION

Contact your nearest Eco Design Advisor
Visit our website ecodesignadvisor.org.nz

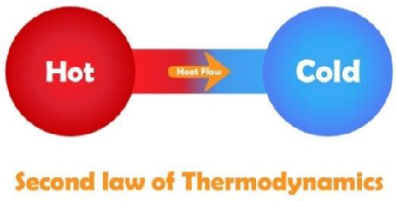
DRAUGHT PROOFING

INFORMATION SHEET 13

DRAUGHT PROOFING FOR EXISTING HOMES

Draughts are the uncontrolled movement of air which creates uncomfortable breezes where you don't want them. Draught proofing is finding and fixing the sources of draught to make your home easier to heat, more comfortable, and energy efficient.

Draughts are uncontrolled ventilation, and are also the cause of considerable heat loss. This can lead to discomfort, or cold, and to higher than necessary heating bills. To understand draughts it can be helpful to understand the fundamentals of heat and how it moves.



Second law of Thermodynamics

1. Hot air rises and cool air drops - Convection movement.
2. Heat moves from hot to cold - Thermodynamics law 2.
3. Heat goes where air flows!

BENEFITS

Draught-proofing is one of the cheapest and most effective ways to save energy and money in any type of building, it will help you to:
- Keep your home warm and energy efficient
- Save money on your fuel bills
- Lower your carbon footprint

BUSTING THE MYTHS

If you think these gaps are small and don't matter, think again! Even small gaps add up and in older NZ homes often equal a 1m² hole in the wall! Don't under-estimate *the power of accumulation*.

SOURCES OF DRAUGHTS

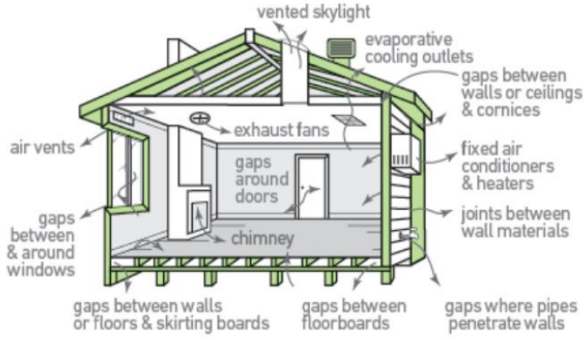
Draughts can be from almost anywhere! Anywhere that indoor air can escape to outside or vice versa. This is worsened by pressure differences between inside and outside. So a windy day is the best time to start looking.

Take a walk around your home and look for the obvious draughts first;

1. Obvious gaps and cracks,
2. Listen for rattles or whistling
3. Feel for moving air or cold spots within a room (using the back of your hand or the smoke of an incense stick)
4. Look for movement in curtains

See the diagram below for the main culprits for draughts;

FIND & FIX GAPS



WHERE DO I START

Below is what we believe to be a sensible process to follow when draught proofing an existing home; These are the most common areas to find draughts, with suggestions on how to fix them.

STEP 1 - CEILING

Before getting started it is important to understand that if your home has a tiled roof there is much more airflow through the ceiling cavity which can enter the living spaces.

Chimney and open flue

If your home has an open fireplace then you have a large hole leaking air straight out the chimney 24/7. These should be replaced with a modern heater and the chimney blocked off. Either capping the chimney, installing a damper or blocking it off from the inside using a Polyurethane Foam. The inflatable balloons are ineffective and don't last.

Old downlights and Passive Vents

Older downlights did not allow insulation to be installed over them because they run at high temperatures. Hot air rises and without insulation to slow the heat transfer these old style lights act like little thermal chimneys sucking hot air out of the living areas. Replacing your downlights with IC-4 rated LED downlights will use 90% less energy and allow you to remedy the insulation, ensure a continuous coverage with no gaps or compressions. Some older homes also have vents which allow air flow from living spaces into the ceiling cavity. These are ineffective and should be sealed closed.

Ceiling Man hole / Loft hatch

Hot air rises and gets lost in the cold space in your loft or attic, so it's worth blocking off draughts around your loft hatch. Use a foam strip insulation to get an air tight seal. Attaching insulation to the topside of the loft hatch is also important to have continuous ceiling insulation.

Extract fans

Extractor fans come in all shapes and sizes and similar to a chimney they are a hole to the outside. If your existing fan extracts directly into the roof space, you need to get it ducted to the outside, plus you can retrofit a draught stopping damper. When installing new extractor fans choose one with an integrated draught stopping damper.

STEP 2 - DOORS & WINDOWS

Exterior Doors

Over time timber doors shrink and warp, creating gaps at the top, bottom and sides, usually to different degrees. Using a V-seal draught excluder can close gaps that vary between 2mm-8mm wide. For the bottom of an exterior door use a brush weather seal externally.

-Follow the instructions carefully for best results

-Don't forget the internal door into the garage.

-If you have a cat door that's broken or no longer in use, it is well worth replacing it or sealing it shut.

Windows

Similar to timber doors, timber windows will experience movement overtime creating gaps. Again the V-seal will do the trick. For aluminum glazing the rubber seals can deteriorate overtime losing their ability to seal effectively. Contact the window manufacturer to arrange replacements.

Curtains

Windows will always be our weak link in the building envelope even in a new home. Curtains that have gaps at the top and sides create a reverse chimney, cooling effect as well as a nasty draught by the window. Please download our Curtains info sheet for more information.

STEP 3 - FLOOR

Floors

If your home has older floorboards your timber floorboards will have shrunk over time creating gaps between boards. In addition gaps can appear between flooring and skirting boards and even the wall. Install subfloor insulation with a wind-wash barrier attached.

Plumbing Penetrations

Open your kitchen cupboards underneath the sink and beneath your vanity basin and even the laundry. Typically there will be large holes to the outside to allow plumbing to pass through creating source of draught.

HOW TO SEAL THE GAPS

Depending on the size of the gaps and their location there will be different methods and sealants to use. As a general rule of thumb, using a flexible silicone based sealant is best for longevity of the seal.

1. Assess the gap, is it larger than 5mm wide at any point? If No you can skip step 2.
2. Select an appropriately sized closed cell foam backing rod and push into the gap, use a screw driver to push it in if required.
3. Clean the area with turps to remove any dirt and grime
4. Apply masking tape on both sides of the join.
5. Run a continuous bead of silicone along the gap
6. Lightly spray the joint with mineral turpentine.
7. Using a silicone applicator tool, smooth the joint removing any excess silicone.
8. Remove masking tape

See this video for details

VENTILATION

INFORMATION SHEET

THE BASICS

The purpose of ventilation is to provide fresh air to a room or, a building, for you to breathe.

WHY MUST WE VENTILATE?

Ventilation serves one primary purpose which is to provide good Indoor Air Quality for us to breath. Since we spend more than 90% of our lives inside buildings, this is important for our respiratory health. But there are other benefits too.

Adequate ventilation should;

1. Remove harmful contaminants (ie fine particles, and organic chemicals from cooking & carbon monoxide and nitrogen dioxide if using a gas hob)
2. Remove excess moisture (generated from household activities such as cooking, showering and even breathing. The average family can produce eight litres per day).
3. Remove carbon dioxide
4. Introduce oxygenated fresh air from outside (not a dusty old roof space)
5. Replace at least 0.35 of the internal volume of air every hour (NZS4304 the standard for Ventilation for acceptable indoor air quality)

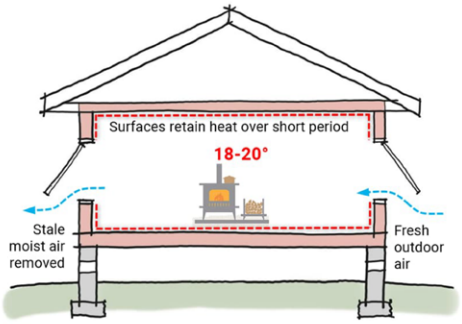
NATURAL VENTILATION

If you live in a home without mechanical ventilation, then opening windows and doors are how you can ventilate for free. Blast ventilation is the most efficient method of naturally ventilating by opening all windows and doors for a short period (5-10 minutes). This reduces heat losses as the surfaces inside the home will retain heat even after the air is replaced.

- Open up windows and doors throughout the home. For best results use cross-ventilation (opening two windows at a time to increase the airflow). If there is a breeze this should introduce a strong breeze through the home.

- Leave the house open for 5-10 minutes.

- Get in the habit of ventilating twice a day, morning & night (once in the middle of the day in winter is okay).



EXTRACTION AT THE SOURCE

Extractor fans and range hoods are a decentralised form of **negative pressure ventilation** commonly found in kitchens and bathrooms. These are a requirement to comply with the Building Code and the Healthy Homes Standard in New Zealand.

TIPS

-Select an extract fan that has a draft excluding features to prevent unwanted drafts, this is especially important when installing thru wall extractors. Also if avoidable do not install facing the prevailing wind.

-Select a more powerful fan than needed (most heat/lamp/fan combos are too weak).

-Ensure the fan vents to the outside of the building and not into the roof space

-Complex ducting reduces the efficiency of the system. Aim for the shortest route to exhaust outside.

For best results turn on the extraction fan before you start your shower/bath/cooking, and leave a window slightly open to draw in 'make-up' air to increase its effectiveness. Also leave the fan running for at least 15 minutes afterwards to remove residual moisture. This can be easily achieved by installing a fan timer or a humidity sensor to ensure the moisture is adequately removed. Extract fans need to be cleaned regularly to maintain their effectiveness.

MECHNICAL VENTILATION SYSTEMS

In New Zealand's temperate climate, opening windows has always been thought to provide most of the ventilation we need. However this view is fast becoming a thing of the past, many moving towards mechanical ventilation to ensure good indoor air quality. Many other OECD countries now require mechanical ventilation systems as a minimum. There are many systems available, and they perform indifferent ways. In all cases careful design and consideration is vital to ensuring they achieve good indoor air quality. For tailored impartial advice speak to your local Eco Design Advisor.

VENTILATION DISTRIBUTION

Centralised ventilation systems use a duct network to transport the supply and extract air.

Decentralised systems, rely on numerous devices usually placed directly in the external walls of the building.

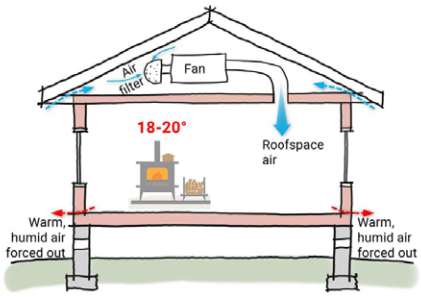
POSITIVE PRESSURE

Sold by HRV, DVS, Unovent, Smartvent, Reliance, Etc

Since the early 2000's there have been positive pressure ventialtion (PPV) systems marketed in New Zealand. Typically taking air from the roof space, which is then (hopefully) filtered and fan forced into the living spaces. As a result this forces warm indoor air out through gaps and cracks in the building.

Note: Ventilation systems that do not bring in fresh air from outside do not comply with NZS4304 the standard for Ventilation for acceptable indoor air quality. In addition there are many instances where a PPV systems can cause unintended moisture problems so it is important to consider this option carefully.

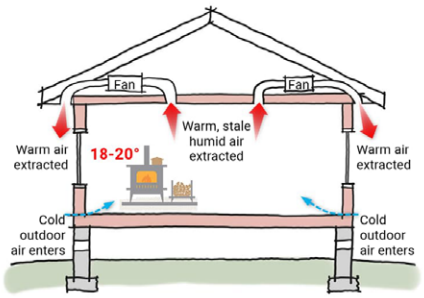
If you have an existing PPV system they can be easily modified with ducting to introduce fresh air from outside. To ensure pollens and fine particles are removed from the air, add a F7 or equivalent fine particle filter.



Positive Pressure

NEGATIVE PRESSURE

Negative pressure ventilation is a fan or series of fans continuously extracting humid air from wet areas (bathrooms, kitchens and laundries). This causes 'fresh' make up air to be sucked in through gaps and cracks in the building. The fans should have at least two speeds to allow high speed extraction when showering or cooking. This is the cheapest effective option however there is incoming 'make up' air is coming from unknown sources and cannot be filtered.



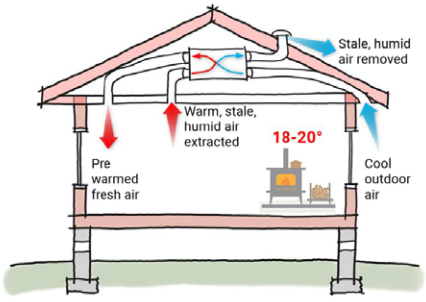
Negative Pressure

BALANCED PRESSURE

AKA Mechanical Ventilation with Heat Recovery (MVHR)

Balanced pressure ventilation (BPV) systems work by pulling in fresh air from outside while extracting the stale humid air at the same time. They usually incorporate a Heat Exchanger which pre warms the in-coming air. These systems are best suited to new homes that are more airtight - however they still provide benefits for older homes too.

Typically a BPV system is introducing fresh outdoor air which is filtered removing pollens and other contaminants ensuring high Indoor Air Quality. A BPV systems can recover heat from out-going air at an efficiency of up to 95%. They can also incorporate an exhaust boost function to also provide local moisture removal. There are also decentralised options available where no roof cavity is available.



Balanced Pressure

MOISTURE AND CONDENSATION

INFORMATION SHEET

HOW TO REDUCE IT AROUND THE HOME

It's a sad fact that many New Zealand homes are cold and damp. These conditions contribute significantly to health problems such as asthma and respiratory illness, which have a disproportionate impact on children and older adults.

Mould thrives in a cold and damp environment. These conditions can exist in a home for a number of reasons:

- poor design and construction;
- inadequate ventilation;
- lack of or not using extractor fans;
- drying washing indoors;
- the use of un-flued gas heaters;
- rising damp from beneath the floor;
- leaks in walls or roofs.

Because many New Zealanders do not adequately heat their homes, we are unwittingly providing the conditions for mould to thrive.

Research indicates that many of our homes are not heated to the World Health Organisation recommended minimums of 18°C for living spaces and 16°C for bedrooms. The higher the temperature the less likely condensation and mould will develop.

Healthy levels of relative humidity within homes can vary between 30% and 65%. At the high end of this range and above, mould and dust mites can thrive.

Addressing the problems of a cold, damp home include the following strategies:

1. minimise or eliminate the sources of moisture;
2. insulate and heat your home adequately;
3. manage the conditions for health and comfort.

MINIMISE OR ELIMINATE SOURCES OF MOISTURE

- Do not air washing indoors. Ensure that clothes driers are vented outside;
- Do not use un-flued gas heaters;
- Use an extractor fan and pot lids while cooking. The best range hoods are larger than the cooking area, are vented outside, and have quiet motors;
- Ensure adequate drainage around the perimeter of your home. Contact a specialist if you suspect water is flowing underneath the structure.
- If your home is on piles and the basement is fully enclosed, install a ground vapour barrier such as heavy-grade polythene to prevent rising damp;
- Limit indoor pot plants and cover fish tanks;
- Check gutters and downpipes for signs of leaks;
- Use an extractor fan while showering and keep showers short. Better yet, install an automatic timer so the fan runs for 10 minutes after you leave, and make sure the bathroom door is closed when you do.

Choose an extractor fan with good air flow volume, and if it struggles to ventilate the space, ensure there is enough inward air flow (either through an open window or a gap under the bathroom door).

INSULATE AND HEAT YOUR HOME

Adequate insulation and tightly fitted, lined curtains will make it easier and more cost effective to heat your home. Please see Information Sheets: **Insulation**; **Windows**; **Curtains & Blinds**; and **Insulation: How effective is it?** (North Island and South Island).

Depending on your location, the three most cost effective options for heating a home are a heat pump, a flued mains gas heater or a wood burner. Running one of these in combination with insulation and good curtaining will allow you to heat your home to a healthy temperature at the lowest cost.

MANAGE CONDITIONS FOR HEALTH AND COMFORT

- Keep beds and furniture at least a hand-width from external walls;
- Wipe condensation from windows as soon as you see it;
- Leave wardrobe doors slightly ajar to allow air circulation;
- Regularly check for mould behind curtains and furniture, and in corners;
- Wash the affected areas with warm soapy water, scrubbing hard with an old toothbrush, scrubbing-brush or cloth to get all mould off the surface. Rinse well and dry. Cleaning regularly after this is strongly recommended.
- If there is no extractor fan in the bathroom, open windows when showering or bathing.
- Flush your home with fresh air once or twice each day for 10 to 20 minutes by opening windows and doors. During winter months the best time to do this is around mid-day when outdoor temperatures are highest. It is better to fully flush the home with fresh air than to leave windows ajar all day and night.
- Run a dehumidifier as needed. This is the most effective in a small to medium sized room. Ensure that the windows are closed.

Only consider a positive pressure or dilution ventilation system as a last resort. They are not suitable for all houses and can cause more problems than they solve.

FOR FURTHER INFORMATION

Contact your nearest Eco Design Advisor
Visit our website ecodesignadvisor.org.nz

View helpful resources at:

- smarterhomes.org.nz
- Sustainable building authority Level: level.org.nz
- Energy Efficiency and Conservation Authority: eeca.govt.nz
- Building Research Association of New Zealand: branz.co.nz
- Building and Housing, MBIE: building.govt.nz
- Beacon Pathway: beaconpathway.co.nz

Aukaha

KIA KAHA, AU KAHA