

Application ID Number:
(for NZEC Office use only)

New Zealand Ethics Committee *Te Roopu Rapu i te Tika*

Request for Ethics Review

(Version 8, March 2021).

When completing this application please:

- Number the pages of your application and include all the following numbers and subheadings below.
- Ensure that any documentation that participants will see is attached (e.g. participant information sheet, consent forms, recruiting advertisements, surveys, etc.)
- Submit all parts of your Application in one document or file, as an attachment to your email.
- Ensure you have signed the Indemnity clause at the end of this application

Type of review:

We offer a tiered approach to review. Please indicate which review type you require:

- Expedited review (within a week) \$1000
- Standard review (at monthly meeting) \$ 500
- Koha (or no payment) – usually available to community research organisations only. Please contact Keely Blanch at manager@nzethics.com

Please make your payment as soon as you receive confirmation of your submission by Direct Deposit into NZ Ethics Ltd
Kiwibank 38-9014-0176382-00

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1. *Research Project Title:*

Public and Māori Housing Renewable Energy Fund Evaluation

2. *Applicant Details:*

Applicant: Dr Greg Martin

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Organisation: Allen and Clarke Policy and Regulatory Specialists

Address: Level 2, The Woolstore, 162 Thorndon Quay, Thorndon, Wellington 6011

Type of organisation: Policy, Regulatory, and Research Consultancy

3. *Co-researchers name & email (please list all):*

Dr Kirsten Lovelock

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Phoebe Taptiklis

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Jessica Kereama-Stevenson

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Shaun Foley

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4. *Sponsor of research (Funder or contractor of work):*

Dr Madhukar Mel Pande, Ministry of Business, Innovation and Employment (MBIE).

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5. *Proposed Start Date for Data Collection*

Early May 2022

6. *Proposed End Date of Project:*

November 2026.

Project Outline

7. *In simple terms, what question(s) do you want to answer with this research?*

In August 2020, the New Zealand government agreed to a 28-million-dollar fund for renewable energy projects in public and Māori housing as part of the Covid-19 response and recovery package (CRRFP). This fund is intended to deliver lower household energy costs, and to trial and evaluate renewable household energy solutions through piloting the installation of renewable energy technology in public and Māori housing. A number of pilot implementations of renewable energy systems have been funded through a contestable process.

The questions we want to answer with this research are:

1. Are the renewable energy projects effective in reducing energy costs?
2. Are they effective in reducing energy hardship?
3. Are they associated with improved indoor environment quality?
4. Are they associated with improved individual and household health and wellbeing?
5. Are they cost-effective in producing these outcomes?

Additional to these research questions, we also aim to compare different types of renewable energy scheme, using the questions above, to inform a potential further roll-out of the scheme.

MBIE requires monitoring and impact evaluation services to assess the effectiveness of renewable energy system trials in public and Māori housing. This current application applies only for approval to begin engagement with potential participants. Some parts of the study (e.g. content and design of data collection tools) will be co-designed with participants; we will seek separate approval for that process.

8. *Why is this research important?*

This research is important because it will provide the following:

- a) Robust evidence of whether and how the initiative delivers positive impacts against its objectives. This includes health and wellbeing outcomes.

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- b) Robust evidence on the cost-effectiveness of options in this initiative – including in comparison to (and in combination with) other energy affordability interventions
- c) Practical recommendations for how future work on this (or related projects) can maximise the benefits
- d) Case studies and stories that will help others make informed decisions on whether to invest in the solutions used for this initiative

9. *For whose benefit is this research being conducted?*

Those seeking increased control over energy generation for the purposes of improving energy affordability in New Zealand households.

The Electricity Price Review defined energy hardship as a household spending more than 10% of income on domestic energy. Households in energy hardship can spend less money on heating or efficiency initiatives such as insulation, good curtains, or efficient appliances. This can have significant negative impacts on wellbeing – including negative health impacts from cold and damp homes, and strained household budgets, resulting in less disposable income for other household expenses.

The study is also for the benefit of MBIE (and the general public) to ensure that investments in renewable energy project are both effective and cost-effective.

10. *Describe any previous research experience, (and that of co-researchers) and any personal qualities, qualifications and experiences relevant to this project (e.g. links to participant group):*

We offer a very experienced team for this evaluation. Our team will work collaboratively with the MBIE Team, Kainga Ora, Māori housing partners, and participants. The curriculum vitae of the team members are attached in Appendix A. The roles of the *Allen and Clarke* team are outlined below:

Dr Kirsten Lovelock (Project sponsor)

Kirsten is the Lead for the Evaluation and Research team at *Allen + Clarke*. She will be responsible for ensuring the team is adequately resourced and supported for this project. Kirsten has a long and successful history of conducting social and health research and evaluation of policy implementation and interventions in a range of fields and sectors in New Zealand. She has conducted research in the field of medical anthropology and has a long-standing research interest in the relationship between racism, material hardship, ethnic identity, and health outcomes. She also been involved with Kaupapa Māori evaluations.

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Dr Greg Martin (Project Manager, Senior Consultant)

Greg has had a successful 20-year career in health and social research. He is a mixed methods researcher who is currently a research partner in the *Warmer Kiwis* housing project for the Energy Efficiency and Conservation Authority (EECA). He has managed numerous large research and evaluation projects in public health.

Phoebe Taptiklis (Fieldwork Manager, Senior Consultant).

Phoebe (Motu) is leading the design and implementation of field work in the *Warmer Kiwis* study for EECA, and has a strong research background in the field of healthy housing, housing condition and housing retrofits/upgrades

Dr Guy Perry, Ngati Kahungunu ki Wairoa (Senior Consultant)

Guy is a scientist and engineer with 20+ years' experience in sustainability, environmental management and research, including: Collaborative community/Māori research and development projects; sustainable (renewable) energy, water, carbon and waste management. Guy has worked closely with marae groups to design and install customized renewable energy schemes in remote locations.

Jessica Kereama-Stevenson, Ngati Raukawa (Stakeholder Engagement Lead, Senior Consultant)

Jessica and has an in-depth knowledge of the Resource Management Act and a long history of representing the rights of iwi on environmental issues. She has previously worked as a community social worker, and for the Human Rights Commission.

Shaun Foley (Consultant)

Shaun is a consultant with *Allen + Clarke* who will provide administrative, data analytic, and fieldwork support to the project. He has a Master's degree in community psychology and experience in engaging with community groups.

Meremoana Potiki

Meremoana has a background in health and indigenous development. With over 10 years of experience working on cross-disciplinary projects, she has an extensive repertoire of both qualitative and quantitative research skills. This includes interviewing, archival research, database management, transcription, resource and survey development and stakeholder management. Prior to beginning at *Allen + Clarke*, Meremoana was an independent research contractor working in the Māori health and iwi development sectors.

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11. Research Methodology and Procedures

In no more than 500 words give a brief, simple-language explanation of the method(s) and procedures (i.e. data collection, and data analysis) used in the project. Include any proposed questionnaires, interview guide or focus group questions in an Appendix below.

We will use a mixed methods approach to data collection, analysis, and interpretation. This will include administrative data, survey data, economic data, data from environmental monitoring, and qualitative data from interviews with key stakeholders.

To facilitate both our requirements for a robust study, incorporating Kaupapa Māori design, as well as to design a data collection method robust to Covid-19 circulating in the community, we have designed a three-level data collection strategy.

Table 1. Three levels of data collection

<i>Level of increasing monitoring</i>	<i>Monitoring component</i>
Level 1: All participants (can be fully non-contact)	<ul style="list-style-type: none">• Smart meter data• Household Experience Survey• Building Inspection Survey• Energy Audit (survey only)• Inverter data• Renewable energy infrastructure characteristics
Level 2: Subset of (public and) Māori housing*	<ul style="list-style-type: none">• All of level 1, plus:• Temperature/humidity monitoring• Cliflo climate data• Energy Audit using survey and on-site measurement (Council audit)• Volumetric measurements of the house• Insulation inspection
Level 3: Subset, possibly only Māori housing	<ul style="list-style-type: none">• All of levels 1 & 2, plus:• Energy monitoring:<ul style="list-style-type: none">- Hot water?- Fridge?- Circuits- Inductor/board?

Those participants in the Māori housing stream will be invited to co-design their monitoring programme with the evaluation team. To facilitate this, the project team has developed a three-level monitoring design, where participants will be required to commit to all of the level-one data collection to participate in the research, but other components, from levels two and three, as well as research questions developed by the rōpu, will be included in the final study design.

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Some aspects of these additional study components may require additional ethics applications, for example, more intensive monitoring, described in level three. Participants from public housing will participate only in level one aspects of the data collection, plus a subset of this group will be invited to participate in temperature and humidity monitoring in their main living area for 12 months.

The aim is to develop a sample of 100 Māori housing and 100 public housing households from which all of the data described in level one is available, and as many of these homes as practicable also included in temperature and humidity monitoring. This sample size has been determined sufficient for robust quantitative analysis to assess the comparative benefit of different schemes, and of the programme as a whole, as well as for identifying the most important modifying household and infrastructure characteristics on the efficacy of the various renewable energy schemes.

After data collection is completed, health, wellbeing and energy audit information will be used, alongside full costs of the infrastructure to develop a cost benefit analysis for the fund as a whole, with the potential to project cost-benefit ratios for if the fund were to focus only on particular types of scheme, or particular community characteristics (for example, rural versus urban).

Project details

If any of the following are not relevant, please indicate so with n/a.

12. *Who is the research population? How many participants are you seeking?*

The study population includes all applicants to the renewable energy fund from māori housing groups, and all Kainga Ora residents in housing where renewable energy has been or will be installed during the period 2022 to 2025. Approximately 1800 homes are likely to be part of the trials.

The energy generation and electricity use of the full Kāinga Ora sample will be collected and analysed (approximately 1000 homes, smart-meter and inverter data only). However, only a sample of 100 Kāinga Ora homes will be evaluated through qualitative means (for comparison with the Māori housing sample). Kainga Ora is responsible for gaining consent for access to smart-meter data in households who are not recruited into our sample of 100 homes.

From the Māori housing communities, we aim to recruit another 100 (or more) households, which we estimate may require the participation of up to ten of the successful community applicants to the fund.

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13. *How will participants be recruited (e.g. Advertisements, snowball, through a third party)?*

Contact details of successful Māori housing applicants will be made available to the research team and we will approach these groups directly, initially by email, and then aim to visit the community to complete the recruitment and co-design aspects of the study. Wherever possible the researchers will aim to recruit all households linked to the renewable energy scheme for the energy audit and the survey, while indoor temperature and humidity monitoring may be done on a smaller group within that sample.

For the 10 case studies, in the first year we would recruit whoever was interested in participating, but in the later stages we would be looking more carefully for groups with a particular type of house/scheme/population to build the numbers of different characteristics (type of houses, household type and renewable energy systems). We will recruit a nominated liaison person for each iwi group.

Kainga Ora households will be contacted directly by the research team to ensure the research is clearly seen as independent of Kainga Ora.

14. *How much time will participants be asked to give to the project?*

Participants will be asked to remain in the study for a full twelve months after the renewable energy scheme has been installed. At this time we will return to conduct the same energy audit and household experience survey that was conducted before the scheme was installed. This will allow us to gain a comprehensive picture of changes in energy use after compared to before the schemes were installed. The timeline is to some extent dependent on the timeline of the installation of the renewable energy scheme, but we describe in our recruitment information that the involvement will range from one to two years, to give a reasonable indication.

15. *How might participants or communities be vulnerable or at risk (physically, emotionally, professionally, etc.) within this research project?*

- COVID-19. While we cannot avert the possibilities of an escalation in the COVID-19 Alert level, all of our consultants are fully equipped to work remotely, meaning that the participants and consultants will not be at risk from potentially risky and unnecessary travel.
- Monitoring equipment failure causing damage

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16. How will researchers manage these vulnerabilities or risks?

We will ensure that all researchers who conduct site visits are fully (triple) vaccinated for Covid-19 and observe appropriate record-keeping masking and social distancing. We will respect the wishes of our participants, who may have vulnerable whānau members, and if they are not comfortable with site visits, they can still participate in a fully non-contact methodology described above in Table 1.

Minor risks may be associated with the use of monitoring equipment, All care will be taken. We will use only battery operated monitoring devices to reduce fire-hazard risk, and we will use appropriate methods to attach monitors to internal walls, designed to avoid damage to internal wall linings.

Other risks involved are primarily around us being able to deliver on all of our commitments. It is recognised here, that not all of our data collection is being described in this application, due to our intention to use co-design methods. We remain open to advice from the committee on whether every case-study will need a separate additional ethics application.

17. What is your process for informed consent? If there is no informed consent process, please explain why this is not necessary for the project.

Allen + Clarke will work with Kāinga Ora liaison and Māori Housing partners to obtain informed, written consent from selected household to allow access to additional energy data (e.g., Smart Meter, or energy bills), for installation of the Internal Environment Quality (IEQ) and energy monitoring equipment, and for consent to participate in the household survey. Participants can opt out of any aspect of the study.

18. What, if any, are the potential areas that are of value to, or of concern, for Māori?

The evaluation will assess the effectiveness of renewable energy system trials in public and Māori housing, a pilot delivered through the Public and Māori Housing Renewable Energy Fund. Other research questions of interest to iwi partners will be developed by themselves and the study co-designed with our team.

19. If there are aspects of interest to Māori, how is this reflected in the research design?

A Kaupapa Māori research method will be adopted. This will involve co-designing new research methodology with the participating community.

Our staff are competent to engage appropriately with Māori and are very experienced in doing so. We have team members who have experience in Kaupapa Māori research and

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evaluation. We have a network of Kaupapa Māori practitioners who provide advice and support to our team where needed.

We suggest the establishment of a Māori Energy Reference group comprised of members of Māori energy providers to provide an appropriate cultural lens on the evaluation.

20. *At which location(s) or institution(s) will the project be conducted?*

Monitoring will take place in Auckland, Wellington, Christchurch and two further provinces to be agreed with MBIE.

Analyses will be conducted at Motu Economic and Public Policy Research, and at Allen + Clark, both based in Wellington, New Zealand.

21. *If the researchers and/or research assistants might encounter unsafe or risky situations in the field, what arrangements will be made to keep them safe?*

Inevitably this project design will involve significant amounts of travel. Three members of the research team will be expected to travel to all of the selected sites. If, for COVID-19 reasons, it is unsafe for the members of the research team to travel then alternative data collection methods will be used.

22. *What potential benefits exist for the research participants and the community?*

Cultural outcomes

We suggest the establishment of a Māori Energy Reference group comprised of members of Māori energy providers to provide an appropriate cultural lens on the evaluation.

The establishment of increased energy independence is also compatible with the Te Tiriti principle of tino rangatiratanga (self-determination). This would be enhanced by location specific energy grids serving local communities. We expect to include a number of Marae-based projects in the evaluation.

Government collaborations in Kaupapa Māori research is a relatively new area. Therefore, to complete the project described here with support from the Māori community groups will be an important outcome in itself. For this reason, we will gather qualitative information from participants of their overall experience as research collaborators and include these findings in the final reporting.

Social outcomes

Effective adoption of affordable renewable energy (e.g., widespread use of photovoltaic panels) would have a significant impact on 'energy poverty', which is likely to have flow

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on effects to improved health outcomes (resulting from improved home heating), and wider social benefits particularly for those on fixed incomes who may currently pay a disproportionate amount of their income on energy costs. There may be the removal of opportunity costs associated with reduced energy costs, such as money formerly spent on energy could be repurposed to such things as medical care, clothing, food or other essentials.

Environmental outcomes

We expect the introduction of renewable energy generation to reduce the use of fossil fuels. Calculation of carbon equivalents will form part of the final reporting. In particular, the replacement of gas/coal/diesel or petrol appliances with electric equivalents will be carefully assessed as part of the energy audit aspect of the project.

Additionally, kaitiakitanga (environmental guardianship) will be assessed and can inform of changes in perceived connection and satisfaction in participants' relationship with their environment.

Economic outcomes

Changes in affordability/availability of energy need to be calculated along-side "take-back" or increases in use of energy and wellbeing. In this sense, it will be pertinent to report on both changes in actual wealth (measured through energy use before) and in perceived wealth before and after the renewable energy trial.

It is proposed that a key metric of economic outcomes for participating groups will be increased use of energy for healthy housing outcomes of heating, refrigeration and hot water.

Key economic outcomes from MBIE's perspective will include the reduction of carbon equivalents in overall energy use as well as improvements in perceived health and wellbeing.

Reporting outcomes

It is a requirement of recipients of the fund to report back to MBIE on the success of their renewable energy installation. Participating in our research can fulfil this requirement in part or in full.

23. *Will any deception be employed? If so, please indicate the nature of this and why it is necessary for the research (attach additional documentation as necessary).*

No.

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24. *How will you ensure confidentiality or anonymity for participants?*

We will report only aggregated results. It may not be possible to protect participants' anonymity entirely, because the list of successful applicants has been publicly notified, and particularities of individual schemes may make them identifiable. However, we will maintain the anonymity of all participants, through the allocation of household identification numbers. A key will be used to separate the names and identities of participants from the data collected from their households. The iwi participants will remain the owners of their own data, and we will retain a copy for use by named team members only for a period of 10 years after the study is ended for the purposes of academic publishing, after which time it will be destroyed.

25. *What, if any, compensation (money/rewards/koha) will be offered to research participants?*

Compensation for the iwi housing groups is primarily in the form of fulfilling their reporting requirements to MBIE as successful applicants. For householders who agree to allow internal temperature and humidity monitoring to be conducted, and additional voucher for \$50 will be compensated (one per household)

For Kāinga Ora householders, all participants will be offered a voucher for \$25 for survey involvement only and \$50 for survey and indoor temperature and humidity monitoring.

26. *How will the findings of this research be made available? (Reports, journal articles, websites, etc.)*

Four reports will be produced:

1. Household Experience Report
2. Energy Audit Report
3. Cost Benefit Analysis Report
4. Overall Monitoring and Evaluation Report

Household Experience Report

- The final content of this report will be developed collaboratively in a 3-way relationship between the participants, *Allen + Clarke* and MBIE, using a Kaupapa Māori approach to report the experience of the participants from their perspective (see process visualization figure)
- *Allen + Clarke* will supply tools in the form technical support to format and upload survey instruments, recorders and annotation for interviews and

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focus groups, project co-management to ensure the process stays within a scope which is developed together early in the project

- Questions developed by *Allen + Clarke* and MBIE, which may be used as is, adapted, or simply used as prompts to help
- Central themes to guide research and reporting will be developed with MBIE to ensure the report will be fit for purpose.

Energy Audit Report

- The difference in total energy use, before and after (household level and Group level)
- Total energy contributed by renewable energy installation (H/H & Group levels); Total and stratified by energy use (e.g. refrigeration, heating etc.)
- Calculation and comparison of carbon equivalents before and after renewable installation.

Cost Benefit Analysis and Report

- The policy and counterfactual of the Treasury's CBAX tool will be the before/after outcomes of the renewable energy installations
- Findings from the Energy Audit Report will feed into costings of both economic and environmental costs and health costs
- Health benefits will be estimated by assessing the reduction of fossil fuel use and published data on the health implications/costs of air pollution and warming temperatures
- Findings from the Household Experience Report will feed into the assessment of wellbeing within the Living Standards Framework
- This intervention will impact many of the domains within the Living Standards Framework. In particular, measurable differences are expected to Income and consumption, Environment, Health, Civic engagement and governance, and subjective wellbeing.

Overall Monitoring and Evaluation Report

- This is the overall and final report addressing the findings of the evaluation. The structure of this report will be agreed with MBIE and Kāinga Ora.

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27. *What information/reports, if any, will be given back to participants? If none, please explain why.*

- Summary reports will be made available to all interested participants.

28. *Who will have access to the research data during the course of the project?*

- Only the immediate project team will have access to the data.

29. *How will data, including electronic data, be stored securely?*

Our data security arrangements vary depending on the requirements of our clients. A conscious decision is made at the start of each project on the most appropriate arrangement for that project's data from both security and privacy perspectives to ensure our client's requirements are satisfied. In consultation with MBIE, at the start of the project we would agree on the most appropriate arrangement for the project's data from both a security and privacy perspective.

We have established systems and processes to ensure confidentiality of client information is maintained. For example, data collected through interviews can be de-identified, and participants allocated a unique study code; with the Lead Researcher retaining a log linking the participant code with identifiers.

If needed, physical documents can be stored in locked cabinetry within *Allen + Clarke's* corporate offices or secured in a locked fireproof safe.

We have robust internal policies on handling, storage, and destruction of confidential information in line with the Privacy Act 1993/2020. Hard copies of confidential documentation can be stored in locked cabinetry. De-identified data will be retained for ten years and then destroyed.

30. *What will happen to the research data after the project is completed?*

De-identified data will be retained for ten years and then destroyed.

Renewable Energy fund Participant Consent Form

- I have read the information sheet provided and have had the details of the study explained to me.
- My questions have been answered to my satisfaction. I understand I may ask further questions at any time.
- I agree to extend my participation in this study under the conditions set out above.
- I agree to an indoor air quality monitoring device remaining in my home to monitor indoor temperature, humidity, light and carbon dioxide for a period of 12 to 15 months.
- I understand I can withdraw from the study at any time. Should I withdraw, I will agree a time with the research team for them to collect the monitoring equipment.
- I agree to the research team having access to my electricity use (Smart Meter) data for the period of one year before and two years after this agreement.

Name of electricity company on bill:

If you have changed electricity company within the last 2 years, please list the name of the company you were with prior to the current one.

Name of previous company _____ from (month/year) _____ to _____

Name of previous company _____ from (month/year) _____ to _____

Signature: _____ **Date:** _____

Full name (in capitals): _____

Tēnā koe/thank you.

Information Sheet

The Māori Housing Renewable Energy Fund Evaluation

The Renewable Energy Fund is being used to pilot many different renewable energy schemes throughout New Zealand. There are two strands, the Māori housing strand and the public housing strand. In the public housing strand, Kāinga Ora selects and manages the renewable energy schemes, while in the Māori housing strand, iwi groups identify, install and manage the schemes. This creates a unique opportunity to compare a very wide variety of small, localised renewable energy schemes, and assess, which schemes best promote wellbeing and alleviate fuel poverty. Our aim is to compare as many schemes as possible to inform a potential wider roll-out of funding.

What we will ask you (MH)

To participate in the evaluation there is a baseline of data collection we wish to collect. This is so that all participants have similar information from which to draw comparisons. These will take the form of a household energy audit survey (conducted twice, before and after the renewable energy scheme is installed) and a household experience survey (also conducted twice). If necessary, these surveys can be conducted by telephone. We will also ask you to share the inverter data and to allow us to access your electricity smart-meter records. We would also like some participants to allow monitoring of temperature and humidity in the living area of their home.

What can we offer you in return?

We can also assist your whānau with other tools for evaluating the project in ways that are useful to you. For instance, we can assist with understanding the energy profile of your houses in more detail with additional detailed housing assessments, we can help with equipment to monitor temperature and humidity in areas other than the main living area of each house (eg, the wharenuī), and we can also monitor energy use of specific appliances including the refrigerator, the hot water cylinder etc.

If what was most important to your whānau was to better understand the electricity grid system or even iwi rights in relation to energy use and access, we can discuss ways that we can use our time, energy and research tools to support you in these areas. What are your important research questions? What can we help you discover?

If your household participates in temperature and humidity monitoring in your living area, we will offer you a supermarket or petrol voucher for \$50 (one per household monitored)

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How will it work?

We will aim to start with a visit to your Kāinga. At this first meeting we will go through the various data collection tools in more detail. We will listen to your aims and aspirations. We will leave some time for decision-making, after which we will come back together to see which combination of data collection will best suit our mutual purposes and decide whether or not to move forward with data collection.

How long will we need to be involved?

The timing of involvement may vary for each iwi group. Ideally we will get as much “baseline data” (data collection of the situation *before* the system is installed) as possible – a year’s worth would be great, but a month’s worth is still useful. Part of this timing may well depend on the construction of the system itself.

Information Sheet

Public Housing Renewable Energy Fund Evaluation

The renewable Energy Fund is being used to pilot many different renewable energy schemes throughout New Zealand. There are two strands, the Māori housing strand and the public housing strand. In the public housing strand, Kāinga Ora selects and manages the renewable energy schemes, while in the Māori housing strand, iwi groups identify, install and manage the schemes. This creates a unique opportunity to compare a very wide variety of small, localised renewable energy schemes, and assess, over the short- and medium-term, which schemes best promote wellbeing and alleviate fuel poverty. Our aim is to try to compare as many different schemes as possible to inform a potential wider roll-out of funding.

What we will ask you

To participate in the evaluation there is a baseline of data collection we wish to collect. This is so that all participants have similar information from which to draw comparisons. These will take the form of a household energy audit survey (conducted twice, before and after the renewable energy scheme is installed) and a household experience survey (also conducted twice). If necessary, these surveys can be conducted by telephone. We will also ask your permission to access your smart meter electricity records from your electricity provider. If you are interested in participating in a more intensive level of data collection we would also like to measure temperature and humidity in the main living area of your home.

What can we offer you?

In return for your participation in our study we would like to acknowledge our gratitude with a voucher (eg supermarket, petrol voucher etc.) to the value of \$25, and for those participating in monitoring \$50. We will also provide you with a complimentary report on your electricity use, looking at how it compares to average usage in our sample, and if there are ways you may be able to improve energy efficiency in your home, by thinking about how you use electricity.

How will it work?

When we hear from you that you would like to be involved, we will arrange an appointment to conduct the energy audit and household experience surveys; either in person or by telephone. If we are to be monitoring temperature and humidity we will need to visit to install a monitor and measure the living area. Approximately one year later we will arrange to re-do the same two surveys, and if necessary collect the monitor.

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Household Survey and Energy Audit

Section 1. Demographics

1	First name of person answering survey	FT
2	House ID	FT
3	How long have you been living at this address	Less than 6 months
		6 months and over, less than 1 year
		1 year and over, less than 2 years
		2 years and over
4	How many people including yourself normally live (in this house?)	integer (max =15)
5	Does that vary through the year	FT
6	What is your gender?	Male
		Female
		Gender diverse
		I prefer not to specify my gender
7	Ethnic group (state all that apply)	FT
	{Repeat qu. 5 & 6 for each hh member in qu. 4}	

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Section 2. Health and Wellbeing

1	How do you feel about your life as a whole? <i>Please think about your life as a whole these days. This includes all areas of your life. Where zero is completely dissatisfied, and ten is completely satisfied.</i>	0-10 (integer)
2	In general, would you say your health is:	Excellent
		Very good
		Good
		Fair
		Poor
		Don't know
		Refused
	<i>The next few questions are about how you have been feeling in the last 2 weeks: (answer options for next 5 qus)</i>	All of the time
		Most of the time
		More than half of the time
		Less than half of the time
		Some of the time
		At no time
		Don't know
		Refused
3	How often have you felt cheerful and in good spirits?	
4	How often have you felt calm and relaxed?	
5	How often have you felt active and vigorous?	
6	How often have you woken up feeling fresh and rested?	

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7	How often have you felt that your daily life has been filled with things that interest you?	
8	Last winter, have you had a cold or the flu? <i>Symptoms of a common cold can include a runny or stuffy nose, sore throat, cough, or sneezing. Symptoms of flu can include a fever, headache, muscle aches, and soreness.</i> {repeat for each hh member in qu. 1.4}	y/n/DK/rf
9	In the last 12 months, have you had an asthma attack? <i>If unsure, please answer "Don't know"</i> {repeat for each hh member in qu. 1.4}	y/n/DK/rf
10	In the last 12 months, have you taken any days off work, study or other activities due to illness {repeat for each hh member in qu. 1.4}	y/n/DK/rf
11	If yes please estimate the total number of days you have been unable to undertake your normal activities due to illness	integer (max=365)

Section 3. Indoor Characteristics

1	Which of these rooms do you have in your house	bedsit (kitchen living and bed all in one room)
		studio (kitchen and living area in one room)
		bedrooms (no.)
		kitchens {skip if answered yes to bedsit or studio}
		dining room (no)
		bathrooms
		laundry
		office/den/playrooms
		hallway

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2	Last winter, was your house/flat colder than you would like?	Yes – always
		Yes – often
		Yes – sometimes
		No
		Don't know
		Refused
3	How often have you observed condensation on windows in winter?	Never
		Sometimes
		Often
		Always
		Don't know
		Refused
4	How often have you observed mould in any living areas or bedrooms (ie, include dining room, office but not bathrooms and laundry)	Never {skip 3.5 to 3.5}
		Sometimes
		Often
		Always
		Don't know
		Refused
5	Please indicate how many rooms are affected?	One room
		Some rooms
		Most rooms

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		All rooms
		Don't know
		Refused
6	Please indicate the worst mould you have observed.	Specks
		Patches
		Large patches
		Extensive
7	How often have you noticed a damp feeling, visible damp patches or a musty or mouldy odour in any living areas or bedrooms?	Never
		Sometimes
		Often
		Always
		Don't know
		Refused
8	Is the living area of your house shaded (by trees/hills/neighbouring buildings) during winter?	Never
		Some of the day
		Most of the day
		All day
		Don't know
		Refused
9	Does your house have double glazing?	Yes, all windows/glazed doors
		Yes, more than half

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		Yes, less than half
		No
		Don't know
		Refused
10	Which rooms of your house have curtains? {pre-populate from question 4.1}	no windows
		No blinds/curtains
		blinds (single layer)
		blinds (double layer/thermal backed)
		single layer drapes
		thermal backed drapes
		double layer (fully lined) drapes
11	What style of curtains is in each room	window coverage only
		window cover with pelmet
		floor length only
		floor length with pelmet
12	Do you use any of these things to make your house warmer in Winter?	Close curtains
		Use draft stoppers
		Bubble wrap/insulating film on windows
		None
		Don't know
		Refused
13	Do you use or do any of these things to help keep warm in your home in Winter?	Electric blanket(s)

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		Hot water bottle(s)
		Extra blanket(s)
		Extra layers (clothes)
		Have a hot shower/bath
		Go to bed earlier]
		Sleep in living room
		Everyone sleep in one room
		Close off/don't use some rooms
		Leave the home for a warmer building
		Have a hot drink
		Move around or do physical activity
		None
		Don't know
		Refused
		Other

Section 4. Appliance use

2	Which times of a typical weekday day is someone normally at your home? <i>Think about all members of the household (s), including sleepsouts etc.</i>	All or most of the time	
		6am to 9am	

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		9am to 12pm						
		Lunchtime (12pm to 2pm)						
		Afternoons (2pm to 5pm)						
		Evenings (5pm onwards)						
		Highly variable						
		DK/ Rf						
3	Which rooms in your house do you usually heat in winter?	{pre-populate from question 4.1}						
4	What times of day do you typically heat your living room in winter, and with which type of heater? Tick all that apply	<i>Matrix {for each room indicated in question 3.1}</i>	Electric heater	Flue d gas	unflued/portabl e gas	ope n fire	pellet/lo g burner	othe r
		Morning						
		Afternoon						
		Evening						
		overnight						
5	Last winter did you ever choose not to heat some rooms (or use the heaters less) because of the cost of heating?	Never						
		Rarely						
		Sometimes						
		Often						
		Always						
		Don't know						
		Refused						

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6	Last winter did you ever choose not to heat some rooms (or use the heaters less) because of other reasons? <i>If yes, please specify</i>	free text	
7	Do you use appliances at a particular time of day because of pricing? <i>e.g. "hour of power", turn hot water off, use the washing machine/ dishwasher on a timer, or charge vehicle overnight?</i>	y/n/DK/rf	
8	Please describe how you use appliances at a particular time of day because of pricing?	free text	
9	In the last seven days, during or after showering or bathing, how often did you air out the bathroom? <i>By air out, we mean open windows wide for at least 10-15 minutes</i>	Every time	
		Most times	
		Sometimes	
		Hardly ever	
		Never	
		Don't know	
		Refused	
10	Do you have an electric vehicle that you charge at home? <i>not including bicycle</i>	y/n/DK/rf	
11	What systems are used to heat water (think about all systems in the house)?	Cylinder - electric	

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	<i>select all that apply. If combination select combination by each type</i>		
		Cylinder – solar	
		Cylinder – wet back	
		Cylinder – heat pump	
		Cylinder - gas	
		Instantaneous gas	
		gas bottles	
		Don't know	
		Refused	
12	Do you have a washing machine at home	y/n/DK/rf	
13	In a typical week, how many loads a week are done	integer	
14	How many of each wash setting do you use		
	cold	integer	
	warm	integer	
	hot	integer	
15	How often do you dry your washing inside the home in winter? <i>e.g. on a clothes airer, using a clothes dryer.</i> <i>Select one</i>	Always	
		Often	
		Sometimes	
		Never	
		Don't know	
		Refused	

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16	Does your home have a tumble dryer?	y/n/DK/rf	
	approximately how many hours a week, over the past 12 months, have you run your tumble dryer?	integer	
	Is your clothes dryer vent ducted to the outside or have a condenser?	Yes; Ducted to outside	
		Yes; Condenser	
		No	
		Don't know	
		Refused	
17	How many times a week do cook a meal on the stovetop	integer	
18	How many times a week do cook a meal in the oven	integer	
19	Are your light bulbs (tick all that apply)	Incandescent (conventional)	adds to 100
		eco non LED (fluorescent, CFL)	
		LED	
20	How many of each of these appliances do you have	TV	
		computer	
		Fridge	
		freezer	
21	How many hours per week is do you use these appliances	TV	matrix hours per appliance
		computer	

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22	Are there any other appliances that you use frequently	x	
		x	
		x	
23	How many hours per week is do you use these appliances	x	
		x	
		x	

Section 5. Energy use

1	How many dwellings are using electricity from this billing address	
	number of each:	flat/house
		caravan/campervan
		sleepout
2	Do you use appliances at a particular time of day because of pricing? (e.g. "hour of power", turn hot water off, use the washing machine/ dishwasher on a timer, or charge vehicle overnight?)	y/n/DK/rf
	if yes then describe	FT
3	Did you receive the Winter Energy Payment last winter?	y/n/DK/rf
4	Can you please look at your most recent electricity bill: What is the unit rate	
	daily 1	rate or n/a
	daily 2	rate or n/a
	fixed	rate or n/a
	variable	rate or n/a
	fixed daily charge	rate or n/a
5	what was your average monthly electricity bill last:	

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	summer	dollar value
	winter	dollar value
6	Does your house have reticulated gas	Y/N
7	Can you please look at your most recent gas bill	
	what is the unit price	rate or n/a
	what is the fixed (daily/monthly?) price	rate or n/a
8	what was your average monthly gas bill last:	
	summer	dollar value
	winter	dollar value
9	Do you use gas bottles	Y/N
	number of each: size (kg)	4.5
		9
		18
		27
		108
10	frequency filled (matrix) for each size indicated above	
11	Do you use a diesel generator at home	
12	how much do you spend per month	
13	How many litres per month	
14	Do you use a petrol generator at home	
15	how much do you spend per month on generator fuel	
16	How many litres of generator fuel do you use per month	

Section 6. Building inspection (to be completed by fieldworker)

Floor area	integer
Ceiling insulation	no
	Yes- less than 100mm
	Yes -100 to 150mm

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	Yes – over 150mm
Underfloor insulation	[Foil] (scale increase by 10% 0-100)
	[polyester] (scale increase by 10% 0-100)
	[polystyrene] (scale increase by 10% 0-100)
	[other] (scale increase by 10% 0-100)
Other	describe
Ground vapour barrier	(scale increase by 10% 0-100)
Evidence of moisture under house	No
	Yes
Number of storeys	1
	1.5
	2
	More than 2
Foundation	[Concrete slab] (scale increase by 10% 0-100)
	[Concrete/brick perimeter foundation] (scale increase by 10% 0-100)
	[Pile foundation (Default value is 100%)] (scale increase by 10% 0-100)
	Note: Max =100%
Subfloor ventilation	Insufficient ventilation
	Sufficient ventilation
	Extra ventilation
Wall cladding material	Timber weatherboard (scale increase by 10% 0-100)
	Timber sheet (ply) (scale increase by 10% 0-100)
	Fibre-cement (scale increase by 10% 0-100)
	Brick (scale increase by 10% 0-100)
	EIFS/PVC (scale increase by 10% 0-100)
	concrete
Wall cladding condition rating	Serious

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	Poor
	Moderate
	Good
	Excellent
Window type	[Timber casement] (scale increase by 10% 0-100)
	[Timber sash] (scale increase by 10% 0-100)
	[Steel/Aluminium/uPVC] (scale increase by 10% 0-100)
	[Other (please specify)] (scale increase by 10% 0-100)
	Note: Max =100%
Window condition rating	Serious
	Poor
	Moderate
	Good
	Excellent
Exterior paint condition rating	Serious
	Poor
	Moderate
	Good
	Excellent
	Unpainted
Roof condition rating	Serious
	Poor
	Moderate
	Good
	Excellent
	Can't tell
Spouting and guttering condition rating	Serious

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	Poor
	Moderate
	Good
	Excellent
	Can't tell (internal gutters)
Do all downspouts empty into a drain?	Yes; all
	Yes; some
	None
House Type	Detached house (not joined to any other houses)
	Top floor unit, detached (at least one unit below, no unit above, no units joined to the side)
	Top floor unit, semi-detached (at least one unit below, no unit above, unit joined at one to the side)
	Top floor unit, terraced (at least one more unit below, no unit above, a unit on both sides)
	Semi-detached house (joined to one other house)
	Terraced house (joined to another house on both sides)
	Ground floor unit, detached (at least one more unit above, none joining to the side)
	Ground floor unit, semi-detached (at least one more unit above, one unit joining to the side)
	Ground floor unit, terraced (at least one more unit above, a unit on both sides)
	Middle floor unit, detached (at least one unit above and one below, no units joined to the side)
	Middle floor unit, semi-detached (at least one unit above and one below, unit joined at one to the side)

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	Middle floor unit, terraced (at least one more unit above and one below, a unit on both sides)
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Risk assessment map (includes Health and Safety)

Part 1 Participant impact assessment

Risk	Likelihood	Potential impact on participants	Impact severity	Mitigation
Covid in community	Medium	Unrelated to research	Low	If equipment is already installed, a courtesy call will be made to participants letting them know of any potential changes to the agreed timeline.
Illness (of fieldworker)	High	Fieldworker is unable to attend appointment.	Low. (inconvenience)	Fieldworker to contact manager who will contact participant and advise of reschedule
Illness (of fieldworker)	High	Fieldworker infects participant with illness	Medium/high	Fieldworkers contract and training to include instructions to avoid any installations while suffering illness. They should contact manager as early as possible (see above)
Illness (of participant)	High	Fieldworker is unable to attend appointment.	Medium/high	Participant information sheet includes request to contact research team in these instances. Participants, fieldworkers and manager coordinate to reschedule visit.

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Fire (electrical fault, after monitoring equipment installed)	Low	House damage. Insurance claim	High	All equipment installed by research team to be battery operated or use a surge protection device
Car accident (fieldworker)	Low	Fieldworker is unable to attend appointment.	Low (inconvenience)	Fieldworker to contact manager who will contact participant and advise of reschedule
Car breakdown (fieldworker)	Low	Fieldworker is unable to attend appointment.	Low (inconvenience)	Fieldworker to contact manager who will contact participant and advise of reschedule
Difficult participant (disagrees with placement of equipment)	Medium	Equipment may be placed somewhere participants consider unsightly	Medium	Participant information sheet will include info describing the importance of leaving the equipment where it is placed by researchers and of it needing to be in a particular place to match other homes. Research team will avoid placing in a thoroughfare or a place where it is physically inconvenient to participants.

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Difficult participant (interferes with equipment)	Medium	Participant may become irritated by equipment after initially indicating otherwise.	Medium	An 0800 number will be promoted to the participant (sticker on equipment) and they will be encouraged to make contact if they have any concerns whatsoever about the equipment after installation. Participant information sheet will include info describing the importance of leaving the equipment where it is placed by researchers and of it needing to be in a particular place to match other homes. Research team will avoid placing in a thoroughfare or a place where it is physically inconvenient to participants
Participant not home	Medium	This may increase the participant's perception that participating in the research is "stressful"	Medium	Fieldworkers to contact the participant immediately prior to embarking on transport to the installation
Fieldworker late/miscommunication	Medium	This may increase the participant's perception that participating in the	Medium	Fieldworkers to contact the participant immediately prior to embarking on transport to the installation

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			research is "stressful"		
fieldworker becomes unavailable	Medium	Appointment may need to be rescheduled	Low (inconvenience)	Management team to contact participant to explain and reschedule	
Participant becomes unavailable	High	Appointment may need to be rescheduled. household may need to be excluded form research	Low (inconvenience)	Fieldworkers to contact the participant immediately prior to embarking on transport to the installation	
Equipment failures (monitoring devices)	Medium	Longer time to install - need replacement	Low	Ensure spare monitoring devices are kept in the kit in case of failures	
Equipment failures (tablet)	Low	Unable to use tablet - need to fill paper form	Low	Ensure paper copies of survey and house inspection are kept in kit.	
No mobile network services available at house	Medium/high	Unable to monitor house	Low/medium	Issues to be explored during initial hui. Telephone/paper survey may be required.	
Server hack/disruption	Low	Potential breach of private information	High	All data is kept in de identified format	

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Part 2: Fieldworker's impact assessment

Risk	Likelihood	Potential impact on fieldworkers	Impact severity	Mitigation
Covid in community	Medium	Unable to travel and complete install and survey/ Increased risk of Covid infection	Medium	Need to reschedule or wear mask and use hand sanitiser and Covid app as per training (depending on traffic light level and participant preferences)
Electricity failures	Medium	Problem installing equipment	Low/medium	Fieldworker to ask participant who electricity provider is and call faults. Report fault and ask for an estimate of time to repair. If reasonable, coordinate with participant to come back when electricity issue is resolved. Otherwise reschedule another visit
Illness (of fieldworker)	High	Stress if they feel conflicted about what they should do in this circumstance.	Medium	Fieldworker contract and training includes instructions to contact manager in these instances, who can call participant to advise of a reschedule.

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Illness (of fieldworker)	High	Fieldworker needs to reschedule	Low.	Fieldworker contract and training includes instructions to contact manager in these instances, who can call participant to advise of a reschedule.
Illness (of participant)	High	Unable to complete install and survey.	Low/medium	Training to include instructions to reschedule in these circumstances
Flood/Earthquake	Low	Unable to complete install and survey. May be associated with both extreme weather and with electricity failures	Low/medium	Training to include instructions to reschedule in these circumstances. Unable to complete install and survey.
Extreme weather	Medium	Fieldworker may get trapped by localised flooding, blocked roads. Unable to complete install and survey.	Medium/High	Training to include instructions to check weather forecasts relevant to place of install both at appointment booking and immediately prior to setting out to installation appointment. reschedule in these circumstances

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Car accident (fieldworker)	Low	Fieldworker involved in accident.	Medium/High	All fieldworkers to demonstrate evidence of full driver's license. All fieldwork to be undertaken in University fleet cars or rental cars, or other fully legal and insured vehicle approved by Motu. All fieldwork vehicles to be supplied with first aid kit. Training module will cover such instances and manager will be available by phone to assist where necessary. Fieldworker will coordinate with manager before and after each install visit. Manager to contact police in situation where contact is unable to be made with fieldworker at expected time of visit end.
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Car breakdown (fieldworker)	Low	Fieldworker may be unable to attend install or get home after.	Low/medium	All fieldwork to be undertaken in University fleet cars or rental cars, or other fully legal and insured vehicle approved by Motu. All vehicles to have provisions for breakdown services, as per contract with fieldworkers. Training module will cover such instances. All vehicles will be covered with breakdown assistance insurance. Management team will be monitoring fieldworker's schedules to identify quickly if fieldworkers are late to an install or late home after an install.
Difficult participant (disagrees with placement of equipment)	Medium	Fieldworker may need to carefully negotiate to place the equipment in the right place for the study	Medium/Low	Training will include role-playing of these negotiations

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Difficult participant (disrespectful/abusive)	Low	Fieldworker may be treated abusively.	High	Training to include role-playing of potential conflict situations. Training will emphasize the fieldworkers health and safety is primary. Training will include instructions to leave the property immediately upon discomfort or threat, and to immediately call manager to discuss the next steps, most likely to be that the installation is cancelled and another participant recruited. The cancellation will be communicated to the participant by the manager.
Difficult participant (changes mind after installation of equipment)	Low	Participant may contact fieldworker after install and complain/demand collection of equipment.	Medium	Training to include role-playing of such situations. Fieldworkers will be instructed to remain polite, but to pass decision-making and conflict resolution to management team
Difficult participant (interferes with equipment)	Medium	No impact - or possibly requiring another visit to remove equipment	Low	This eventuality will be discussed in training. Fieldworkers will be trained to repeat the information about the 0800 number, verbally, three times during the visit. (At the start and twice more before leaving)

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Participant not home	Medium	Additional time to reschedule	Low	Participant information sheet will include info describing the importance of leaving the equipment where it is placed by researchers and of it needing to be in a particular place to match other homes. Research team will avoid placing in a thoroughfare or a place where it is physically inconvenient to participants.
Fieldworker late/miscommunication	Medium	Additional time to reschedule. Conflict resolution.	Medium	Fieldworkers to contact the participant immediately prior to embarking on transport to the installation
Dogs	High	This may increase the fieldworker's perception that fieldwork is "stressful"	Medium	Training to include discussion of this scenario. Field workers will not be expected to undertake any installations which make them feel unsafe. Participants will be asked about dogs and requested to have them restrained throughout the installation
Participant becomes unavailable	High	Additional time to reschedule.	Low	Research team to expect a certain proportion of people to change their minds or for availability to change throughout the data collection period

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Hazardous environment (participant's property)	Medium	Additional on site risk assessment to be conducted	high	Training to include relevant sections of "Small construction sites – the absolutely essential health and safety toolkit". Fieldworkers will be instructed to place their own health and safety above data collection needs.
Cramped/cluttered environment (participant's house)	High	Increase discomfort, and difficulty of finding appropriate place for equipment	Low	Training to include discussion of this scenario and potential mitigations, e.g. keeping fieldwork kit organised.
Equipment failures (monitoring devices)	Medium	Longer time to install - need replacement	Low	Ensure spare monitoring devices are kept in the kit in case of failures
Equipment failures (tablet)	Low	Unable to complete install	Low/medium	Ensure fieldwork kit includes several paper copies of survey
No mobile network services available at house	Medium/high	Unable to complete install	Low	Ask about service during initial hui.

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Part 3 Research impact assessment

Risk	Likelihood	Potential impact on research	Impact severity	Mitigation
Covid in community	Medium	Potential for losing time during critical period for installation of equipment	High	Each Fieldworker to have sufficient equipment (masks, hand sanitiser, covid app poster) for Covid-19 protocols to be observed at all times. No fieldwork will be conducted levels 3 or 4. Will need to enact protection clause in EECA contract and revise schedule/outputs
Electricity failures	Medium	Equipment may need rebooting. This may be possible from distance, but may need a phone call to participant asking them to switch off and back on at outlet.	Medium	We will recruit an iwi liaison for each participating iwi group, who will be trained in the handling and of any equipment used at their community site.
Illness (of fieldworker)	High	Potential for extra cost due to increased fieldworker hours	Low/Medium	include sufficient contingency budget
Illness (of fieldworker)	High	Potential for negative publicity, complaint to (ethics body?). Potential for extra cost due to increased fieldworker hours	High	Fieldworkers contract and training to include instructions to avoid any installations while suffering illness. They should contact manager as early as possible. Include sufficient contingency budget
Illness (of fieldworker)	High	Potential for extra cost due to increased fieldworker hours	Low/medium	include sufficient contingency budget

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Illness (of participant)	High	Potential for extra cost due to increased fieldworker hours	Low/medium	include sufficient contingency budget
Fire (electrical fault, after monitoring equipment installed)	Low	Potential for extra cost due need to recruit replacement participants and purchase replacement equipment. Potential for negative publicity, or insurance claims made against Motu.	High	Training to emphasis the importance of using the surge protection device in between monitoring equipment and electrical outlet. Participants will be encouraged to contact Motu management team (via 0800 number) if they have any concerns about the monitoring devices
Fire (other)	Low	May need to recruit another participant and possibly more/ different control households	Low	include sufficient contingency budget
Flood/Earthquake	Low	May need to recruit another participant and possibly more/ different control households	Low	include sufficient contingency budget
Extreme weather	Medium	Potential for extra cost due to increased fieldworker hours. If fieldworker is injured replacement may be needed, increasing costs and time. Potential for need to help fieldworker to deal with circumstances related to the specific scenario.	Low/Medium	Management team to expect to take a lead role in crisis management in any scenario for fieldworker where unexpected events are involved. Ensure management team are available and aware of fieldworker's schedules. Get fieldworkers to check in after each install so that if they are missing or uncontactable, emergency services can be alerted at the earliest opportunity

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Car accident (fieldworker)	Low	Potential for extra cost due to increased fieldworker hours. If fieldworker is injured replacement may be needed, increasing costs and time.	Medium/High	Management team to expect to take a lead role in crisis management in any scenario for fieldworker where unexpected events are involved. Ensure management team are available and aware of fieldworker's schedules. Get fieldworkers to check in after each install so that if they are missing or uncontactable, emergency services can be alerted at the earliest opportunity
Car breakdown (fieldworker)	Low	Potential for extra cost due to increased fieldworker hours	Low/Medium	include sufficient contingency budget
Difficult participant (disagrees with placement of equipment)	Medium	Potential for data not comparable across houses	Medium	Training will include role-playing of these negotiations
Difficult participant (disrespectful/abusive)	Low	Potential for extra cost due to increased fieldworker hours	Low/medium	include sufficient contingency budget
Difficult participant (changes mind after installation of equipment)	Low	Potential for extra cost due to increased fieldworker hours	Low	include sufficient contingency budget
Difficult participant (interferes with equipment)	Medium	data collection may be less reliable.	Medium	The decision to exclude household from the research will be made sooner rather than later, after a polite and respectful attempt to resolve the issue

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Participant not home	Medium	Potential for extra cost due to increased fieldworker hours	Low	include sufficient contingency budget.
Fieldworker late/miscommunication	Medium	Potential for extra cost due to increased fieldworker hours	Low	include sufficient contingency budget.
Dogs	High	None	NA	Dogs are asked about during recruitment and this information is reported to fieldworkers
fieldworker becomes unavailable	Medium	Potential for extra cost due to increased fieldworker hours, lost time and training new installers	Medium/high	Each region to train at least two fieldworkers so there is some backup available. Include sufficient contingency in budget
Participant becomes unavailable	High	Potential for extra cost due to increased fieldworker hours	Low	include sufficient contingency budget.
Hazardous environment (participant's property)	Medium	Potential for extra cost due to increased fieldworker hours	Low	include sufficient contingency budget.
Cramped/cluttered environment (participant's house)	High	May lead to participant changing mind or interfering with equipment (see "Difficult participant")	Low	Management team to monitor data collection remotely. Contact participant by telephone if concerns arise about data quality
Equipment failures (monitoring devices)	Medium	negligible if mitigations are followed as described	Low	Ensure spare monitoring devices are kept in the kit in case of failures

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Equipment failures (tablet)	Low	Increased workload due to need to conduct data entry of paper surveys	Low/medium	replace tablet ASAP
No mobile network services available at house	Medium/high	Potential for extra cost due to increased fieldworker hours	Low	Ask about service during recruitment phone call
Server hack/disruption	Low	Potential for negative publicity, complaint to (ethics body?). Potential for loss of data.	High	Ensure all servers where data is stored are protected and secure. Each piece of monitoring equipment is routed to a different server, then joined at Motu server, thus minimizing the risk of loss of all data.

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I have included below the participant information sheet and consent form. (please tick) ✓

I have created one document that includes this application form, the information sheets and consent forms and any questionnaires, topics guides, letters of access, and all other documentation related to the project. Please submit one document only. ✓

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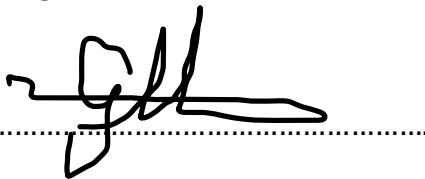
INDEMNITY CLAUSE

1. The NZ Ethics Committee provides independent ethics review for non-health, non-tertiary research occurring in New Zealand. Its role is to safeguard the rights, health and wellbeing of consumers and research participants and, in particular, any persons with diminished autonomy.
2. While it reviews research from an ethical point of view, the NZ Ethics Committee does not guarantee the success or otherwise of the proposed research, nor does it assume responsibility for any legal liability that might be incurred by the researcher in the course of carrying out the research.
3. The researcher agrees to indemnify the NZ Ethics Committee against any action against the Committee by a third party as the result of the research. The researcher would be well advised to investigate and secure appropriate indemnity insurance as this will not be carried by the NZ Ethics Committee.

By signing this, I agree to indemnify the New Zealand Ethics committee against any action against the Committee by a third party as the result of the research.

Printed Name: Greg Martin

Signature:

A handwritten signature in black ink, appearing to be 'G. Martin', written over a horizontal dotted line.

Date: 15/03/2022