

Low Income Incentive Package: Research & Investigation

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Bay of Plenty Regional Council**

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Executive Summary

This research is directed to assisting the Bay of Plenty Regional Council (the Council) establish the options and costs of packages that would incentivise low-income households to substitute non-compliant heating with clean heat appliances.

The research has involved the collection and analysis of both quantitative and qualitative data and included: surveying 252 Community Service Card (CSC) eligible households in the Rotorua airshed, estimating the number and characteristics of CSC households living in dwellings with non-compliant heating; reviewing the performance and affordability of clean heat appliances and the fuel poverty status of CSC households; focus groups with over thirty dwelling owners and nineteen interviews with various key stakeholders. CSC eligibility is an accepted measure of households requiring additional assistance because of income-related deficits.

CSC Households with Non-Compliant Heating

This research suggests that:

- The number of CSC households in the Rotorua Airshed using non-compliant heating appliances ranges between 2,500 and 3,500 households and is likely to be around 3,400 households.
- Almost half the participants with non-compliant heating appliances in the CSC Household Clean Heat Survey were found in couple and child(ren) households.
- CSC households with non-compliant heating in the Rotorua Airshed are predominantly very low income. They include both owner occupiers and tenants. Over half (53.7 percent) are likely to have incomes less than \$25,000 annually.

CSC Households with Non-Compliant Heating: Heating Use and Preferences

This research reinforces previous research that shows CSC households primarily use and prefer woodburners. It also shows that:

- 74.2 percent of CSC householders surveyed use their main heating appliance as a whole house heater.
- Woodburners are preferred because they are seen as:
 - Effective heaters for whole house heating.
 - Affordable.
 - Multi-functional (potential for hot water heating and occasional cooking) and resilient in the face of grid failures.
- Heat pumps were preferred by some CSC householders who saw them as safe and convenient. CSC householders that did not prefer heat pumps saw them as vulnerable to corrosion and/or difficult to whole house heat and/or exposing them to potentially higher electricity costs than their current heating arrangements.
- In the low end of the rental market, premium prices were associated with the provision of wood burners and/or heat pumps.

Views on Clean Heat Appliances

Most CSC householders (73.6 percent) agree that clean heat appliances will contribute to a reduction in Rotorua air pollution. There is a strong view that clean heat conversion to low emission woodburners is desirable but should be accompanied by programmes to increase the supply of dry fire wood.

The prospect of reducing air pollution is *least* likely to motivate householders to improve their heating appliance. Clean heat appliances are less likely to be seen as a way of achieving what CSC householders value most – cost, health and comfort benefits.

43.4 percent of CSC households see clean heat conversions as being *very likely* to deliver reductions in air pollution, but in relation to:

- **Lowering heating costs** only 18.1 percent of CSC householders with non-compliant heating see clean heat conversion as *very likely* to deliver;
- **Increasing warmth and comfort in living areas** only 28.9 percent of CSC householders with non-compliant heating see clean heat conversion as *very likely* to deliver;
- **Making the home healthier**, 31.7 percent of CSC householders with non-compliant heating see clean heat conversion as *very likely* to deliver;
- **Reducing mould and damp**, only 24.9 percent of CSC householders with non-compliant heating see clean heat conversion as *very likely* to deliver;
- **Heating areas outside the living areas such as bedrooms**, 31.7 percent of CSC householders with non-compliant heating see clean heat conversion as *very likely* to deliver.

Willingness and Ability to Adopt Clean Heat

Between 10 and 17 percent of CSC households are adamantly opposed to adopting clean heat appliances. Around 80-90 percent of CSC householders are willing to consider clean heat appliances but express strong concerns around affordability and value for money as follows:

- Many households see the Hot Swap Loan as affordable, particularly where repayment can be aligned with weekly or fortnightly income cycles.
- Some households that see the Hot Swap Loan as affordable do not see clean heat conversion as affordable. This is because of costs they believe to be excluded from loan coverage. This was particularly the case with:
 - Households with wetbacks attached to non-compliant heaters
 - Households that require additional work to decommission non-compliant heaters beyond the current guidelines including such items as: additional patching, extended flues, and hearths.
- The majority of surveyed CSC householders saw Hot Swap Loans as manageable, particularly if they are able to make weekly or fortnightly payments.
- Analysis of affordability using fuel poverty measures and energy consumption data suggests that some CSC households are unable to meet the loan repayment costs. The households that have severe affordability problems fall into two categories:
 - Very low income CSC households.
 - CSC households confronting extraordinary costs, in particular those exposed to compulsory rates or payments associated with the Lakes Communities Sewerage Scheme programme such as at Hinemoa Point.
- All CSC householders are concerned with the relative value for money of different clean heat appliances and often feel at a loss to make a credible assessment.
- CSC householders are concerned that the life a clean heat appliance may not extend beyond the period of a Hot Swap Loan.
- There is considerable anxiety among householders around the costs of decommissioning where they have not sought a Hot Swap Loan or, as in the case of wetbacks, replacement of a non-compliant heater with a different heating appliance still leaves decommissioning costs.
- There is considerable anxiety about converting to clean heat without dealing with insulation.

Affordability and Value for Money

The Hot Swap Loan programme's affordability has been assessed in two ways:

- Firstly, through the subjective assessment of its affordability by surveyed CSC households; and
- Secondly, by assessing the ratio of outgoings to income given patterns of low income household electricity consumption found in the Household Energy End-Use Project (HEEP) and using internationally accepted fuel poverty standards.

The majority of CSC owner occupiers found \$10.20 repayments weekly either very affordable or manageable.

CSC Owner Occupier Household Assessment of Affordability of \$10.20 Weekly Payment (CSC Household Clean Heat Survey 2011)

Affordability Assessment \$10.20 weekly	CSC Households	% CSC Households
Not Affordable At all	16	8.8
Hard to Manage	24	13.2
Manageable	83	45.6
Very Affordable	59	32.4
Total	182	100

Our assessment of loan affordability among CSC householders is that householders on annual incomes of \$25,000 will find a loan unaffordable and those between \$25,000 and \$40,000 household income will struggle.

The Fuel Poverty Status of CSC Households and Affordability of Clean Heat Loan Repayments.

Household Annual Income	Vulnerable to Fuel Poverty with Ordinary Energy Costs	Vulnerable to Fuel Poverty Servicing \$2,000 Loan or More	Vulnerable to Fuel Poverty by Servicing \$3,000 Loan or More	Vulnerable to Fuel Poverty by Servicing \$4,000 Loan or More	Servicing Clean Heat Loan Affordable
\$25,000 or less					
\$25,001-\$40,000					
\$40,001 or more					

Many households are concerned with the value for money of different clean heat appliances and the comparative information about appliance payback periods and operating costs. Most CSC householders do not consider gas clean heat appliances as providing value for money. Woodburners are preferred, and heat pumps while seen as convenient, are seen by those that currently use woodburners as having the potential to raise their electricity costs significantly.¹

¹ The confusion around the relative operating costs and value for money of clean heat appliances is partly due to a number of factors which are discussed in Section 7 of this report.

Options around Rental Housing

Previous surveying of landlords found that around 49 percent of landlords of dwellings with non-compliant heating would be prepared to undertake clean heat conversion with a loan mechanism similar to that now being delivered by the Council. The data collected in this research are consistent with that finding.

Current rental market over supply presents both risks and opportunities for clean heat conversion among landlords. The risks are:

- Landlords may postpone expenditure and dwelling improvements including clean heat conversion.
- Any widespread failure of heat pumps (which are landlords preferred option) prior to the end of the loan period and after any warranty period may also suppress landlord take-up.

The opportunity for increasing clean heat conversions lies in the competitive advantage that it may give landlords who can provide improved amenities to their tenants.

- Tenants are more likely to stay in tenancies if clean heat conversions involve either the installation of woodburners or heat pumps.
- Over half (58.5 percent) of tenants participating in the CSC Household Clean Heat Survey were willing to encourage their landlord to take up clean heat conversion knowing that the Council loan facility was available to landlords.
- Tenants value warm homes.

The key to maximising clean heat conversion take-up among landlords appears to reside in taking up the following options:

- | | |
|-----------|---|
| Option 1: | Direct promotion of clean heat conversion to landlords with a particular emphasis on their ability to attract and retain tenants. |
| Option 2: | Active promotion of the Council's clean heat loans with local property managers, particularly those who manage properties owned by landlords living outside the region. |
| Option 3: | Promote knowledge of the clean heat conversion loans among tenants. This will allow sitting tenants to actively promote conversion with their landlords and prospective tenants to select clean heat dwellings. |
| Option 4: | Encourage the development and implementation of a clean air accreditation scheme for landlords. |

These options are not mutually exclusive. Options 1-3 should be developed as an integrated communication and engagement package. Option 4 will require feasibility review and specification. This should include discussion with property managers and local landlords on how the industry could be involved in developing and implementing such a scheme. The risks and benefits of each option are presented in the Table below. All these are consistent with the Rotorua Air Quality Action Plan.

Benefits and Disadvantages of Suggested Options for Encouraging Clean Heat Conversions in Rental Dwellings

Options	Benefits	Disadvantages
Option 1: Direct promotion of clean heat conversion to landlords with a particular emphasis on their ability to attract and retain tenants	Builds on current clean heat activities with landlords and may be accommodated with current budget allocations. Likely to increase take-up.	Requires intensification of interaction with landlords using face-to-face techniques. May impact on resource allocations and is demanding of public engagement and interaction skills.
Option 2: Active promotion of the Council's clean heat loans with local property managers, particularly those who manage properties owned by landlords living outside the region	Builds on current clean heat activities and may be accommodated with current budget allocations. Likely to increase take-up among landlords (especially those out of town) by assisting property managers to develop a clean heat take-up value case for landlords.	Requires intensification of interaction with landlords using face-to-face techniques. May impact on resource allocations and is demanding of public engagement and interaction skills.
Option 3: Promote knowledge of the clean heat conversion loans among tenants. This will allow sitting tenants to actively promote conversion with their landlords and prospective tenants to select clean heat dwellings	A new activity likely to broaden community awareness of both the value of clean heat and the Hot Swap Loan, particularly among low income households that tend to be less engaged by household directed social marketing. Increases the ability of tenants to make clean air friendly tenancy choices and will contribute to landlord take-up by generating market demand in the low rent segment of the market.	Because this would be a new and very specifically targeted set of promotional activities (including direct engagement with tenants and the community organizations and agencies that tenants relate to, and promotional material) this may require some reallocation of current resources within the current communications budgets.
Option 4: Encourage the development and implementation of a clean air accreditation scheme for landlords	Provides compliant landlords with the ability to demonstrate their compliance to tenants. Reinforces Council's leadership without requiring further regulatory interventions.	New activity that will generate new skill demands around engagement with the industry. There could be risks around liability which will need to be managed. This may be best achieved by encouraging the industry to develop and promulgate an appropriate scheme.

Options around CSC Owner Occupiers

CSC householders are confronted with a continuous need to assess the affordability and prioritise their expenditure and consumption choices. This research has found that CSC owner occupiers in the Rotorua Airshed living in dwellings with non-compliant heating can be broadly divided into three segments. Those are:

- **Refusers**
Owner occupiers who are committed to retaining their current heating appliance. The CSC Clean Heat Survey suggests that of the around 2,800 CSC owner occupiers in the Rotorua Airshed with non-compliant heating, around 280 fall into this segment.
- **Strugglers**
Owner occupiers who are willing to consider a clean heat conversion but are already on the margins of fuel poverty. This segment is constituted by households with incomes less than \$25,000 annually and without financial reserves. Some CSC householders with incomes between \$25,000 and \$40,000 may also have difficulties with purchase and/or repayment costs where they have extraordinary expenditure. It is estimated that this segment includes between 1,300 and 1,500 households who will struggle to meet the repayment costs of the Council's lending package.
- **Cautious Adopters**
Owner occupiers who are willing to consider a clean heat conversion but are worried about affordability, value for money and preserving amenity. This segment is constituted by CSC households whose economic situation demands careful assessment of priorities. They can sustain loan repayments but may be less able to sustain the costs of exclusions from the loan package and are concerned that clean heat conversion will not undermine their amenities or expose them to increased operating costs. It is estimated that this segment includes between 1,000 and 1,220 households.

The Council has the option of attempting to move all three of these segments toward clean heat conversions. It is likely to be more productive, however, to focus its attention on the *Struggler* and *Cautious Adopter* segments. A series of options emerge from the research that will address the needs of these two segments of CSC households. Those are:

- **Options targeted at the Strugglers:**
 - Option A: Waive loan repayments for extremely low income CSC households eligible and receiving central government Rate Rebate.
 - Option B: Waive loan repayments for CSC households within the Rotorua Airshed simultaneously exposed to ratepayer contributions to the Rotorua Lakeside Communities Sewerage Scheme Programme.
 - Option C: Institute a discretionary decommissioning grant to assist extremely low income CSC households to decommission non-compliant heaters when no replacement is sought through a Hot Swap Loan.
 - Option D: Provide a decommissioning grant for all extremely low income CSC households for decommissioning wetbacks where replacement clean heat appliance does not include a wetback.
- **Options assisting both Cautious Adopters and Strugglers**
 - Option E: Extend allowable items for Hot Swap Loans to include within the maximum insulation and/or dry wood storage contingent on satisfactory conversion to an improved clean heat appliance.

- **Options targeted at increasing programme credibility and effective communication with CSC householders.**

- Option F: Intensify dry wood promotion by extending the period of public information around dry wood supply.
- Option G: Develop targeted population and community based communications strategies that directly engage community networks to disseminate information and assist CSC householders to apply and manage the clean heat conversion process.

These are not mutually exclusive. It is suggested that work on developing responses to these options is undertaken as an integrated package to reduce inconsistency and optimise decision-making and the effectiveness of implementation. The risks and benefits of each option are briefly summarised in the Table below. All respond to the Rotorua Air Quality Action Plan.

Benefits and Disadvantages of Suggested Options for Encouraging Clean Heat Conversions in CSC Households

Options	Benefits	Disadvantages
Option A: Waive loan repayments for extremely low income CSC households eligible and receiving central government Rate Rebate.	Addresses barriers to take up among very low income households below \$25,000 annual household income. Offsets increase in subsidy cost through optimizing ratepayers access to existing central government subsidy.	May have a marginal fiscal impact depending on the extent to which the rates rebate meets the costs of clean heat conversion. Additional, minor policy work required to amend current programme. Additional work to promote awareness of the change and encourage very low income households to apply for the Rate Rebate Scheme.
Option B: Waive loan repayments for CSC households within the Rotorua Airshed simultaneously exposed to ratepayer contributions to the Rotorua Lakeside Communities Sewerage Scheme Programme.	Addresses barriers to take up among very low income households and those facing very high rating costs due to imposed targeted rates. A very small number of households means fiscal risk is limited – around 60 households. Eligibility easily specified and strong promotional opportunities.	Will have a fiscal impact. Additional, minor policy work required to amend current programme. Additional promotion work required to promulgate changes. Additional operational processes in reviewing and approving applications.
Option C: Institute a discretionary decommissioning grant to assist extremely low income CSC households to decommission non-compliant heaters when no replacement is sought through a Hot Swap Loan.	Addresses a particular barrier to take-up among low income households. Extends current programme but in a targeted manner which can be robustly specified.	Fiscal implications, the size of which will need to be assessed, before any changes are made. Required to amend current programme. Additional promotion work required to promulgate changes. Additional operational processes in reviewing and approving applications.

Option D: Provide a decommissioning grant for all extremely low income CSC households for decommissioning wetbacks where replacement clean heat appliance does not include a wetback.	Addresses a particular barrier to take-up among low income households. Extends current programme but in a targeted manner which can be robustly specified.	Fiscal implications, the size of which will need to be assessed, if any changes are made. Required to amend current programme. Additional promotion work required to promulgate changes. Additional operational processes in reviewing and approving applications.
Option E: Extend allowable items for Hot Swap Loans to include within the maximum insulation and/or dry wood storage contingent on satisfactory conversion to an improved clean heat appliance.	Addresses a particular barrier to take-up among low income households. Provides opportunities to make alliances with funders and programmes directed at insulation but would provide access to households with non-compliant heating. Assistance remains within current loan limits.	Policy work required to amend current programme. Additional promotion work required to promulgate changes. Additional operational processes in reviewing and approving applications.
Option F: Intensify dry wood promotion by extending period of public information around dry wood suppliers.	Builds on current activities and will reinforce both suppliers' incentives to provide dry wood over a longer period and assist consumers to pre-plan and ensure access to dry wood. Improve the credibility of Council and address skepticism among some low income households committed to woodburners about the value of upgrading their appliances. Uses a market mechanism to stimulate change.	Extension of the current programme is likely to have some costs.
Option G: Develop targeted population and community based communications strategies that directly engage community networks to disseminate information and assist CSC householders to apply and manage the clean heat conversion process.	Increase low income household awareness and trust by working with groups with whom they are already dealing. Likely to increase take-up by more effectively engaging with the diversity of low income households who are likely to have limited response to consumer oriented social marketing techniques. Raising community agency awareness and involvement.	Resourcing for scoping and developing communications and engagement strategy required.

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1 Introduction

- 1.1 The Bay of Plenty Regional Council (the Council) wants to establish the options and costs of packages that would incentivise low-income households to substitute non-compliant heating with clean heat appliances. The goal of those packages is to increase the take-up of clean-heat conversions among low income households and, thereby, reduce fine particulates in the Rotorua Urban Airshed within the limits of the National Environmental Standards for Air Quality for fine particulates.
- 1.2 The Council has already instituted a clean-heat package in response to the Rotorua Air Quality Action Plan. The Council encourages clean heat conversions through interest free loans. The Council recognises, however, that some low income households may not be able to access the current range of assistance. This report presents the findings of research designed to enable the Council to better understand:
- The quantum of dwellings with low income owners or occupiers who are unlikely to convert to clean heating because of affordability or other barriers.
 - How the Council can increase the ability for low-income households to take-up clean heat conversions;
 - How the number of conversions among low income households can be maximised by expanding the pool of funding available from sources beyond the Council; and
 - How the use of Council funding may be optimised.
- 1.3 The report is structured as follows:
- Section 2 provides a brief overview of the Clean Heat programme designed to encourage conversion to clean heat appliances in the Rotorua airshed.
 - Section 3 sets out the scope of this project and details the research and investigation methodology.
 - Section 4 sets out estimates of the numbers of CSC households living in dwellings with non-compliant heating in the Rotorua Airshed.
 - Section 5 presents the data related to CSC households' current heating and preferences.
 - Section 6 comments on CSC householders' perceptions of the benefits associated with upgrading to clean heat appliances and the value they place on those benefits.
 - Section 7 analyses the issue of affordability.
 - Section 8 provides a summary and overview of the issues and approaches around incentivising CSC clean heat.
 - Section 9 sets out some options for addressing some of the issues around CSC households and clean heat conversions.
- 1.4 It should be noted that the scope of this research is limited to focusing on optimising clean heat take up among low income households. It is not an evaluation of the current programme delivery, its outcomes or the policy logic that underpins the Council's air quality strategy or the actions related to domestic fires. It should also be noted that over the period of and subsequent to this research, Council officials have been reviewing various operational matters which address some issues raised in the course of this research.

2 Clean Heat Appliance Conversion – Incentive Loan Package

- 2.1 The Bay of Plenty Regional Council incentive loan package is part of the Rotorua Air Quality Action Plan. The Hot Swap Loan package is targeted to reducing and restricting domestic emissions, through providing home owners and landlords with help to change to a clean heating appliance. The main causes of domestic emissions in the Rotorua area have been identified as inefficient solid fuel burning appliances, i.e. open fires, coal fires and old wood burners (generally pre-2005).
- 2.2 The incentive loan package is intended to assist homeowners and landlords comply with the Air Quality Control Bylaw adopted in 2010. This bylaw requires:
- From 1 December 2010, home owners can only install an approved wood burner or pellet fire. Open fires and multi-fuel burners and cookers cannot be installed.
 - From 1 May 2012 properties in the Rotorua Airshed cannot be sold with non-compliant solid fuel burners. These need to be de-commissioned.
 - From 1 May 2015 indoor open fires cannot be used.
- 2.3 The incentive loan package was introduced in September 2010. It consists of:
- A heating package, including assessment, appliance purchase, installation, removal of old appliance and building permit. The value of the package is up to \$4,000 (excluding GST). Any costs over that amount must be paid by the householder directly to the service provider.
 - An interest free loan paid back over 10 years through a targeted rate on the property.
- This package was developed through market research to find out how people were currently heating their homes, and the barriers and incentives to change.
- 2.4 Home owners, either owner occupiers or as landlords, are eligible for Hot Swap Loans. However, they need to:
- Live in the Rotorua Airshed.
 - Be the ratepayer for the property.
 - Have rate payments up to date.
 - Have a non-compliant wood burner or open fire in the main living area.
 - Agree to have the non-compliant wood burner or open fire de-commissioned or removed.
- 2.5 Service providers to supply and install the clean heat appliances were selected through a tender process. Eight providers were selected. Those providers undertake a home heating assessment to identify the most appropriate appliance for the household situation and budget. The service providers generally also assess if the enquirer is eligible for the package, and fills in the application for the package. Once the package is approved by the regional council, the provider installs the new appliance and removes the old appliance.
- 2.6 A market campaign – “Rotorua Hot Swap” – has promoted the incentive package. The campaign has been run through:
- Press advertisements and public notices in the Daily Post and local free newspapers.
 - Radio advertising.
 - Local television.

- Networking with property managers.
 - Poster displays in bus shelters, dairies, local buses and installer show rooms.
 - Presentations at home shows.
- 2.7 Residents who are interested in the package and want to find out more can call a free phone number or go to the website www.hotswap.co.nz. On the website residents can contact the approved service providers for more information and a quote. At 29 March 2011 the programme had generated 332 Hot Swap Loan approvals.

3 Finding Out About Clean Heat and Low Income Households

- 3.1 This project has used a variety of research methods to identify the incentives for and barriers to clean heat conversion by low incomes households. The key methods are:
- Modelling the number and distribution of dwellings with low income households or owners with non-compliant heating.
 - Implementation of a heating preferences and willingness to pay survey of a random sample of CSC householders in the Rotorua airshed which includes both owner occupiers and tenants.
 - Focus groups with householders, supplemented by some interviews.
 - Focus groups and interviews with landlords and key organisational stakeholders.
 - Analysis of appliance affordability and loan affordability using survey, income, energy consumption data, and appliance costs and performance data.

3.1 The Numbers of Low Income Dwellings with Non-compliant Heating

- 3.2 Developing incentives for low income households to take-up clean heat conversions requires an understanding of CSC owners and occupiers in dwellings with non-compliant heating. It also requires an understanding of the household income distribution across CSC households. As Table 3.1 shows, the incomes of CSC eligible households can vary significantly depending on household composition and family size.

Table 3.1: CSC Eligibility Income Limits 2010

Household Composition and Family Size	Income Limit
Single Sharing Accommodation	\$23,576
Single Living Alone	\$24,995
Married, civil union or de facto couple no dependents	\$37,336
2-person Family – 1 adult, 1 child	\$45,078
3-person Family	\$54,589
4-person Family	\$62,154
5-person Family	\$69,563
6-person Family	\$77,843
Family of 7 or more	\$77,843 + \$7,295 each person after 1 st six

- 3.3 The diversity of incomes among CSC households means that the affordability of clean heat conversion varies considerably among low income households as determined by the CSC. Understanding the distribution of incomes among CSC households is important to understanding the range of clean-heat packages affordable to CSC households.

- 3.4 Precise determination of the number and income profile of CSC households with non-compliant heaters requires an up-to-date relational dataset. That is, a dataset which contains each Rotorua household and directly matched data relating to: household composition, family size, income, dwelling tenure, and type and compliance of dwelling heating.
- 3.5 No such data exists. Consequently, estimates have been developed by:
- Firstly modelling the number of CSC households, their incomes and dwelling tenure in the area using matched household composition data and income data from the 2006 census.
 - Secondly, using data relating to the pattern of home heating methods and fuels to estimate the numbers of dwellings accommodating non-compliant heating among those population groups.
- 3.6 The latter has been done by:
- i. Applying of the proportions of potentially compliant and non-compliant heating in New Zealand households nationally as indicated by national census data.
 - ii. Applying data generated by previous surveying around the relative proportions of owner occupied households in the Rotorua Airshed with compliant and non-compliant heating appliances.
 - iii. Generating an estimate based on the screening process undertaken to implement the Survey of CSC owner occupier and tenant households with non-compliant heating in the Rotorua Airshed. That survey was implemented in January 2011 as part of this research.

3.2 CSC Household Clean Heat Survey

- 3.7 The survey consisted of telephone interviews with 252 Community Services Card (CSC) eligible households with a non-compliant heating appliance used to heat their home living within the Rotorua Urban Airshed. The survey was designed to take about 10-12 minutes using a structured close-ended questionnaire. A copy of the questionnaire is presented in Annex A. Respondents were asked to respond to up to 22 core questions relating to their:
- Current housing situation including tenure status, duration of occupation, intention to move, renovations or retrofit undertaken in the two years pre-interview or planned for the two years post-interview.
 - Home heating type and heating practices.
 - Attitudes and priorities around willingness to change to a new heating system, and
 - Views on affordability of changing to a new heating system.
- 3.8 The sample frame was designed to target non-compliant CSC households in the Rotorua Urban Airshed. A list of meshblocks comprising the Rotorua Urban Airshed, provided by the Bay of Plenty Regional Council, were used to request a set of random telephone numbers for dwellings within the Airshed. Screening questions were then used to identify whether the household was both CSC eligible and currently using a non-compliant heat source (either an open fire or a pre-2005 woodburner).

- 3.9 Surveying began 19 January 2011 and continued through to 27 January 2011. Attempts were made to recruit and complete a minimum of 200 interviews with eligible households over the allocated fieldwork period. As the fieldwork was scheduled for a traditionally difficult time for surveying – coinciding with the summer school holidays – and the screening questions were personal in nature an incentive in the form of entry into a draw to win a \$100 voucher was offered both for respondents who completed the screening questions and who completed the full questionnaire if eligible. At the completion of phone surveying a yield of 252 interviews had been achieved. The margin of error for the survey is around 5.95 percent. A full set of frequencies for the survey is provided in Annex B.

3.3 Focus Groups with Owners of Dwellings with Non-compliant Heating

- 3.10 Six focus groups were proposed as follows:
- Low income owner occupiers with non-compliant heating. Because employment and life stage has a considerable impact on affordability, willingness to pay and perceptions around the value of clean heat, it was intended to run four focus groups among home owners involving:
 - Beneficiary households with children.
 - Working households with children.
 - Working households with no children.
 - Older people's households.
 - Landlords. Two focus groups as follows:
 - Landlords with low income tenants.
 - Landlords who are themselves eligible for CSC.
- 3.11 Owing to the difficult timing of the research over the Christmas and January holiday period and the limited timeframe it was predicted that focus groups and the qualitative component of the research might present problems. Consequently, a flexible approach was taken. This proved particularly necessary because of the adverse weather events that prevented some from attending timetabled focus groups.
- 3.12 As a result, six focus groups were conducted as follows:
- A focus group of very low income, owner occupiers.
 - A focus group of low income tenants.
 - Three focus groups of CSC owner occupiers comprised mostly of employed householders. Those focus groups had participants in various household types ranging from people living alone to couples with children and sole parents with dependent children.
 - One focus group with landlords with CSC eligible tenants.
- 3.13 Where individuals were unable to attend a focus group or preferred to be interviewed this was accommodated. In all, a total of 32 people participated in this component of focus groups and interviews.
- 3.14 Focus groups were facilitated using structured, conversational techniques. Discussion was solutions-oriented seeking views around three aspects of clean heat conversion that could impact on take-up:
- Financial assistance – This explored the relative merits of various payment mechanisms (grants, loans, payment through rates either over time or at point of sale).

- Clean heat appliances – This explored the perceptions of the merits of clean heat low emission wood burners, electrical appliances and heat pumps in relation to: access costs; operating costs; performance and durability.
- Installation and operating – This explored issues around: choice around installer; confidence in installation; service, and fuel access.

3.15 Notes were taken at all focus groups and interviews and have been subject to anonymised, thematic analysis.

3.4 Key Stakeholders

3.16 These focused on the opportunities the Council has to work with other stakeholders to leverage funding and resources necessary to making clean heat a practical option for low incomes households in Rotorua and clean air an achievable outcome for the city. They also focused on exploring the barriers to take-up for low income households.

3.17 Interviews with key stakeholders were structured and facilitated around the following themes:

- The extent to which they see domestic clean heat as an issue for their organisation and their clients.
- Whether current programmes, services or products contribute to achieving clean heat.
- Whether the access of low income households to clean heat conversion is of concern.
- What opportunities they see to develop or extend programmes, services or products that contribute to achieving clean heat conversions among low income households.
- How they see their roles and responsibilities in relation to the Council and other community and industry players.

3.18 Although it was intended that this project would involve up to twelve interviews, nineteen interviews were completed.

3.19 Those included the following groups:

- Property managers.
- Installers and product providers under the Hot Swap Loan.
- Community information and service providers.
- Community funders.
- Key individuals concerned with healthy housing, retrofits, Maori and low income households in Rotorua.

3.5 Finance and Clean Heat Appliance Affordability

3.20 This component focuses on two aspects of clean heat conversions for low income households. Firstly, the financial assistance that supports low income household take-up and, secondly, the appliances that are most suitable for low income households in the context of Rotorua. Both have affordability implications and were carried out through two activities. Those are:

- A review of clean heat programmes throughout New Zealand and the efficacy of their various approaches to increasing low income household take-up of clean heat conversions.

- An analysis of the relative affordability and performance of different clean heat appliances for low income households in relation to: capital costs; operating costs and life cycle cost.

4 CSC Households with Non-compliant Heating

- 4.1 The Council's Clean Heat programme is directed to all households in the Rotorua Airshed that use non-compliant heating appliances. Fundamental to the Council's consideration of options to encourage conversions to clean heat appliances among low income people, is an understanding of the numbers and characteristics of low income occupiers in dwellings with non-compliant heating.
- 4.2 This section presents those household numbers and the approach used to generate those estimates. The section is structured as follows.
- Section 4.1 provides an estimate of the total number of households eligible for Community Service Cards (CSC) in the Rotorua Airshed.
 - Section 4.2 estimates the number of CSC households who are likely to be either completely reliant on potentially non-compliant heating or who use potentially non-compliant heating appliances in combination with other heating appliances.
 - Section 4.3 sets out the household composition profile of CSC households that live in dwellings with compliant and non-compliant heating appliances respectively.
 - Section 4.4 sets out the income profile of CSC households that live in dwellings with compliant and non-compliant heating appliances respectively.

4.1 CSC Households in the Rotorua Airshed

- 4.3 CSC eligibility is an accepted measure of households requiring additional assistance because of income-related deficits. The levels of income associated with CSC eligibility are set by central government and take account of household composition and the number of dependents within a household.
- 4.4 While the proportion of CSC eligible households fluctuate in any population, and is likely to have increased recently because of the current recession, it is still most appropriate to estimate the numbers of CSC households using the 2006 census. The 2006 census provides the most robust data around household incomes and composition in the Rotorua Airshed.
- 4.5 Applying the CSC income limits of that period to 2006 census data suggests that around 6,924 households in the Rotorua Airshed are CSC eligible. Not all those households have non-compliant heating appliances in their living area.

4.2 CSC Households with Non-compliant Heating

4.6 Three approaches have been used to estimate the number of those CSC households that are likely to be living in dwellings with non-compliant heating appliances. Those are:

- Application of the proportions indicated by national census data of compliant and potentially non-compliant heating devices.
- An estimate based on previous surveying undertaken by McDermott Miller around the relative proportions of owner occupied households in the Rotorua Airshed with compliant and non-compliant heating appliances.
- An estimate based on the screening process undertaken to implement the Survey of CSC owner occupier and tenant households with non-compliant heating in the Rotorua Airshed. That survey was implemented in January 2011 as part of this research.

4.7 The estimates generated by each approach are set out in Table 4.1.

Table 4.1: CSC, Non-compliant Heater Households in Rotorua Airshed by Estimate Approach

Approach to Estimate	CSC Households with Non-compliant Heaters
National pattern of heater compliance – 2006 Census	2,634
McDermott Miller Owner Occupier Non-compliance – 2010 survey	3,517
CSC Household Clean Heat Screening data – 2011 survey	3,406

4.8 The estimate using the McDermott Miller data is likely to be somewhat high for two reasons:

- Firstly, the sample size for CSC households is relatively small (128 CSC households compared to 806 CSC households screened for the CSC Household Clean Heat Survey).
- Secondly, the McDermott Miller sample was restricted to owner occupiers. The screening process for the CSC Household Clean Heat Survey and the McDermott Miller landlord data both indicate that owner occupiers are more likely to have non-compliant heating appliances in their dwellings than tenants.

4.9 By contrast, the national data related to heating appliances probably simultaneously under- and over- estimates non-compliant heating appliances in Rotorua. The risk of under estimation arises out of the national census data including warmer areas in New Zealand. Those warmer areas are less likely to have dwellings with potentially non-compliant heating appliances such as woodburners and open fires.

4.10 The risk of over-estimation arises out of the limitations of census data. The census collects data about heating appliances but does not collect data around the clean air compliance or non compliance of those heating appliances. McDermott Miller's survey data on compliant and non-compliant heating in the Rotorua airshed suggests that around 90 percent of dwellings using wood or solid fuel are non-compliant in Rotorua. The census estimate of non-compliant CSC dwellings has been scaled down accordingly, but the effect of excluding tenants from the McDermott Miller Survey may still generate a slight over-estimation.

4.11 Overall, we conclude that the number of CSC households in the Rotorua Airshed using non-compliant heating appliances ranges between 2,500 and 3,500 households and is likely to be around 3,400 households.

- 4.12 Of those 3,400 households around 2,800 can be expected to be owner occupiers and the remainder in private rental dwellings.

4.3 Rental Dwellings, CSC Households and Non-compliant Heating

- 4.13 The number of dwellings in the private rental stock with non-compliant heating in the Rotorua airshed is difficult to establish with any preciseness. This is, in part, because while the most accurate tenure data is found in the New Zealand census there is considerable churn of stock between rented and owner occupied stock.² That is, stock can be owner occupied one year and being offered on the rental market the next year. In addition, where house prices increase rapidly relative to incomes there can also be a significant expansion of the rental market. Of course where house prices fall there may also be new opportunities for home ownership. Those dynamics are further complicated by two other factors. Firstly, the demography of home ownership. Secondly, the profile of Rotorua house prices compared to house prices in other provincial towns and main urban areas.
- 4.14 With regard to the demography of homeownership, it should be noted that populations with higher proportions of younger householders are more likely to have higher proportions of households in rental accommodation. Access to home ownership has decreased significantly over the last decade.³ That trend is most pronounced in main urban areas but is, nevertheless, evident in other regions. The higher level of home ownership among older people means that while most older people in retirement are low income households, they also tend to own their own homes. This contrasts with younger households where the lower the household income the higher the likelihood that the household will be in rental accommodation.
- 4.15 The second dynamic that impacts on tenure profile is the impact of Rotorua's house prices. Relative to other regions Rotorua has lower house prices than urban centres in both the Waikato and Auckland. Regional differences in house prices can stimulate inter-regional population movement. Some households may choose to move to lower house price regions to enable them to enter home ownership.
- 4.16 More obvious, however, is the tendency for property investors to seek rental properties in lower priced regions which provide relatively positive rates of return on investment. There appears to be evidence of this in Rotorua with a number of stakeholders commenting on both Australian and Auckland property investors being active in Rotorua. The datasets that would provide up to date information on these landlords are rating data, property valuation data and Department of Building and Housing tenancy bond data. Each of these datasets have their own limitations and would require considerable analysis to establish fine-grained detail about the dwellings in rental tenure in the Airshed. This might be a worthwhile exercise if the Council chooses to tailor very specific clean heat promotions with those landlords.
- 4.17 For the purpose of this report, only a broad estimate of dwellings is required. The 2006 Census indicates that there are around 5379 rental dwellings in the Rotorua Airshed. Of those, 3441 are in private tenancies and the remainder are owned by HNZC, central government agencies, territorial authorities or Housing New Zealand Corporation. The ownership of 318 is not known. We have used two methods to

² Saville-Smith and Fraser, 2004, *National Landlord Survey, Preliminary Analysis of the Data*, Centre for Research, Evaluation and Social Assessment, Wellington.

³ Morrison, P., 2008, *On the Falling Rate of Home Ownership in New Zealand*, Centre for Housing Research Aotearoa New Zealand, Wellington.

estimate the number of private rental units that have non-compliant heating and are likely to be occupied by CSC eligible households.⁴ Those indicate between 600 and 980 dwellings.

4.4 Composition of CSC Households with Non-compliant Heating

- 4.18 National census data suggests that the largest single category of CSC households with compliant heating consists of people living alone. That national pattern is also found among the CSC households in the Rotorua Airshed.
- 4.19 As Table 4.2 shows, almost half the participants with non-compliant heating appliances in the CSC Household Clean Heat Survey were found in couple and child(ren) households.

Table 4.2: Composition of Rotorua CSC Households with Non-compliant Heating

Household Type	Non-compliant Heating Appliance Dwellings	
	Dwellings	%
Single alone	45	17.9
Couple only	67	26.6
One parent and child(ren) households	16	6.3
Couple and child(ren) households	122	48.4
Other households	2	0.8
Total	252	100

4.5 Income of Rotorua CSC Households with Non-compliant Heating

- 4.20 The 2006 census data suggests that the CSC households with non-compliant heating in the Rotorua Airshed are predominantly very low income. Over half (53.7 percent) are likely to have incomes less than \$25,000 annually (Table 4.3).

Table 4.3 2006 CSC Eligible Households in Rotorua Airshed by Household Income and Clean Heat Potential Compliance

CSC Household Income	Rotorua Households with Potentially Non-compliant Heating	
	%	Cumulative %
Loss	0.4	0.4
Zero Income	0.4	0.8
\$1 - \$5,000	2.1	2.9
\$5,001 - \$10,000	6.1	9.0
\$10,001 - \$15,000	13.7	22.7
\$15,001 - \$20,000	15.3	38.0
\$20,001 - \$25,000	15.7	53.7
\$25,001 - \$30,000	6.8	60.5
\$30,001 - \$35,000	9.0	69.5
\$35,001 - \$40,000	5.2	74.7
\$40,001 - \$50,000	8.3	83.0
\$50,001 - \$70,000	17.1	100.1
Total	100.1	

⁴ One method applies the prevailing tenure and heating compliance patterns of dwellings in the Rotorua airshed to the households who are CSC eligible. The second applies the CSC eligibility and heating compliance proportions found in the CSC Clean Heat Survey to the 2006 census data related to the private rental stock in the Rotorua Airshed.

5 CSC Households' Current Heating and Heating Preferences

- 5.1 Information on current heating and heating preferences have been drawn from four sources:
- The CSC Household Clean Heat Survey.
 - Focus groups and interviews with householders and landlords.
 - Previous research into heating undertaken for the Council and clean heat loan take-up data.
 - Interviews with clean heat appliance providers and other community stakeholders.
- 5.2 That data consistently shows relatively high use of woodburners and a strong preference for them. This section focuses primarily on the data generated by the survey and focus groups and interviews with householders and landlords.

5.1 Current Heating Appliances and Heating Practices

- 5.3 Of the 252 participants in the CSC Household Clean Heat Survey, 89.7 percent had a woodburner. Twenty-six (10.3 percent) participants reported that they had an open fire. Slightly lower proportions, however, used those appliances as their main heating appliance. 79.8 percent of CSC households used a wood burner as their main heating appliance and only 6.7 percent used open fires (Table 5.1).
- 5.4 That means that not all CSC households with non-compliant heating use those heating appliances as their primary heating appliance, but the majority do so.

Table 5.1 Main Heating Appliance among CSC Households with Non-compliant Heating (CSC Household Clean Heat Survey 2011)*

Main Heating Appliance	CSC Rotorua Households with Non-compliant Heating (N=252)	
	Households	% CSC Households
Wood burner	201	79.8
Heat pump	24	9.5
Open fire	17	6.7
Unflued gas	15	5.9
Flued gas	7	2.8
Electric bar or convection heater	5	2.0
Underfloor heating	3	1.2
Pellet burner	2	0.8
Multi-fuel burner	1	0.4

*Multiple response

- 5.5 In addition to 24 households using heat pumps as their main source of heating, a further 20 also had heat pumps in the dwelling. That is, 17.5 percent of the dwellings had a heat pump.
- 5.6 The main heating appliance used in the living room tends also to be used to heat the house as a whole.

- 5.7 The CSC Household Clean Heat Survey shows that this is the case for 74.2 percent of CSC households. Indeed, 55.6 percent of participants rely on their living space heater to heat other parts of the house without any supplementary heaters. Almost a fifth of households (18.7 percent) attempt to use their living room appliance to heat the whole house but supplement it with heaters in some other areas (Table 5.2).

Table 5.2 Use of Main Heating Appliance as Whole House or Spot Heater among Rotorua CSC Householders (CSC Household Clean Heat Survey 2011)

Heating Practice		CSC Households with Non-compliant Heaters	
		Households	% CSC Households
Main living space heater used for whole house	Main heater in living space used to heat whole house with no supplementation	140	55.6
	Main heater in living space used to heat whole house with supplementation in other rooms	47	18.6
Main living space heater used for living space only	Main heater in living space used to heat living space only. Remainder of house not heated.	26	10.3
	Main heater in living space used to heat living space only. Remainder of house heated with other heaters.	39	15.5
Total Households		252	100

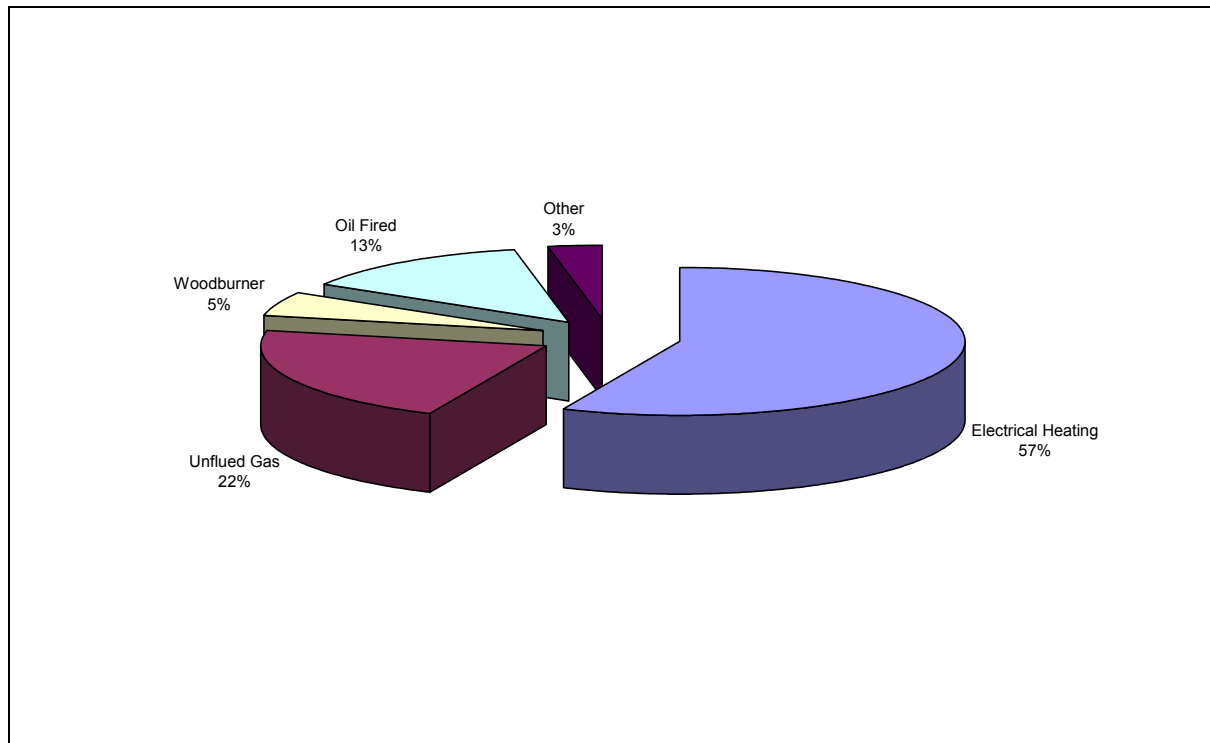
- 5.8 Around a quarter of households (25.8 percent) only attempt to heat their living areas with their main heating appliance situated in the living space. In that category of householders, the majority (39 of 65 householders) use heaters elsewhere in the dwelling but 26 householders do not attempt to heat the rest of the house at all.
- 5.9 As Table 5.3 and Figure 5.1 show, where heating appliances are used elsewhere in the house they tend to be electrical heating appliances followed by unflued gas heating.

Table 5.3 Heating Appliances Used to Heat Other Spaces among CSC Households with Non-compliant Heating (CSC Household Clean Heat Survey 2011)*

Heating Appliances Used in Other Spaces	CSC Rotorua Households with Non-compliant Heating (N=252)	
	Households	% CSC Households
Electric bar, convection or fan heater	38	15.1
Unflued gas	21	8.3
Heat pump	16	6.3
Oil fired heating	13	5.2
Wood burner	5	2.0
Flued gas	2	0.8
Nightstore heater	1	0.4
Underfloor heating	1	0.4

*Multiple response

Figure 5.1: Heating Appliances Used by CSC Households in Other Areas of the House (CSC Household Clean Heat Survey 2011)



5.2 Heating Preferences

- 5.10 Previous surveying of owner occupiers by McDermott Miller found a pronounced preference for woodburners with 40.3 percent of non-compliant home owners reporting such a preference. The pattern of clean heat appliances installed under the Council's loan programme reflects that preference. Of the 250 clean heat installations approved, the largest proportion (about 62 percent) has been for up-grading with low emission woodburners.
- 5.11 That data is also consistent with the experience of clean heat appliance installers. Installers reported that the majority of those taking up the Hot Swap Loan are installing wood burners, and there is a reluctance to move to other heat appliances. Wood burners are preferred because they are familiar and can often be the cheapest installation option. Householders also like the whole house heating offered by wood burners and the cheaper running costs compared to other types of appliances in the programme.
- 5.12 Installers attributed householders' lower uptake of heat pumps to concerns about the running costs of heat pumps, maintenance issues, the short manufacturer warranty periods (between two and five years) and the shorter life expectancy of heat pumps compared to other types of heating appliances. Some heat pump installers did observe that heat pumps have nevertheless been a growth area in their business.
- 5.13 Installers noted that very few customers interested in the Hot Swap Loan programme are choosing pellet burners and gas fires. Pellet burners tend to be higher priced than wood burners and are not well understood. Those few looking to switch to a gas fire usually do so because they are familiar with gas and have other gas appliances.

5.14 Installer comments included:

“People are concerned about having a product they are paying off for 10 years, they are still wanting it to be working when they’re paying it off.”

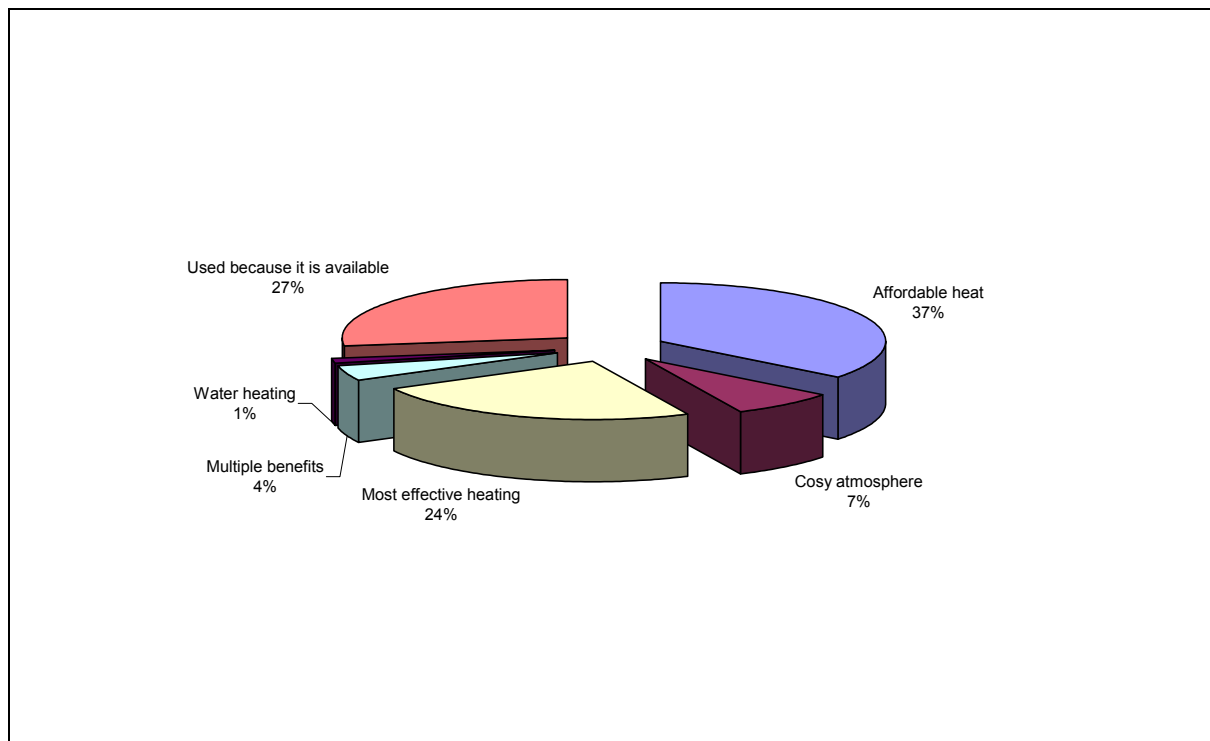
“Heat pumps work well in modern insulated houses but older houses without insulation they don’t work for. People recognise that heat pumps are going to not be so effective for heating these larger homes ...people go off them when they discover they can’t transfer heat from the heat pump to the bedroom”.

“People are quite aware of the operating costs of different options”.

“Pellet fires are attractive to people who want to have a flame but are sick of firewood. They like the ease of using, just push a button ...People like the idea that you are able to turn the pellet fire off, it is instant ... when people first realise it is run by electricity they are put off – they don’t realise it is the same as a 100w light bulb.”

- 5.15 The CSC Household Clean Heat Survey undertaken in the course of this project shows that CSC householders use woodburners because householders perceive positive amenity values associated with them. While around a quarter of CSC householders (26.7 percent) used woodburners as their main form of heating did so because the woodburner was available, woodburners were also reported as providing affordable, effective heating (figure 5.2).

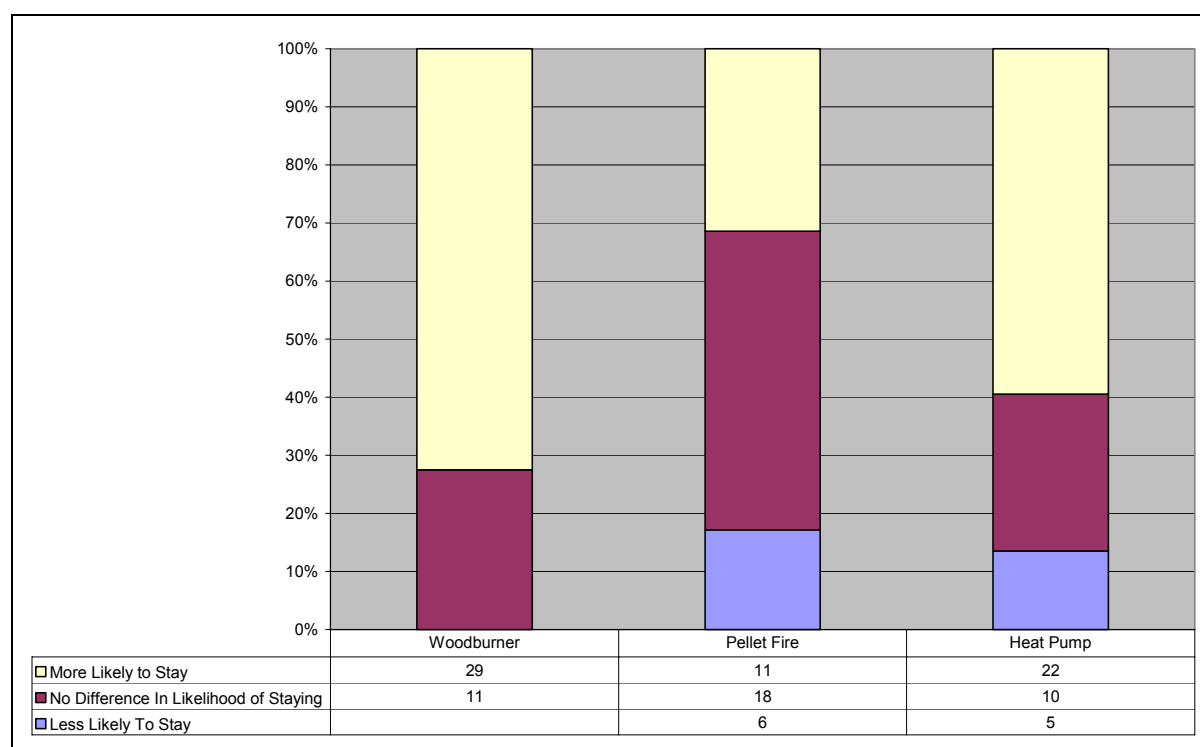
Figure 5.2: Reasons CSC Households Report for Using Woodburners as Main Heating Appliance (CSC Household Clean Heat Survey 2011)



- 5.16 The multiple functionality of woodburners as well as their effectiveness as whole house heaters repeatedly arose as themes in the interviews and focus groups with both CSC tenants and CSC owner occupiers. Wood burners are favoured because they can be used without power, they provide heating to the whole house, and people know how to use them.
- 5.17 One of the main reasons both owner occupiers and tenants prefer wood burners was because they find them cheap to run. Many commented that they could obtain free or cheap firewood from friends or relatives, or just by gathering firewood. But they also said that they encountered problems in sourcing dry firewood, including from wood suppliers, and in storing it. Tenants in particular said that they had no place to store wood. A few focus group participants also said that they were now unable to access free firewood as they had done in the past.
- 5.18 Interviews with stakeholders confirmed the strong preference among Rotorua householders for wood burners, and particularly among low income households. However, stakeholders also noted that access to free firewood is becoming increasingly difficult, that the price of firewood is rising, and that firewood suppliers are not good at storing wood to ensure it is dry. One stakeholder commented that often, low income families do not have the additional money to purchase firewood in good time for it to dry, nor adequate covered space to store wood.
- 5.19 Despite some problems in accessing wood, both home owners and tenants liked the fact that they could still use a wood burner in a power cut. Several commented on the multiple uses of their wood burner, for cooking, drying clothes, and heating water through a wetback. This helped them save on power costs. Those with children found it convenient to use the wood burner for cooking and clothes drying. They also commented on the benefits of whole house heating, as wood burners generated enough heat to at least take the chill off children's bedrooms.
- 5.20 Some householders said that they preferred heat pumps. This was mainly voiced by those who had already experienced using heat pumps. They emphasised the safety of the appliance for children, and the convenience of operation. Some older people commented that, although they were unfamiliar with heat pumps, their declining health meant that it is increasingly difficult for them to manage a wood burner.
- 5.21 Comments that showed a clear preference for wood burners included:
- "I didn't understand that I couldn't have the wood burner, it has a wetback so I'm very loathe to get anything else, but with health problems I can't cut wood and I don't want to be reliant on anyone" (Owner occupier superannuitant).*
- "[flued gas] I am worried about the safety aspects, and do not like the idea of paying line charges when not using it." (Owner-occupier working family).*
- "I am concerned about costs of running a heat pump, and the pellet burner, well, it's electricity and pellets ... it would not be useable in a power cut. Older people find it hard to lift those pellet bags" (Owner occupier superannuitant).*

- 5.22 Stakeholders said that heat pumps were less popular because householders were concerned about running costs, corrosion problems and difficulties in getting satisfactory responses from suppliers, and a different type of heat to that put out by wood burners. Several said there was low public awareness of pellet fires, although there were also perceptions that pellet burners are expensive to run. One person questioned whether there is a secure supply of pellets.
- 5.23 Wetbacks and the ability to cook on a woodburner, both of which were seen as elements of heating security by CSC tenants and owner occupiers. Some clean heat installers noted that some householders rejected the opportunity to clean heat convert because they could not afford the costs of replacing their current wetback woodburner with a new wetback woodburner.
- 5.24 Interviews with landlords and property managers suggested that woodburners were popular among tenants, although a property manager reported that out of town landlords, in particular those based in Auckland, tended to prefer heat pumps. The CSC Household Clean Heat Survey found that while CSC tenants accepted heat pumps, an upgrade to a low emission woodburner was most likely to persuade tenants to stay in their current tenancies (Figure 5.3).

Figure 5.3: Impact of Clean Heat Appliances on Probability of CSC Tenancy Retention (CSC Household Clean Heat Survey 2011)

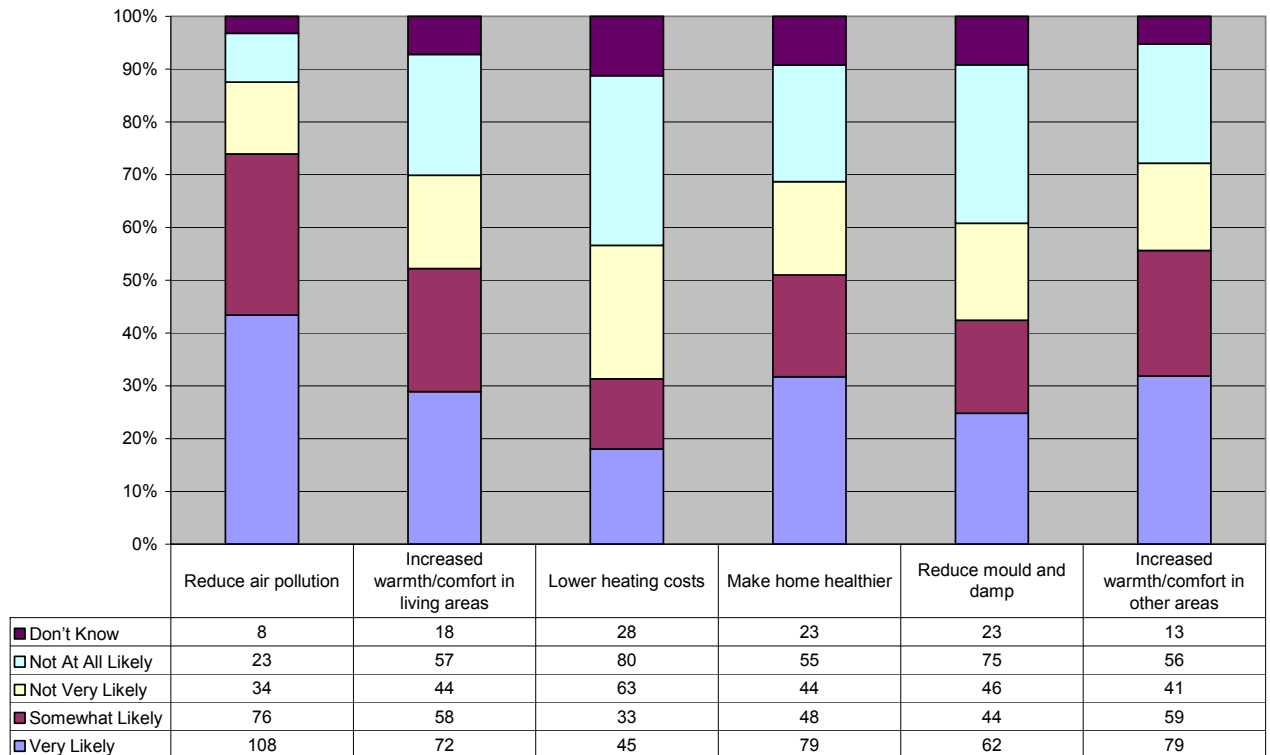


6 Perceived Benefits of Upgrading to Clean Heat Appliances

- 6.1 CSC householders are likely to be resistant to clean heat conversion if such conversions are not perceived as having benefits that householders' value.
- 6.2 The CSC Household Clean Heat Survey found a distinct difference in householders' views about the probable outcomes of converting to clean heat and the benefits that they valued and wished to achieve through improving their heating.
- 6.3 Overall, 73.6 percent of CSC householders believed that it was at least somewhat likely that converting to a clean heat appliance would reduce air pollution in Rotorua. However, only 12 percent of CSC householders saw enough benefit to their household that air pollution would motivate them to convert from their current appliance to a clean heat appliance. Indeed, reducing air pollution emerged as the consideration least likely to motivate householders to improve their heating appliance with over a fifth (22 percent) citing it as the least important in motivating a change.
- 6.4 In the focus groups and interviews, there was some scepticism about the severity of Rotorua's air pollution problems. Stakeholders interviewed also observed some scepticism amongst the public about air quality issues. Several noted that there is a low awareness among their customers or clients about clean heat issues and air quality problems.
- 6.5 Some in the focus groups and interviews were aware of council publicity about Rotorua's air quality but questioned whether domestic fires were as big a problem as industrial emissions. Some questioned the location of council monitoring devices, which they considered only sampled the "worst areas". Others were not concerned about changing to clean heat because they did not see the by-laws applying to them:
- "It's only an issue if I sell the house and I'm not going to sell" (Owner-occupier working family).*
- Others misunderstood the target of the air quality measures, and did not think that they were affected at all, even when they clearly had a non-compliant appliance:
- "I didn't really understand that the wood burner is non compliant. It's in excellent condition. I saw the ads and I thought 'poor people having to get new heating', but I didn't think it applied to me. I didn't understand the pollution aspect" (Owner occupier superannuitant).*
- 6.6 Several installers thought that the general level of householders' understanding of Rotorua's air quality problems is low, but gradually changing:
- "Some people just want the biggest fire they can get, but some are starting to come to the realisation that the council is going to create restrictions for them".*

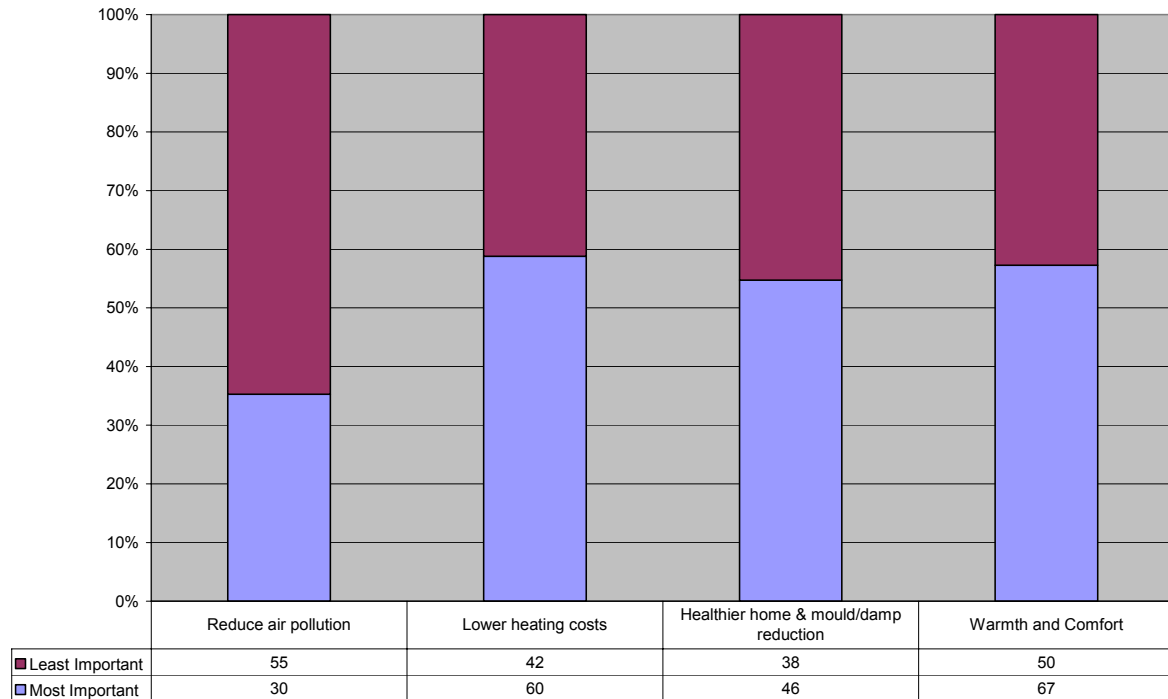
- 6.7 As Figure 6.1 shows, 43.4 percent of CSC households see clean heat conversions as being *very likely* to deliver reductions in air pollution, but in relation to:
- **Lowering heating costs** only 18.1 percent of CSC householders with non-compliant heating see clean heat conversion as *very likely* to deliver;
 - **Increasing warmth and comfort in living areas** only 28.9 percent of CSC householders with non-compliant heating see clean heat conversion as *very likely* to deliver;
 - **Making the home healthier**, 31.7 percent of CSC householders with non-compliant heating see clean heat conversion as *very likely* to deliver;
 - **Reducing mould and damp**, only 24.9 percent of CSC householders with non-compliant heating see clean heat conversion as *very likely* to deliver;
 - **Heating areas outside the living areas such as bedrooms**, 31.7 percent of CSC householders with non-compliant heating see clean heat conversion as *very likely* to deliver.

Figure 6.1 Perceived Probability of Outcomes Associated with Clean Heat Conversion (CSC Household Clean Heat Survey 2011)*



- 6.8 Yet it is cost, health and comfort benefits, rather than reductions in air pollution that are most likely to motivate a clean heat conversion.
- 6.9 Almost a fifth of CSC householders (19.4 percent) either clearly state they would not convert or are unclear about what might motivate them to convert. While other CSC householders are open to clean heat conversions, those householders have a strong focus on warmth, health and cost reductions as motivating factors.
- 6.10 The CSC Household Survey shows that air pollution reductions are the least important consideration in motivating CSC householders with non-compliant heaters to undertake clean air conversions (Figure 6.2).

Figure 6.2 Outcomes from Clean Heat Most and Least Likely to Motivate Conversion Among CSC Households (CSC Household Clean Heat Survey 2011)*



6.11 CSC householders reported that the considerations **most likely** to motivate a change to clean heat are:

- Lowering heating costs – 29.6 percent.
- Being able to achieve comfortable warmth in winter in other areas such as bedrooms – 20.7 percent.
- Reducing air pollutions – 14.8 percent.
- Making home healthier – 13.3 percent.
- Increasing warmth and comfort in living areas in winter – 12.3 percent.
- Reducing mould and damp in the house – 9.9 percent.

6.12 The proportions of CSC householders reporting that the following considerations **least likely** to motivate a change to clean heat were:

- Reducing air pollution – 29.7 percent
- Lower heating costs – 22.7 percent
- Reducing mould and damp – 16.8 percent
- Being able to achieve warmth in other areas of the house such as bedrooms – 15.7 percent
- Increasing warmth and comfort in living areas in winter – 11.4 percent.
- Making home healthier – 3.8 percent.

6.13 The importance of lower heating costs (or the fear of increased heating costs), the desire for warmth and comfort, the importance of healthier conditions and reducing damp and mould were repeated themes among householders participating in the focus groups, survey and interviews. The following comments were typical:

“Our previous rentals were freezing, mouldy, we moved out because it was too cold for the children. I had to get rid of all the bedding and mattresses because the mould made them un-useable. The children were constantly sick with coughs.” (Tenant working family).

“We’ve got an old wood burner inserted into the fireplace, but it is inefficient. There’s insulation but it’s old, and there’s no baseboards on the house. We’ve done underfloor insulation, but haven’t looked at the ceiling yet. There’s condensation on the windows in winter.” (Owner-occupier working family).

“I’ve got an open fire, but I also use an electric heater and a gas heater [unflued]. It’s not warm enough in winter. I search for free firewood ... yes it’s hard to get dry firewood. It’s very difficult to get the fire going with wet wood, I give up and go to bed.” (Owner occupier beneficiary).

“In the last place the wood burner was so hard to light, I couldn’t do it, I had to wait for my husband to come home, and the kids and I would be freezing”. (Tenant working family).

- 6.14 Stakeholder interviews also noted householder concerns with cold, damp housing. CAB commented that tenants approach them seeking advice about cold housing, and enquire whether there is any assistance to encourage landlords to improve heating. CAB also receives many enquiries about power costs and how to switch power suppliers. Other stakeholders said that some tenants are reluctant to ask their landlords to improve the heating, either because they do not think the landlord will be interested in installing better heating, or because they fear their rent will increase if the landlord installs new heating.

7 The Issue of Affordability

- 7.1 The previous discussion indicates that CSC householders with non-compliant heating appliances tend to be unconvinced about the amenity benefits of clean heat conversions. They have a preference for and are familiar with woodburners. They are not convinced by the representation to them that Rotorua’s air pollution is either as severe as claimed or generated from non-compliant domestic heating. They are concerned about ensuring that their houses are effectively insulated prior to clean heat conversion both to improve warmth and to reduce heating costs.
- 7.2 Despite those reservations, only about 17 percent of the CSC householders with non-compliant heating appliances stated at some point in the CSC Household Clean Heat Survey that they would not change their current heating appliance. In the focus groups and the interviews, it was clear that most of those who were willing to change would wish to:
- Ensure that the new device provided equal or better amenity value than they already have, in particular effective house heating, water heating if they already have a wetback, heating security in the context of power cuts, and, in some cases, the ability to heat food.
 - Have a cost-effective heating appliance that they could afford to buy and afford to operate.

- 7.3 The issue of affordability in the context of the clean heat programme, then, has five separate but connected elements. Those are the:
- Extent to which the costs of conversion are affordable.
 - On-going financing costs associated with appliance purchase and installation.
 - On-going operating costs of the appliance.
 - Cost-effectiveness or value for money of the appliance.
 - Durability of the appliance and the exposure of householders to replacement expenses.
- 7.4 This section explores each of those issues drawing on data from:
- The CSC Household Clean Heat Survey.
 - Interviews and focus groups with installers, householders, landlords/property agents, and other community stakeholders.
 - Household energy use research, appliance performance, and household expenditure research and modelling.

7.1 Costs and Affordability of Conversion

- 7.5 The Rotorua Air Quality Action Plan promotes conversion from non-compliant heating appliances or open fires to heat pumps, compliant wood burners, compliant pellet fires, or flued gas appliances.
- 7.6 Each of those appliances are associated with a range of prices which are in part tied to heating performance, in part tied to manufacturer price and in part tied to retailer and installer margins. The actual cost of installation of those appliances varies according to installation requirements such as consents and requirements arising out of the characteristics of a particular dwelling, the current heating system and the new heating system, and installer margins.
- 7.7 Table 7.1 sets out typical purchase and installation costs of different clean air heating appliances, and their typical heat generation capacity and consenting requirements.

Table 7.1: Typical Costs and Outputs Associated with Purchasing and Installing Clean Heat Appliances⁵

Cost/Output	Heat pump	Pellet burner	Wood burner	Flued gas heater	Electric plug in heater
Purchase and installation per heater	\$2,500-4,500	\$4,000-5,000	\$3,000-5,000	\$2,500-7,000	\$50-200
Typical outputs (test conditions)	2-10 kW	2-11 kW	up to 27 kW	Up to 8 kW	1-2.4 kW
Council Consent	No	Yes	Yes	Yes	No

⁵ Note this is based on BRANZ analysis of Rotorua and national data compiled by Lisa Burrough of BRANZ who currently heads a national study into the use and performance of heat pumps.

- 7.8 Reviewing the pricing of appliances and installation delivered within the Council's incentive loan package compared to pricing delivered under other programmes such as EECA's Warm Homes or through the mainstream retail market is beyond the scope of this research. There is merit in undertaking such a comparison if the Council's incentive loan package was to be formally evaluated, although any comparison would need to be undertaken with care to ensure that the price/cost items were comparable.
- 7.9 Householders, landlords, installers and community stakeholders report that they believe the pricing of appliances and installation in the Council's incentive loan packages is at least reasonable and, in some cases, particularly good. However, although competitive market pricing is a necessary component of affordable access to clean heat by households, it is not necessarily sufficient to make conversion affordable for low income, CSC households.
- 7.10 The on-going costs of financing the loans the Council is making available for clean heat conversion are discussed in more detail in Section 7.2. With some very particular exceptions, those financing costs are seen as affordable by householders, although objective analysis of affordability shows that households with incomes less than \$25,000 annually will struggle to sustain payments.
- 7.11 Even when the loan repayments are seen as affordable by households, the interviews and focus groups suggest that the up front costs of conversion may remain unaffordable for CSC households. There are a number of reasons for this. Clearly, the loan maximum of \$4,000 does not cover the full range of typical prices for appliances as set out in Table 7.1. CSC householders noted that they were less interested in gas appliances and pellet fires than wood burners and heat pumps because of the apparently high capital costs.
- 7.12 But CSC householders were also concerned with clean heat conversion related costs that they believed would either mean that the costs exceed the available lending facility through the incentive package; and/or not be eligible to be included in the lending package. Items typically identified by CSC householders as pushing the cost of conversion over the loan limit or excluded from the loan package were:
- Wetback purchase and installation.
 - Costs of decommissioning wetbacks when a non-compliant heater was replaced by a non-wetback alternative.
 - Extended flues for non-standard spaces.
 - Hearths where a current hearth was non-existent, inadequate or not suitable to a clean heat appliance.
 - Heat pumps of a size to meet household heating needs equivalent to their current wood burner.
- 7.13 The following comments were typical:
- "I think that the cost of decommissioning the old wood burner, which is in the fireplace, and installing a free standing one would be more than standard. Then there's all the work involved in blocking up the chimney and making good the hearth "* (Owner-occupier working family).
- "We've got a two storey place. How would that work?"* (Owner-occupier working family).

"I wanted to get a new wood burner but they said it could not be fitted where the old one was in the living room, I didn't like where they would have to put it. I will have to get a heat pump". (Owner occupier superannuitant).

"I wasn't sure what I was supposed to do with the by-law. So I got a heat pump... It cost me over \$4,000 from my savings but I only used it twice. It doesn't heat my bedroom and my Kent does and it heats the water as well. I paid for it all. Now it seems I will still have to get rid of my Kent and I don't know how that will be paid for. Will I be able to change it to a new one?" (Owner occupier superannuitant)

- 7.14 Installers gave several examples of non-standard situations that they have encountered. They also noted that householders are aware of the additional costs they may face, because of non-standard situation, and that may affect their decision to take up the programme. Typical comments were:

"There are so many limitations for the scheme, a lot of situations don't fit neatly into their boxes, for example where you couldn't go through the wall [for flueing] so the customer needs to pay extra."

"[Customers] want to know why a wetback can't be included in the loan. Some people then just say they won't be replacing their wood burner ... not many are wanting to put in a new wetback due to upfront costs ... A lot are quite happy to upgrade until they start finding they have to pay for the extras out of their own pockets ... if they need a new hearth, extra flue or whatever which don't fit into the standard install then this won't be covered by the council loan."

"Floor standing heat pumps are about \$600 more expensive. These are better for older people and for large volume ceiling space. The free standing model does go over the cap."

"Wetbacks are a problem ... it creates a lot of ill will ... people aren't really interested in paying costs outside the scheme, e.g. hearths are not covered but they often can need replacing."

"The most common [heat pump] install is a 4.8kW just over \$3275 incl GST. That's sized for a living area. If you want to go up to the next size you have to pay the difference, even if it's less than \$4,000".

7.2 Clean Heat Conversion Loan Repayment Affordability

- 7.15 The Council's clean heat conversion package is effectively an interest free loan with a rates based payment scheme. The affordability of that package has been assessed in two ways:
- Firstly, in terms of the subjective assessment of its affordability by CSC householders.
 - Secondly, through modelling the energy outgoings of typical low income households that might take up the maximum clean heat conversion loan.

CSC Householders' Assessment of Loan Affordability

- 7.16 The CSC Household Clean Heat Survey explored the extent to which owner occupiers and tenants respectively felt able to manage the costs associated with loan repayments. Participants were asked to assess the affordability of payments according to:

- Three different loan amounts \$2,000, \$3,000 and \$4,000⁶ and a slightly higher payment for a potentially higher loan.⁷
 - Three payment streams of weekly, monthly and quarterly payments.
- That approach is designed to allow affordability problems associated with the loan amount to be distinguished from affordability problems arising from the payment period.

Owner Occupier Assessment of Loan Affordability

- 7.17 The data in this discussion excludes a core of around 10 percent of owner occupiers who persistently reported in the CSC Household Clean Heat Survey that they would not be prepared to change their heating appliance irrespective of price.
- 7.18 The majority of CSC owners prepared to consider a change found even the highest weekly repayment tested with them – \$10.20 which is in excess of the current loan repayments – was seen as either very affordable or at least manageable (Table 7.2). Almost a third (32.4 percent) of those CSC households saw those payments as ‘very affordable’ and a further 45.6 percent considered them as manageable.

Table 7.2 CSC Owner Occupier Household Assessment of Affordability of \$10.20 Weekly Payment (CSC Household Clean Heat Survey 2011)

Affordability Assessment \$10.20 weekly	CSC Households	% CSC Households
Not Affordable At all	16	8.8
Hard to Manage	24	13.2
Manageable	83	45.6
Very Affordable	59	32.4
Total	182	100

- 7.19 However, around 5 percent of those CSC willing to change heating reported that they would not find a payment of \$4.50 weekly affordable. That is about the payment associated with a \$2,000 loan (See Figure 7.1).
- 7.20 The payment period impacts on perceived affordability. Figures 7.1-7.3 show that the when CSC householders report finding loan repayments unaffordable or payments hard to manage, quarterly and monthly payments are dominant payment streams. This is least obvious, but nevertheless still apparent, when the loan amount is \$2,000 (Figure 7.1) and is most apparent in repayments for \$4,000 loans (Figure 7.3). That is, some householders who report that a \$2,000 loan is unaffordable or hard to manage when they repay on a quarterly basis will report that same loan amount is affordable when they pay on a weekly or fortnightly basis.

⁶ All excluding GST

⁷ For the purpose of surveying the payments have been rounded.

Figure 7.1: Payment Period and CSC Household Assessment of Affordability on \$2000 (ex gst) Loan (CSC Household Clean Heat Survey 2011)

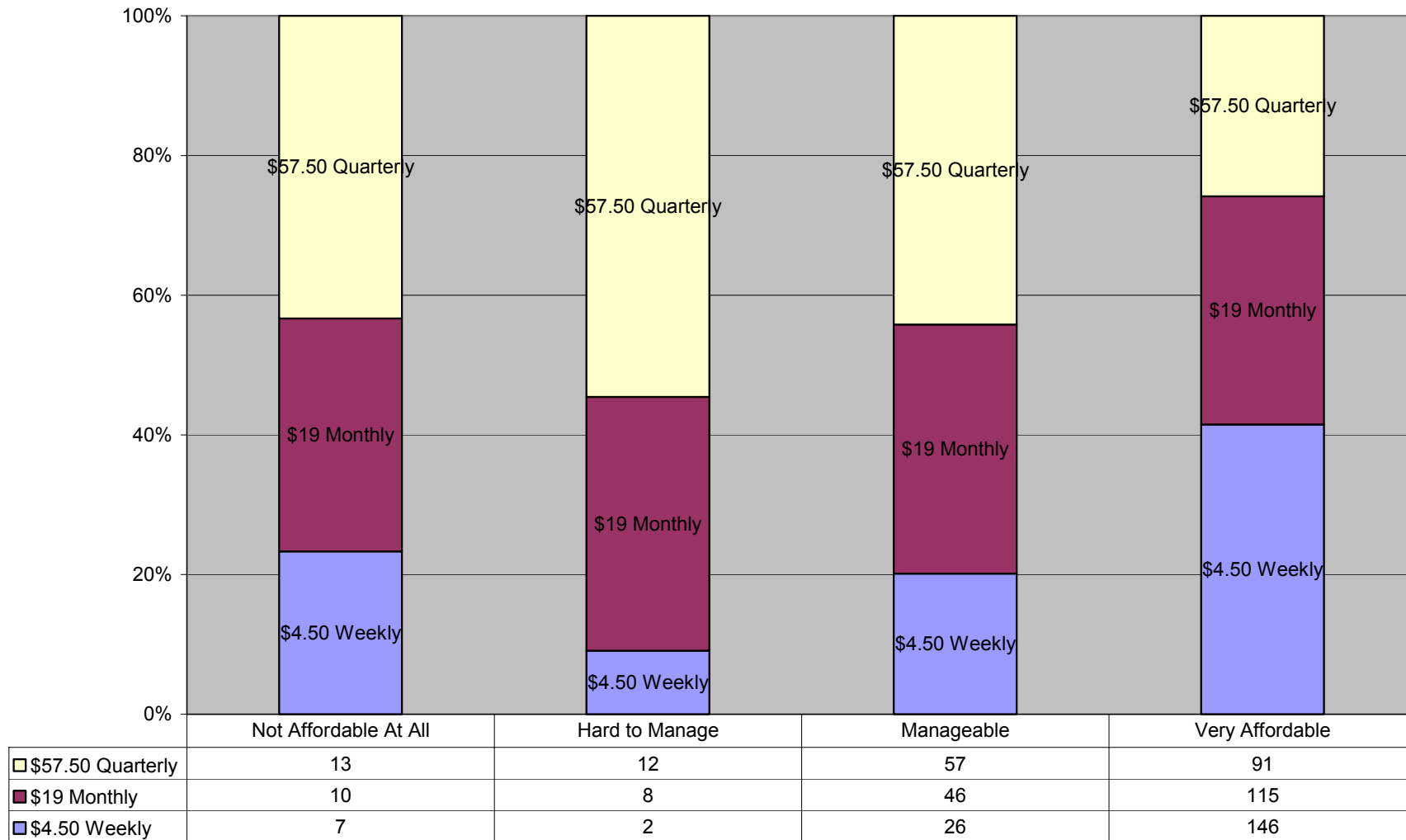


Figure 7.2: Payment Period and CSC Household Assessment of Affordability on \$3000 (ex gst) Loan (CSC Household Clean Heat Survey 2011)

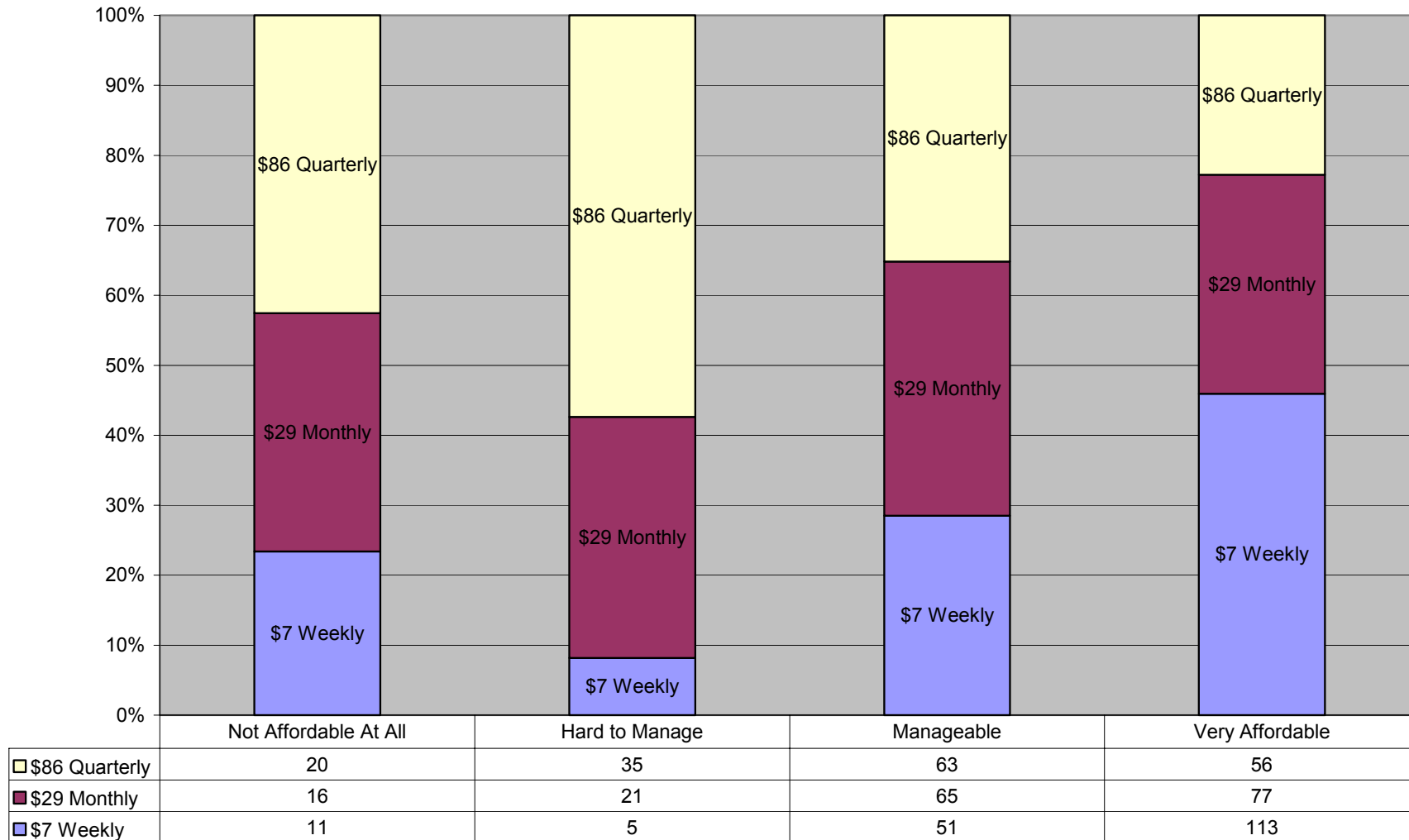
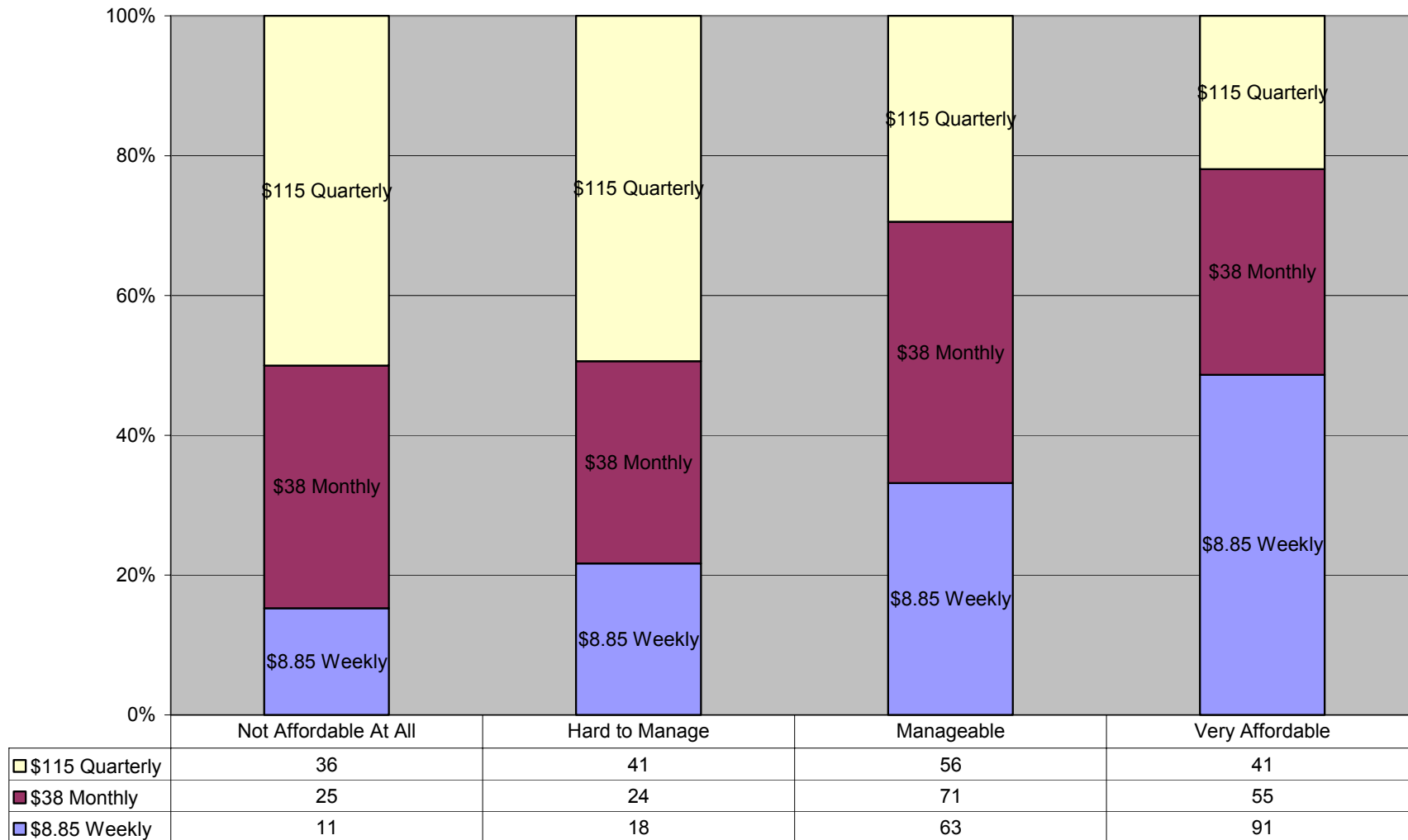


Figure 7.3: Payment Period and CSC Household Assessment of Affordability on \$4000 (ex gst) Loan (CSC Household Clean Heat Survey 2011)



- 7.21 A similar pattern is found on \$3,000 loans and \$4,000 loans. For instance, on a \$4,000 loan only 14.5 percent of owner occupier householders reported that this was unaffordable when asked about weekly payments. But 39.1 percent reported that a \$4,000 loan was unaffordable when the payment amount was calculated on a quarterly basis (Table 7.3).

Table 7.3 CSC Owner Occupier Household Assessment of Affordability of \$4000 Loan Repayment (CSC Household Clean Heat Survey 2011)

Affordability Assessment	CSC Owner Occupier Assessment of Repayment at		
	\$ 8.85 Weekly	\$38 Monthly	\$115 Quarterly
Not Affordable At all	5.5	12.8	18.3
Hard to Manage	9.0	12.3	20.8
Manageable	31.5	36.4	28.4
Very Affordable	45.5	28.2	20.8
Not interested at any price	8.5	10.3	11.7
Total	100	100	100

- 7.22 In the focus groups and interviews, there was general support for the loan programme. Owner-occupiers were positive about the programme, mainly because it is interest free. The ability to spread payment over ten years is also an attraction:

"I'm already thinking about improving heating because of a cold house, so a scheme like that would be good" (Owner-occupier working family).

"It's a good idea because it's interest free" (Owner-occupier working family).

- 7.23 There was a range of owner-occupier views on perceived affordability of the loan repayments. Some said they would struggle on repaying \$5 or less a week, while others thought they could manage up to \$9 per week:

"I could afford up to \$9 per week, I see that amount as manageable". (Owner-occupier working family).

- 7.24 Owner occupiers only receiving superannuation, particularly those living alone, appeared to be least able to afford a loan, or least willing to consider a loan:

"I could afford up to \$9 per week, but I would have to cut down on other expenses".

"I am on a fixed income and plan my budget. I would find even \$2 a week extra difficult, and would have to cut spending from something else."

"It's hard to make ends meet, there's nothing extra in the budget".

- 7.25 Older owner-occupiers were also the most anxious about what the council by laws might mean for them:

"I'm scared, I will have to pull my old fireplace out, it's been worrying me".

"It's a big thing to make the change and not be afraid of it. It's not only the finances, it's something [heat pump] I am not familiar with."

"My daughters said you have to change, otherwise you would get fined".

- 7.26 Stakeholders working with older home owners commented that they are not only reluctant to take on debt at their time of life, but also need help to understand the loan arrangements and processes for taking it up. Even though it may benefit them, their feeling uncomfortable about what the programme entails may be a significant barrier.
- 7.27 Several owner-occupiers identified current constraints on their budget that would preclude their ability to service a loan at present. These not only included mortgage and hire purchase commitments, but also one householder who was already paying an additional compulsory targeted Rotorua District Council rate for a sewerage scheme, and another who was clearing rates arrears at \$10 a week.
- 7.28 Stakeholders working with low income owner-occupiers considered that an interest-free loan is still beyond many. This is in part due to very little discretionary income. A few stakeholders considered that grants are the “only realistic option” for very low income owner-occupiers. Stakeholders noted that lower income households may have difficulty sustaining loan payments if they encounter financial difficulties such as unemployment, unpredictable earnings (e.g. due to seasonal or casual employment) or unexpected expenditure. Those on limited incomes have less ability to absorb financial shocks. Some pointed out that low income home owners can be faced with relatively high rates, and that rates arrears is a problem.
- 7.29 Owner-occupiers emphasised that being able to choose the frequency of loan repayment was an important factor in their ability to service the loan. Being able to pay back the loan on the same frequency as their current rate payment (weekly, fortnightly or quarterly) was preferred. Some have organised financial commitments to coincide with their income stream, such as fortnightly superannuation payment or wages, and would like to be able to do the same with a clean heat loan. There was support for being able to make small payments frequently, rather than larger payments quarterly; several people commented that they feel much more comfortable if they can meet their commitments weekly.
- 7.30 Some suggested that the loan be enhanced with subsidisation of part of the cost. Others suggested that very low income home owners receive a grant to change to clean heating.
- 7.31 As well as commenting on the affordability of the Hot Swap Loan, there was also a strong view from several people that the loan programme is too narrow and the loan should also be available for other actions that improve home warmth and contribute to clean air. In particular, they wanted funding for insulation and for improved wood storage to be included in the loan. They also suggested that any funding left over from the \$4,000 for an installation be able to be used by the householder for heat transfer to contribute to whole house heating, or for retention of their wetback. Some stakeholders also suggested that the programme be widened to include insulation, and have a greater focus on encouraging the use of dry wood.
- 7.32 Owner-occupier suggestions for changes to the current loan programme included:
- “A new wood burner can be polluting if green wood is burnt. Provide funding to improve wood storage on properties” (Owner occupier superannuitant).*
- “There’s not enough room to store wood, I have to put it under tarpaulin and that’s not altogether satisfactory” (Owner occupier superannuitant).*

“Include insulation in the scheme because that reduces heating costs and improves health” (Owner-occupier working family).

“A scheme combined with insulation would be more appealing to older home owners” (Owner occupier superannuitant).

- 7.33 Landlords in the focus groups and interviews supported the interest free loan, commenting that it would help them to retain good tenants and improve the value and attractiveness of their dwelling. They also saw tax advantages in taking up the loan. However, some were cautious about taking it up and did not think that all landlords would be willing or able to:

“The present scheme would not be enough to attract many landlords, I would like to see a discount included for landlords with CSC tenants.”

“Target the scheme to landlords with young families and encourage them to take up the scheme, because Rotorua has a huge problem with bronchitis”.

“I would have to clear debts before considering taking on more debt”.

“Landlords think, ‘what’s in it for me?’ It’s human nature ... a lot of people with rentals aren’t wealthy, they need a bit of help and encouragement.”

“\$8-\$9 per week is do-able, but I would look at the cheapest appliance and installation and try to spend less than the \$4,000”.

- 7.34 Installers also noted that some owner-occupiers could have difficulties affording a loan, including those paying off rates arrears. One pointed out that almost all of his customers taking up the Hot Swap Loan so far were middle and upper income households. Another said that they have received a lot of interest in the programme from landlords, in part because of a desire to sell their rental in future. The one installer who had a lot of enquiries from CSC eligible households, about 60-70 percent of enquiries, said that many of those enquiries were not translating into sales, as householders were put off by the amount of money. Another noted that those faced with extra installation costs or a desire to retain their wetback were also not taking up the loan.

Tenant Assessment of Affordability

- 7.35 The 41 tenants in the CSC Household Clean Heat Survey were asked to indicate their willingness to pay additional weekly rent to accommodate the costs of clean heat conversion in relation to woodburners, pellet fires and heat pumps respectively. As Table 7.4 shows, in all cases the single largest groups of tenants reported that they would not be willing to pay any rent increase at all. However, in relation to both woodburners and heat pumps, substantial proportions of the tenants that reported that they would be willing to pay increased rents.

Table 7.4 CSC Tenant Household Assessment of Acceptable Increases in Weekly Payment for Clean Heat Appliances (CSC Household Clean Heat Survey 2011)

Increased Rent Payment Weekly	Clean Heat Woodburner		Pellet Fires		Heat Pumps	
	CSC Tenants	% Tenants	CSC Tenants	% Tenants	CSC Tenants	% Tenants
\$11 or more	12	29.3	6	14.6	13	31.7
\$8-10.99	8	19.5	4	9.8	4	9.8
\$5-7.99	4	9.8	7	17.1	3	7.3
\$2-4.99	1	2.4	3	7.3	3	7.3
More than \$0-\$1.99	2	4.9	3	7.3	2	4.9
No increased rent	14	34.1	16	39.0	13	31.7
Don't know	0	0.0	2	4.9	3	7.3
Total	41	100	41	100	41	100

7.36 The strong preference for tenants for woodburners and heat pumps is notable in Table 7.2. Woodburners in particular are highly valued. 58.6 percent of tenants were willing to pay an increased rent of \$5 or more per week for a clean heat woodburner compared to just less than half (48.8 percent) for heat pumps and 41.5 percent for pellet fires. This reflects a pervasive anxiety around the functionality and operating costs of both heat pumps and pellet fires found among tenants.

7.37 The tenants in the focus groups and interviews thought that up to \$5 a week extra on their rents for a clean heat appliance would be manageable. Those tenants preferred wood burners or heat pumps. Tenants typically commented:

"Up to \$5 extra a week would be manageable, because I am working. But I know friends on a benefit that would find it hard." (Owner-occupier working family).

"If the house was going to be warmer, I think a lot of tenants would be prepared to pay increased rent". (Owner-occupier working family).

However, some tenants had experienced landlord reluctance to do anything to improve heating appliances, or to install insulation. As one tenant commented:

"Be thankful you've got a source of heating, any heating".

Affordability of Household Energy Costs When Borrowing for Clean Heat Conversion

7.38 Irrespective of CSC householders' views around loan affordability, it is useful to consider a more objective measure of loan affordability. In this case, the conversion loan costs are deemed unaffordable for households whose combined energy operating and loan costs are higher than the internationally accepted measure of fuel poverty.

7.39 It is well established by the Household Energy End Use Project (HEEP) that low income households in New Zealand are particularly vulnerable to fuel poverty. That is, paying more than 10 percent of household income on energy. On the basis of current energy prices and energy consumption levels by household income identified in HEEP, Table 7.5 sets out the average household energy for CSC eligible households by household income.

Table 7.5 Exposure to Fuel Poverty and the Maximum Energy Costs for Fuel Poverty Avoidance

Household annual Income	HEEP Households CSC Eligible	Estimated Energy Costs All Households (\$)	Average Estimated Energy Costs Including Low Electricity Users Tariffs (\$)	Maximum Energy Cost to Avoid Fuel Poverty (\$)
\$5000 or less	1	3,275.42	3,402.17	0-500
\$5,001-\$10,000	6	2,071.33	1,965.12	501-1,000
\$10,001-\$15,000	25	1,994.81	1,867.88	1,001-1,500
\$15,001-\$20,000	26	2,324.83	2,277.89	1,501-2,000
\$20,001-\$25,000	16	2,768.54	2,751.99	2,001-2,500
\$25,001-\$30,000	12	2,966.34	3,080.03	2,501-3,000
\$30,001-\$40,000	29	2,895.49	3,026.15	3,001-4,000
\$40,001-\$50,000	27	2,826.92	2,901.87	4,001-5,000
\$50,001-\$60,000	23	2,994.95	3,123.83	5,001-6,000
All Households	165	2,636.92	2,667.06	

7.40 What this analysis suggests is that many CSC households are likely to be on the margins of fuel poverty even when simply dealing with the ordinary costs of energy consumption.

7.41 Some of these low income households will reduce their actual costs because they are able to substitute priced energy by unpriced energy or marginal cost energy. Typically, this involves accessing free or reduced price fire wood and, for some, using wetback water heating.

7.42 Table 7.6 sets out our assessment of the fuel poverty status of CSC households.

Table 7.6 The Fuel Poverty Status of CSC Households and Affordability of Clean Heat Loan Repayments.

Household Annual Income	Vulnerable to Fuel Poverty with Ordinary Energy Costs	Vulnerable to Fuel Poverty Servicing \$2,000 Loan or More	Vulnerable to Fuel Poverty by Servicing \$3,000 Loan or More	Vulnerable to Fuel Poverty by Servicing \$4,000 Loan or More	Servicing Clean Heat Loan Affordable
\$25,000 or less					
\$25,001-\$40,000					
\$40,001 or more					

7.43 CSC households with annual incomes in excess of \$40,000 annually will typically have no affordability problems arising from clean heat conversion loan repayments – the green cell in Table 7.6.⁸

⁸ Unless they are subject to other extraordinary expenses.

- 7.44 For households with incomes between \$25,000 up to \$40,000, the affordability is marginal – the orange cells in Table 7.6. For those households, affordability is likely to be dependent on householders being able to achieve energy cost savings. These households will be particularly vulnerable to tipping into fuel poverty through future increases in electricity, pellet or firewood prices, any borrowing outside the loan programme needed to allow them to convert to clean heat,⁹ or loss of multi-functional systems such as wetbacks that allow them to reduce their water heating energy consumption.
- 7.45 Households with annual incomes of \$25,000 or less are routinely struggling with energy affordability – the red cells of Table 7.6. Unless they have some financial reserves, as some older people do through long term savings, they will struggle both with the capital costs of clean heat conversion and with loan payments.
- 7.46 Of course, this analysis assumes that households are not already exposed to extraordinary and unavoidable expenses. There are, for instance, a number of households in the Rotorua Airshed that are already exposed to additional rating expenses associated with compulsory requirements such as the community sewerage scheme programmes.
- 7.47 In the case of one family interviewed in the course of this project, the interest and lending costs associated with the Rotorua Lakeside Communities Sewerage Scheme Programme constitute a repayment commitment of \$530 annually over multiple decades. That expenditure is a significant barrier to their ability to convert to clean heat although they expressed a strong desire to do so.

7.3 Operating Costs, Payback Periods and Unaffordable Risk

- 7.48 It was noted previously that the affordability of clean heat loan servicing outgoings may be maximised reducing energy operating costs. Householders are themselves aware of this, although they frequently have relatively little factual information about appliance operating costs. Indeed, some CSC householders expressed a reluctance to convert to clean heat because they felt unclear about the comparative operating costs of different appliances.
- 7.49 From a clean heat perspective, the operating costs, risks and payback periods of different heating appliances is not relevant in and of itself. However, for CSC householders it is clear that these considerations are critical to their decisions around undertaking clean heat conversion. Most importantly, if householders are confused by information given to them on these issues and/or that information is inconsistent with what friends and/or family tell them, this presents a significant barrier to taking up any clean heat conversion.
- 7.50 Under those circumstances, the Council needs to be aware of two issues:
- Firstly, the impact of the substitution effect on householders' perceptions of operating costs.
 - Secondly, the variety of operating cost information to which CSC householders are likely to be exposed. Notably both those problems arise primarily around the operating costs of heat pumps and woodburners respectively.

⁹ See the previous discussion on exclusions related to the capital cost of conversions.

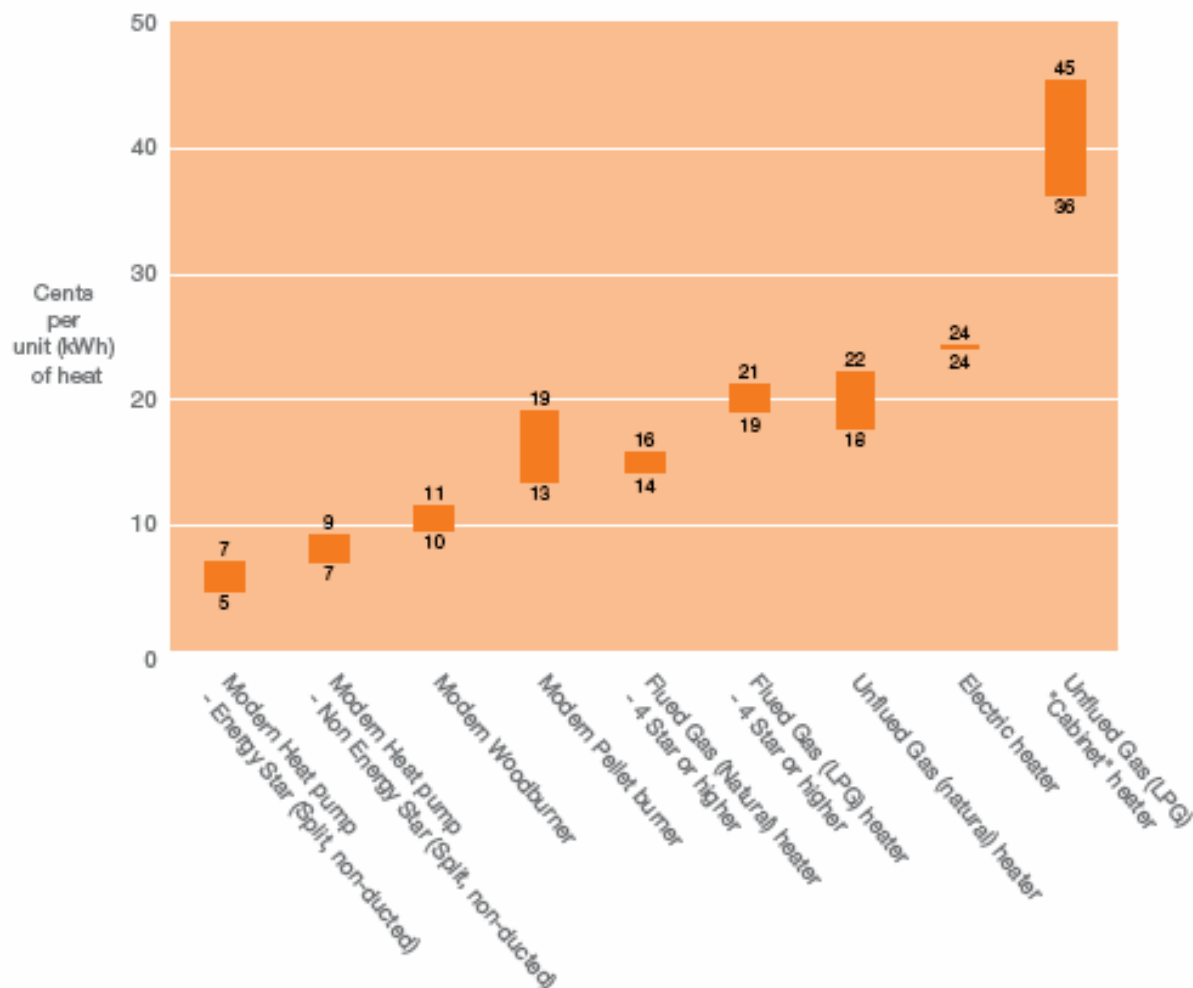
Household Perceptions of Costs Arising from Substitution

- 7.51 Some CSC households in both the survey and the focus groups expressed concern about what they considered to be the high electricity costs associated with heat pumps. For those householders, this perception is often a reflection of hearsay, typically a family member or friend's comment. There are a number of factors that generate that perspective which derive almost entirely from the experience of substituting a woodburner with a heat pump. Firstly, the convenience of heat pumps sometimes means that the householders use them more. They heat more so they pay more in total, although the unit cost of the heat may in fact be lower.
- 7.52 The second substitution effect arises because electricity costs (like gas costs) are more apparent. They are measured more regularly and presented to householders on a monthly basis. Heating costs when using reticulated electricity or gas are continually a focus of attention for householders compared to the more 'lumpy' and discretionary costs associated with firewood. Under those conditions, householders lose sight of comparative heating costs and see heating using reticulated energy as more expensive. This is exacerbated where householders have access to sources of firewood at discounted prices.

'Objective Measures' of Cost

- 7.53 It has been to manage some of these substitution effects that so called objective measures of costs have been developed. The problem for the Council is that those so-called 'objective measures' are not always consistent. Contradictory information and information on costs that are not credible merely create anxiety and frequently simply stop householders making decisions. This problem was very evident in Rotorua.
- 7.54 The following comments sum up a prevailing view from the focus groups and interviews:
- "There needs to be a lot more information on the different heating appliances. People don't know enough about pellet burners and flued gas. There is confusion about gas – many people think flued gas is the same as a portable gas heater. This lack of information makes it hard for people to make good decisions about their heating" (Owner-occupier working family).*
- "Provide more information on what would be saved in terms of running costs by installing a compliant burner" (Owner occupier superannuitant).*
- 7.55 Associated with this anxiety about operating costs, concerns around affordability also focus on the relative cost-effectiveness of clean heat appliances and the risk that they will expose the householder to unaffordable expenses in the future. The inability of householders to make their own assessments of these aspects of affordability appeared to present a very real barrier to householders taking up the opportunity presented by the clean heat loan incentive programme.
- 7.56 We have two so-called objective measures of the operating costs of different heating appliances. They are:
- EECA's promotional material (Figure 7.4).
 - The Consumer NZ's calculation of kWh operating costs (Figure 7.5).

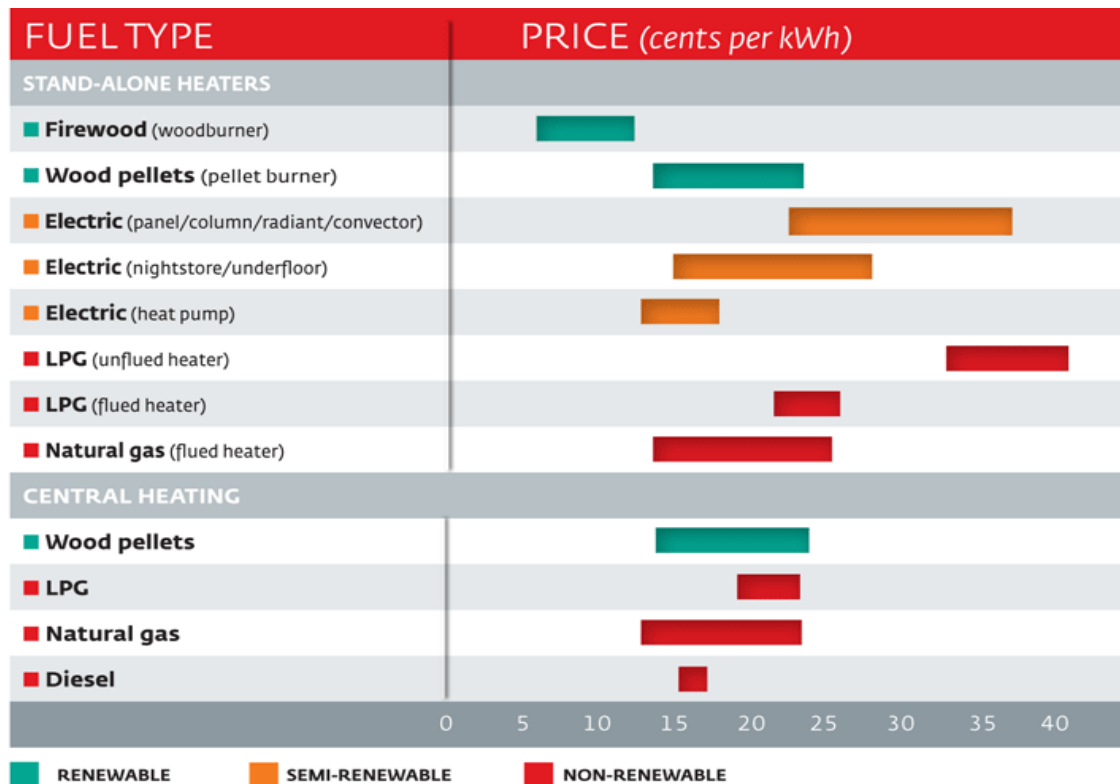
Figure 7.4 Estimated Operating Costs for a Range of Home Heating Options (EECA)¹⁰



Based on typical highest and lowest heater efficiencies. Does not include purchase/installation and maintenance costs.
Fuel cost assumptions: Electricity 24 c/kWh; Wood pellets \$0.82/kg; Firewood \$75/m³; Natural gas 12.4c/kWh; LPG (45kg bottle) \$2.30/kg plus \$120 annual rental charge (18.5c/kWh including bottle rental assuming a total annual gas consumption of 7000 kWh); LPG (9kg bottle) \$3.50/kg. For unfired gas heaters 30% of the heat produced is assumed to be lost due to the requirement to leave a window open. Note that fuel costs can vary greatly depending on location, retailer and plan.
*Natural gas price includes a portion of fixed charges assuming a total annual gas consumption of 7000 kWh. Actual cost depends on your tariff and actual total gas consumption.

¹⁰ Source: EECA, 2010, *How to Use a Heat Pump and Use it Wisely*, Energy Efficiency Conservation Authority, Wellington.

Figure 7.5 Consumer NZ's Fuel Price Comparison¹¹



Guide to the table: Costs are calculated on the basis of providing one kilowatt of heat for one hour. Firewood costs are based on our January 2011 survey of prices for pine. Electricity and natural gas costs are from PowerSwitch. Other costs are from pricing data collected during February 2011. GST is included.

- 7.57 This overstatement of heat pump efficiency derived from the COP evident in EECA's promotional material is exacerbated when attempting to provide householders with credible information about the comparative costs that they might face. There are significant risks around opening up a "credibility gap".
- 7.58 It will be seen that there are clear differences between these two. EECA's operating costs analysis is significantly higher than Consumer NZ. This is because Consumer NZ have recognised that thermodynamics in different climates, installation differences, and the way in which householders use heat pumps all affect the performance of heat pumps. BRANZ's preliminary research on heat pump performance as well as overseas research shows that heat pumps actual performance is lower than that delivered under test conditions (COP rating).
- 7.59 In Rotorua, and among low income users, this is exacerbated by a number of other factors. The costs of heating in Rotorua for low income households is different from the national averages presented by EECA and Consumer NZ respectively for the following reasons:
- The prevailing electricity tariffs in Rotorua are different.
 - Low income households tend to use less electricity and consequently CSC households are likely to be paying a low user kWh tariff for electricity which lifts the kWh cost of electricity from about 19 cents to 29 cents.¹²

¹¹ See: <http://www.consumer.org.nz/reports/heating-options/fuel-prices-compared>

¹² Note that EECA has set the low user tariff at 24 cents per kWh.

- With the winter climate in Rotorua the laws of thermodynamics mean that heat pumps will not perform as efficiently in Rotorua compared to test conditions.¹³ The performance of some heating appliances is strongly related to the cost of the appliance not simply the kWh rating.¹⁴
- 7.60 The Council faces a quandary here. CSC householders are concerned with operating costs but the measurement of operating costs for heating appliances is difficult. There may be a range of risks using the EECA comparative operating cost table that they use to promote heat pumps, not least of which may be a credibility gap if some householders' experience deviates significantly from the performance EECA suggests. This may inhibit other CSC households undertaking heat pump clean heat conversion. Under those conditions it may be beneficial for the Council to both note to consumers the ranges of operating costs and refer householders to both EECA and Consumer NZ information.
- 7.61 In relation to the loan term for the clean heat incentive package, the greatest risk of costs arising from replacement requirements within or soon after loan repayment lie with heat pumps. Even with optimal life expectancy, the life expectancy of heat pumps is closest to the ten year loan period.¹⁵
- 7.62 The Council has required that installers of heat pumps undertake protection treatments on heat pumps as part of the clean heat conversion programme. This varies from installer to installer and the impacts on reducing corrosion will be demonstrated over the next few years. A number of CSC householders did, however, express concern about the efficacy of such treatment and the possibility of heat pump failure after the warranty period but prior to the completion of the loan period.
- 7.63 One installer commented that one brand of heat pumps specifically excludes Rotorua from its warranty. This installer has developed extensive measures to protect their heat pumps, including encasing the copper loops by hand with a soft setting silica product and treating indoor units. In areas that they assess as particularly vulnerable to corrosion the firm provides additional treatment, including double sided coating for steel panels and replacement of all steel bolts and screws.
- 7.64 The installer has developed treatments based on years of experience installing heat pumps in Rotorua, and expects them to last 12-15 years without any problems. Some installations the provider has done are now 20-22 years old and still running satisfactorily. Nevertheless, the installer warned that even with extensive treatments, sulphur can still cause problems. The installer noted that another brand of heat pump has guaranteed that if the installer's process is used it will honour the warranty for environmental damage.
- 7.65 Other heat pump installers reported treating heat pumps with a spray on coating. One followed up this treatment with a free six month service and check. He noted that appliances usually need to be resprayed after two years. This installer also commented that he had replaced a number of heat pumps installed by other firms (not installed as part of the Hot Swap programme), which had not been treated for sulphur corrosion.

¹³ Research undertaken by BRANZ has found that in situ COP is significantly lower than in test conditions, especially in cold climates. The actual average COP of heat pumps tested in situ in Otago and Southland shows the COP being 2.2.

¹⁴ Our estimate of operating costs and payback periods is provided in Annex D.

¹⁵ See Annex D for durability information.

- 7.66 Other heat pump installers also commented on the need for treatment, and noted that customers considered the corrosion risk when making decisions:

“People go towards the wood burner because of the extended warranty. People are concerned about having a product they are paying off for ten years, and they are wanting it to be working when they are paying it off.”

8 Issues & Approaches to Incentivising CSC Clean Heat

- 8.1 This section summarises the issues arising for landlords and CSC households in relation to clean heat conversion. It notes that a series of issues that engender resistance to clean heat conversion can be prompted by anxieties around affordability even where the Council's loan package addresses many owners' financial needs. In addition, it is noted that there are a subset of households for whom the purchase costs and/or the payment costs do present a barrier to clean heat conversion. Finally, the discussion provides a brief overview of the approaches other councils are using to promote clean heat conversion.

8.1 Issues for Landlords

- 8.2 Landlords with non-compliant heating in their dwellings are frequently concerned with many of the issues expressed by CSC households and community stakeholders which are set out below. They, however, are primarily concerned with two aspects of clean heat conversion. Firstly, they have an interest in the purchase cost and, secondly, an interest in retaining tenants and reducing vacancy rates. Among local landlords there is a strong sense that affordability is an issue, with a consequence that they tend to install heat pumps and the clean heat loans provide an effective way of reducing the costs of conversion.
- 8.3 Landlords are less concerned with issues around the type of heating appliance, whole house heating amenity versus spot heating, or, indeed, the operating costs of any heating appliance. They have some concern about the durability of heating appliances, particularly heat pumps in areas in Rotorua that are associated with corrosion. Even here, however, those landlords with landlord insurance are able to mitigate risks around that problem.
- 8.4 For out of town, particularly Auckland, landlords, previous research and interviewing property managers acting on their behalf, suggest that the main preoccupation appears to be rental levels. There is some evidence that Auckland landlords perceive rents as low in Rotorua and despite healthy rates of return because of comparatively low house prices, this perception acts as a barrier to clean heat conversion and loan take-up.
- 8.5 One property manager sees those landlords only being willing to take up the opportunities provided by the clean heat loans if they feel tenant pressure through tenant exit or difficulty in tenanting vacant properties. That manager reports that tenants are increasingly careful about the thermal performance of the dwellings they rent – around 30 percent of prospective tenants now ask whether a dwelling is insulated which was unheard of some years ago.

8.2 Issues for CSC Householders

- 8.6 CSC households have been identified by government as needing additional assistance because of possible income deficits in the context of high demand on their resources due to household dependents.
- 8.7 In the context of the clean heat programme, however, they present significant diversity. Some are owner occupiers, while others are tenants. Some have child dependents and others are living alone or in couple only households. Some are beneficiaries while others are in employment. They encompass households consisting of people in their late teens to households of older retirees.
- 8.8 These diverse CSC householders do, however, have some commonalities that are particularly pertinent to the take-up of clean heat conversion and Hot Swap Loans. Those may be summarised as follows:
- CSC householders are strongly concerned with what they see as value for money and, consequently:
 - Tend to be resistant to substituting what they see as a cost-effective appliance with one that exposes them to new expenditure. This is particularly evident in resistance to:
 - removing wetbacks;
 - substituting woodburners for electricity based heating or pellet fires;
 - substituting what they see as 'whole house' heating with 'spot' heating.
 - Are preoccupied by both purchase price and ongoing operating costs and:
 - are not convinced that clean heat appliances will reduce operating costs;
 - question the value of up-grading heating appliances without adequate insulation.
 - CSC householders tend to be anxious about 'large-item', non-routine expenditure and financial commitments even if they appear to be able to afford them.¹⁶ Consequently, they tend to:
 - delay decision-making;
 - demand considerable clarity and certainty around:
 - the nature of their financial exposure; and
 - the extent to which the full range of costs of clean heat conversion will be covered by any financing option.
 - be easily dissuaded from making commitments by:
 - what appear to be relatively minor process issues such as application forms, use of websites, and assessment/approval processes; and
 - anxieties around the performance and durability of heat appliances.¹⁷
 - CSC householders use and have a strong preference for woodburners and tenants will seek out dwellings that have woodburners.
 - CSC householders value warmth and comfort and:
 - There is a seasonal hump in tenancy changes with the onset of winter as tenants attempt to find warmer homes.
 - Prefer heating systems that provide heat beyond the main living area.

¹⁶ This is a well established phenomenon among prudent, low income households. Expenditure on low cost, seemingly extraneous items may be evident rather than making a long-term commitment to apparently more necessary investments. For low income families, the former are easier to manage. If circumstances demand they can reduce expenditure easily. Long term financing commitments on large items is less able to be managed in the context of changing circumstances. Many low income households have strict policies around the number of long term commitments they take on at any one time.

¹⁷ The impact of social informational influence should not be under-estimated.

- Are unconvinced that clean heat appliances that they can afford through the clean conversion will provide a heating amenity equivalent to their current heating appliance.
- CSC householders tend to be unconvinced by the severity or the source of Rotorua's air pollution. CSC householders and landlords who do accept the contribution of non-compliant domestic fires to Rotorua's air pollution problems:
 - Either do not value air pollution reductions over the perceived financial costs and amenity losses they associate with clean heat conversion.
 - Or do not see clean heat conversions as sufficient to address the problem. They promote what they see as a more holistic approach which:
 - aligns clean air with warm homes; and
 - actively promotes dry fuel use not only through household education but through assuring that the fuel supply chain delivers dry wood.

8.9 Under those circumstances, even the many CSC households for whom the Council's loan facility overcomes the immediate financial problems of purchase price and provides an affordable payment pathway, are likely to be both slow and resistant to convert to clean heating appliances if they are owner occupiers or encourage their landlords to do so if they are tenants.

8.10 In addition, there is a subset of CSC households who do have significant affordability problems. Among tenants there are those who are already confronting higher than affordable rents and/or can not afford the burden of changing tenancies. They are unlikely to ask their landlords to convert to clean heat. Among owner occupiers, the current loan package is not affordable for:

- CSC households with annual incomes of \$25,000 or less. It is notable that some of these households, older householders in particular, may have significant reserves that they may be willing to commit in clean heat but are concerned with their on-going ability to pay a loan or indeed their current local and regional rates.
- CSC households that face specific extraordinary expenses including significant rating commitments such as the Lake Communities Sewerage Scheme programme.
- CSC households for whom conversion and/or decommissioning non-compliant heating appliances involve activities not currently encompassed in the programme.

8.3 The Shared Issue of Awareness

8.11 There were some landlords and owner-occupiers who were unaware of the Hot Swap programme, and most participating in the focus groups were unaware of the details, e.g. the areas in the Rotorua Air shed; when open fires have to be de-commissioned; the loan repayment period; the point-of-sale requirements; and which wood burners are compliant. Comments included:

"They need to advertise it. I've never heard about it. Send out information with the rates bill" (Landlord).

"Most older people do not use the internet. They need simple information on one sheet" (Owner occupier superannuitant).

8.12 Stakeholders made several suggestions for improving awareness of the loan programme, including targeting information through community organisations and community events.

8.4 What are Other Councils Doing?

- 8.13 This section provides a brief overview of the types of instruments used and the extent and ways in which other councils in New Zealand are attempting to address the clean heat take-up issues associated with low income households.

Loans and Grants Assisting Households to Take Up Clean Heat

- 8.14 Two main types of subsidy instruments are used by Councils across New Zealand to support Clean Heat upgrades: loans repaid through rates, and, direct grants.
- 8.15 As Table 8.1 shows a large number of Councils have picked up the EECA promoted approach of using a loan instrument repaid through a targeted rate. Generally interest is charged on the loan (at the rate paid by the Council, so lower than a mortgage rate) and the loan is repaid over a 9 or 10 year period. Nelson City Council (Unitary Authority) and Environment Canterbury also offer interest free loans.
- 8.16 In some cases the loan moves with the property (e.g. Nelson) if this is sold, in other cases (e.g. Hawkes Bay, Greater Wellington Council) the loan is repaid in full if the property is sold. The amount of loan subsidy varies across Councils. In Marlborough there is no upper limit on the loan value. By way of contrast, in the Wellington region the loan limit is a maximum of \$2,600. Several councils, for example Tasman and Hawkes Bay offer separate loan amounts for an insulation component and the heating component.
- 8.17 Direct grants are used by a large number of Councils for low income households, generally those who are CSC eligible. These are generally Clean Heat branded projects set up in conjunction with funding from EECA and a number of other organisations – often local district health boards.
- 8.18 Examples include Tokoroa (Environment Waikato), Hastings (Hawkes Bay Regional Council) and Christchurch (Environment Canterbury). In most cases they cover the total cost of the installation, but in a few (e.g. Otago Regional Council) this is a partial grant only. In some instances the low income/Clean Heat programmes are part of a wider Healthy Homes programme with some specific targeting around health criteria, particularly families with small children.
- 8.19 The Environment Canterbury programme is undoubtedly the most successful in the country when numbers of Clean Heat conversions are considered. It is also the longest running. Uptake by low income households has been particularly good. According to the data supplied, around 50 percent of all the conversions in Christchurch City have been households eligible for CSC.
- 8.20 CSC holders pay only a maximum of \$1000 towards the cost of insulation and clean heating – \$250 towards ceiling insulation, \$250 towards underfloor insulation and \$500 towards the cost of their clean heating. Particularly low income households – those eligible for the Government Rates Rebate scheme, are fully subsidised – with the Christchurch City Council funding the difference above the ECan subsidy.
- 8.21 Nelson City Council has also indicated very good success with low income household conversions through a loan scheme. If households are eligible for the Government Rates Rebate Scheme then the Council waives their loan repayment for that year.

- 8.22 In addition, the Council has also found that because of the additional cost of the targeted rate to repay the loan (on top of the general Council rates) some households were becoming eligible for the Government Rates Rebate Scheme, or receiving larger subsidies through this. This was seen as an added incentive by the Council, which is making low income households aware of this benefit.
- 8.23 Infobox 8.1 provides some additional information around the operation of the Government Rates Rebate scheme in Nelson. It should be noted that because the Nelson City Council is a unitary authority it deals with both clean air responsibilities (a regional council responsibility) and the administration of the Government Rates Rebate Scheme (a territorial authority responsibility). In the Rotorua Airshed applications for rates rebates would be made to and administered by the Rotorua District Council although it is the total rate that is of importance in the scheme.

Infobox 8.1 Rates Rebate Scheme and Clean Air in Nelson

Take an example: If the annual rates for a property were \$1500, a couple on superannuation (estimated income of \$28,457 in 2009/10) would be eligible for \$129 Rates Rebate – thereby paying an actual rate of \$1371 (the rest being covered by Department of Internal Affairs). If they took out a Nelson Pay as Your Heat loan for \$3000 that would mean a targeted rate repayment of \$345 per annum bringing their total rates to \$1845. This means their Rates Rebate would increase to \$329 (another \$200).

Because the Nelson City Council has agreed to waive the targeted rate any year that homeowners are eligible for the Rates Rebate scheme, the actual amount of rates paid by the homeowner would decrease by \$200, making the actual total rates paid by the ratepayer that year \$1171, and they get their new heating device as well.

The information the Nelson City Council provides to the public, clearly emphasises the opportunity for low income ratepayers to get extra financial assistance through this mechanism, and also the potential for increases in the Accommodation Supplement.

(extract from Nelson's information booklet)

"If I get a rates rebate do I still have to pay back the loan?"

No, for each year that you receive a rates rebate we will make your yearly loan repayment for you. You will still have to make the repayment in any year that you do not receive a rates rebate. To find out if you are eligible for a rates rebate phone the Council on 546 0200."

"Will the targeted rate affect my WINZ accommodation supplement?"

The targeted rate is added on to your rates bill, so your rates will be higher. This may in fact increase your entitlement to an accommodation supplement – please check with WINZ."

- 8.24 The Government's Rates Rebate scheme was introduced in 1973. The last review of the scheme led to changes in the rebate thresholds and rebate amounts. Those came into effect on 1 July 2010 and provide for:
- Maximum rebate of \$570.
 - Income threshold of \$22,340 with an additional \$500 for each household dependent.
- Annex C presents the Government's example tables designed to assist households to assess their eligibility and the rate minimums associated with a rates rebate for a full rebate according to income.

The Scope of Assistance in Clean Heat Programmes

- 8.25 All Councils involved in heating subsidies offer a standard range of appliances:
- Low emission wood burners;
 - Pellet burners;
 - Heat pumps; and
 - Flued gas appliances.
- In addition some councils include diesel fired and electric nightstore appliances among those subsidised.
- 8.26 In most loan schemes, heating appliance are generally sized for the main living area. In practice, however, there is considerable discretion around this and wood burners and pellet burners are acknowledged as having the advantage of providing better heat outcomes for households. In that context, Nelson City has changed its criteria to allow two heat pumps to be used where a woodburner was previously used. In this case the maximum loan remains the same.
- 8.27 Other councils offering loans or grants allow the cost of insulation to be incorporated into the loan maximum for a clean heat conversion. All those councils require insulation to be installed in the house before assistance is provided for a clean heating appliance. This is the case irrespective of whether the council is partnering with EECA.
- 8.28 Council officers elsewhere expressed mixed views on an EECA linked approach. One felt that the EECA programme had allowed substantial cost increases, particularly from national firms moving into the regions. It was suggested that this was driving up both insulation and clean heat prices and that some installers were gouging the grants associated with CSC households.
- 8.29 Several officials felt insulation requirements led to a greater proportion of homeowners taking up heat pumps. They considered that householders saw heat pumps as leading to high power bills where dwellings were uninsulated and it was the concern about operating costs that preoccupied many low income households.
- 8.30 District councils have assisted in some areas. Christchurch City Council has contributed towards grant funding for low income households and Wellington City Council has waived the Building Consent fee for Clean Heat installations.

Table 8.1 Summary of Air Quality Clean Heat Conversion Programmes by Other Councils in New Zealand

Council	Context	Regulation	Incentive Programme	Low Income Programme	Other Non Regulatory Programme
Northland	Main air quality problems in Whangarei – focus is on industrial discharges and backyard burning	Wood burners and other domestic fuel burners are permitted to 40kW output – no compliance standards beyond Building Consent	No	No	Pamphlet on tips to improve emissions quality. No major programme
Auckland	Domestic burning contributes 39% of PM 10 emissions	Regional Rule: New and replacement burners must be MFE compliant. No phase out programme	Not in Regional Role but WCC loans part of the new Auckland Council. Insulation key part of loan offer (must insulate first if want subsidy for Clean Heat device)	Not in Regional Role but Snug Homes/DHB programme free insulation and heating upgrades as part of the new Auckland Council	Work with wood suppliers to ensure covered and dry wood. Good practice guide promoted to consumers Strongly promote insulation, clean burning, heat pumps and flued gas as part of change process
Waikato	Inland King Country and Waikato, Taupo and Rotorua have problems from domestic heating.	No	Yes for Taupo, Tokoroa & Te Kuiti – Waikato Clean Heat.	Waikato Clean Heat in Taupo, Tokoroa & Te Kuiti - \$400,000 per annum contribution to enable free replacement of heating device for CSC holders. House is required to be insulated to receive free device. [Insulation subsidy of 60% available through Warm Up NZ to CSC holders. Taupo Healthy Homes programme also available for greater insulation subsidies for CSC holders.] The Council has recently reviewed this programme And appears likely to recommend they continue with their current approach.	Work with wood suppliers and provide info on good wood and clean burning

Taranaki	Good air quality in New Plymouth Focus on industrial & agricultural emissions	No	No	No	No
Manawatu-Wanganui	Odour most pressing air quality issue	Wood burners and other domestic fuel burners are permitted to 40kW output – no compliance standards beyond Building Consent	No	No	No
Hawkes Bay	Napier and Hastings have significant PM10 exceedances.	Regional Rule: New and replacement burners must be MFE compliant. Open Fires unable to be lit from 1 Jan 2012	<p>Offers loans for insulation in conjunction with EECA Warm Up NZ: Heat Smart programme. (must insulate first if want subsidy for Clean Heat device)</p> <p>Offers grant of \$700 OR up to \$3,500 loan + 50% int. subsidy to homeowners earning less than \$100,000 for clean heat device.</p> <p>Have had 80 installs and a further 512 approved applications for their programme after 12 months. Think that</p>	<p>Offers loan of up to \$2800 with 50% interest subsidy to CSC holders for clean heat device. Offers grant of \$700 OR up to \$3,500 loan + 50% int. subsidy to landlords with CSC holders for clean heat device.</p> <p>Also provide a Healthy Homes programme which provides free insulation and heating installations for people with health problems and CSC. Also provide a Clean Heat Hastings programme – full assistance for insulated homes of CSC holders. Deliberate sizing of device to ensure heats whole home for both Healthy Homes and Clean Heat programme.</p> <p>If the beneficiaries are tenants the landlord is invited to pay a \$500 contribution – but no one ever has.</p>	
Gisborne	Limited monitoring, No issue identified	No	No	No	No

Wellington	Masterton, Carterton, Lower Hutt problem areas	No	Offers loans in conjunction with EECA Warm Up NZ: Heat Smart programme. (must insulate first if want subsidy for Clean Heat device). Loan value up to \$2600 repaid over 9 years with interest. * Note W City Council also offers subsidy for low emission wood burner/pellet burner installation building consent fee	No difference	Small amount of education as part of wider environmental education programmes
Marlborough	Blenheim has PM10 exceedences	Proposed Rules: Open Fires and backyard burning banned. No multi fuel fires allowed to be installed in new houses; replacement of old wood burners after 15-20 years. Appear to still be deciding on final regulatory package.	Offers loans in conjunction with EECA Warm Up NZ: Heat Smart programme. Loan value repaid over 9 years with interest. No cap on amount – is residual cost after EECA subsidy paid. Includes insulation and clean heating. Loan attached to house (not required to be repaid when sold)	No difference	Minimal
Tasman	An early programme. Major PM10 issues in Richmond	In Richmond: New woodburners must be MFE compliant; No new homes are allowed to install woodburners and no property without a woodburner is allowed to install one.	Offers loans in conjunction with EECA Warm Up NZ: Heat Smart programme. Loan value of \$2600 towards insulation and \$3500 towards Clean Heating. Paid back over 9 years with interest. Insulation required before Clean Heat. Loan attached to house (not required to be repaid when sold)	No difference	Good wood programme. Compliance officers on the streets in winter.

Nelson	One of the earliest programmes – Air Quality nearly as bad as Chch. Have had much less success with uptake than CCC – have now moved to EECA approach.		Offers loans in conjunction with EECA Warm Up NZ: Heat Smart programme. (must insulate first if want subsidy for Clean Heat device) . Loan is interest free. Max loan \$4999 incl. GST. Able to install 2 heat pumps and wetbacks (wetback costs not to be included in loan).	<p>Initially the Council's scheme was only available to low income people (Community Services Card holders) on a total subsidy with 434 conversions from 2005-2007.</p> <p>From 2007 the Council changed its scheme to a targeted rate loan scheme. However the Council's scheme is particularly attractive for low income people – especially those who are eligible for the Government's Rate Rebate as the Council waives any targeted rate repayment for the period they receive a Rate Rebate, i.e. if they receive Rate Rebate for 10 years following completion of works the Council covers full cost up to limit of \$4999. From 2007 to end 2010 647 low income homes (either home owner or tenant) of a total of 1281 have used the targeted rate scheme which suggests it has been very successful for low income households. While the Council funds the full cost for these low income households, the amount of the rate is able to contribute to their eligibility for the Rates Rebate programme.</p>	
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Canterbury	80% of PM10 emissions from domestic heating. Problems in Christchurch, Kaiapoi, Rangiora, Timaru, Ashburton	New burners must meet emissions standards. Resource consent required to install a wood burner in a house without one (new or existing). Open fire and solid fuel burners more than 15 years old not able to be used in some areas.	Offers loans in conjunction with EECA Warm Up NZ: Heat Smart programme. (must insulate first if want subsidy for Clean Heat device). 10 year interest free loan to a maximum of \$5200 Pays \$100 towards the cost of wood burner removal/chimney sealing.	Full assistance to homeowners who qualify for a CCC Rates Rebate – get insulation to EECA stds plus 1 Clean Heat device sized to heat the living area. NOTE CCC area programme wrapping up 1 July Substantial assistance to homeowners with a CSC – they pay only \$500 towards the cost of the clean heat appliance, \$250 towards the cost of ceiling insulation and \$250 towards the cost of underfloor insulation.	Very strong, and ongoing education campaign – programme led by social marketing and has been most successful in the country as a result. Targeted at consumer motivations (warm + you clean up the air vs clean up the air) ECan strongly promote insulation because they believe the heating devices get used less – i.e. less emissions from the wood and pellet burners in insulated houses, so has a material impact on the airshed. Are very clear that heat pumps are sized for living room heating, so insulation also helps mitigate against reduced heat output where this replaces a wood burner (but not a problem with open fires as these are very efficient)
West Coast	Reefton & Westport have a problem with PM10 exceedences.		No programme	No programme	No programme
Otago	Cromwell, Clyde, Alexandra and Milton have significant PM10 exceedences due to domestic emissions		Subsidy of up to \$2000 (i.e. \$1500 more than Warm Up NZ) towards the cost of Clean Heating device. House must be insulated to EECA stds to get subsidy.	No more than \$500 paid by CSC holders for clean heating device. Must have EECA std insulation. If not EECA std insulation \$1700 flat fee for CSC holders – rest paid by the Council – insulation and heating part of package.	

Southland	Invercargill, Gore, Te Anau have PM10 problems. Invercargill & Gore over 90% of problem caused by domestic appliances.			Southland Warm Homes Trust programme provides subsidy for CSC holders who only pay \$300-\$500 towards insulation component. Those who meet health criteria get insulation for free. If rental property and tenant has CSC then landlord only pays 1/3 of quoted price. Note this is a DISTRICT Council initiative with Southland, Invercargill and Gore District Councils -Environment Southland contributes \$10K towards the project.	
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9 Options for Rotorua CSC Household Clean Heat Conversions

9.1 This section is concerned with the way in which the take-up of clean heat conversions and decommissioning of non-compliant heaters might be encouraged among CSC household through options directed to the owners and occupiers of rental dwellings and as well as to CSC owner occupiers.

9.2 The section is structured around options for incentivising each of those groups followed by a brief discussion of strategic relationships with other agencies which may help to optimise clean heat conversions among low income households.

9.1 Options Targeting Clean Heat Conversion in Private Rental Dwellings

9.3 Previous surveying of landlords found that around 49 percent of landlords of dwellings with non-compliant heating would be prepared to undertake clean heat conversion with a loan mechanism similar to that now being delivered by the Council. The data collected through focus groups and interviews with landlords, tenants and property managers are consistent with that finding.

9.4 Although a few landlords suggested that they were unable to manage clean heat conversion loan repayments without a further subsidy, the real issue confronting the Council is how it may optimise landlord clean heat conversion in the context of changing market conditions.

9.5 Participants in this research suggest that the rental market is moving from under-supply to over-supply. If that is the case, tenants are likely to have greater choice and landlords, particularly in the lower end of the market, are likely to be exposed to higher vacancy rates, extended vacancy periods and limited opportunities to increase rents.

9.6 Those conditions present both risks and opportunities for clean heat conversion among landlords:

- The risk is that landlords may postpone expenditure and dwelling improvements including clean heat conversion. Given that both previous surveying and this research shows that landlords are most inclined to install heat pumps, any failure of heat pumps prior to the end of the loan period and after any warranty period may also suppress landlord take-up.
- The opportunity for increasing clean heat conversions lies in the competitive advantage that it may give landlords who can provide improved amenities to their tenants.

9.7 This research shows that tenants are more likely to stay in tenancies if clean heat conversions involve either the installation of woodburners or heat pumps. Tenants clearly value warmer and drier homes. In both the survey and the qualitative research, CSC tenants expressed a willingness to pay some premium for dwellings that were easy and cost-effective to heat. Both heat pumps and woodburners attracted tenants. In addition, over half (58.5 percent) of the tenants participating the CSC Household Clean Heat Survey reported that they would be willing to encourage their landlord to take up clean heat conversion knowing that the Council loan facility was available to landlords.

- 9.8 Under those circumstances, the key to maximising clean heat conversion take-up among landlords appears to reside in taking up the following options:
- Option 1: Direct promotion of clean heat conversion to landlords with a particular emphasis on their ability to attract and retain tenants.
 - Option 2: Active promotion of the Council's clean heat loans with local property managers, particularly those who manage properties owned by landlords living outside the region.
 - Option 3: Promote knowledge of the clean heat conversion loans among tenants. This will allow sitting tenants to actively promote conversion with their landlords and prospective tenants to select clean heat dwellings.
 - Option 4: Encourage the development and implementation of a clean air accreditation scheme for landlords.
- 9.9 These options are not mutually exclusive. Options 1-3 should be developed as an integrated communication and engagement package. Option 4 will require feasibility review and specification. This should include discussion with property managers and local landlords on how the industry could be involved in developing and implementing such a scheme. The risks and benefits of each option are presented in Table 9.1.

Table 9.1: Benefits and Disadvantages of Suggested Options for Encouraging Clean Heat Conversions in Rental Dwellings

Options	Benefits	Disadvantages
Option 1: Direct promotion of clean heat conversion to landlords with a particular emphasis on their ability to attract and retain tenants	Builds on current clean heat activities with landlords and may be accommodated with current budget allocations. Likely to increase take-up.	Requires intensification of interaction with landlords using face-to-face techniques. May impact on resource allocations and is demanding of public engagement and interaction skills.
Option 2: Active promotion of the Council's clean heat loans with local property managers, particularly those who manage properties owned by landlords living outside the region	Builds on current clean heat activities and may be accommodated with current budget allocations. Likely to increase take-up among landlords (especially those out of town) by assisting property managers to develop a clean heat take-up value case for landlords.	Requires intensification of interaction with landlords using face-to-face techniques. May impact on resource allocations and is demanding of public engagement and interaction skills.
Option 3: Promote knowledge of the clean heat conversion loans among tenants. This will allow sitting tenants to actively promote conversion with their landlords and prospective tenants to select clean heat dwellings	A new activity likely to broaden community awareness of both the value of clean heat and the Hot Swap Loan, particularly among low income households that tend to be less engaged by household directed social marketing. Increases the ability of tenants to make clean air friendly tenancy choices and will contribute to landlord take-up by generating market demand in the low rent segment of the market.	Because this would be a new and very specifically targeted set of promotional activities (including direct engagement with tenants and the community organizations and agencies that tenants relate to, and promotional material) this may require some reallocation of current resources within the current communications budgets.

Option 4: Encourage the development and implementation of a clean air accreditation scheme for landlords	Provides compliant landlords with the ability to demonstrate their compliance to tenants. Reinforces Council's leadership without requiring further regulatory interventions.	New activity that will generate new skill demands around engagement with the industry. There could be risks around liability which will need to be managed. This may be best achieved by encouraging the industry to develop and promulgate an appropriate scheme.
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9.2 Options Targeting Clean Heat Conversion Among CSC Owner Occupiers

9.10 CSC householders are, by definition, in a fragile economic position which confronts them with a continuous need to assess the affordability and prioritise their expenditure and consumption choices. CSC owner occupiers in the Rotorua Airshed living in dwellings with non-compliant heating can be broadly divided into three segments. Those are:

- **Refusers**

Owner occupiers who are committed to retaining their current heating appliance. The CSC Clean Heat Survey suggests that of the around 2,800 CSC owner occupiers in the Rotorua Airshed with non-compliant heating, around 280 fall into this segment.

- **Strugglers**

Owner occupiers who are willing to consider a clean heat conversion but are already on the margins of fuel poverty. This segment is constituted by households with incomes less than \$25,000 annually and without financial reserves. Some CSC householders with incomes between \$25,000 and \$40,000 may also have difficulties with purchase and/or repayment costs where they have extraordinary expenditure. It is estimated that this segment includes between 1,300 and 1,500 households who will struggle to meet the repayment costs of the Council's lending package.

- **Cautious Adopters**

Owner occupiers who are willing to consider a clean heat conversion but are worried about affordability, value for money and preserving amenity. This segment is constituted by CSC households whose economic situation demands careful assessment of priorities. They can sustain loan repayments but may be less able to sustain the costs of exclusions from the loan package and are concerned that clean heat conversion will not undermine their amenities or expose them to increased operating costs. It is estimated that this segment includes between 1,000 and 1,220 households.

9.11 The Council has the option of attempting to move all three of these segments toward clean heat conversions. It is likely to be more productive, however, to focus its attention on the *Struggler* and *Cautious Adopter* segments. Both those segments are low income households but for the *Strugglers* both purchase and loan repayment affordability are clear barriers. In addition, they are also concerned with ensuring that clean heat conversion does not expose them to higher energy costs or reduce their

heating amenity including water heating. They are fearful of decommissioning costs and uncertain their futures under the current by-law.

9.12 *Cautious Adopters* have similar preoccupations about operating expense, unforeseen costs, loss of amenity (particularly water heating and whole house heating), and are beset with anxieties around issues such as decommissioning and the impact of the current by law. They are typically unconvinced by the Council's focus on domestic heating, are concerned with insulation, and clean heat conversion outcomes being undermined by suppliers of fuel wood and the difficulties some households have in keeping fuel dry. They are, however, able to accommodate the payments under the current loan package. Indeed, they may be more amenable to clean heat conversion if the lending maximum was extended to allow for current exclusions to be accommodated or assistance with insulation.

9.13 In our view a series of options emerge to address the needs of these two segments of CSC households amenable but hesitate to, or are unable to, pay for a change to clean heat appliances. Those are:

- **Options targeted at the *Strugglers*:**

- Option A: Waive loan repayments for extremely low income CSC households eligible and receiving central government Rate Rebate.
- Option B: Waive loan repayments for CSC households within the Rotorua Airshed simultaneously exposed to ratepayer contributions to the Rotorua Lakeside Communities Sewerage Scheme Programme.
- Option C: Institute a discretionary decommissioning grant to assist extremely low income CSC households to decommission non-compliant heaters when no replacement is sought through a Hot Swap Loan.
- Option D: Provide a decommissioning grant for all extremely low income CSC households for decommissioning wetbacks where replacement clean heat appliance does not include a wetback.

- **Options assisting both *Cautious Adopters* and *Strugglers***

- Option E: Review options to encourage dry wood supply to build on current programme identifying dry wood suppliers.
- Option F: Extend allowable items for Hot Swap Loans to include within the maximum insulation and/or dry wood storage contingent on satisfactory conversion to an improved clean heat appliance.

- **Options targeted at increasing programme credibility and effective communication with CSC householders.**

- Option F: Intensify dry wood promotion by extending period of public information around dry wood suppliers.
- Option G: Develop targeted population and community based communications strategies that directly engage community networks to disseminate information and assist CSC householders to apply and manage the clean heat conversion process.

- 9.14 These are not mutually exclusive. It is suggested that work on developing responses to these options is undertaken as an integrated package to reduce inconsistency and optimise decision-making and the effectiveness of implementation. The risks and benefits of each option are briefly summarised in Table 9.2. All respond to the Rotorua Air Quality Action Plan.

Table 9.2: Benefits and Disadvantages of Suggested Options for Encouraging Clean Heat Conversions in CSC Households

Options	Benefits	Disadvantages
Option A: Waive loan repayments for extremely low income CSC households eligible and receiving central government Rate Rebate.	Addresses barriers to take up among very low income households below \$25,000 annual household income. Offsets increase in subsidy cost through optimizing ratepayers access to existing central government subsidy.	May have a marginal fiscal impact depending on the extent to which the rates rebate meets the costs of clean heat conversion. Additional, minor policy work required to amend current programme. Additional work to promote awareness of the change and encourage very low income households to apply for the Rate Rebate Scheme.
Option B: Waive loan repayments for CSC households within the Rotorua Airshed simultaneously exposed to ratepayer contributions to the Rotorua Lakeside Communities Sewerage Scheme Programme.	Addresses barriers to take up among very low income households and those facing very high rating costs due to imposed targeted rates. A very small number of households means fiscal risk is limited – around 60 households. Eligibility easily specified and strong promotional opportunities.	Will have a fiscal impact. Additional, minor policy work required to amend current programme. Additional promotion work required to promulgate changes. Additional operational processes in reviewing and approving applications.
Option C: Institute a discretionary decommissioning grant to assist extremely low income CSC households to decommission non-compliant heaters when no replacement is sought through a Hot Swap Loan.	Addresses a particular barrier to take-up among low income households. Extends current programme but in a targeted manner which can be robustly specified.	Fiscal implications, the size of which will need to be assessed, before any changes are made. Required to amend current programme. Additional promotion work required to promulgate changes. Additional operational processes in reviewing and approving applications.
Option D: Provide a decommissioning grant for all extremely low income CSC households for decommissioning wetbacks where replacement clean heat appliance does not include a wetback.	Addresses a particular barrier to take-up among low income households. Extends current programme but in a targeted manner which can be robustly specified.	Fiscal implications, the size of which will need to be assessed, if any changes are made. Required to amend current programme. Additional promotion work required to promulgate changes. Additional operational processes in reviewing and approving applications.

Option E: Extend allowable items for Hot Swap Loans to include within the maximum insulation and/or dry wood storage contingent on satisfactory conversion to an improved clean heat appliance.	Addresses a particular barrier to take-up among low income households. Provides opportunities to make alliances with funders and programmes directed at insulation but would provide access to households with non-compliant heating. Assistance remains within current loan limits.	Policy work required to amend current programme. Additional promotion work required to promulgate changes. Additional operational processes in reviewing and approving applications.
Option F: Intensify dry wood promotion by extending period of public information around dry wood suppliers.	Builds on current activities and will reinforce both suppliers' incentives to provide dry wood over a longer period and assist consumers to pre-plan and ensure access to dry wood. Improve the credibility of Council and address skepticism among some low income households committed to woodburners about the value of upgrading their appliances. Uses a market mechanism to stimulate change.	Extension of the current programme is likely to have some costs.
Option G: Develop targeted population and community based communications strategies that directly engage community networks to disseminate information and assist CSC householders to apply and manage the clean heat conversion process.	Increase low income household awareness and trust by working with groups with whom they are already dealing. Likely to increase take-up by more effectively engaging with the diversity of low income households who are likely to have limited response to consumer oriented social marketing techniques. Raising community agency awareness and involvement.	Resourcing for scoping and developing communications and engagement strategy required.

9.3 Leveraging Clean Heat through Strategic Relationships

- 9.15 In establishing the incentive package for CSC householders and landlords, the Council has made a considerable commitment. This research has not been directed to evaluating the efficacy of the programme, the implementation of the programme or its programme logic. It has been concerned with exploring the particular opportunities for and barriers to low income households taking up the programme.
- 9.16 In this context low income households have been defined, as they are by EECA in relation to its programmes and by many other councils, as households eligible for Community Service Cards. It is clear, however, that in relation to energy consumption, these CSC households really fall into two categories:
- Those who are already struggling to meet their energy consumption requirements; and
 - Those who with assistance over the barrier of immediate purchase costs through the Council's Hot Swap Loans can afford to clean heat convert.

- 9.17 This confronts the Council with two different issues both of which are more likely to be resolved through strategic partnering. The first issue is how to fund an increase in the subsidies necessary to assist the extremely low income CSC householders (and those with extraordinary expenses).
- 9.18 The second issue is how to mobilise those CSC householders for whom the current level of subsidy has made clean heat conversion more affordable, but who are hesitant, disengaged or simply unaware of Hot Swap Loans.

Leveraging Funding

- 9.19 This research was intended to involve up to twelve interviews with stakeholders from a range of groups. In fact nineteen interviews were undertaken with property managers, installers, community service groups, community funders and other individuals concerned with housing, housing retrofit, Maori interests and the well-being of low-income households in Rotorua. Three themes emerged from the interviews with community services groups and funders regarding strategic alliances and funding opportunities. They are:
- Programmes are generally under pressure due to the international financial crisis as well as local economic recession.
 - The restructuring of Government health and welfare funding under Whanau Ora has led to uncertainty and a potentially dramatic change in the landscape of potential funding partners.
 - If the Council wishes to make strategic alliances to extend the take-up of its clean heat outcomes it will need to stabilise and strengthen key relationships.

Funding Under Pressure

- 9.20 The international and local economic recession have generated two problems, both of which combine to reduce opportunities for funding streams outside the Council. The first problem is that community trusts who fund local activities have had their income from investment radically reduced. They have, in response, tended to reduce the number and size of their funding rounds. While attempting to maintain an active investment in the community in the present, they are also working to future proof their continued investment by attempting to replenish reserves.
- 9.21 At the same time, the local economic recession has seen a rise in the demand for funding for a range of activities that already have funding from community trusts as well as among those seeking funding support for the first time.
- 9.22 In short, community funding is caught between constrained income and increasing demand. In the context of a decline and uncertainty of funds from community and government sources, some have raised the issue of whether treaty settlement might be a source of funding for a range of different programmes. Is this an option for extending assistance to CSC households to undertake clean heat conversion? In Rotorua, as elsewhere, entities managing settlement assets are engaged in concentrated and extended strategic planning processes and ultimately this must be a matter for iwi.

- 9.23 However, the Council is no doubt aware that there are considerable sensitivities about agencies attempting to target settlement assets. It must be recognised that treaty settlements are not a windfall gain for iwi. Nor are they a mechanism by which central government has chosen to invest in Maori households or welfare. Settlements are a compensation for losses associated with grievances around breaches of the Treaty of Waitangi. Settlement assets, consequently, have quite different origins and purposes than the tax and rate based funds of public agencies. They are also substantially different from the funds accumulated by charitable trusts.

Restructuring Central Government Funding

- 9.24 Uncertainties around central government funding will also limit the ability of the Council to make rapid alliances around activities that could contribute to clean air outcomes. The amounts of funding directed to Whanau Ora nationally or in Rotorua and where those funds come from, in an at best fiscally neutral environment, is unclear. It appears that some funding at least is effectively a reconfiguration and reallocation of existing social services and health monies. The resolution of who will be the consortium providers and the amount and scope of Whanau Ora funding in Rotorua has yet to be finalised. The uncertainties such as the funding around healthy housing are, in part, a reflection of these broader uncertainties.
- 9.25 The Council is, consequently, operating in a dynamic funding environment, characterised by the likely contraction of funding available and heightened demand for that funding. We have already noted that the Council may be able to encourage CSC household take-up through encouraging take-up of the Government's Rates Rebate scheme. Any other funding access is going to depend on the Council making stronger relationships with agencies concerned with ancillary interests to its own clean air outcomes.

Synergies and Key Relationships

- 9.26 There are three obvious synergies. They are, respectively, those concerned with:
- Energy efficiency;
 - Clean air; and
 - Indoor health and comfort.
- 9.27 It is notable that some years ago central government recognised that these three outcomes can be achieved through better integration between improved heating appliances and insulation. In practice the integration of government programmes across these outcomes has not always been as straight forward as might have been hoped. However, at the local level in which the Council operates, it is clear that there are community trusts focused directly on extremely low income CSC households.
- 9.28 However, those funders have a strong commitment to warm houses and/or energy efficiency and consequently, ensuring that dwellings are appropriately insulated. Obviously EECA falls into the category of organisation that is concerned with insulation because of energy efficiency. For the community trusts the interest in insulation and in energy efficiency resides in the desire to deliver affordable warm homes which are healthy. It is notable that CSC households themselves appear somewhat resistant to clean heat conversion (especially heat pump conversion) if dwelling insulation is not also improved. What EECA's role and funding around warm homes is in the future may change. But if that funding continues there are opportunities for the Council to use its current investment to leverage central Government funding around insulation.

- 9.29 For the Council, insulation can not be seen as an end in itself. It does not have specified responsibilities in this area. However, it is clear from this research that lack of insulation does inhibit some households from taking up clean heat conversion and, consequently, inhibits the Council meeting its own clean air targets.
- 9.30 Under those circumstances, partnering with an insulation programme is an option. So too, of course, is allowing residual Hot Swap Loan monies to be used for insulation contingent on clean heat conversion being achieved.
- 9.31 A more flexible approach to insulation would provide a good platform for building synergies with community funders such as the Bay Trust, the district health board and the Eastern Bay Energy Trust – all of which have had an interest in up-grading heating appliances in low income households.
- 9.32 The Council is rightly concerned to ensure that de facto it does not generate expectations that it has a statutory responsibility for either indoor health or energy efficiency. It is critical then that insulation is treated as a pathway that the Council uses to encourage clean heat conversion, not an end in or of itself.
- 9.33 Perhaps the greatest challenge, however, lies in finding common ground between agencies that have an interest in the wellbeing of CSC households through improved heating and the Council's interest in air quality outcomes. There is no inherent conflict between warm home outcomes and air quality improvement through upgrading heating appliances. However, strong views have been expressed among funders concerned with the former about the exclusion of insulation as an element of the Council's initiative. The way forward may be through developing a more holistic approach in which multiple outcomes can be leveraged to the satisfaction of all parties.

Engaging CSC Households

- 9.34 CSC households, particularly the households of the old, the very young and those that have had to face health problems, have established around them a series of networks of friends, family and supportive groups. It is engaging those networks and making them aware of the opportunities provided by Council that are most likely to raise awareness of (and provide the support for) householders wanting to access the Hot Swap Loans or indeed any other initiatives related to clean heat.
- 9.35 Critical networks that could be engaged in information provision include: church groups; CAB; PHOs; Tipu Ora; marae and iwi; Aged Concern; Grey Power; neighbourhood, community and ratepayer groups. There are a myriad of such groups. Engaging with them, however, requires building on the social marketing activities undertaken by Council to date and extending into a more community-based engagement model.
- 9.36 In addition, given the concern expressed by householders and other community stakeholders about insulation as an important component of clean heat conversion affordability, the Council could also consider working with the Healthy Housing Programme to promote clean heat conversions among low income households that have already had insulation retrofits over the last few years.

Annex A – Telephone Survey Instrument

CRESA – Rotorua Heating Survey

Research New Zealand #4163

DATE Jan 2011

Good morning/afternoon/evening, my name is **AI** from Research New Zealand. We are conducting research on behalf of CRESA (the Centre of Research, Evaluation and Social Assessment) and the Bay of Plenty Regional Council to help them better understand Rotorua's heating needs and ways in which households can best access cleaner heating.

They particularly want to talk to people aged 18 years or older who have, or are eligible for, a community services card, so not everyone we ring will be asked to participate in the full interview. Can I ask a few quick questions about your household and its heating to see if you are eligible to participate? It will only take two minutes. If you complete these questions you will be entered in a draw to receive a \$100 grocery or petrol voucher.

If you are eligible and you complete the full survey you will also be entered in a second draw for a \$100 voucher.

- ◆ The eligibility questions will take about 2 minutes. If you then go on to do the full survey, that will take around 10 minutes to complete.
- ◆ This is genuine market research. I'm not selling anything.
- ◆ Information provided is confidential. We report summary results about groups; we do not identify which individuals have said what.
- ◆ CRESA (The Centre of Research, Evaluation and Social Assessment) is a private research company whose research focuses on encouraging community development and sustainable communities. They have been commissioned to do this particular survey on behalf of the Bay of Plenty Regional Council .
- ◆ Why is the survey being done? You may be aware that the Bay of Plenty Regional Council is encouraging people to change from open fires and old solid fuel heaters to cleaner heating such as low emission wood burners and heat pumps. CRESA is looking at what would help households take-up cleaner heating
- ◆ If you have any questions about the research and wish to speak to someone at CRESA you can contact Kay or Ruth on freephone 0508 427372.
- ◆ If you would like to talk to someone at the Bay of Plenty Regional Council you can contact Marion Henton on 0800 368288.

Read This interview is being recorded for quality control and training purposes.

Updated 02 February 2011

1

Eligibility questions

Q1 First of all, can you tell me which of the following best describes your current living situation?
Please say stop when I read out the option that matches your living situation. Do you live... **Read**

- 0. Alone
- 1. With your partner or spouse but with no dependent children
- 2. As a sole parent with one child
- 3. 3 person family
- 4. 4 person family
- 5. 5 person family
- 6. 6 person family
- 7. 7 person family
- 8. 8 person family
- 9. 9 person family
- 10. 10 person family
- 11. 11 person family
- 12. 12 person family
- 13. Or are you flatting with other people **Go to Q2a**

Q2 Is your annual household income, before tax equal to or less than [insert income]...?

Insert the following figure depending on the answer to Q1:

If Q1=0: \$24,995

If Q1=1: \$37,336

If Q1=2: \$45,078

If Q1=3: \$54,589

If Q1=4: \$62,154

If Q1=5: \$69,563

If Q1=6: \$77,843

If Q1=7: \$85,138

If Q1=8: \$92,433

If Q1=9: \$99,728

If Q1=10: \$107,023

If Q1=11: \$114,318

If Q1=12: \$121,613

- 1. Yes
- 2. No **TERMINATE 1**
- 3. Don't know **TERMINATE 1**
- 4. Refused **TERMINATE 1**

Q2a: **If Q1=13 ask, else go to Q3:** Is your annual personal income, before tax equal to or less than \$23,576?

- 1. Yes
- 2. No **TERMINATE 1**
- 3. Don't know **TERMINATE 1**
- 4. Refused **TERMINATE 1**

Updated 02 February 2011

2

Q3 Do you have an enclosed solid fuel heater (such as a woodburner or multi-fuel burner) or an open fire that you use to heat your home?

1. Yes, I use a wood burner or multi-fuel burner
2. Yes, I use an open fire **Go to Q4b**
3. No **TERMINATE 2**
4. Don't know **TERMINATE 2**
5. Refused **TERMINATE 2**

Q4 Was that installed before 2005?

1. Yes
2. No **TERMINATE 3**
3. Don't know **TERMINATE 3**
4. Refused **TERMINATE 3**

Termination statement 1: Thank you for your time but for this particular survey we need to speak to people who have, or are eligible for, a community services card. However, you do qualify for the \$100 grocery or petrol voucher prize draw. If you would like to give me your name I can enter you into the draw.

Termination statement 2: Thank you for your time but for this particular survey we need to speak to people who use a wood burner or an open fire to heat their house. However, you do qualify for the \$100 grocery or petrol voucher prize draw. If you would like to give me your name I can enter you into the draw.

Termination statement 3: Thank you for your time but for this particular survey we need to speak to people who use a wood burner that was installed before 2005. However, you do qualify for the \$100 grocery or petrol voucher prize draw. If you would like to give me your name I can enter you into the draw.

Q4b Thanks for that. You do qualify for the main survey that will take about 10 minutes. Everyone who completes this will be entered into another draw for a \$100 grocery or petrol voucher. Are you happy for us to continue? **Probe for clear answer**

1. Yes, continue
2. Not now, make appointment
3. No, do not want to do the survey

Q5 What is the **main** form of home heating you use in the main living area of the house? **Code many (but only if absolutely necessary). Probe for clear answer**

1. Open fire
2. Log Burner (wood burner)
3. Wetback from log burner (wood burner)
4. Multi-fuel burner
5. Pellet burner
6. Heat pump
7. Electric bar heater (radiant heater or radiator)
8. Electric convection heater (heat bars not exposed)
9. Electric fan heater
10. Night-store heaters
11. Stand alone gas heater
12. Built in gas heater (flued)
13. Built in gas heater (unflued)
14. LPG heater (un-flued)
15. Gas under-floor heating
16. Oil fired heating system
17. Geothermal heating
18. Other **Specify**

Q5a **If Q5 does not equal 6 ask:** Do you also have a heat pump?

1. Yes
2. No
3. Don't know
4. Refused

Q6 Which of the following best describes how you heat your house? **Read**

1. I use the heater in the main living room to heat the whole house and DON'T USE heaters in other parts of the house.
2. I use the heater in the main living room to heat the whole house but I supplement it with heaters in some other parts of the house.
3. I just use the heater in the main living room to heat the main living room and DO NOT heat the rest of the house.
4. I just use the heater in the main living room to heat the main living room and I heat other parts of the house using other heaters.

Q6a **If Q6=2 or 4 go to Q6a, else go to Q7:** What sort of heaters are used in the other parts of the house? **Probe for clear answer. Code many**

1. Open fire
2. Log Burner (wood burner)
3. Wetback from log burner (wood burner)
4. Multi-fuel burner
5. Pellet burner
6. Heat pump
7. Electric bar heater (radiant heater or radiator)
8. Electric convention heater (heat bars not exposed)
9. Electric fan heater
10. Night-store heaters
11. Stand alone gas heater
12. Built in gas heater (flued)
13. Built in gas heater (unflued)
14. LPG heater (un-flued)
15. Gas under-floor heating
16. Oil fired heating system
17. Geothermal heating
- 96 Other **Specify**

Q7 **If Q5=1 or 2 ask, else go to Q8:** Do you use a log burner or open fire mainly because... **Read**

1. You can get the wood or fuel for free
2. Or at a low cost
3. Because the fire creates a nice atmosphere
4. It heats your house better than anything else
5. Or do you just use it because it's there
- 96 Other **Specify** ****Do not read****
- 98 Don't know ****Do not read****

For the next few questions, I would like you to answer as if you didn't have to worry about how much it might cost to change your heater or whether your landlord would do it or not.

Q8 If, instead of using your old woodburner or open fire, you changed to a new model of wood burner or some other heater such as a pellet burner or heat pump, how likely do you think it would be that this would...? **Read each statement Read full scale for first statement, then as necessary to clarify**

	Not at all likely	Not very likely	Somewhat likely	Very likely	Don't know **Do not read**	Refused **Do not read**
a.) Help reduce air pollution in Rotorua?	1	2	3	4	98	99
b.) Lower your heating costs?	1	2	3	4	98	99
c.) Increase warmth and comfort in your living areas in winter?	1	2	3	4	98	99
d.) Make your home healthier?	1	2	3	4	98	99
e.) Reduce mould and damp in the house?	1	2	3	4	98	99
f.) Help you achieve comfortable warmth in winter in other areas of the house, such as bedrooms?	1	2	3	4	98	99

Q9 If you knew that you could get those sort of benefits, which of the following would **MOST** motivate you to change to one of those other heating appliances instead of using your old woodburner or fire? **Read**

1. Reducing air pollution in Rotorua?
2. Lowering your heating costs?
3. Increasing warmth and comfort in your living areas in winter?
4. Making your home healthier?
5. Reducing mould and damp in the house?
6. Being able to achieve comfortable warmth in winter in other areas such as bedrooms?
7. None of them – would not change heating ****Do not read****
98. Don't know ****Do not read****

Q10 Which would be the **LEAST** important in motivating you to changing to a new model of wood burner or some other heater such as a pellet burner or a heat pump? **Read**

1. Reducing air pollution in Rotorua
2. Lowering your heating costs
3. Increasing warmth and comfort in your living areas in winter
4. Making your home healthier
5. Reducing mould and damp in the house
6. Being able to achieve comfortable warmth in winter in other areas such as bedrooms
7. All of them – would not change heating ****Do not read****
98. Don't know ****Do not read****

Now I want to talk about the financial side of changing to a new heating system, before doing so I just need to know ...

Q11 Do you own the house you are living in? **Probe for clear answer**

1. Owned by a family trust
2. Owned with a mortgage
3. Owned without a mortgage
4. Rented
5. Rent free
6. Other **Specify**

HOMEOWNERS ONLY

Q12 **If Q11=1, 2, or 3 ask, else go to Q13:** If the regional council provided interest free 'loans' for 10 years, how affordable would the following repayment options be for someone like you if your circumstances remained pretty much the same as they are now? **Read. Once respondent says "very affordable", skip to the next time frame (i.e. monthly or quarterly).**

	Not affordable at all	Hard to manage	Manageable	Very affordable	N/A (not interested at any price)	Don't know **Do not read**	Refused **Do not read**
<u>Weekly</u>							
a.) Weekly payments of \$10.20	1	2	3	4	95	98	99
b.) \$8.85 a week	1	2	3	4	95	98	99
c.) \$7.00 a week	1	2	3	4	95	98	99
d.) \$4.50 a week	1	2	3	4	95	98	99
<u>Monthly</u>							
e.) \$38 a month	1	2	3	4	95	98	99
f.) \$29 a month	1	2	3	4	95	98	99
g.) \$19 a month	1	2	3	4	95	98	99
<u>Quarterly</u>							
h.) \$115 paid four times a year with your quarterly rates bill	1	2	3	4	95	98	99
i.) \$86 paid four times a year with your quarterly rates bill	1	2	3	4	95	98	99
j.) \$57.50 paid four times a year with your quarterly rates bill	1	2	3	4	95	98	99

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TENANTS ONLY

Q13 If Q11=4 or 5 ask, else go to Q16: If you knew that the regional council could give your landlord an interest free 'loan' for 10 years, would you encourage your landlord to install a new woodburner, pellet fire or heat pump

1. Yes
2. Maybe (*Specify* what this would depend on _____)
3. No
98. Don't know

Q14 If your rent stayed the same, would you be more or less likely to stay in your flat or house if your landlord got you a new... **read**

	Less likely to stay	No difference	More likely to stay	N/A already have one	Don't know	Refused
a.) Woodburner	1	2	3	95	98	99
b.) Pellet fire	1	2	3	95	98	99
c.) Heat pump	1	2	3	95	98	99

Q15a. Thinking about your current rental, how much more rent would you be willing to pay weekly to get a new woodburner? **Read until respondent says 'yes, they would pay that amount' and then skip to Q15b**

1. \$11 per week or more
2. \$8-10.99 per week
3. \$5-7.99 per week
4. \$2-4.99. per week
5. Less than \$2 per week
97. No rent increase at all
98. Don't know ****Do not read****

Q15b. And what about for a pellet fire? **Read until respondent says 'yes, they would pay that amount' and then skip to Q15c**

1. \$11 per week or more
2. \$8-10.99 per week
3. \$5-7.99 per week
4. \$2-4.99. per week
5. Less than \$2 per week
97. No rent increase at all
98. Don't know ****Do not read****

Q15c. And for a heat pump? **Read until respondent says 'yes, they would pay that amount' and then skip to Q16**

1. \$11 per week or more
2. \$8-10.99 per week
3. \$5-7.99 per week
4. \$2-4.99. per week
5. Less than \$2 per week
97. No rent increase at all
98. Don't know ****Do not read****

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ALL PARTICIPANTS

Finally, we just want to ask you a couple of questions about your current house and circumstances:

Q16 Does anyone in your household have a community services card?

1. Yes
2. No
3. Don't know
4. Refused

Q17 How long have you been living at your current house?

1. Answer *Specify*
2. Don't know
3. Refused

Q18 Do you intend to move from your current dwelling in the next two years?

1. Yes
2. No
3. Don't know
4. Refused

Q19 Have any renovations or retrofit such as putting insulation into the ceiling or under the floor been done to your house in the last two years? **If yes:** Can you tell me what was done? **Code many – probe for clear answer**

1. Roof replacement
2. Full exterior re-paint
3. Replacement of significant amounts of exterior cladding
4. Replacement of interior cladding
5. Interior repainting and/or wallpapering
6. Carpeting
7. Polishing floors
8. Adding rooms
9. Replace bathroom whiteware
10. Replace kitchen appliances
11. Replace bathroom cabinetry
12. Replace kitchen cabinetry
13. Rewiring full or significant part of the dwelling
14. Replumbing
15. Install underfloor insulation
16. Install ceiling insulation
17. Install wall insulation
18. Install double glazing
19. Install wood burner
20. Install pellet burner
21. Install heat pump
22. Install solar hot water system
23. Install heat pump hot water system
24. Install wet back hot water system
25. Install ventilation systems, such as HRV/DVS
26. Install rainwater tank
27. Install a new hot water cylinder
28. Install a rangehood/extractor fan in the kitchen
29. Installing an extractor fan in the bathroom
30. Venting the drier to the outside
31. Installing passive vents in the windows
32. Upgrading hot water system to instant gas
33. Upgrading hot water system to solar hot water
34. Putting in a wetback hot water system
35. Installing a low flow shower head
36. Polishing floors
37. Replace laundry whiteware
38. Installing a dual flush toilet
39. Other **Specify**
97. No renovations or retrofit have been done to the house in the last two years
98. Don't know

Q20 Are you, or your landlord, intending to do any renovations in the next two years to your current house? **If yes:** Can you tell me what renovations have been planned? **Code many – probe for clear answer**

1. Roof replacement
2. Full exterior re-paint
3. Replacement of significant amounts of exterior cladding
4. Replacement of interior cladding
5. Interior repainting and/or wallpapering
6. Carpeting
7. Polishing floors
8. Adding rooms
9. Replace bathroom whiteware
10. Replace kitchen appliances
11. Replace bathroom cabinetry
12. Replace kitchen cabinetry
13. Rewiring full or significant part of the dwelling
14. Replumbing
15. Install underfloor insulation
16. Install ceiling insulation
17. Install wall insulation
18. Install double glazing
19. Install wood burner
20. Install pellet burner
21. Install heat pump
22. Install solar hot water system
23. Install heat pump hot water system
24. Install wet back hot water system
25. Install ventilation systems, such as HRV/DVS
26. Install rainwater tank
27. Install a new hot water cylinder
28. Install a rangehood/extractor fan in the kitchen
29. Installing an extractor fan in the bathroom
30. Venting the drier to the outside
31. Installing passive vents in the windows
32. Upgrading hot water system to instant gas
33. Upgrading hot water system to solar hot water
34. Putting in a wetback hot water system
35. Installing a low flow shower head
36. Polishing floors
37. Replace laundry whiteware
38. Installing a dual flush toilet
39. Other **Specify**
97. Not intending to do any renovations or retrofit to the house
98. Don't know

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Closing Questions

Q21 Thanks for that. Now before I go, do you have any other comments you'd like to make about the subject of this interview?

- 1 Comments **Specify**
- 2 No

Q22 May I please confirm your name in case my supervisor needs to check on the quality of this interview? **Record first and last name**

Those are all the questions I have. Thank you very much for your help. My name is **Q01V** from Research New Zealand. If you have enquiries about this survey, please ring the Project Manager, Katrina Fryer, on our toll-free number: 0800 500 168. (Wellington respondents 499-3088)

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Annex B – Frequency Tables from Telephone Survey

**Q1# Q1. First of all, can you tell me which of the following best describes your current living situation?
Please say stop when I read out the option that matches your living situation. Do you live... READ**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Alone	45	17.9	17.9	17.9
	With your partner or spouse but with no dependent children	67	26.6	26.6	44.4
	As a sole parent with one child	16	6.3	6.3	50.8
	3 person family	33	13.1	13.1	63.9
	4 person family	43	17.1	17.1	81.0
	5 person family	29	11.5	11.5	92.5
	6 person family	12	4.8	4.8	97.2
	7 person family	2	.8	.8	98.0
	8 person family	2	.8	.8	98.8
	9 person family	1	.4	.4	99.2
	Or are you flatting with other people	2	.8	.8	100.0
	Total	252	100.0	100.0	

recodeQ2 REcodeQ2. Is your annual household income, before tax equal to or less than {Q2ins}?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes - CSC eligible	252	100.0	100.0	100.0

Q3# Q3. Do you have an enclosed solid fuel heater (such as a woodburner or multi-fuel burner) or an open fire that you use to heat your home?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes, I use a wood burner or multi-fuel burner	226	89.7	89.7	89.7
	Yes, I use an open fire	26	10.3	10.3	100.0
	Total	252	100.0	100.0	

Q4# Q4. Was that installed before 2005?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	226	89.7	100.0	100.0
Missing	n/a - has an open fire not a wood burner	26	10.3		
Total		252	100.0		

Q5recode What is the MAIN form of home heating used in the main living area of the house

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	open fire	14	5.6	5.6	5.6
	log burner (wood burner)	169	67.1	67.1	72.6
	wetback from log burner	14	5.6	5.6	78.2
	multi-fuel burner	1	.4	.4	78.6
	pellet burner	2	.8	.8	79.4
	heat pump	13	5.2	5.2	84.5
	electric bar heater	2	.8	.8	85.3
	stand alone gas heater	3	1.2	1.2	86.5
	built-in gas heater flued	4	1.6	1.6	88.1
	built-in gas heater (unflued)	2	.8	.8	88.9
	LPG heater (unflued)	3	1.2	1.2	90.1
	Gas under-floor heating	2	.8	.8	90.9
	open fire and an LPG heater (unflued)	2	.8	.8	91.7
	open fire and a log burner	1	.4	.4	92.1
	log burner plus a heat pump	10	4.0	4.0	96.0
	log burner and electric convention heater	1	.4	.4	96.4
	log burner plus electric bar heater	1	.4	.4	96.8
	log burner and a stand alone gas heater	3	1.2	1.2	98.0
	log burner plus other	1	.4	.4	98.4
	log burner plus built in gas heaters	1	.4	.4	98.8
	heat pump and night store	1	.4	.4	99.2
	gas heaters flued and unflued	2	.8	.8	100.0
	Total	252	100.0	100.0	

Q5a# Q5a. Do you also have a heat pump?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	47	18.7	18.7	18.7
	No	205	81.3	81.3	100.0
	Total	252	100.0	100.0	

Q6# Q6. Which of the following best describes how you heat your house? READ

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I use the heater in the main living room to heat the whole house and DON'T USE heaters in other parts of the house.	140	55.6	55.6	55.6
	I use the heater in the main living room to heat the whole house but I supplement it with heaters in some other parts of	47	18.7	18.7	74.2
	I just use the heater in the main living room to heat the main living room and DO NOT heat the rest of the house.	26	10.3	10.3	84.5
	I just use the heater in the main living room to heat the main living room and I heat other parts of the house using other heaters	39	15.5	15.5	100.0
	Total	252	100.0	100.0	

Q6a#A Open fire

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	84	33.3	98.8	98.8
	Yes	1	.4	1.2	100.0
	Total	85	33.7	100.0	
Missing	n/a - either does not heat the rest of the house or heater in main living room heats whole house	166	65.9		
	missing	1	.4		
	Total	167	66.3		
Total		252	100.0		

Q6a#B Log Burner (wood burner)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	82	32.5	96.5	96.5
	Yes	3	1.2	3.5	100.0
	Total	85	33.7	100.0	
Missing	n/a - either does not heat the rest of the house or heater in main living room heats whole house	166	65.9		
	missing	1	.4		
	Total	167	66.3		
Total		252	100.0		

Q6a#C Wetback from log burner (wood burner)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	84	33.3	98.8	98.8
	Yes	1	.4	1.2	100.0
	Total	85	33.7	100.0	
Missing	n/a - either does not heat the rest of the house or heater in main living room heats whole house	166	65.9		
	missing	1	.4		
	Total	167	66.3		
Total		252	100.0		

Q6a#D Multi-fuel burner

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	85	33.7	100.0	100.0
Missing	n/a - either does not heat the rest of the house or heater in main living room heats whole house	166	65.9		
	missing	1	.4		
	Total	167	66.3		
Total		252	100.0		

Q6a#E Pellet burner

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	85	33.7	100.0	100.0
Missing	n/a - either does not heat the rest of the house or heater in main living room heats whole house	166	65.9		
	missing	1	.4		
	Total	167	66.3		
Total		252	100.0		

Q6a#F Heat pump

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	69	27.4	81.2	81.2
	Yes	16	6.3	18.8	100.0
	Total	85	33.7	100.0	
Missing	n/a - either does not heat the rest of the house or heater in main living room heats whole house	166	65.9		
	missing	1	.4		
	Total	167	66.3		
Total		252	100.0		

Q6a#G Electric bar heater (radiant heater or radiator)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	78	31.0	91.8	91.8
	Yes	7	2.8	8.2	100.0
	Total	85	33.7	100.0	
Missing	n/a - either does not heat the rest of the house or heater in main living room heats whole house	166	65.9		
	missing	1	.4		
	Total	167	66.3		
Total		252	100.0		

Q6a#H Electric convention heater (heat bars not exposed)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	70	27.8	82.4	82.4
	Yes	15	6.0	17.6	100.0
	Total	85	33.7	100.0	
Missing	n/a - either does not heat the rest of the house or heater in main living room heats whole house	166	65.9		
	missing	1	.4		
	Total	167	66.3		
Total		252	100.0		

Q6a#I Electric fan heater

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	69	27.4	81.2	81.2
	Yes	16	6.3	18.8	100.0
	Total	85	33.7	100.0	
Missing	n/a - either does not heat the rest of the house or heater in main living room heats whole house	166	65.9		
	missing	1	.4		
	Total	167	66.3		
Total		252	100.0		

Q6a#J Night-store heaters

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	84	33.3	98.8	98.8
	Yes	1	.4	1.2	100.0
	Total	85	33.7	100.0	
Missing	n/a - either does not heat the rest of the house or heater in main living room heats whole house	166	65.9		
	missing	1	.4		
	Total	167	66.3		
Total		252	100.0		

Q6a#K Stand alone gas heater

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	74	29.4	87.1	87.1
	Yes	11	4.4	12.9	100.0
	Total	85	33.7	100.0	
Missing	n/a - either does not heat the rest of the house or heater in main living room heats whole house	166	65.9		
	missing	1	.4		
	Total	167	66.3		
Total		252	100.0		

Q6a#L Built in gas heater (flued)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	83	32.9	97.6	97.6
	Yes	2	.8	2.4	100.0
	Total	85	33.7	100.0	
Missing	n/a - either does not heat the rest of the house or heater in main living room heats whole house	166	65.9		
	missing	1	.4		
	Total	167	66.3		
Total		252	100.0		

Q6a#M Built in gas heater (unflued)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	83	32.9	97.6	97.6
	Yes	2	.8	2.4	100.0
	Total	85	33.7	100.0	
Missing	n/a - either does not heat the rest of the house or heater in main living room heats whole house	166	65.9		
	missing	1	.4		
	Total	167	66.3		
Total		252	100.0		

Q6a#N LPG heater (un-flued)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	78	31.0	91.8	91.8
	Yes	7	2.8	8.2	100.0
	Total	85	33.7	100.0	
Missing	n/a - either does not heat the rest of the house or heater in main living room heats whole house	166	65.9		
	missing	1	.4		
	Total	167	66.3		
Total		252	100.0		

Q6a#O Gas under-floor heating

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	84	33.3	98.8	98.8
	Yes	1	.4	1.2	100.0
	Total	85	33.7	100.0	
Missing	n/a - either does not heat the rest of the house or heater in main living room heats whole house	166	65.9		
	missing	1	.4		
	Total	167	66.3		
Total		252	100.0		

Q6a#P Oil fired heating system

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	72	28.6	84.7	84.7
	Yes	13	5.2	15.3	100.0
	Total	85	33.7	100.0	
Missing	n/a - either does not heat the rest of the house or heater in main living room heats whole house	166	65.9		
	missing	1	.4		
	Total	167	66.3		
Total		252	100.0		

Q6a#Q Geothermal heating

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	85	33.7	100.0	100.0
Missing	n/a - either does not heat the rest of the house or heater in main living room heats whole house	166	65.9		
	missing	1	.4		
	Total	167	66.3		
Total		252	100.0		

Q6a#CR Other (Specify)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	78	31.0	91.8	91.8
	Yes	7	2.8	8.2	100.0
	Total	85	33.7	100.0	
Missing	n/a - either does not heat the rest of the house or heater in main living room heats whole house	166	65.9		
	missing	1	.4		
	Total	167	66.3		
Total		252	100.0		

Q6a#CR_verb

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		245	97.2	97.2	97.2
	Chip Burner	2	.8	.8	98.0
	Gas cylinder.	1	.4	.4	98.4
	Heat transfer system, via ducts and thermostat and an HRV system.	1	.4	.4	98.8
	HRV	2	.8	.8	99.6
	Square eco heater.	1	.4	.4	100.0
	Total	252	100.0	100.0	

Q7# Q7. Do you use a log burner or open fire mainly because... READ

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	You can get the wood or fuel for free	41	16.3	20.3	20.3
	Or at a low cost	33	13.1	16.3	36.6
	Because the fire creates a nice atmosphere	14	5.6	6.9	43.6
	It heats your house better than anything else	49	19.4	24.3	67.8
	Or do you just use it because it's there	55	21.8	27.2	95.0
	multiple benefits	8	3.2	4.0	99.0
	water heating	2	.8	1.0	100.0
	Total	202	80.2	100.0	
Missing	n/a no log burner or open fire used	50	19.8		
Total		252	100.0		

Q8#A Help reduce air pollution in Rotorua?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not at all likely	23	9.1	9.5	9.5
	Not very likely	34	13.5	14.1	23.7
	Somewhat likely	76	30.2	31.5	55.2
	Very likely	108	42.9	44.8	100.0
	Total	241	95.6	100.0	
Missing	missing	2	.8		
	Don't know	8	3.2		
	Refused	1	.4		
	Total	11	4.4		
Total		252	100.0		

Q8#B Lower your heating costs?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not at all likely	80	31.7	36.2	36.2
	Not very likely	63	25.0	28.5	64.7
	Somewhat likely	33	13.1	14.9	79.6
	Very likely	45	17.9	20.4	100.0
	Total	221	87.7	100.0	
Missing	missing	2	.8		
	Don't know	28	11.1		
	Refused	1	.4		
	Total	31	12.3		
Total		252	100.0		

Q8#C Increase warmth and comfort in your living areas in winter?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not at all likely	57	22.6	24.7	24.7
	Not very likely	44	17.5	19.0	43.7
	Somewhat likely	58	23.0	25.1	68.8
	Very likely	72	28.6	31.2	100.0
	Total	231	91.7	100.0	
Missing	missing	2	.8		
	Don't know	18	7.1		
	Refused	1	.4		
	Total	21	8.3		
Total		252	100.0		

Q8#D Make your home healthier?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not at all likely	55	21.8	24.3	24.3
	Not very likely	44	17.5	19.5	43.8
	Somewhat likely	48	19.0	21.2	65.0
	Very likely	79	31.3	35.0	100.0
	Total	226	89.7	100.0	
Missing	missing	2	.8		
	Don't know	23	9.1		
	Refused	1	.4		
	Total	26	10.3		
Total		252	100.0		

Q8#E Reduce mould and damp in the house?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not at all likely	75	29.8	33.2	33.2
	Not very likely	45	17.9	19.9	53.1
	Somewhat likely	44	17.5	19.5	72.6
	Very likely	62	24.6	27.4	100.0
	Total	226	89.7	100.0	
Missing	missing	2	.8		
	Don't know	23	9.1		
	Refused	1	.4		
	Total	26	10.3		
Total		252	100.0		

Q8#F Help you achieve comfortable warmth in winter in other areas of the house, such as bedrooms?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not at all likely	56	22.2	23.8	23.8
	Not very likely	41	16.3	17.4	41.3
	Somewhat likely	59	23.4	25.1	66.4
	Very likely	79	31.3	33.6	100.0
	Total	235	93.3	100.0	
Missing	missing	2	.8		
	Don't know	13	5.2		
	Refused	2	.8		
	Total	17	6.7		
Total		252	100.0		

Q9# Q9. If you knew that you could get those sort of benefits, which of the following would MOST motivate you to change to one of those other heating appliances instead of using your old woodburner or fire? READ

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Reducing air pollution in Rotorua?	30	11.9	14.8	14.8
	Lowering your heating costs?	60	23.8	29.6	44.3
	Increasing warmth and comfort in your living areas in winter?	25	9.9	12.3	56.7
	Making your home healthier?	27	10.7	13.3	70.0
	Reducing mould and damp in the house?	19	7.5	9.4	79.3
	Being able to achieve comfortable warmth in winter in other areas such as bedrooms?	42	16.7	20.7	100.0
	Total	203	80.6	100.0	
Missing	missing	2	.8		
	None of them – would not change heating	42	16.7		
	Don't know	5	2.0		
	Total	49	19.4		
Total		252	100.0		

Q10# Q10. Which would be the LEAST important in motivating you to changing to a new model of wood burner or some other heater such as a pellet burner or a heat pump? READ

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Reducing air pollution in Rotorua	55	21.8	29.7	29.7
	Lowering your heating costs	42	16.7	22.7	52.4
	Increasing warmth and comfort in your living areas in winter	21	8.3	11.4	63.8
	Making your home healthier	7	2.8	3.8	67.6
	Reducing mould and damp in the house	31	12.3	16.8	84.3
	Being able to achieve comfortable warmth in winter in other areas such as bedrooms	29	11.5	15.7	100.0
	Total	185	73.4	100.0	
Missing	All of them – would not change heating	37	14.7		
	missing	2	.8		
	Don't know	28	11.1		
	Total	67	26.6		
Total		252	100.0		

Q11# Now I want to talk about the financial side of changing to a new heating system, but before doing so I just need to know...

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Owned by a family trust	10	4.0	4.0	4.0
	Owned with a mortgage	106	42.1	42.9	47.0
	Owned without a mortgage	90	35.7	36.4	83.4
	Rented	36	14.3	14.6	98.0
	Rent free	5	2.0	2.0	100.0
	Total	247	98.0	100.0	
Missing	missing	5	2.0		
Total		252	100.0		

Q12#A Weekly payments of \$10.20 : {Q12ins}

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not affordable at all	16	6.3	8.0	8.0
	Hard to manage	24	9.5	11.9	19.9
	Manageable	83	32.9	41.3	61.2
	Very affordable	59	23.4	29.4	90.5
	N/A (not interested at any price)	19	7.5	9.5	100.0
	Total	201	79.8	100.0	
Missing	n/a - not a homeowner	41	16.3		
	missing	6	2.4		
	Don't know	2	.8		
	Refused	2	.8		
	Total	51	20.2		
Total		252	100.0		

Q12#B \$8.85 a week : {Q12ins}

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not affordable at all	11	4.4	5.5	5.5
	Hard to manage	18	7.1	9.0	14.5
	Manageable	63	25.0	31.5	46.0
	Very affordable	41	16.3	20.5	66.5
	already said affordable to a higher price so this is also affordable	50	19.8	25.0	91.5
	N/A (not interested at any price)	17	6.7	8.5	100.0
	Total	200	79.4	100.0	
Missing	n/a - not a homeowner	41	16.3		
	missing	6	2.4		
	Don't know	3	1.2		
	Refused	2	.8		
	Total	52	20.6		
Total		252	100.0		

Q12#C \$7.00 a week : {Q12ins}

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not affordable at all	11	4.4	5.5	5.5
	Hard to manage	5	2.0	2.5	8.0
	Manageable	51	20.2	25.6	33.7
	Very affordable	31	12.3	15.6	49.2
	already said affordable to a higher price so this is also affordable	82	32.5	41.2	90.5
	N/A (not interested at any price)	19	7.5	9.5	100.0
	Total	199	79.0	100.0	
Missing	n/a - not a homeowner	41	16.3		
	missing	6	2.4		
	Don't know	4	1.6		
	Refused	2	.8		
	Total	53	21.0		
Total		252	100.0		

Q12#D \$4.50 a week : {Q12ins}

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not affordable at all	7	2.8	3.5	3.5
	Hard to manage	2	.8	1.0	4.5
	Manageable	26	10.3	13.1	17.6
	Very affordable	47	18.7	23.6	41.2
	already said affordable to a higher price so this is also affordable	99	39.3	49.7	91.0
	N/A (not interested at any price)	18	7.1	9.0	100.0
	Total	199	79.0	100.0	
Missing	n/a - not a homeowner	41	16.3		
	missing	6	2.4		
	Don't know	4	1.6		
	Refused	2	.8		
	Total	53	21.0		
Total		252	100.0		

Q12#E \$38 a month : {Q12ins}

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not affordable at all	25	9.9	12.8	12.8
	Hard to manage	24	9.5	12.3	25.1
	Manageable	71	28.2	36.4	61.5
	Very affordable	55	21.8	28.2	89.7
	N/A (not interested at any price)	20	7.9	10.3	100.0
	Total	195	77.4	100.0	
Missing	n/a - not a homeowner	41	16.3		
	missing	6	2.4		
	Don't know	7	2.8		
	Refused	3	1.2		
	Total	57	22.6		
Total		252	100.0		

Q12#F \$29 a month : {Q12ins}

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not affordable at all	16	6.3	8.1	8.1
	Hard to manage	21	8.3	10.6	18.7
	Manageable	65	25.8	32.8	51.5
	Very affordable	29	11.5	14.6	66.2
	already said affordable to a higher price so this is also affordable	48	19.0	24.2	90.4
	N/A (not interested at any price)	19	7.5	9.6	100.0
	Total	198	78.6	100.0	
Missing	n/a - not a homeowner	41	16.3		
	missing	6	2.4		
	Don't know	4	1.6		
	Refused	3	1.2		
	Total	54	21.4		
Total		252	100.0		

Q12#G \$19 a month : {Q12ins}

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not affordable at all	10	4.0	5.1	5.1
	Hard to manage	8	3.2	4.0	9.1
	Manageable	46	18.3	23.2	32.3
	Very affordable	49	19.4	24.7	57.1
	already said affordable to a higher price so this is also affordable	66	26.2	33.3	90.4
	N/A (not interested at any price)	19	7.5	9.6	100.0
	Total	198	78.6	100.0	
Missing	n/a - not a homeowner	41	16.3		
	missing	6	2.4		
	Don't know	4	1.6		
	Refused	3	1.2		
	Total	54	21.4		
Total		252	100.0		

Q12#H \$115 paid four times a year with your quarterly rates bill : {Q12ins}

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not affordable at all	36	14.3	18.3	18.3
	Hard to manage	41	16.3	20.8	39.1
	Manageable	56	22.2	28.4	67.5
	Very affordable	41	16.3	20.8	88.3
	N/A (not interested at any price)	23	9.1	11.7	100.0
	Total	197	78.2	100.0	
Missing	n/a - not a homeowner	41	16.3		
	missing	6	2.4		
	Don't know	5	2.0		
	Refused	3	1.2		
	Total	55	21.8		
Total		252	100.0		

Q12#I \$86 paid four times a year with your quarterly rates bill : {Q12ins}

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not affordable at all	20	7.9	10.2	10.2
	Hard to manage	35	13.9	17.9	28.1
	Manageable	63	25.0	32.1	60.2
	Very affordable	18	7.1	9.2	69.4
	already said affordable to a higher price so this is also affordable	38	15.1	19.4	88.8
	N/A (not interested at any price)	22	8.7	11.2	100.0
	Total	196	77.8	100.0	
Missing	n/a - not a homeowner	41	16.3		
	missing	6	2.4		
	Don't know	5	2.0		
	Refused	4	1.6		
	Total	56	22.2		
Total		252	100.0		

Q12#J \$57.50 paid four times a year with your quarterly rates bill : {Q12ins}

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not affordable at all	13	5.2	6.6	6.6
	Hard to manage	12	4.8	6.1	12.8
	Manageable	57	22.6	29.1	41.8
	Very affordable	39	15.5	19.9	61.7
	already said affordable to a higher price so this is also affordable	52	20.6	26.5	88.3
	N/A (not interested at any price)	23	9.1	11.7	100.0
	Total	196	77.8	100.0	
Missing	n/a - not a homeowner	41	16.3		
	missing	6	2.4		
	Don't know	5	2.0		
	Refused	4	1.6		
	Total	56	22.2		
Total		252	100.0		

Q13# Q13. If you knew that the regional council could give your landlord an interest free 'loan' for 10 years, would you encourage your landlord to install a new woodburner, pellet fire or heat pump?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	24	9.5	63.2	63.2
	Maybe	3	1.2	7.9	71.1
	No	11	4.4	28.9	100.0
	Total	38	15.1	100.0	
Missing	n/a not a renter	205	81.3		
	missing	6	2.4		
	Don't know	1	.4		
	has a heat pump already or in the process of having one installed	2	.8		
	Total	214	84.9		
Total		252	100.0		

Q14#A Woodburner

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No difference	11	4.4	27.5	27.5
	More likely to stay	29	11.5	72.5	100.0
	Total	40	15.9	100.0	
Missing	not a renter	205	81.3		
	missing	6	2.4		
	Don't know	1	.4		
	Total	212	84.1		
Total		252	100.0		

Q14#B Pellet fire

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less likely to stay	6	2.4	16.7	16.7
	No difference	18	7.1	50.0	66.7
	More likely to stay	11	4.4	30.6	97.2
	N/A (already have one)	1	.4	2.8	100.0
	Total	36	14.3	100.0	
Missing	not a renter	205	81.3		
	missing	6	2.4		
	Don't know	5	2.0		
	Total	216	85.7		
Total		252	100.0		

Q14#C Heat pump

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less likely to stay	5	2.0	12.8	12.8
	No difference	10	4.0	25.6	38.5
	More likely to stay	22	8.7	56.4	94.9
	N/A (already have one)	2	.8	5.1	100.0
	Total	39	15.5	100.0	
Missing	not a renter	205	81.3		
	missing	6	2.4		
	Don't know	2	.8		
	Total	213	84.5		
Total		252	100.0		

Q15a# Q15a. Thinking about your current rental, how much more rent would you be willing to pay weekly to get a new woodburner? READ UNTIL RESPONDENT SAYS 'YES, THEY WOULD PAY THAT AMOUNT'

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	\$11 per week or more	12	4.8	44.4	44.4
	\$8-10.99 per week	8	3.2	29.6	74.1
	\$5-7.99 per week	4	1.6	14.8	88.9
	\$2-4.99. per week	1	.4	3.7	92.6
	Less than \$2 per week	2	.8	7.4	100.0
	Total	27	10.7	100.0	
Missing	not a renter	205	81.3		
	No rent increase at all	14	5.6		
	missing	6	2.4		
	Total	225	89.3		
Total		252	100.0		

Q15b# Q15b. And what about for a pellet fire? READ UNTIL RESPONDENT SAYS 'YES, THEY WOULD PAY THAT AMOUNT'

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	\$11 per week or more	6	2.4	26.1	26.1
	\$8-10.99 per week	4	1.6	17.4	43.5
	\$5-7.99 per week	7	2.8	30.4	73.9
	\$2-4.99. per week	3	1.2	13.0	87.0
	Less than \$2 per week	3	1.2	13.0	100.0
	Total	23	9.1	100.0	
Missing	not a renter	205	81.3		
	No rent increase at all	16	6.3		
	Don't know	2	.8		
	missing	6	2.4		
	Total	229	90.9		
Total		252	100.0		

Q15c# Q15c. And for a heat pump? READ UNTIL RESPONDENT SAYS 'YES, THEY WOULD PAY THAT AMOUNT'

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	\$11 per week or more	13	5.2	52.0	52.0
	\$8-10.99 per week	4	1.6	16.0	68.0
	\$5-7.99 per week	3	1.2	12.0	80.0
	\$2-4.99. per week	3	1.2	12.0	92.0
	Less than \$2 per week	2	.8	8.0	100.0
	Total	25	9.9	100.0	
Missing	not a renter	205	81.3		
	No rent increase at all	13	5.2		
	Don't know	3	1.2		
	missing	6	2.4		
	Total	227	90.1		
Total		252	100.0		

Q16# Q16. Does anyone in your household have a community services card?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	177	70.2	71.1	71.1
	No	72	28.6	28.9	100.0
	Total	249	98.8	100.0	
Missing	missing	2	.8		
	Don't know	1	.4		
	Total	3	1.2		
Total		252	100.0		

Q17recode Q17. How long have you been living at your current house? (years)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than 1 year	12	4.8	4.8	4.8
	1	9	3.6	3.6	8.4
	2	10	4.0	4.0	12.4
	3	13	5.2	5.2	17.7
	4	17	6.7	6.8	24.5
	5	16	6.3	6.4	30.9
	6	17	6.7	6.8	37.8
	7	10	4.0	4.0	41.8
	8	8	3.2	3.2	45.0
	9	7	2.8	2.8	47.8
	10	14	5.6	5.6	53.4
	11	2	.8	.8	54.2
	12	9	3.6	3.6	57.8

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	13	4	1.6	1.6	59.4
	14	5	2.0	2.0	61.4
	15	10	4.0	4.0	65.5
	16	7	2.8	2.8	68.3
	17	7	2.8	2.8	71.1
	18	5	2.0	2.0	73.1
	19	2	.8	.8	73.9
	20	9	3.6	3.6	77.5
	21	2	.8	.8	78.3
	23	1	.4	.4	78.7
	24	2	.8	.8	79.5
	25	3	1.2	1.2	80.7
	26	1	.4	.4	81.1
	27	2	.8	.8	81.9
	28	2	.8	.8	82.7
	29	3	1.2	1.2	83.9
	30	5	2.0	2.0	85.9
	31	2	.8	.8	86.7
	32	3	1.2	1.2	88.0
	34	1	.4	.4	88.4
	35	2	.8	.8	89.2
	36	1	.4	.4	89.6
	37	1	.4	.4	90.0
	40	11	4.4	4.4	94.4
	42	1	.4	.4	94.8
	43	3	1.2	1.2	96.0
	44	1	.4	.4	96.4
	46	3	1.2	1.2	97.6
	47	1	.4	.4	98.0
	48	1	.4	.4	98.4
	49	1	.4	.4	98.8
	50	1	.4	.4	99.2
	55	1	.4	.4	99.6
	60	1	.4	.4	100.0
	Total	249	98.8	100.0	
Missing	missing	3	1.2		
Total		252	100.0		

Q18# Q18. Do you intend to move from your current dwelling in the next two years?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	50	19.8	21.1	21.1
	No	187	74.2	78.9	100.0
	Total	237	94.0	100.0	
Missing	missing	2	.8		
	Don't know	13	5.2		
	Total	15	6.0		
Total		252	100.0		

Q19#A Roof replacement

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	248	98.4	99.2	99.2
	Yes	2	.8	.8	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q19#B Full exterior re-paint

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q19#C Replacement of significant amounts of exterior cladding

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q19#D Replacement of interior cladding

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	249	98.8	99.6	99.6
	Yes	1	.4	.4	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q19#E Interior repainting and/or wallpapering

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	245	97.2	98.0	98.0
	Yes	5	2.0	2.0	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q19#F Carpeting

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	249	98.8	99.6	99.6
	Yes	1	.4	.4	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q19#G Polishing floors

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q19#H Adding rooms

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	248	98.4	99.2	99.2
	Yes	2	.8	.8	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q19#I Replace bathroom whiteware

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	248	98.4	99.2	99.2
	Yes	2	.8	.8	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q19#J Replace kitchen appliances

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	246	97.6	98.4	98.4
	Yes	4	1.6	1.6	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q19#K Replace bathroom cabinetry

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	249	98.8	99.6	99.6
	Yes	1	.4	.4	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q19#L Replace kitchen cabinetry

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	249	98.8	99.6	99.6
	Yes	1	.4	.4	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q19#M Rewiring full or significant part of the dwelling

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q19#N Replumbing

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q19#O Install underfloor insulation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	217	86.1	86.8	86.8
	Yes	33	13.1	13.2	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q19#P Install ceiling insulation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	205	81.3	82.0	82.0
	Yes	45	17.9	18.0	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q19#Q Install wall insulation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	240	95.2	96.0	96.0
	Yes	10	4.0	4.0	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q19#R Install double glazing

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	248	98.4	99.2	99.2
	Yes	2	.8	.8	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q19#S Install wood burner

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q19#T Install pellet burner

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q19#U Install heat pump

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	245	97.2	98.0	98.0
	Yes	5	2.0	2.0	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q19#V Install solar hot water system

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	248	98.4	99.2	99.2
	Yes	2	.8	.8	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q19#W Install heat pump hot water system

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	249	98.8	99.6	99.6
	Yes	1	.4	.4	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q19#X Install wet back hot water system

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q19#Y Install ventilation systems, such as HRV/DVS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	245	97.2	98.0	98.0
	Yes	5	2.0	2.0	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q19#Z Install rainwater tank

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q19#AA Install a new hot water cylinder

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q19#AB Install a rangehood/extractor fan in the kitchen

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q19#AC Installing an extractor fan in the bathroom

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	249	98.8	99.6	99.6
	Yes	1	.4	.4	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q19#AD Venting the drier to the outside

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q19#AE Installing passive vents in the windows

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q19#AF Upgrading hot water system to instant gas

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q19#AG Upgrading hot water system to solar hot water

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q19#AH Putting in a wetback hot water system

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q19#AI Installing a low flow shower head

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q19#AJ Polishing floors

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q19#AK Replace laundry whiteware

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	248	98.4	99.2	99.2
	Yes	2	.8	.8	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q19#AL Installing a dual flush toilet

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q19#CR Other (Specify)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	219	86.9	87.6	87.6
	Yes	31	12.3	12.4	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q19#CS No renovations or retrofit have been done to the house in the last two years

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	89	35.3	35.6	35.6
	Yes	161	63.9	64.4	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q19#CT Don't know

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	248	98.4	99.2	99.2
	Yes	2	.8	.8	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q20#A Roof replacement

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	247	98.0	98.8	98.8
	Yes	3	1.2	1.2	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q20#B Full exterior re-paint

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	237	94.0	94.8	94.8
	Yes	13	5.2	5.2	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q20#C Replacement of significant amounts of exterior cladding

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q20#D Replacement of interior cladding

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	248	98.4	99.2	99.2
	Yes	2	.8	.8	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q20#E Interior repainting and/or wallpapering

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	236	93.7	94.4	94.4
	Yes	14	5.6	5.6	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q20#F Carpeting

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	245	97.2	98.0	98.0
	Yes	5	2.0	2.0	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q20#G Polishing floors

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q20#H Adding rooms

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	249	98.8	99.6	99.6
	Yes	1	.4	.4	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q20#I Replace bathroom whiteware

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	245	97.2	98.0	98.0
	Yes	5	2.0	2.0	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q20#J Replace kitchen appliances

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	247	98.0	98.8	98.8
	Yes	3	1.2	1.2	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q20#K Replace bathroom cabinetry

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	247	98.0	98.8	98.8
	Yes	3	1.2	1.2	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q20#L Replace kitchen cabinetry

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	248	98.4	99.2	99.2
	Yes	2	.8	.8	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q20#M Rewiring full or significant part of the dwelling

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	248	98.4	99.2	99.2
	Yes	2	.8	.8	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q20#N Replumbing

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q20#O Install underfloor insulation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	235	93.3	94.0	94.0
	Yes	15	6.0	6.0	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q20#P Install ceiling insulation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	240	95.2	96.0	96.0
	Yes	10	4.0	4.0	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q20#Q Install wall insulation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	244	96.8	97.6	97.6
	Yes	6	2.4	2.4	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q20#R Install double glazing

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	246	97.6	98.4	98.4
	Yes	4	1.6	1.6	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q20#S Install wood burner

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	245	97.2	98.0	98.0
	Yes	5	2.0	2.0	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q20#T Install pellet burner

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q20#U Install heat pump

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	242	96.0	96.8	96.8
	Yes	8	3.2	3.2	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q20#V Install solar hot water system

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q20#W Install heat pump hot water system

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q20#X Install wet back hot water system

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q20#Y Install ventilation systems, such as HRV/DVS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	248	98.4	99.2	99.2
	Yes	2	.8	.8	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q20#Z Install rainwater tank

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q20#AA Install a new hot water cylinder

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q20#AB Install a rangehood/extractor fan in the kitchen

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q20#AC Installing an extractor fan in the bathroom

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q20#AD Venting the drier to the outside

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q20#AE Installing passive vents in the windows

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q20#AF Upgrading hot water system to instant gas

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q20#AG Upgrading hot water system to solar hot water

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q20#AH Putting in a wetback hot water system

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q20#AI Installing a low flow shower head

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q20#AJ Polishing floors

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q20#AK Replace laundry whiteware

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q20#AL Installing a dual flush toilet

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	250	99.2	100.0	100.0
Missing	missing	2	.8		
Total		252	100.0		

Q20#CR Other (Specify)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	210	83.3	84.0	84.0
	Yes	40	15.9	16.0	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q20#CS Not intending to do any renovations or retrofit to the house

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	101	40.1	40.4	40.4
	Yes	149	59.1	59.6	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Q20#CT Don't know

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	239	94.8	95.6	95.6
	Yes	11	4.4	4.4	100.0
	Total	250	99.2	100.0	
Missing	missing	2	.8		
Total		252	100.0		

Annex C – Rates Rebate Eligibility Examples

Example 1

A couple where both partners qualify for New Zealand Superannuation (estimated income of \$28,457 in 2009/10), and receive no other income, would be eligible for a rebate as shown below:

Level of rates	Estimated rebate
\$1200	\$0
\$1350	\$29
\$1500	\$129
\$1800	\$329
\$2000	\$462
\$2170	\$570

Example 2

A single person receiving New Zealand Superannuation, living alone (estimated income of \$18,954 in 2009/10), and receive no other income, would be eligible for a rebate as shown below:

Level of rates	Estimated rebate
\$600	\$293
\$900	\$493
\$1015	\$570
\$1200	\$570
\$1500	\$570

Example 3

A household with an income of \$21,000 and one or two dependants would be eligible for a rebate as shown below:

Level of rates	Estimated rebate with 1 dependant	Estimated rebate with 2 dependants
\$600	\$293	\$293
\$900	\$493	\$493
\$1050	\$570	\$570
\$1200	\$570	\$570
\$1500	\$570	\$570

Example 4

A household with an income of \$28,000 and one or two dependants would be eligible for a rebate as shown below:

Level of rates	Estimated rebate with 1 dependant	Estimated rebate with 2 dependants
\$900	\$0	\$0
\$1200	\$48	\$111
\$1500	\$248	\$311
\$1800	\$448	\$511
\$2000	\$570	\$570

Source: http://www.dia.govt.nz/diawebsite.nsf/wpg_URL/Services-Rates-Rebate-Scheme-Rebate-eligibility-examples

Annex D – Calculation of Operating Costs, Payback Periods and Durability

Operating Costs, Payback Periods and Durability – Heating appliances in Rotorua for Low Income Households¹⁸

	Heat pump	Pellet burner	Wood burner	Flued gas heater	Electric plug in heater
Approximate operating costs	9 cents/kWh 11 cents/ kWh (low user)	16 cents/kWh	10 cents/kWh	23 cents/kWh	19 cents/kWh, 29 cents/kWh (low user)
Payback Living room heating only	6 to 9 years	10 to 16 years	6 to 10 years	13 to 37 years	N/A Electrical heater is the payback baseline
Payback Heating 80% of house	5 to 8 years	5 to 8 years	3 to 5 years	9 to 28 years	N/A Electrical heater is the payback baseline
Expected lifetime	12-15 years Less in corrosive environments	15-20 years	20-30 years	20 years	2-10 years
Typical warranty period	5 years for compressor 3 years on parts	5 years on firebox and 1 year on parts	Up to 15 years on firebox 1 year on parts	Up to 15 years for firebox 3 years on parts	1-2 years

¹⁸ This assumes a heating season COP of 2.55 of 2.75 see comment on the COP issue in Section 7.