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Environment
Manatū Mō Te Taiao

Warm Homes Technical Report: Social Drivers

Phase 1: Interim Progress Report

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Executive Summary

The Warm Homes project has been set up by the Ministry for the Environment to examine ways to encourage New Zealand households to move to cleaner heating sources and increase household energy efficiency, and overall to encourage warmer and healthier homes.

An important step towards designing an appropriate Warm Homes programme is to understand the drivers behind New Zealanders' uptake of home heating and energy efficiency improvements – or their reluctance to do so. Social drivers are the mix of influences and factors that result in people behaving the way they do. Understanding social drivers is a vital part of designing effective policies and intervention programmes

Many New Zealand homes are not 'warm homes'. Despite advances in technology, housing improvements, etc., indoor temperatures in houses today on average do not appear to be noticeably warmer than 30 years ago. Insulation has been shown to provide measurable benefits, but on its own does not provide sufficient temperature rise to guarantee a 'warm home'. A very strong tradition of individual room heating continues to this day, although expectations are developing for a greater level of home heating based on people's exposure to warmer conditions experienced elsewhere.

There is a strong retention of solid-fuel burning among New Zealanders, driven by a variety of reasons, including retaining access to local fuel sources, concerns about the cost and reliability of electricity and gas, and the attraction of the flame effect. Also, houses with wood burners are warmer overall.

Lifestyle and convenience factors have seen a steady movement towards heating systems that provide instant heat, flick-of-the-switch, availability, etc. There is still a strong retention of electrical heating in certain market segments, and strong growth in the use of heat pumps. The very large increase in portable gas heater availability reflects home heating behaviours by large groups of New Zealanders: avoiding the risk of relying on a single heating source, and preferring heating that is cheap to purchase, has single room capability, is capable of quick heating, is easy to control, and has low running costs.

Proximity to energy sources is a major driver for many households, including access to gas from the North Island piped network, access to 'free' or self-collected wood (more available in rural centres and rural areas), and access to local coal supplies (West Coast and Southland). Proximity is often an attractive driver because of cost considerations (eg, perception of low cost if the wood is self-collected).

Many of the drivers of energy efficiency are the same as those for home heating choices. Some drivers can be both positive and negative because they affect different segments of the market in different ways. For example, electricity prices can be an incentive for energy efficiency for those with the capital to invest, but electricity prices may also be perceived as relatively cheap and cost-effective in some market segments and therefore do not encourage change. Occasionally a driver encourages clean heat but discourages investment in insulation (eg, low electricity prices), which means there can be confusion in promoting both at the same time.

Overseas experience in incentivising change offers invaluable guidance for the development of ways to encourage change in home heating and energy efficiency in New Zealand. Key observations that can be made from overseas experience include the need for:

- a clear direction and strong commitment from central government
- a long term commitment – change will not happen overnight
- adequate funding
- involvement from all sectors – including central, regional and local government, the private energy sector, non-profit organisations, and the community
- a variety of complementary measures and initiatives – including financial grants and incentives, awareness raising and education, regulation and market transformation.

In addition:

- although all households need to be targeted, some households will need additional targeted assistance (often financial) to make changes – including low-income households, householders in private rental accommodation, and the elderly
- monitoring and evaluation of programmes are essential to ensure objectives are being met.

These all affect programme participation, and should therefore be carefully considered during programme design and implementation.

1 Introduction

1.1 The Warm Homes project

The Warm Homes project has been set up by the Ministry for the Environment to examine ways to encourage New Zealand households to move to cleaner heating sources and increase household energy efficiency, and overall to encourage warmer and healthier homes.

In particular, the project is investigating and developing possible national programmes that work with regional and local government, energy suppliers, manufacturers and communities to achieve these aims against the background of two key policies.

- 1) *The National Environmental Standard (NES) for air quality* – this requires councils to improve air quality progressively to the level of the national standard by 2013. For home heating the most relevant standard is that for particulate matter (PM₁₀), which requires average ambient concentrations of no more than 50 ug/m³ over a 24-hour period, with a maximum of one exceedance per year.¹ Currently, nearly 30 communities around the country have air pollution levels that breach these standards as a result of households being heated (in part or in full) by burning wood or coal in inefficient or non-clean-burning appliances (over 40% of New Zealand households) (Ministry for the Environment, 2005).
- 2) *The National Energy Efficiency and Conservation Strategy 2001* – this strategy established a target for all pre-1977 houses to be retrofitted with a suite of cost-effective energy efficiency measures within 15 years (ie, by 2016). Within this target it is expected that by 2012 150,000 houses occupied by lower-income households will be retrofitted (EECA and MfE, 2001). Currently it is estimated that at least half a million houses have no insulation or significantly sub-standard levels of insulation.²

At this stage there is no specific policy objective for adequacy of home heating, and therefore no corresponding target date for achievement. We do know, however, that there are adverse health effects associated with living in uninsulated cold houses,³ and that there are a significant number of houses in New Zealand where average temperatures fail to reach the minimum temperature recommended by the World Health Organisation.⁴

¹ See: www.mfe.govt.nz/publications/rma/standards-draft-nov04/standards-draft-nov04.pdf/

² Ministry for the Environment (2005): this survey indicated that 29% of households (out of a total of 1.44 million in 2004) did not have ceiling insulation, or respondents did not know. Most houses without ceiling insulation also have little or no wall or floor insulation. In addition, the ceiling insulation installed in many houses is old and sub-standard.

³ These have recently been quantified through the Health and Housing national study. See: www.wnmeds.ac.nz/academic/dph/research/housing/insulation.html Kainga Oranga, WSM&HS, UoO/

⁴ Based on longitudinal studies conducted by the Building Research Association of New Zealand (BRANZ). See, for example, Isaacs, 2004.

The Warm Homes project is also influenced by the Sustainable Development Programme of Action (2003), which includes not only some important key principles, such as “seeking innovative solutions that are mutually reinforcing” and “using the best information available to support decision making” (Department of Prime Minister and Cabinet, 2003: 10), but also a major work stream on energy, the overarching goal of which is “to ensure the delivery of energy services to all classes of consumer in an efficient, fair, reliable and sustainable manner” (Department of Prime Minister and Cabinet, 2003: 16–18).

The Ministry for the Environment therefore wishes to provide specific advice to its Minister and to the Minister of Energy on how to encourage changes to New Zealanders’ home heating practices in ways that are most likely to achieve results, but more particularly, that optimise the social, environmental and economic outcomes desired.

1.2 Project objectives

The objectives of this project, as set out in the original Request for Proposals, are to:

- understand the drivers behind the choice of home heating type
- understand the drivers behind the uptake of energy efficiency measures
- investigate the necessary incentives (financial or otherwise) required to achieve behaviour change
- make recommendations as to the most appropriate way to achieve behaviour change.

Initial discussions with Ministry staff confirmed that the primary focus of this work is to provide the Ministry with a good understanding, from the householder’s viewpoint, of what the main social drivers are for home heating behaviour, and how the Government can most effectively provide incentives to generate sufficient change in householder home heating choices to meet its national air quality targets and reduce levels of ‘energy poverty’ (the incidence of home heating deficits). ‘Incentives’, in this context, may be financial or otherwise, and involve a combination of ‘carrots’ (eg, information, persuasion, loans, grants, inducements) and ‘sticks’ (eg, regulatory measures).

1.3 Social drivers defined

An important step towards designing an appropriate Warm Homes programme is to understand the drivers behind New Zealanders’ uptake of home heating and energy efficiency improvements – or their reluctance to do so. Social drivers are the mix of influences and factors that result in people behaving the way they do. Understanding social drivers is a vital part of designing effective policies and intervention programmes.

1.4 The approach

The original Request for Proposals envisaged two phases of work. Phase 1 was to provide a comprehensive scoping of what is already known about the social drivers underpinning New Zealanders' existing heating patterns and their attitudes to home heating, and to identify critical gaps in information that might form the focus of a national survey of households. Phase 2 was to conduct such a social survey (if found necessary) and to develop appropriate incentives for home heating and energy efficiency.

In the proposal submitted it was pointed out that a national survey was inappropriate on methodological grounds as well as on the grounds of timing and cost. Consequently, the structure of the research has been as follows.

Phase 1 has, as intended, focused on providing a comprehensive scoping of what is already known about the social drivers. The research covers a review of literature and extensive discussions with over 30 key practitioners and experts in this area. Information gaps identified will be followed up during Phase 2, as necessary, and where relevant will be signalled to the Ministry in the Phase 2 report. The Phase 1 research is reported in this document.

This Phase 1 report should be treated very much as work in progress. Its purpose is two-fold. Firstly, it satisfies the contractual requirement to bring the Ministry up-to-date with progress that has been made on the investigations. Secondly, and perhaps more importantly, it sets out explicitly the manner in which the conceptual framework has been developed and applied to these investigations, so that others can follow the structure of the analysis that has been undertaken.

Phase 2 focuses on the development of options for incentives, and improvements to existing incentive programmes. Some of these options have been tested with community stakeholders in a series of workshops, and as a result a set of recommendations has been developed on a national Warm Homes programme. These are presented for consideration.

Phase 1 of the investigations has involved the following approach.

Development of a conceptual framework

A conceptual framework was developed to guide the project's investigations (see section 1.5 for details).

An international literature review

An international literature review was conducted to identify social drivers from overseas experience, and to highlight the range of approaches (and their critical success factors) adopted overseas to address 'warm homes' issues. The literature review focused on the United Kingdom, the United States and Australia. The review used team members' resources, Google, and university databases (including Current Contents Connect, Infotrac, and Web of Science) to identify relevant literature and websites.

Analysis of New Zealand experience to date

An analysis of New Zealand experience was conducted to establish the nature of New Zealand's home heating and energy efficiency market, to identify social drivers, and to explore the range (and success factors) of incentive programmes. Specifically, this analysis included:

- an overview of home heating and energy efficiency trends in New Zealand
- a market analysis, including identifying segments and key variables adopted by various players in the market
- case study analyses of the facilitated programmes of energy efficiency/home heating undertaken in New Zealand over the last decade.

Case studies included:

- Christchurch's clean air initiatives
- Energy Efficiency and Conservation Authority (EECA) residential grants
- community network approaches – Community Energy Action, Waitara, Huntly
- the Housing New Zealand Corporation retrofit programme.

Key informant interviews

Key informants were selected with the aim of covering a range of stakeholder perspectives, including:

- representatives of householder groups or communities (eg, community trusts, property investors)
- regional and local government agencies involved in existing programmes to incentivise change (eg, Environment Canterbury, Christchurch City Council, Nelson City Council)
- community and social agencies with an interest in public health and environmental quality (e.g. community and public health, general practitioners)
- firms providing products and services for home heating and dwelling insulation (eg, appliance suppliers, insulation installers)
- agencies involved in generating and providing independent information on home heating and insulation (eg, Building Research Association of New Zealand – BRANZ).

A full list of key informants interviewed during Phase 1 is given in the Appendix.

The aim of these interviews was to gather information and opinions from a range of people who have been actively involved in addressing issues of cleaner heating and warmer homes. The semi-structured interviews covered questions relating to:

- trends (social, demographic, economic, technological, policy and institutional, etc) considered likely to affect the chances of achieving sufficient change in appropriate home heating practice by 2013
- the experiences and perceptions of the most significant drivers influencing householder decisions on home heating in various segments of the market
- ways of segmenting the market for home heating improvements to target particular initiatives

- views on the most effective ways to incentivise behaviour (towards cleaner forms of heating and warmer, healthier homes) in each of the various segments of the market
- any critical uncertainties or information gaps hindering policy development in this area.

In each case the key informant was sent an email message giving background information on the investigations and indicating the scope of questions to be covered in the interview. In many cases, more detailed questions, considered particularly relevant to an individual's experience, were also pre-circulated. Most interviews were conducted by telephone, but some were face-to-face, and in a few instances several informants were interviewed together.

1.5 The conceptual framework adopted

With the primary focus of this work being an investigation of social drivers of individual and household behaviour – particularly choices and practices related to home heating – the research team adopted a conceptual framework which focuses on the range of drivers that influence individual decision-making in response to public policy initiatives.

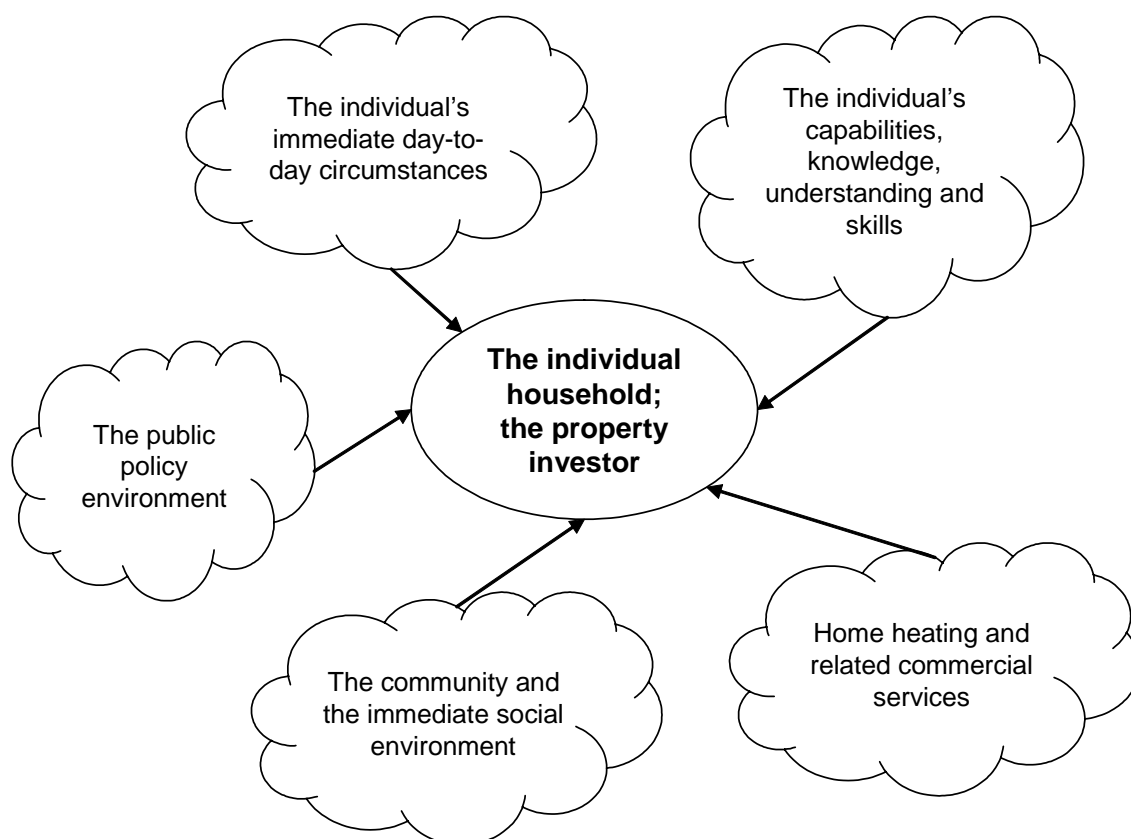
In simple terms, the framework assumes decision-making influences as a complex of five types of drivers, which interact in various contexts, as follows.

1. *Influences within the individual's immediate, day-to-day circumstances* (eg, the local climate; the extent of air quality problems experienced locally; the type of dwelling tenure; household size; the level of household debt; the amount of discretionary household income; the impact of energy prices; household spending priorities; attitudes to risk and reliability in electricity supply; the value attached to convenience in lifestyle; the attitudes to frugality; personal expectations for comfort).
2. *Influences in terms of individual capabilities, particularly the level of knowledge, understanding and skills to make decisions to change* (eg, recognising that a problem exists; recognising that their behaviour contributes to the problem; making the connections between heating levels and health; recognising that there are alternative choices; understanding the consequences of their choices; literacy and numeracy skills needed to receive and interpret policy messages and marketing messages; coping with technical information and conflicting information; receptiveness to certain channels of communication; cultural perceptions about home heating).
3. *Influences from the public policy environment* (eg, the strength, clarity and consistency of policy messages about particular policy objectives; confusing messages about multiple objectives; the perceived effectiveness of specific public policy programmes aimed at changing behaviours – including implementation methods and the blend of 'carrots' and 'sticks'; perceptions of the degree of multi-agency involvement and mutual reinforcement; perceptions of the adequacy of resources for implementation; eligibility for or barriers to the financial assistance packages on offer; level of compulsion perceived).
4. *Influences from the community and the immediate social environment* (eg, the involvement of local community groups in advocating certain behaviours; the strength and integrity of community leadership on home heating issues; the presence of trusted champions, information sources or sources of advice; the involvement of people and organisations who are known and trusted, the influence of close friends and neighbours who form part of the immediate social network; the role of 'word of mouth').

5. *The orientation of home heating and related commercial services* (eg, the development of the residential energy efficiency sector; the promoters of single technologies or whole-house approaches; the integrity and standard of service of providers; the availability of appropriate financing packages).

This framework demonstrates a conception of incentives and social drivers that goes well beyond the narrow focus of market incentives. Because of this, it has the potential to inform a wider understanding of market transformation processes of the kind that have started to occur in New Zealand, and that will need further reinforcement if the policy targets are to be achieved.

Figure 1.1: The five drivers that influence decision-making on home heating



The relevance of this type⁵ of framework derives from three main attributes.

- *Its origins:* the promotion of public health on a population-wide basis has to contend with a complex set of social drivers, which span both private benefits and public goods. Such promotion is also working in a policy domain characterised by multiple objectives (personal wellbeing, public health and economic productivity). This is similar to the situation with the Warm Homes project, which seeks to achieve changes in behaviours that are consistent with a public ‘cause’ aligned with private benefits.

⁵ This framework is adapted from the Ottawa Charter, first developed as the basis for practical policy implementation in the field of public health in the late 1980s.

- *Its multi-agency character:* the framework invites consideration not only of the social drivers that influence people’s behaviours, but also the range of agencies and organisations that have roles to play in creating and maintaining various social drivers. Effective promotion of a public ‘cause’ never relies on a single agency. Instead, strategically selected people and organisations each need to do what they are most effective at, rather than having a single agency trying to change the world on its own. Getting the multiple policy objectives on enough agency agendas⁶ is fundamental to achieving change.
- *Its use to develop comprehensive strategies for behaviour change:* to gain effective leverage you need a range of strategies across the five areas, which complement and reinforce each other. This involves identifying the (type of) organisation(s) or individuals best able to develop each part of the strategy.

This framework has been used to carry out certain specific analytical tasks:

- to help structure the analysis of New Zealand’s practical experience of incentive programmes (case studies)
- to guide the review of incentive programmes (overseas and New Zealand literature review)
- to help structure key informant interviews.

The research approach adopted here combines both top-down and bottom-up perspectives, by ensuring the research team was able to draw on the insights developed internationally and locally about the drivers that influence individual decision-making, while remaining open to data that might expand, or even contradict, the prior evidence.

The framework also provides the basis for communicating the findings of these investigations: the combination of social drivers that is most relevant to each segment of the home heating market, and how these combinations might translate into effective programmes for each market segment. To reflect this, the results are presented as a set of annotated tables which categorise the social drivers in terms of the five main categories of the conceptual framework, and whether the drivers *encourage* or *inhibit* the types of behavioural change required to meet the stated policy objectives. Sections 3 to 5 therefore contain a sequence of tables in the following layout:

⁶ This applies to central government agencies (eg, Ministry for the Environment, Energy Efficiency and Conservation Authority, Ministry of Social Development, Ministry of Economic Development, Ministry of Health, Department of Buildings and Housing), as well as local government agencies, decentralised government agencies such as District Health Boards, community groups and private sector organisations operating locally.

Table 1.1: General layout of preliminary findings

Category of driver 'For' or 'against'	Influences within the individual's immediate, day-to-day circumstances	Knowledge, understanding and skills to make decisions to change	Influences from the public policy environment	Influences from the community and the immediate social environment	The orientation of home heating and related commercial services
Drivers encouraging change to cleaner heating and warmer homes					
Drivers inhibiting change to cleaner heating and warmer homes					

1.6 Structure of the report

Section 2 provides some of the evidence base for the analysis of social drivers in the form of a review of home heating and energy efficiency trends in New Zealand. More of the evidence base is referred to in the notes in sections 3 to 5.

Sections 3 to 5 present our findings on social drivers relating, respectively, to the adoption of cleaner heating technologies, the adoption of improved energy efficiency in dwellings (particularly insulation), and participation in publicly funded programmes that seek to promote such changes to householders. As noted above, the results are presented in table form, followed by discussion of each table cell.

2 Home Heating and Energy Efficiency in New Zealand

2.1 Overview

Residential energy supply and use

Traditionally, home heating has been provided by burning things – initially using self-collected wood and other bio-fuels and waste, then expanding to commercial fuels, primarily coal. Individual room heating was the norm, using open fires. The introduction of coal ranges enabled room heating, cooking and hot water in a single unit, and coal ranges provided the primary form of home heating in many New Zealand homes for decades.

Solid fuels predominated as the source for home heating through the first half of the 20th century. Change occurred largely through the commercialisation and application of new technology that made new energy sources available.

- Manufactured gas became available in most urban centres by the early part of the century, although it was used mainly for cooking rather than heating.
- Electricity started to become more widely available from the 1930s, coinciding with the development of major hydro-electric schemes in the North and South Islands, and expansion of supply networks. But it was not until the completion of large new stations in the late 1950s (eg, the Roxburgh and Waikato River stations) that electricity became available with reliability and at a price that saw it making inroads into the home heating market.
- By the end of the 1960s natural gas was available, primarily from the Kapuni field, and the reticulation network was expanded through the North Island. Gas distribution was further boosted from the 1980s by supplies from the Maui field.

Hence, by the late 1960s the predominance of solid fuels for home heating was being challenged by the much greater availability of alternatives – alternatives that offered flexibility, flick-of-the-switch responsiveness, convenience and cleanliness. By 1971/72, for example, while about 70% of houses were still using solid fuels for all or some of their heating, electricity was being used in 54% of homes for all or some household heating, with 30% being heated by electricity alone (New Zealand Department of Statistics, 1973).

The prominence of electricity for home heating in New Zealand – unique when compared with other countries – was initially driven by early power station development and expansion of the distribution network. Thus began the cycle of surplus/promotion of electricity for home heating, followed by shortages and pleas for restraint as demand outstripped supply, which has continued more or less to the present day. Also, electricity prices fell in real terms over the 1950s and 1960s, further encouraging growth in use. In part, low electricity prices were due to a tendency to price electricity for domestic consumers lower than for other users – a feature that lasted until the pricing re-adjustments of the 1990s. Even so, average residential electricity

prices in New Zealand are still some of the lowest in the industrialised world – comparable with Australia and the US, and about 60% of the price paid by European consumers (MED, 2004).

House design

House design was also changing. Turn-of-the century Victorian villas, many of which still exist today, were generally closed against the sun (both for architectural style and to protect the furniture), and were oriented towards the street frontage (Lloyd-Jenkins, 2004). Inherently they were cold houses. By the middle of the century, under the influences of international design and local architects/designers seeking an indigenous New Zealand identity, lightweight timber designs predominated. Houses were designed with more windows, greater light and sun access, indoor–outdoor flow, etc. This allowed the sun (and heat) in, but did nothing towards retaining heat: houses were still inherently poorly insulated.

Insulation was incorporated into houses for the first time from the late 1950s. When local manufacturing of glass fibre began in the early 1960s, increased marketing and promotional effort by the manufacturer led to much greater interest in using insulation both for new houses and for retrofitting into existing houses (Isaacs, 1993). However, it was not until 1978 that insulation was made mandatory for all new homes.

Over one-third of the current housing stock has been constructed since insulation standards were introduced, with a further 40% of houses having some insulation retrofitted, primarily in ceilings.⁷ This suggests that at least 0.5 million houses still have no, or only partial/sub-standard, ceiling insulation, with higher numbers lacking wall and floor insulation. Note that quite a lot of the current insulation retrofit market caters for re-insulating over the top of old/ineffectual existing insulation.

⁷ The national survey reported by Ministry for the Environment (2005) indicated that 71% of homes had ceiling insulation, while a further 7% of respondents didn't know whether there was any insulation installed. As expected, the survey indicated a lower incidence of other forms of insulation: 50% for walls, 22% for floors (this number is difficult to interpret because in theory all post-1978 houses, about 35% of the total, should meet an insulation standard for floors, but it is likely that many householders with slab-on-ground concrete floors would not classify them as being insulated) and 10% for double glazing.

2.2 Recent home heating trends

Heating appliance availability

This section outlines a high-level trends analysis of home heating over the past 20 years. The main source of information is the Household Economic Surveys (previously known as the Household Expenditure Survey); the latest data are from the 2003/04 survey. The core information provided is a tally of the *heating appliances available for use* in the household – currently collected under 10 categories. The survey cannot provide information on whether any appliance was actually used in the last year, or the extent of that use. Supplementary information sources have been used to help interpret the survey trends.⁸

Appliance numbers and percent of households, covering a two-decade period, are shown in Table 2.1. Based on comparison with other surveys, the main area of divergence between *availability* and *use* of appliances is:

- open fires – only about half the households having open fires available appear to use them on any regular basis
- portable gas heaters – up to a quarter of households have a portable gas heater only for emergencies or as back-up.

Table 2.1: Heating appliance availability

	Estimated households having the option available					
	Number			%		
	1985/86	1997/98	2003/04	1985/86	1997/98	2003/04
Portable electric heater	942,000	870,600	1,071,500	87	75	72
Electric night-store heater fixed in place	348,000	121,500	140,400	32	11	9
Other electric heater fixed in place		359,500	450,000		31	30
Portable gas heater	25,000	355,600	506,900	2	31	34
Gas heater fixed in place	70,000	152,500	163,300	7	13	11
Open fire	421,000	232,900	234,400	39	20	16
Slow combustion fire	302,000	388,100	478,900	28	33	32
Portable kerosene heater	92,000	9000	16,000	9	1	1
Wet-back fire of any kind	241,000	205,200	209,000	22	18	14
Central heating	60,000	50,500	75,000	6	4	5

Source: Household Economic Survey (Statistics New Zealand).

Key observations from these trends, categorised by heating type, are as follows.

⁸ Other key sources are: (a) New Zealand Population Census – the latest information available is from the 2001 Census. The core information provided is the *type of fuel used to heat the dwelling*. Seven fuel types are specified, but the Census cannot provide information on the extent of fuel use, or the relative importance of one fuel type over another (when multiple fuels are used); (b) Survey of home heating methods and fuels 2004 (Ministry for the Environment, 2005). This survey was undertaken as part of the Warm Homes project, and is a one-off ‘snapshot’ of heating appliance and fuel use in the *main living areas* of homes; (c) BRANZ – various reports of the Household Energy End-use Project (HEEP).

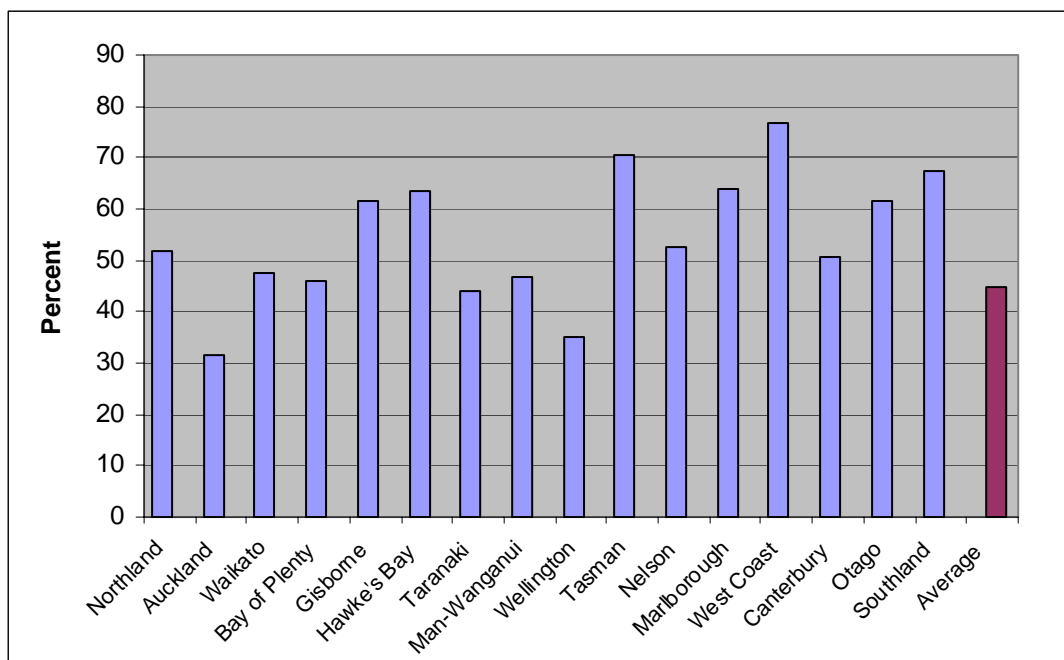
Solid-fuel burning

Over the past two decades the number of households with solid-fuel appliances available has remained virtually unchanged. The decline in open fires has been largely compensated for by an increased number of houses with wood/multi-fuel burners, which are now available in almost 500,000 households across the country.

There are a number of reasons why solid-fuel heating continues to be attractive to householders, including a love affair with burning / the flame effect and feelings of cosiness, the ability to gather one's own wood, wetbacks used for water heating, perceptions of the high cost and unreliability of electricity and gas, and the ability of wood burners to heat large areas of the house (and to higher temperatures). The introduction of pellet-fuel burners potentially represents a new generation of solid-fuel heating by providing convenience and controllability that begin to match those of electricity and gas appliances.

There are large regional differences in solid-fuel burning throughout the country, ranging from 32% in Auckland to over 75% on the West Coast of the South Island (Figure 2.1).⁹ However, a better explanation is provided by segregating urban from rural, and North Island from South Island (Figure 2.2). Solid-fuel burning also confers benefits for the electricity system in that New Zealand would experience much higher winter peak loads on the network if there were not the extent of solid-fuel burning there currently is.

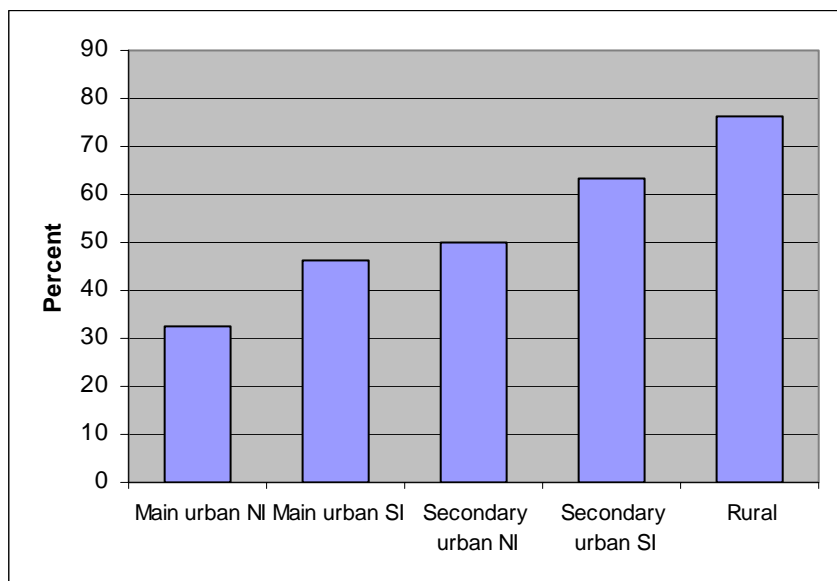
Figure 2.1: Proportion of households using wood, by region



Source: Population Census 2001, Statistics New Zealand

⁹ Note that wood is used here as a proxy for all solid fuels (including coal), because virtually all households that burn coal also burn wood.

Figure 2.2: Proportion of households using wood, by urban/rural split



Notes: NI = North Island; SI = South Island.

Electricity

Although the number of households using portable electric heaters is still growing, the trends suggest a declining market share since the mid-1980s. Many portable electric heaters are used for instant/spot heating, and portable gas heaters have captured some of this market.

Fixed-in-place electric systems have continued to increase, however. Night-store heaters were originally promoted as a means of utilising cheaper, off-peak electricity (ie, supplier push), but suffer from lack of flexibility and control. Also, night-rate tariffs are generally not as low (relative to day rates) as they were. Most of the appliance growth over the last 5 to 10 years has been in heat pumps, now estimated to be in about 12% of houses (Ministry for the Environment, 2005). This represents a very rapid growth rate.

The 2001 Census indicated that 25% of households used electricity as the sole form of heating. This is lower than in 1971/72, when it was found that 30% of households used electricity alone for heating (New Zealand Department of Statistics, 1973).

Gas

There has been a very large increase in the availability and use of portable gas heaters over the past 15 years. This type of heater has largely replaced kerosene heaters; as noted, they also appear to have moved into the market previously occupied by portable electric heaters. Much of the use of portable gas heaters is for spot heating, heat boosting or emergency use, and in conjunction with other sources (mainly electricity and wood). In 2001 portable gas heaters were the only heating method in 71,000 (about 5%) households.¹⁰

¹⁰ Population Census 2001, Statistics New Zealand.

Fixed-in-place gas heaters showed a small increase over the past few years, but their market share appears to be levelling off or in decline. The previous increase in mains gas connections also appears to have levelled off. Possible reasons for this include cost (because of the level of fixed charges, gas can be relatively costly for home heating if not also used for water heating and cooking), a perception of gas supply unreliability, and because of industry restructuring and splitting of incentives between industry players.¹¹

Central heating

Despite decades of availability, central heating is installed in only a minority of homes. Although central heating has typically not been the New Zealand way, industry sources suggest that it may be a significant growth area over the next decade as increasing numbers of people determine to heat their homes to the levels experienced in their working conditions (eg, in offices), and in their exposure to home heating levels in the northern hemisphere.

The influence of tenure

Tenure is one reason for observed differences in heating characteristics (Table 2.2).

Table 2.2: Appliance availability, by tenure, 2003/04

Appliance type	% of households		
	All rental	Owned with mortgage	Owned without mortgage
Portable electric heater	67	71	77
Electric night-store heater fixed in place	7	10	11
Other electric heater fixed in place	21	30	39
Portable gas heater	34	40	28
Gas heater fixed in place	6	14	13
Portable kerosene heater	0	2	1
Wet-back fire of any kind	11	13	19
Open fire	20	14	13
Slow-combustion fire	22	40	35
Central heating of any kind	3	5	7
Gas mains connection	11	18	14

Source: Household Economic Survey 2003/04, Statistics New Zealand.

Following are the key points to note from Table 2.2.

- Rental houses show a consistently lower availability of heating appliances, especially more capital-intensive fixed-in-place appliances such as fixed electric heating, fixed gas heaters, wood burners and central heating.
- Rental houses have the highest proportion of open fire availability.

¹¹ Key informant (KI) interview: Gas Industry Association.

- The two categories of owner–occupier houses show similar patterns of appliance availability, the largest difference being the higher ownership of electric heating for those without a mortgage. This may largely reflect a strong weighting of elderly/retired people in these houses, where electricity is often the preferred heating source because of lifestyle, convenience and safety factors.

2.3 Warmth and temperatures

Overview

Two reasonably comprehensive national snapshots of indoor temperatures exist: the 1971/72 Household Electricity Survey, and the Household Energy End-use Project (HEEP) monitoring over the past seven years. Other measurement has been carried out through the Housing Insulation and Health Study (Howden-Chapman, 2004), monitoring of public housing upgrades in Dunedin, Invercargill and Gore (Shen and Lloyd, 2004), and a survey of private rental housing in Dunedin in 2004 (Povey, 2005), which help to complement the national picture. Comparison of the early 1970s survey and the latest HEEP monitoring suggests there has not been much change in average temperatures over that time (Table 2.3).

Table 2.3: Comparative living-room temperatures, August–September period, 1971/72 and 1990s–2003

	Mean room temperature (°C)		Temperature differential between outside and inside(°C)	
	1971/72	Late 1990s–2003	1971/72	Late 1990s–2003
Northern North Island	17.7	16.6 ± 0.4	5.7	4.5 ± 0.4
Southern North Island	16.6	15.7 ± 0.4	5.6	5.3 ± 0.4
Christchurch	15.2	16.0 ± 0.6	5.9	5.7 ± 0.6

Source: BRANZ, 2003.

The monitoring of public housing in the south of the South Island in 2003 showed average living-room temperature in the coldest month (July) to be about 13°C, representing a temperature differential between the outside ambient temperature of about 6.5°C. Monitoring of bedrooms shows average temperatures consistently 2.5–3°C lower than in living areas (and typically only 3–4°C above ambient) (Shen and Lloyd, 2004; BRANZ, 2003).

Effect of heating appliance

HEEP monitoring has found that the type of heater used has a marked effect on temperatures in the main living area. Solid-fuel and centrally heated rooms on average were 1.5–2°C warmer than rooms heated by portable electric or LPG heaters (Table 2.4).

Table 2.4: Winter living-room evening temperatures, by main heater type

Heater type	Temperature (°C)
Electric	16.4
LPG	16.8
Fixed electric	17.6
Gas	17.8
Solid fuel	18.2
Gas central	18.3

Source: BRANZ 2003, Year 7 HEEP Report.

These results also provide insights into why many households might be reluctant to relinquish wood burners: wood burners on average provide higher levels of home heating compared to electric or gas appliances. The reasons for this are likely to be mostly a combination of lower costs for wood heating and higher appliance heat outputs.

Effect of insulation

Several recent studies present reasonably consistent findings on the effect of insulation on warmth and temperatures in homes.

- In the HEEP study, post-1978 houses (all meeting the insulation code for ceiling, walls and floor) were on average 1°C warmer than pre-1978 houses (which are insulated to various levels) (BRANZ, 2003).
- Insulation provided about a 1–1.5°C lift in average temperatures in monitoring carried out as part of the Housing Insulation and Health study. In addition, first-year energy savings averaged about 19%.¹²
- Insulation provided about a 0.5°C lift in living rooms and about a 0.7 °C lift in bedrooms in the southern South Island public housing study, while first-year electricity use was reduced by about 13% (Shen and Lloyd, 2004).

Overall, these results indicate that:

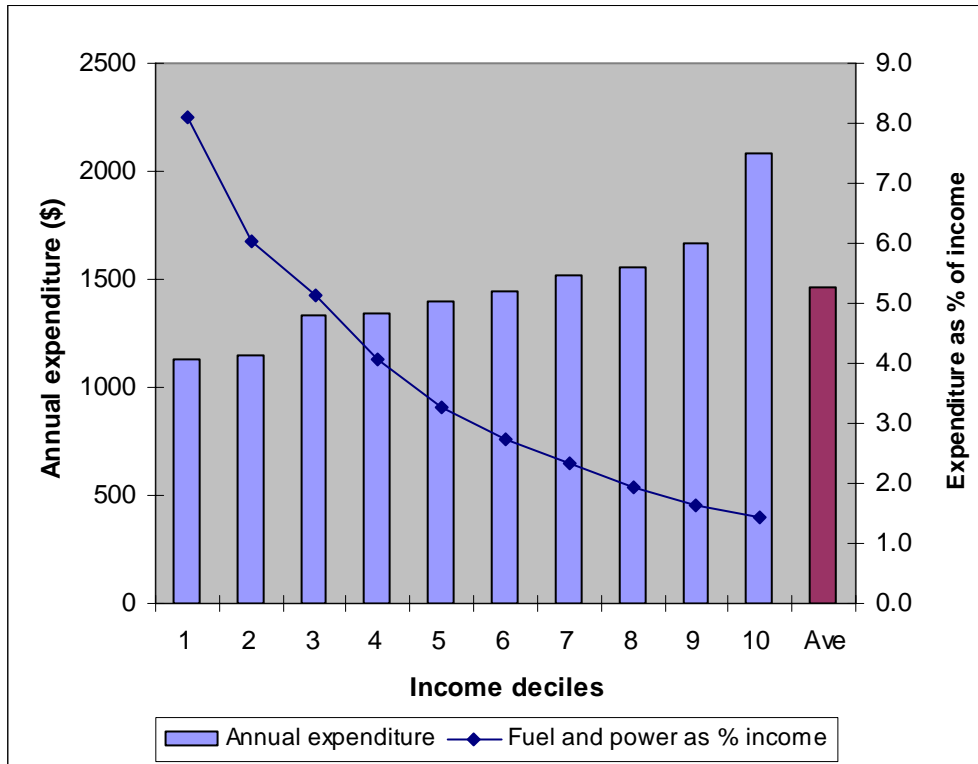
- better insulation yields benefits in indoor temperatures
- people appear to realise the benefits of insulation through a combination of warmer homes and energy savings
- although insulation provides health benefits, the temperature lift from retrofit insulation alone is generally insufficient to meet indoor temperatures prescribed by the WHO.

¹² Data provided by the WSMHS study team.

2.4 Energy affordability

Average expenditure on fuel and power by households (in 2003/04)¹³ indicated reasonable consistency across all income groupings (eg, increasing by less than 50% from decile 1 though to 9) (Figure 2.3). This provides an indication of the basic needs for energy services across all household types.

Figure 2.3: Household expenditure on fuel and power, by income decile



Source: Household Economic Survey 2003/04, Statistics New Zealand.

In relation to income, fuel and power expenditure averaged over 8% of income for the lowest decile group, and 1–2% of income for the higher decile groups. The main implication of these numbers is the likely severe lack of disposable income in low-income households that would be available to be invested in new heating appliances or energy upgrades. Note, though, that the HEEP study suggests it is not always the case that low expenditure on home heating is associated with low household income: some high-income families choose to live in cold conditions.

¹³ From the Household Economic Survey 2003/04. Note that ‘fuel and power’ expenditure relates to all energy expenditure for operating the household and so includes energy used for hot water, lighting, cooking, etc. The data do not account for non-commercial energy sources such as self-collected wood.

2.5 Key points

Following are some key points relating to the framework used in this study.

Influences within the individual's immediate, day-to-day circumstances

- There is a strong retention of solid-fuel burning among New Zealanders, driven by a variety of reasons, including retaining access to local fuel sources, concerns about the cost and reliability of gas, and the attraction of the flame effect. Also, houses with wood burners are warmer overall.
- Life style and convenience factors have seen a steady movement towards heating systems that provide instant heat, flick-of-the-switch, availability, etc.
- There is still a strong retention of electrical heating in certain market segments, and strong growth in the use of heat pumps.
- The very large increase in portable gas heater availability reflects home heating behaviours by large groups of New Zealanders: avoiding the risk of relying on a single heating source, and preferring heating that is cheap to purchase, has single room capability, is capable of quick heating, is easy to control, and has low running costs.
- A very strong tradition of individual room heating continues to this day, although expectations are developing for a greater level of home heating based on people's exposure to warmer conditions experienced elsewhere.
- Proximity to energy sources is a major driver for many households, including access to gas from the North Island piped network, access to 'free' or self-collected wood (more available in rural centres and rural areas), and access to local coal supplies (West Coast and Southland). Proximity is often an attractive driver because of cost considerations (eg, perception of low cost if the wood is self-collected).

Influences from the public policy environment

- Low electricity prices encouraged high levels of electric heating changeovers during the 1960s and 1970s.

The orientation of home heating and related commercial services

- New technology advances and product commercialisation have been (and continue to be) major drivers of change within the home heating market.

2.6 Conclusions

Many New Zealand homes are not 'warm homes'. Despite advances in technology, housing improvements, etc., indoor temperatures in houses today on average do not appear to be noticeably warmer than 30 years ago. Insulation has been shown to provide measurable benefits, but on its own does not provide sufficient temperature rise to guarantee a 'warm home'.

3 Home Heating Social Drivers

3.1 Introduction

The contract brief called for the identification of drivers behind:

- the choice of home heating type (covered in section 3)
- the uptake of energy efficiency (covered in section 4).

Note that there is some duplication across the tables in sections 3 and 4, since it can be expected that drivers for investing in a change to the type of home heating may also be drivers for investing in improved insulation – although this is not always the case.

In addition to this classification, it is also important to distinguish those drivers that apply to individual choice and behaviour from those drivers that relate specifically to participation in some publicly funded programme (covered in section 5). The other drivers of individual choice do not simply disappear in the presence of a programme, but by its very nature a publicly funded programme is deliberately intended to alter the balance of drivers to the point where individual choices are affected.

Table 3.1 provides a quick overview of the range of drivers that are believed to influence householders' decisions on the type of home heating, and whether or not they wish to change to a less polluting form of home heating and/or a warmer home. Table 3.1 is structured to distinguish whether or not the drivers act to *encourage* change towards cleaner heating and warmer homes, or *inhibit* change.

Table 3.1: Drivers behind choice of home heating

Category of driver 'For' or 'against'	Influences within the individual's immediate, day-to- day circumstances (3.2)	Knowledge, understanding and skills to make decisions to change (3.3)	Influences from the public policy environment (3.4)	Influences from the community and the immediate social environment (3.5)	The orientation of home heating and related commercial services (3.6)
Drivers encouraging change to cleaner heating and warmer homes	<ul style="list-style-type: none"> (1) Relatively low residential electricity tariffs (2) The desire for 'concrete' results (3) Increase in the number of two-income households (4) Demographic transition (5) Fashions in housing and home heating 	<ul style="list-style-type: none"> (1) The increasing range of information sources available on home heating options (2) Increasing exposure of New Zealanders to international experience of well-heated homes 	<ul style="list-style-type: none"> (1) Publicity around health and housing (2) Publicly funded programmes stimulating the general market for energy efficiency, and clean heat options (3) Central government intervention to cap electricity prices and ensure reliable supply (4) Policy to encourage more women into paid employment 	<ul style="list-style-type: none"> (1) Public lobbying by social agencies on the links between health morbidity and warm homes 	<ul style="list-style-type: none"> (1) Improved range of technology options available (2) Capability of firms providing commercial services (3) Geographic coverage of firms providing commercial services (4) Solid Energy's decision to stop coal sales to the domestic sector
Drivers inhibiting change to cleaner heating and warmer homes	<ul style="list-style-type: none"> (6) The severity of local winter conditions (7) Household tenure – rental accommodation (8) Recent increases in residential tariffs (9) Residential electricity tariff structures (10) Reliability issues for electricity supply (11) Entrenched attitudes (12) Rising house prices (13) Cost and affordability of change (14) Individual household priorities 	<ul style="list-style-type: none"> (3) A lack of information and 'understanding' (4) The absence of a practical, assessable minimum standard for warm homes that is easily understood 	<ul style="list-style-type: none"> (5) Gas-industry restructuring and the ability of gas suppliers to offer financial incentives (6) Lack of protection for tenants with regard to the condition of some rented properties (7) The absence of any general tax incentives related to home heating 		<ul style="list-style-type: none"> (5) Firms touting particular products (6) 'Cowboy' operators (7) Lack of reliable 'real life' standards for clean heating/efficient appliances (8) The lack of financial products designed to facilitate the market for clean heating options

3.2 Influences within the individual's immediate, day-to-day circumstances

Encouraging drivers

(1) Relatively low residential electricity tariffs

Relatively low residential electricity tariffs have been a significant driver in the past, and, despite recent increases are still encouraging conversions to electrical clean-heat options among a number of segments of the market. This is especially so when investment is in high-efficiency heat pumps.

(2) The desire for 'concrete' results

The desire for 'concrete results', such as a palpable increase in warmth, is a driver that can encourage householders to warmer home outcomes. For example, Environment Canterbury (ECan) has found it easier to promote change among households with open fires (which tend to result in under-heated houses) than in houses with old log burners, although this may in part be due to a greater focus on targeting open fires. For households currently using open fires (likely to be predominantly older dwellings and therefore less well insulated), substitution of the open fire with cleaner heating options can be associated with private gains in effective warmth as well as public gains in reduced air pollution. In such cases, householders experience satisfaction from achieving both personal benefit and contributing to public benefit.

(3) Increase in the number of two-income households

The increasing number of two-income households in New Zealand has probably led to an increased value being put on leisure time. This is likely to be a driver encouraging change to more convenient, less labour-intensive forms of home heating (eg, electrical heating or gas heating), and also quick-response spot heating. It has possibly also reduced heating needs by reducing the time during the day the house is occupied.

(4) Demographic transition

The elderly often use traditional heating appliances and have inadequately heated homes due to attitudes of frugality and 'doing without'. As this cohort declines, a demographic transition is taking place which supports changes to cleaner forms of heating. Future generations of elderly, who have not lived through war-time deprivations and the depression, will be less likely to have such entrenched attitudes. As a group, elderly people, many of whom live on fixed incomes, are always likely to experience more constraints on their spending ability – particularly for capital items. However, as elderly live longer and spend more of their lives in retirement, the attraction of increased comfort levels is likely to take on more prominence.

(5) Fashions in housing and home heating

New technologies in housing and home heating can influence householders' choice of home heating (eg, trends in under-floor heating and heat pumps). Some segments of the market are attracted by particular new technologies while others are not.

Inhibiting drivers

(6) The severity of local winter conditions

Location is a major driver, both in relation to the amount of home heating required (eg, greater heating required in colder areas) and in the choice of heating appliances. These two issues are not unrelated: in colder areas of the country more householders choose solid-fuel heating, in part because solid-fuel heaters can often provide greater quantities of heat at lower cost. This comparison indicates that severe winter conditions inhibit change to cleaner heating. It also points to the fact that local climatic conditions have a bearing on the cost-effectiveness of alternatives.

(7) Household tenure – rental accommodation

Living in rental accommodation can inhibit changes to cleaner heating and warmer homes. A tenant is unlikely to change to cleaner heating when it means investing in (and possibly increasing the value of) someone else's property, a property in which they may not always live. Also, a tenant may not have permission to make such a change without the landlord's consent. This kind of investment decision rests with the non-resident owner/landlord of the property. A number of considerations – that are likely to inhibit change – will probably influence the owner/landlord, including the desire to limit expenditure on their property investment.

In some segments of the rental market landlords may regard investment in heating and energy efficiency as a feature that will add value to their property and make it more rentable. A related policy issue may be how to give renters knowledge of the home energy rating concept, and the value of a higher rating.

Big changes have occurred in home ownership patterns over recent years, the most significant for the Warm Homes project being the decline in home ownership and commensurate increase in rented houses. Some increase in rentals has been through new units and apartments, but many existing houses have been converted to rentals. The potential implication for the Warm Homes project is that this shift in ownership is pushing many houses with 'warm homes' problems into the rental category, and much of the increased numbers of rental properties will be older existing houses that are likely to be lacking insulation and efficient heating appliances. There is also an extreme segment in the rental market utilising houses in very poor condition, which the owner has no interest in upgrading because they are destined for demolition when a suitable re-development opportunity arises.

The rental sector is not a clearly defined homogeneous market. Within it there are many sub-segments, which may be described as follows.

- *Executives*: are typically renting for one year; competing with new homes and prepared to pay top rents because they expect ‘all the mod cons’ and a very high degree of comfort and convenience. This top end of the rental market is very competitive. Tenants are prepared to pay relatively high rents corresponding to high expectations for quality, comfort and convenience, their point of comparison being new dwellings.
- *Students*: are tied into 12-month contracts (usually beginning mid-summer), and are strongly influenced by rent level, location *vis a vis* transport options (walk, bike, bus, petrol), and proximity to where they travel frequently. The quality of house seems to be of little importance. Students don’t tend to look ahead to the coldness of winters, and generally move to a different flat the next year – a decision likely to be determined by social factors such as choice of flatmates.
- *Long term renters*: cannot afford home ownership and take a long time to build up sufficient capital for the deposit. Long term can be up to 10 years or more. These are generally working people, with or without families, and affordability/savings ability is a critical driver.
- *Perpetual renters*: are identical to long term renters except they never get to buy their own home.
- *Very low-income households – beneficiaries of some kind*: are severely financially constrained, and take what they can get, irrespective of the condition of the dwelling. This is the easiest segment to rent to, driven by desperation, urgency and few choices. These renters are often very itinerant.

Overall, private rental sector key informant interviewees believe the average tenancy period to be seven to nine months (shorter in very low-income situations), indicating frequent opportunities to influence landlord decisions, since property owners are most likely to make improvements between tenancies. The short average tenancy may also be due, in part, to rental properties being cold and hard to heat. A survey of renters undertaken in Christchurch indicated that cold houses were one of the most important reasons for tenants moving.¹⁴ In practice, such information, if given adequate exposure, should be a driver for landlords to make investments in improved heating of the dwellings.

In the private rental sector it is the property owner/investor who is most instrumental in making changes to the structure and fabric of the house, although tenant demands may provide important signals, particularly when seeking rental accommodation. Public rental accommodation (Housing New Zealand Corporation and territorial local authority-owned rental portfolios) is subject to the policies of the organisation. In owner-occupied dwellings the owner is clearly the most instrumental decision-maker.

¹⁴ KI interview: Jennifer Small.

It is worth noting, in relation to the New Zealand private residential rental market, that only around 30% of such property investors use the services of professional property managers (compared with around 90% in Australia), reflecting the New Zealand do-it-yourself culture and the high level of single-dwelling investments.¹⁵ The significance of this lies in the fact that property managers generally make regular inspections (sometimes quarterly) of rental accommodation and file reports and recommendations to the property investors concerned, a practice that has the potential to provide opportunities for influencing investor decisions regarding dwelling insulation and heating options. The Residential Tenancy Act is currently being reviewed; the outcome of this review may have implications for the proportions of property investors using the services of professional property managers.

Although government is committed to reversing the declining trend in home ownership, the factors driving current trends have been quite strong over a number of years (eg, high house prices, lack of capital, indebtedness), and will not necessarily reverse easily. The conclusion drawn from this analysis is that the rental sector is pivotal to the success of the Warm Homes programme, and that the recent rental market trends mainly serve to increase the scale of the challenges to programme design, resourcing and implementation.

(8) Recent increases in residential electricity tariffs

It is a disincentive to any household to consider electrical clean-heat options when there is a risk of future price increases. It discourages people who currently use solid fuels, particularly those who have access to cheap supplies of wood (not generally the very poor, who don't have the ability to collect their own wood).¹⁶

(9) Residential electricity tariff structures

There are only very crude price signals to conserve electricity in the residential market, or to change to more efficient forms of electrical heating such as heat pumps. Apart from night rate (11 pm–7 am) differentials, used mainly by electricity companies to spread the load, existing tariff structures (fixed daily charges and uniform consumption charges per kWh irrespective of level of consumption) give weak signals to residential consumers that electricity conservation would be beneficial, either in the long or the short term. A seasonal differential would be important if there was strong seasonal variation in the true price of electricity generation. (Note also that the environmental damage of electricity generation is unpriced.)

(10) Reliability issues for electricity supply

The memory of power shortages threatened several times over the past decade reduces householders' willingness to rely entirely on electricity for heating.

¹⁵ KI interview: Martin Evans, Christchurch Property Investors Association.

¹⁶ KI interview: EnergySmart.

(11) Entrenched attitudes

Deeply ingrained attitudes held by New Zealanders entrench the practice of poorly heated homes – the attitude that says it’s OK to live in cold houses or at best partly heated homes. This is particularly true for the older generation. This attitude is, however, less prevalent among expatriate New Zealanders and European immigrants accustomed to better standards of housing.¹⁷ Similarly, some older Maori hold to the attitude of personal sacrifice in favour of opportunities for younger members of the whanau.¹⁸ Older people living in their own mortgage-free homes can be very resistant to making improvements because it will cost them money and they’re uncertain of the results, even though these same elderly may later have to move to a residential facility where they discover the joys of central heating but have to cash up their homes to pay the weekly fees.¹⁹

New Zealanders have a long history of heating their homes by ‘burning something’, which has created a cultural legacy that needs to be addressed. One key informant estimated that as many as 30% of New Zealand householders wanted ‘to burn something’ to heat their houses.²⁰ Among these householders there is also a ‘hard core’ of those who profess a deep psychological attachment to open fires.

(12) Rising house prices

Rising house prices may have several flow-on effects which inhibit investment in alternative clean heating.

- It appears to be leading to declining rates of home ownership (and more people living in rental accommodation, for longer). This is especially evident among Maori.
- It is leading to households having more capital tied up in the initial purchase of their house and less capital available to spend on upgrades.
- Investors may more commonly be negatively geared (ie, the rent doesn’t cover the loan repayments).²¹ In theory this should present a positive driver to encourage the adoption of more cost-effective heating because discretionary income has fallen. However, in practice, affordability barriers (discussed elsewhere) often make such an outcome unlikely.

¹⁷ KI Interview: Ron Theaker, Energy Efficiency Homes.

¹⁸ KI Interview: Ed Parker, Waitara Employment Trust.

¹⁹ KI Interview: Grant Dunford, Negawatt Resources.

²⁰ KI Interview: Terry Moody, Christchurch City Council.

²¹ KI Interview: Martin Evans, Christchurch Property Investors Association.

(13) Cost and affordability of change

Many aspects of home heating – the choice of heating appliance, the level of expenditure on fuel or electricity, the choice about investing in improved insulation, and therefore the level of comfort and healthiness achieved – are subject to the opportunities and constraints of household income. As noted earlier in this report, it is a well-established fact that significant numbers of households in New Zealand do not spend enough on home heating to provide indoor conditions conducive to good health, simply because they cannot afford to. Other households make similar decisions out of choice, influenced by attitudes or different priorities (see below).

(14) Individual household priorities

Not everyone puts the same priorities on environmental objectives (air quality) or improving home heating and personal health as policy makers would like. Drivers for home heating behaviour have to compete with drivers for other things that householders hold to be important, and these will vary immensely across the population.²²

3.3 Knowledge, understanding and skills to make decisions to change

Encouraging drivers

(1) The increasing range of information sources available on home heating options

The range of information sources available on home heating can influence changes to home heating. The use of different media²³ (written media such as rates notices, power bills, local newspapers; TV adverts, radio adverts, Energy Efficiency and Conservation Authority promotions, word of mouth) and a range of sources (regional councils, health agencies, energy companies, energy efficiency companies) is particularly important. Information from a range of sources can be particularly useful for promoting the message to ‘harder to reach’ households. Combined efforts at promotion are gradually raising awareness of both the social value and the private value of change.

²² See for instance: Centre for Sustainable Energy, 2004.

²³ KI Interviews: EnergySmart; Nelson City Council; Insultech; Carrier Air Con.

(2) Increasing the exposure of New Zealanders to international experience of well-heated homes

New Zealanders are becoming increasingly exposed to international experience of well-heated homes. The traditional acceptance by New Zealanders of poorly heated homes is now much less prevalent among expatriate New Zealanders and European immigrants accustomed to better standards of housing.²⁴ As international travellers, this group is most likely to be relatively unconstrained financially and more likely to change their home heating conditions and choices without financial assistance from the government, since they have already experienced the benefits of higher standards of home heating and need little convincing.

Inhibiting drivers

(3) A lack of information and ‘understanding’

A lack of information about the range of heating appliances available and the benefits of clean heat appliances can inhibit changes to cleaner heating methods. Notwithstanding the positive driver of an increasing range of information sources, there appears still to be a very high level of ignorance and misconception about home heating issues among the public at large.

(4) The absence of a practical, assessable minimum standard for warm homes that is easily understood

There is no practical, assessable minimum standard for warm homes that is easily understood. Ambient air quality has a well-defined 2013 target in terms of the acceptable number of exceedances, but indoor ambient conditions have no corresponding well-defined target that people can relate to. The absence of an easily understood standard or indicator means that individual households have little way of knowing whether or not they are heating their homes to healthy standards.

²⁴ KI Interview: Energy Efficiency Homes.

3.4 Influences from the public policy environment

Encouraging drivers

(1) The publicity and focus of research around health and housing

The publicity and focus of research around health and housing have had an impact on people's attitudes,²⁵ by raising awareness of the links between insulation, adequate heating and better health. The very fact that the research was commissioned and funded is an indicator of the recognition and growing importance attached to this issue in policy circles. This raises the question of how effectively this research is used and which segments of the market are most likely to be influenced by the research. This is likely to depend on the communication medium (verbal, written, visual, etc) and on perceptions of the messenger (a stranger, like the appliance retailer; or a trusted person, like a nurse or GP).

(2) Publicly funded programmes stimulating the general market for energy efficiency and clean heat options

By stimulating demand from participating households for new clean heat technologies, publicly funded programmes (such as Environment Canterbury's clean air initiatives, Nelson City Council's clean air initiatives, and the Energy Efficiency and Conservation Authority's initiatives) and their associated promotions generate a flow of business activity which gives suppliers of clean heat technologies a greater presence, adds to their profile in the general market, and raises the awareness of other households (either through the programme promotions, increased private sector marketing efforts or word of mouth). Thus publicly funded programmes influence decisions not only for the targeted households but for households generally.

Publicly funded programmes help stimulate the general market for energy efficiency and cleaner heating options like heat pumps.²⁶ The general market, by definition, involves those who have already informed themselves of the benefits or who know the experience of people who have taken part in the funded programmes, and who are not constrained in their own choices by insufficient funds.

²⁵ KI Interview: Robyn McKeown, EnergySmart.

²⁶ KI Interviews: Insultech; Carrier Air Con; Insulation Services.

(3) Central government intervention to cap electricity prices and ensure reliability of supply

Existing users of solid-fuel home heating will be less reluctant to change to electrical heating sources such as heat pumps if the government steps in to cap prices and to place reliability of supply as a key policy goal. For households choosing to convert to clean heat without public financial assistance (or with only modest incentives) for reasons of convenience or comparative cost, low electricity tariffs reinforce the choice. Similarly, for households participating in fully assisted conversions, low electricity tariffs reduce the financial risks of adopting the electrical heating option.

The relatively low price of residential energy does not encourage householders with discretionary income to spend on improved insulation because it has the effect of reducing the financial benefits to householders.²⁷ US experience suggests that people change when energy prices are high, conversely, relatively low electricity prices may make householders more inclined to consider electrical clean-heat options such as heat pumps.

(4) Policy to encourage more women into paid employment

See 3.2(3) above relating to dual-income households and the value of leisure time. Note that this is an example of an initiative in the public policy environment that many people might regard as totally unrelated to Warm Homes drivers and outcomes. It is certainly a policy objective whose origins have nothing to do with environmental quality or energy policy considerations. Nevertheless, within the conceptual framework presented here, it is possible to see how such a policy initiative may indeed have a bearing on the processes of household change that are relevant to the Warm Homes programme.

Inhibiting drivers

(5) Gas industry restructuring and the ability of gas suppliers to offer financial incentives

Gas industry restructuring has reduced gas suppliers' ability to offer assistance or incentives. When there was an integrated industry it was possible to offer turnkey packages,²⁸ but now the benefits are split between several operators and the transaction costs have increased. This is likely to be a factor more for new homes and relatively wealthy households converting to several gas uses (eg, water heating, space heating and cooking).

²⁷ KI Interview: Pamela Storey, Huntly EE Trust.

²⁸ KI Interview: Gas sector.

(6) Lack of protections for tenants with regard to the condition of some rented properties

There are no minimum standards for home heating/insulation.²⁹ The lack of effective regulatory protection is likely to reinforce the most powerless tenants in their view that there is little they can do to alter their home-heating circumstances, and so they are likely to continue their use of cash-flow and portability-driven options, such as unflued gas heaters. This situation could change when the outcome of the review of the Residential Tenancy Act is known. While unflued gas heaters are a cleaner form of home heating than solid-fuel appliances (for the external environment), it is generally considered that they do not contribute to improved health. These heaters release high volumes of water vapour, which can result in health risks from dampness and moulds, and the gases from the combustion process can adversely affect respiratory health.

(7) The absence of any general tax incentives related to home heating

Successive governments have moved away from providing population-wide tax incentives for any form of policy promotion.

3.5 Influences from the community and the immediate social environment

Encouraging drivers

(1) Public lobbying by social agencies on the links between health morbidity and warm homes

Public lobbying by social agencies on behalf of their constituencies (eg, Age Concern on behalf of elderly people) raises awareness among their members of the issues and appropriate behaviours.

²⁹ KI Interview: Stephen Ward, Robert Tromop EECA.

3.6 The orientation of home heating and related commercial services

Encouraging drivers

(1) Improved range of technology options available

The technology options for both cleaner heating sources and all aspects of domestic energy efficiency and insulation have increased markedly in recent years.

(2) Capability of firms providing commercial services

A numbers of firms have developed a history of commercial operations providing energy efficiency services at the household level (many through Energy Efficiency and Conservation Authority-sponsored programmes). Some firms are evolving towards providing ‘whole-of-house’ solutions that cater to cleaner heating. In contrast, some firms put commercial interest and supplier allegiance first by promoting particular brands or models of heating appliance, regardless of suitability to the situation. Also, the commercial sector has its share of ‘cowboy’ operators who cause difficulties for market development by providing sub-standard installations and workmanship.

(3) Geographic coverage of firms providing commercial services

Most towns and cities now have firms supplying new technologies such as heat pumps, linked to other appliance supply.

(4) Solid Energy’s decision to stop coal sales to the domestic sector

Solid Energy has made very public statements about the link between its decision to terminate domestic coal sales and regional council efforts to address air quality problems. Even though there are other private-sector coal suppliers who continue to supply the domestic market, the stance of Solid Energy is a very public gesture from a major energy-sector player.

Inhibiting drivers

(5) Firms promoting particular products

Firms that promote particular products, rather than packaged solutions suited to the individual dwelling and household are a factor in potentially inhibiting changes to cleaner heating and

warmer homes. A particular product or brand may be put forward rather than the best package for the household.³⁰

(6) ‘Cowboy’ operators

There are ‘cowboy’ operators installing heat pumps – often operators who see the chance for fast money when publicly funded schemes are operating. They compete by using cheap imported brands/models or insulation materials, and cutting corners in installation in order to be able to offer the cheapest price. They also lack the training and technical know-how.

(7) Lack of reliable ‘real life’ standards for clean-heating/energy-efficient appliances

Clean air approved appliances have standards set on the basis of testing procedures. There is concern that these do not always represent ‘real life’ conditions, and that some appliances continue to be sold under the guise that they are ‘clean air’. For example, heat pumps vary in terms of their performance and energy efficiency. Not all are well suited to New Zealand. While Environment Canterbury has set standards for the Clean Heat programme (as has Nelson), there are no such standards applying in the general market, with the risk that substandard products might produce disappointing results.

(8) The lack of financial products designed to facilitate the market for clean heating options

For a large part of the market – middle New Zealand – it appears that a potentially significant issue influencing household choices about whether or not to change home heating or invest in better insulation is the capital cost barrier. Financing arrangements that help people over this hurdle have the potential to be very influential.

³⁰ KI Interview: Grant Dunford Negawatt; Insultech.

4 Energy Efficiency Social Drivers

4.1 Introduction

Just as section 3 presented our preliminary findings on the social drivers behind householders' choice of home heating, this section presents our preliminary findings on the social drivers behind the uptake of energy efficiency improvements. The layout – summary table followed by explanatory notes – is identical to that used in section 3. Where the social drivers are the same as for the choice of home heating, the reader is simply referred to the corresponding note in section 3 rather than repeating the text here.

Table 4.1: Drivers behind the uptake of energy efficiency

Category of driver 'For' or 'against'	Influences within the individual's immediate, day-to-day circumstances (4.2)	Knowledge, understanding and skills to make decisions to change (4.3)	Influences from the public policy environment (4.4)	Influences from the community and the immediate social environment (4.5)	The orientation of home heating and related commercial services (4.6)
Drivers encouraging improved energy efficiency and warmer homes	(1) The severity of local winter conditions (2) Recent increases in residential electricity tariffs (3) Demographic transition	(1) The increasing range of information sources available on energy efficiency (2) Increasing exposure of New Zealanders to international experience of well-heated homes	(1) Publicity around health and housing (2) Publicly funded programmes stimulating the general market for energy efficiency and clean heat options	(1) Social agencies and NGOs putting pressure on government to address the energy poverty gap	(1) Improved range of technology options available (2) Capability of firms providing commercial services (3) Innovative practices to develop the market (4) Leadership in social responsibility
Drivers inhibiting improved energy efficiency and warmer homes	(4) Household tenure – rental accommodation (5) Relatively low residential electricity tariffs (6) Residential electricity tariff structures (7) Entrenched attitudes (8) Change is invisible (9) Rising house prices (10) Cost and affordability of change	(3) A lack of information and 'understanding' (4) The absence of a practical, assessable minimum standard for warm homes that is easily understood (5) No independent, credible and widely available information resources	(3) No public/public sector strategic partnership to transform the market (4) Government focus restricted to low-income households (5) Lack of a Home Energy Ratings Scheme (HERS)	(2) Insecure funding regime for many NGOs	(5) Firms touting particular products (6) 'Cowboy' operators (7) The lack of financial products designed to facilitate the market for clean heating options (8) No provider of residential energy services providing the 'complete package'

4.2 Influences within the individual's immediate, day-to-day circumstances

Encouraging drivers

(1) The severity of local winter conditions

Severe winters may drive households to install energy efficiency measures to increase the warmth of their homes.

(2) Recent increases in residential electricity tariffs

Increasing electricity prices encourage people who can afford it to improve their home insulation. For some people the driver is long term energy savings, but more often the benefits of insulation are felt in increased comfort/better health rather than reduced power bills. For some insulation/energy efficiency improvements, the energy savings driver might be minimal (eg, for double glazing the motivations are more to do with comfort, reducing condensation and improving the home's value) (McChesney and Smith, 2003).

(3) Demographic transition

See section 3.2(4).

Inhibiting drivers

(4) Household tenure – rental accommodation

See section 3.2(7).

(5) Relatively low residential electricity tariffs

For higher-income segments of the market, electricity tariffs are often perceived to be relatively low, especially if using off-peak rates. The perception of low prices reduces the propensity to invest in improved insulation.

(6) Residential electricity tariff structures

Electricity tariffs do not necessarily signal true costs. For example, apart from controlled rate tariffs, consumers generally pay a standard rate tariff throughout the year with no distinction between time of day or season. See also section 3.2(9).

(7) Entrenched attitudes

See section 3.2(11).

(8) Change is invisible

It is difficult to promote energy efficiency because ‘you can’t see insulation’,³¹ and the outcomes are difficult to measure.

(9) Rising house prices

Rising house prices may have several flow-on effects which inhibit investment in alternative energy efficiency: (1) prices appear to be leading to declining rates of home ownership and more people living in rental accommodation, for longer; this is especially evident among Maori; (2) this leads to households having more capital tied up in the initial purchase of their house and less capital available to spend on upgrades; (3) and investors may be negatively geared (ie, the rent does not cover the loan repayments).³²

(10) Cost and affordability of change

See section 3.2(13).

4.3 Knowledge, understanding and skills to make decisions to change

Encouraging drivers

(1) The increasing range of information sources available on energy efficiency options

See section 3.3(1).

(2) Increasing exposure of New Zealanders to international experience of well-heated homes

See section 3.3(2).

³¹ KI Interview: Ken Lawn, ECan.

³² KI Interview: Martin Evans, Christchurch PIA.

Inhibiting drivers

(3) A lack of information and ‘understanding’

See section 3.3(3).

(4) The absence of a practical, assessable minimum standard for warm homes that is easily understood

See section 3.3(4).

(5) No independent, credible and widely available information resources

While this appears to contradict 4.3(1) above, it relates to issues around hard technical information on product type, quality etc, and long term studies that support the case for energy efficiency improvements.

4.4 Influences from the public policy environment

Encouraging drivers

(1) The publicity and focus of research around health and housing

See section 3.4(1).

(2) Publicly funded programmes

See section 3.4(2).

Inhibiting drivers

(3) No public/public sector strategic partnership to transform the market

While the Energy Efficiency and Conservation Authority has a set of energy efficiency targets set by the National Energy Efficiency and Conservation Strategy (NEECS), there is no strategic delivery plan (that involves Government, the private sector and community sector) to transform the market and meet those targets.

(4) Government focus restricted to low-income households

Energy Efficiency and Conservation Authority's EnergyWise Home Grants programme is restricted to low-income households (or those with health issues), which limits the ability to incentivise across a wider range of lower–middle/upper income households.

(5) Lack of a Home Energy Ratings Scheme

Unlike a number of other countries, there is no Home Energy Ratings Scheme (HERS) operating in New Zealand. A HERS would provide a tangible measure of the energy performance of the house – information that could inform potential homebuyers or renters. The lack of such a rating scheme acts as a disincentive for home owners to invest in energy efficiency improvements, especially if the owner intends to sell the house in forthcoming years, because the investment often remains invisible and unable to be recouped through a higher value on the house.

4.5 Influences from the community and the immediate social environment

Encouraging drivers

(1) Social agencies and NGOs putting pressure on government to address the energy poverty gap

There is now a considerable network of agencies with knowledge and concern about cold housing seeking to initiate actions to address these issues in their communities. See also 3.5(1).

Inhibiting drivers

(2) Insecure funding regime for many NGOs

With central government funding being tied to a local share, many energy-related NGOs struggle to survive, and cannot invest in other activities such as information provision and education.

4.6 The orientation of home heating and related commercial services

Encouraging drivers

(1) Improved range of technology options available

See section 3.6(1).

(2) Capability of firms providing commercial services

See section 3.6(2).

(3) Innovative practices to develop the market

An example is energy efficiency firms promoting their services through third parties such as property managers.

(4) Leadership in social responsibility

An example is energy companies involved in promoting energy efficiency improvements to households with asthma sufferers.

Inhibiting drivers

(5) Firms touting particular products

See section 3.6(5).

(6) ‘Cowboy’ operators

See section 3.6(6).

(7) The lack of financial products designed to facilitate the market for clean heating options

See section 3.6(8).

(8) No provider of residential energy services providing the complete package

See section 3.6(5).

4.7 Key points

Here are the key points from the analysis of energy efficiency social drivers.

- Many of the drivers of energy efficiency are the same as those for home heating choices.
- Some drivers can be both positive and negative because they affect different segments of the market in different ways. For example, electricity prices can be an incentive for energy efficiency for those with the capital to invest, but electricity prices may also be perceived as relatively cheap and cost-effective in some market segments and therefore do not encourage change.
- Occasionally a driver encourages clean heat but discourages investment in insulation (eg, low electricity prices), which means there can be confusion in promoting both at the same time.

5 Programme Participation Social Drivers

5.1 Introduction

This section provides an overview of past and current approaches to incentivising change overseas (section 5.2) and in New Zealand (section 5.3). Based on these experiences, this section draws out and discusses the drivers that influence householders' decisions to participate in programmes that encourage change to cleaner heating and/or energy efficiency (sections 5.4 to 5.9).

5.2 Overseas approaches and experiences

United Kingdom

The United Kingdom (UK) first grappled with the issue of air pollution and the need for clean-heating appliances a long time ago. A pivotal event was London's infamous 1952 Great Smog, a mid-winter episode caused by an inversion layer, resulting in the deaths of over 4000 people. As a result of this event, in 1956 the Clean Air Act was passed, making it an offence to emit smoke from chimneys and laying down a set of rules about the types of fuel and appliances permitted, including the banning of coal burning from large areas of London. Also, assistance was made available through a system of grants to enable replacement or alteration of unsuitable fire grates. This set in place what is now a commonly established incentive regime of 'sticks and carrots'. Later the clean air objectives were aided significantly by the widespread availability of North Sea gas, which was piped to major urban conurbations in the UK, and provided clean-burning and cost-effective energy for domestic purposes.

During the past two decades the UK has taken significant steps towards improving energy efficiency in its domestic market. This has been largely driven by its need to meet four energy goals, as outlined in the UK Government's Energy White Paper:³³

- to cut carbon dioxide emissions
- to maintain the reliability of energy supplies
- to promote competitive markets
- to ensure that every home is adequately and affordably heated.

Energy efficiency is seen as the best way to achieve all four of these goals.³⁴

³³ See: www.dti.gov.uk/energy/whitepaper/

³⁴ Ibid.

Although the outcomes being sought in the UK differ from those in New Zealand (here there is also a need to reduce the use of air-polluting home-heating appliances), the UK's experience still provides invaluable insights into incentivising change in the domestic energy efficiency market. Many of the insights and lessons learnt will also be applicable to incentivising change in the home heating market.

The UK's efforts to encourage householders to become more energy efficient have involved many sectors, including local, regional and central government,³⁵ the private energy sector, non-profit organisations, and the community. Non-profit organisations have led the way when it comes to encouraging change. Two examples are the Centre for Sustainable Energy, which was established in 1979, and whose mission is to “advance sustainable energy policy and practice, engaging people and communities in meeting real needs for both environmentally sound and affordable energy services;”³⁶ and National Energy Action, a national charity focused on eliminating fuel poverty.³⁷ Although the UK government has developed and supported various initiatives since the early 1990s, significant involvement by the government has only come about in the past five years. A series of strategies, reviews, papers and action plans during this period has signalled a new level of support and direction from the government.³⁸

The direction supported by the UK government and other sectors is one that relies on a variety of complementary measures and initiatives to achieve change, including financial grants and incentives, regulation, awareness-raising and education, and market transformation. Note also that the UK has fuel subsidies for particular groups of energy consumers.

Although energy efficiency is required in all households, some measures and initiatives are specifically targeted at certain ‘groups of households’ who are unlikely to be able to make changes unassisted. Following are some specific examples of UK initiatives.

³⁵ For example, the UK government has set up a Sustainable Energy Policy Network to implement the programmes outlined in the Energy White Paper. This is a network of policy units across government departments, the devolved administrations, regulators and key delivery organisations.

³⁶ See: www.cse.org.uk/

³⁷ See: www.nea.org.uk/

³⁸ Department of Trade and Industry, 2001; Performance and Innovation Unit, 2002; Department of Trade and Industry, 2003; DEFRA, 2004a.

Warm Front

Established in 2000³⁹ by the UK government, Warm Front aims to tackle fuel poverty⁴⁰ by providing energy efficiency advice and financial grants to vulnerable⁴¹ private sector households to install energy efficiency measures. Grants of up to £1,500 are available to families and the disabled in receipt of certain government benefits, and up to £2,500 to householders who are over 60 years old and in receipt of certain government benefits. A recent evaluation of the Warm Front programme by the National Audit Office (2003) acknowledged the successes of the programme to date, but also noted several problems and issues for consideration. These included the lack of precision in identifying the fuel poor when existing documentation is relied on and assumptions are made about ‘vulnerable households’ also being the fuel poor, the lack of options under the scheme for ‘hard to heat’ homes,⁴² and the special challenges faced when dealing with the private rental sector.

Energy Efficiency Commitment⁴³

Implemented in 2002⁴⁴ by the UK government and overseen by the gas and electricity regulator Ofgem, the Energy Efficiency Commitment requires energy suppliers to encourage and assist customers to take up energy efficiency opportunities. A particular focus on pensioners and low-income consumers is required.

Local Government Energy Efficiency Activity

Under the Home Energy Conservation Act 1995, all local authorities with housing responsibilities are required to identify practical and cost-effective measures to significantly improve the energy efficiency of all residential accommodation in their area, implement these measures, and report on progress made. The Department for Environment, Food and Rural Affairs is reviewing this activity to see if local authorities could meet these requirements in a more effective, coherent and strategic manner.

³⁹ This follows on from the Home Energy Efficiency Scheme which was established in 1991.

⁴⁰ Although there are several more complex definitions of ‘fuel poverty’, simply put ‘fuel poverty’ occurs when a household cannot afford to keep warm (www.defra.gov.uk/environment/energy/fuelpov/index.htm).

⁴¹ ‘Vulnerable households’ include those on a low income (in receipt of certain government benefits), the elderly, the sick or disabled, and families with young children (DEFRA, 2004b).

⁴² ‘Hard to heat’ homes include homes that are not on the gas network, homes that have solid walls that cannot be filled with insulation, and homes that require more than the maximum grant or assistance that falls outside the scheme rules.

⁴³ Department of Trade and Industry, 2003; DEFRA, 2004c.

⁴⁴ This follows on from the Energy Efficiency Standards of Performance, which have operated since 1994.

Energy Matters⁴⁵

Energy Matters is an educational programme run by the Centre for Sustainable Energy (CSE). Its aim is to raise awareness of the importance of energy conservation and reduce energy use in the home by educating children at school. CSE works with local authorities to find and train a local person to act as their 'energy educator'. Schools are then recruited and teachers introduced to the programme with a workshop. Teachers are given resources and the schools run the programme. The programme includes pupils carrying out energy surveys and analysing data to take home recommendations for energy efficiency improvements. An evaluation of Energy Matters was conducted over a three-month period and involved interviews with pupils, parents/carers and school staff. The evaluation showed that not only had 75% of the parents/carers taken action to reduce their energy consumption, but that the schools themselves had also increased their use of energy efficiency measures.

Market Transformation Programme

Established in 1997, the UK's Market Transformation Programme aims to "encourage products, systems and services which do less harm to the environment, using less energy, water and other resources over their lifetime".⁴⁶

It should be noted that these examples represent only a very small selection of initiatives and programmes used in the UK. For example, the Centre for Sustainable Energy notes that at any one time it has 50 to 60 programmes or projects under way.

North America

The North American (US) experience is more diverse and complex than the UK's, due to the size of the domestic market and the nature of the government system. Although the US does not appear to be addressing energy efficiency in the domestic market to the same extent or in the same manner as the UK, there is some involvement by all sectors, including federal and state government, the private energy sector, non-profit organisations and the community.

The federal government's commitment is evident in its National Energy Policy (Department of Energy, 2001), which "promotes the development and deployment of energy systems and practices that will provide current and future generations with clean, efficient, affordable, and reliable energy". In particular, it stresses the importance of product pricing, energy prices, the construction of energy-efficient buildings, energy efficiency products, and information on energy use. This emphasis on the energy efficiency market, or 'market transformation', is another aspect of the US experience that distinguishes it from the UK experience.

⁴⁵ www.cse.org.uk/cgi-bin/projectprint.cgi?1003; www.cse.org.uk/cgi-bin/projectprint.cgi?1029/

⁴⁶ www.defra.gov.uk/environment/consumerprod/mtp/

Many market initiatives are linked to Home Energy Rating Schemes (HERS) developed within each state.⁴⁷ These initiatives create a symbiotic relationship between HERS and energy mortgages. HERS provides leverage to get money for energy efficiency and efficient heating systems, while at the same time creating market awareness of the benefits of energy efficiency and best heating systems. A national group, RESNET, is the umbrella organisation which seeks to co-ordinate all aspects of HERS, energy mortgages, standards, and training and accreditation for providers of residential energy services. The overall objective of the organisation is to educate, inform and incentivise the market.⁴⁸

The work of the Consortium for Energy Efficiency, a non-profit organisation, is another example of efforts focused on market transformation. The Consortium states that its objectives are to develop national initiatives to promote the manufacture and purchase of energy-efficient products and services, and induce lasting structural and behavioural changes in the market place, resulting in the increased adoption of energy efficiency technologies.⁴⁹

Despite this emphasis on market transformation, the US does recognise the need for other measures and initiatives to address change in the domestic energy efficiency market. The best example is the Weatherization Assistance Program, which was established in 1976.⁵⁰ This programme “enables low-income families to permanently reduce their energy bills by making their homes more energy efficient”. In doing so, it also reduces the nation’s energy dependency, improves the environment, and stimulates economic development in low-income communities. The programme offers free installation of appropriate energy efficiency measures to qualifying homes, including measures for the building, heating and cooling systems, electrical systems, and electricity consuming appliances. Funding (an average upgrade costs \$2,672) and technical guidance is provided by the federal government, while states run the programmes (including setting eligibility and selecting service providers). Approximately 100,000 households are assisted per year, each of which saves approximately \$200 to \$250 on their annual energy bills.

The Weatherization Program has recently been extended with the implementation of the Weatherization Plus Program,⁵¹ which addresses the funding limitations of the Weatherization Assistance Program by combining the resources of different providers to enable ‘whole-house weatherization’.

⁴⁷ Forty-seven were in operation in 2003.

⁴⁸ See: www.natresnet.org/

⁴⁹ www.cee1.org/cee/mt-primer.php3/

⁵⁰ www.eere.energy.gov/weatherization/

⁵¹ www.eere.energy.gov/weatherization/plus_opportunities.html/

Australia

The Australian experience appears to be more limited than that of the UK and the US. Any discussion or initiatives that are taking place tend to originate from the southern states (New South Wales, Victoria and Tasmania), where home heating and air quality are more of an issue. These discussions and initiatives include changes to building codes, small-scale incentive programmes, and Home Energy Rating Schemes.⁵² The focus at the federal level is through the National Framework for Energy Efficiency, with priority areas being the development of minimum energy efficiency standards for new houses, and the mandatory disclosure of house energy performance.⁵³

Key observations from the overseas experience

Overseas experience in incentivising change offers invaluable guidance for the development of ways to encourage change in home heating and energy efficiency in New Zealand. Key observations that can be made from overseas experience include the need for:

- a clear direction and strong commitment from central government
- a long term commitment – change will not happen overnight
- adequate funding
- involvement from all sectors – including central, regional and local government, the private energy sector, non-profit organisations, and the community
- a variety of complementary measures and initiatives – including financial grants and incentives, awareness raising and education, regulation and market transformation.

In addition:

- although all households need to be targeted, some households will need additional targeted assistance (often financial) to make changes – including low-income households, householders in private rental accommodation, and the elderly
- monitoring and evaluation of programmes are essential to ensure objectives are being met.

⁵² See, for instance, details on the 5 Star requirement for new homes constructed in Victoria: www.sea.vic.gov.au/buildings/5starhousing/index.asp/

⁵³ See: www.nfee.gov.au/implementation_committees/buildings/areas_focus.asp/

5.3 New Zealand experience

Christchurch clean air initiatives

Over the past two decades four different types of incentive programme have been implemented to encourage Christchurch householders to move away from solid-fuel heating.

- *Clean Air loans* – these were introduced in the early 1980s and comprised interest-free loans for a period of two years to enable open fires to be replaced by an electric heating appliance. Most of the electric appliances used were night-store heaters. The programme ran for a number of years, and was used by about 2500 householders. The programme was administered by Southpower, the then local electricity supplier.
- *Helping Hand for Heating* – this programme was introduced by the Christchurch City Council in 1998 to complement the regulatory approach being pursued by Environment Canterbury (ECan) at that time. It provided a \$500 grant towards the installed costs of a solid-fuel,⁵⁴ LPG, diesel burner or heat pump, with a lesser amount for other forms of on-demand electric heating. The scheme also provided an incentive for under-floor and ceiling insulation, although the insulation was optional and not a condition for accessing the heating appliance grant. The scheme provided grants to over 6000 households until it finished in 2001. Most households uplifted just the heating grant alone, with relatively low numbers also taking advantage of the insulation incentive.
- *Warmer Homes programme* – this programme was also run by the Christchurch City Council. It ran over the period 2001/02 and was developed largely in response to concern that the Helping Hand programme did not provide sufficient incentive for low-income households. In total 525 households were assisted to install insulation and a budget form of heating, with the average amount of the grant being around \$1000.
- *Clean Heat* – ECan launched the \$38 million, 10-year Clean Heat programme in 2003. It currently provides three different incentive streams (low-income, landlords and general), ranging from a 100% subsidy for insulation and a fixed heating system for the low-income stream, to lower levels of subsidy for the other streams. The average subsidy for the low-income stream over the first year was about \$2700. To date ECan has met almost all of the costs through local rates.

One feature that stands out with this progression of schemes is that over time the amount of incentive has increased substantially. Some have regarded this as the incentive schemes becoming increasingly inefficient, but there is a ‘natural’ progression at work here, with earlier schemes capturing the discretionary ‘low-hanging fruit’ for relatively low costs. However, with ECan seeking full participation from all households with non-complying solid-fuel burners to meet proposed air quality rules, there has been an inevitable realisation that higher forms of incentive are needed to bring about *desirable* change.

⁵⁴ On condition that it meet the ECan-approved emission rate for solid-fuel burners, which was 1.5 g/kg wood.

The issue of desirable change is important here. ECan has not only sought to clean up the air, but has chosen to do this in ways that:

- improve the efficiency of energy use in the home (by making insulation upgrades a compulsory part of the programme)
- provide a permanent, efficient form of heating⁵⁵ in the home
- address social issues of cold homes and affordability.

This adds a considerable extra cost to the programme (compared with a regulatory/low incentive approach) and raises issues of where the funding should logically be sourced. There are other issues that ECan is currently addressing, including the relatively low uptake from the lower incentive streams of the programme.

Despite these concerns, the Clean Heat programme is probably the nearest thing to a desired Warm Homes programme operating in New Zealand at present.

Energy efficiency initiatives: EECA residential grants

The Energy Efficiency and Conservation Authority (EECA) has provided various support measures for residential energy efficiency since 1995. The initial programme was the Energy Saver Fund (ESF), which allocated grants on a competitive basis to those who could demonstrate the ability to provide cost-effective energy efficiency services and products. Funding was allocated yearly, although multi-year contracts were possible. A range of organisations accessed the ESF, including central and local authorities, energy supply companies, private energy efficiency businesses, non-government organisations and charitable trusts, and institutional landlords.

Over the years a number of changes were made to the ESF, including funding rules and eligibility criteria. For a period (1999–2001) the amount of grant money available decreased, and the scheme operated on a year-to-year basis. In 2001 the ESF was replaced and EECA now provide residential support through the EnergyWise Home Grants programme. The programme targets those who are least likely to be able to retrofit their homes – low-income home owners and landlords with rental properties at average or below rents. Currently the programme supports a range of projects throughout the country operated by commercial energy efficiency businesses or local non-profit community organisations. In 2004 the EECA's total expenditure on buildings initiatives was \$1.4 million, most of which was used in Home Grants to provide assistance with insulation retrofits into 3400 homes.

⁵⁵ Approved appliances include heat pumps, pellet burners, flued gas heaters.

Energy efficiency initiatives: a community network approach

The first community energy efficiency initiative was undertaken in Christchurch in 1993, driven by a combination of rising electricity costs, high numbers of under-heated and hard-to-heat houses, and clean air issues. This led to the establishment of Community Energy Action in 1994, and since then an estimated 20 community-based retrofit enterprises have come into existence, literally from Kaitaia to Bluff, with many in poorer towns. A number of these projects were created by or with iwi and runanga. In the mid-1990s the Energy Efficiency and Conservation Authority (EECA) established subsidies for basic energy efficiency retrofits, which helped support these enterprises, as did support and subsidies from other government agencies such as Work and Income (Ministry of Social Policy) and the Community Employment Group for wage subsidies, and Te Puni Kokiri.

Objectives in common (although the emphasis has varied) have been to realise within a community the health, employment, job creation and economic benefits of energy efficiency (ie, social equity). The target group has been lower-income households, particularly those at risk from chronic illness caused by cold, damp houses. Environmental issues have been a lesser driver in most cases.

Community organisations end up undertaking much the same type of work as commercial insulation companies (eg, retrofitting insulation into ceilings and under floors). This can create both competitive and complementary elements. While the commercial companies are often better placed to undertake large contracts that are geographically dispersed and have some established funding providers, community organisations have often been at the forefront of initiating warm home/energy efficiency activities in a community, and have strong networks with other community groups and with a wide range of government agencies. The community group approach is especially successful at identifying need and being able to marshal resources to assist (eg, the Community Energy Action's Warm Babies project in Christchurch, which is sponsored by Meridian Energy and networks with a range of community groups, including Plunket and First Start).

Funding support, especially during the start-up years, has been particularly vital. So has developing a large enough geographical base to allow the organisation to build to a critical mass. One of the issues around the current institutional arrangements for funding is that EECA funding is conditional on there being a local funding share. Some community groups have closed down when they failed to secure the local ongoing funding required to meet the EECA's conditions.

To date an estimated 25,000 houses – mostly occupied by those on low incomes – have been fully or partially retrofitted through community-based organisations.

Energy efficiency initiatives: Housing New Zealand Corporation retrofit programme

Housing New Zealand Corporation (HNZC) rents properties to low-income New Zealanders. In 2001 HNZC began a 10–12-year project to improve the living environment of all HNZC homes built before 1977. The programme involves checking all properties built before 1977 to see if the following energy efficiency features can be improved, or installed if they are not already in place:

- ceiling insulation
- hot-water cylinder wrap
- insulating hot-water pipes in the cylinder cupboard
- under-floor insulation
- adjusting the hot-water cylinder thermostat.

The programme also involves improving the heating and ventilation of the houses to promote a healthy living environment. This includes fixing draughty windows, and addressing condensation and dampness under houses, and can include open fire replacements if needed to comply with local clean air regulations. In Christchurch, for example, in its one- and two-bedroom houses, HNZC has aimed to replace open fires with an electric heating appliance, while in its three-plus bedroom houses it has aimed to replace them with an enclosed wood burner. Some heat pumps have also been installed. In 1997 in Christchurch, 2688 houses contained open fires. As at July 2001, 1155 of these still had open fires (762 of which were in one- and two-bedroom houses, 393 in three-plus bedroom houses), 1035 had enclosed wood burners, 495 used electric heating, and three used gas (Environment Canterbury, 2001, pp.54-55).

In many areas, community-based organisations (CBOs) are contracted to provide energy efficiency retrofits. The benefits of the programme include:

- potentially lower power and medical bills
- a warmer, healthier home in which to live
- provision of local employment opportunities through CBOs, which often target unemployed persons and provide skill-building courses as part of the retrofit delivery programme.

In the 2002/03 financial year, 2619 properties were retrofitted with energy-efficient features. Other properties also benefited from insulation installation through the Healthy Housing, Rural Housing and Community Renewal programmes.

Key observations from the New Zealand experience

- Canterbury clean air has had a very long gestation, a lot of learning by doing, some false moves, issues of inter-agency conflict, etc, but there are many elements of the current programme that are working well. Canterbury has provided an invaluable template for future programmes to build on.
- The experience with incentivising warm homes has been very limited, and is focused almost entirely on grants or subsidies for specific measures. New Zealand's experience has some significant gaps (eg, market-based drivers such as Home Energy Ratings Scheme, loans/financing mechanisms), and the information/learning/motivational environment for change in general has been underdone in New Zealand.
- Programmes need incentives *and* rules. Incentives without rules reinforce procrastination and inertia, send mixed messages about the importance of the changes being promoted, and probably lead to higher levels of incentive having to be offered. Rules without incentives will force heating choices indiscriminately across all market segments, which will likely result in an uneven and inequitable distribution of private benefits and costs, lead to low capital cost heating choices (such as unflued gas heaters) that may have other detrimental side-effects, and may result in a significant degree of community resistance and non-compliance.
- Programmes to date (both clean air and energy efficiency and incentives/rules) have provided significant stimulus to commercial players, but more could probably be done to harness the motivation that could flow from a properly engaged commercial sector.
- Many initiatives are *output* rather than *outcome* focused; that is, focused on numbers of burners changed, floors insulated, etc, but not on whether warm and sustainable environments have been created.
- Community energy efficiency initiatives are generally strapped for cash and output focused, but the community approach has proven that it can reach people and identify need in ways that larger bureaucracies can find difficult to do – reaching the target audience is often harder than one might think. A number of barriers may be overcome through utilising a community network approach.
- Funding arrangements throughout the country are inconsistent and fragmented. They range from virtually full funding by local ratepayers of both energy efficiency and clean heating appliances for Environment Canterbury's full assistance stream under Clean Heat,⁵⁶ through to partial funding from the Energy Efficiency and Conservation Authority (EECA) for local energy efficiency programmes.⁵⁷ The requirement for a high local share of funding for the EECA social retrofit programmes has led to disparate funding arrangements, with some local communities engaged and others not.
- The Community Services Card (CSC) is used for eligibility into most assistance programmes, but many people who need warm home miss out on incentives because they don't qualify under the CSC criteria.

⁵⁶ Some funding for energy efficiency has been made available by EECA from 2004/05.

⁵⁷ EECA state a desire for 3:1 (local:EECA) funding, although typically the EECA contribution is higher than 25%.

5.4 Summary of programme participation drivers

This section draws together social drivers that relate specifically to householder participation in publicly funded programmes such as the Environment Canterbury clean air initiatives, Nelson City Council clean air initiatives, Energy Efficiency and Conservation Authority schemes, and various overseas programmes. Drivers listed in the previous two sections (sections 3 and 4) will not be repeated here, even though some of them still apply.

Table 5.1: Drivers specific to programme participation

Category of driver 'For' or 'against'	Influences within the individual's immediate, day-to-day circumstances (5.5)	Knowledge, understanding and skills to make decisions to change (5.6)	Influences from the public policy environment (5.7)	Influences from the community and the immediate social environment (5.8)	The orientation of home heating and related commercial services (5.9)
Drivers encouraging change to cleaner heating, improved energy efficiency and warmer homes	(1) Being able to meet eligibility criteria (2) Assistance sufficient to make change possible (3) Financial incentive sufficient to 'tip' the decision	(1) Awareness of the programme (2) A programme that is simple to understand (3) The role of in-home assessments to customise solutions (4) Rising expectations of the quality of energy services, comfort and warmth	(1) Government leadership (2) Co-ordination of policy and programme effort across government (3) Sustaining public programme efforts and promotions over the long term (4) The role of incentives to accelerate change	(1) Using organisations/people with established relationships to households to promote the programme (2) Using organisations/people with established relationships to households to deliver the programme (3) Information sources that are trusted (4) Local champions (5) Skilled project managers for local projects	(1) Using registered installers who are audited (2) The role of approved suppliers/installers in educating other professionals
Drivers inhibiting change to cleaner heating, improved energy efficiency and warmer homes	(4) Inflexible eligibility criteria as the only gateway to participation	(5) Eligibility requirements that are complicated and onerous (6) Insufficient levels of social marketing to reach enough households	(5) The cross-compliance requirement to insulate homes (6) Ineffectual deadlines (7) Insufficient \$ resources for promotion (8) Failure to build working relationships (9) Staff turnover (10) Commercial tendering procedures (11) Inability of programme implementers to target households		(3) Finance, mortgage (and energy sector) not engaged

5.5 Influences within the individual’s immediate, day-to-day circumstances

Encouraging drivers

(1) Being able to meet eligibility criteria

Being able to meet eligibility criteria is clearly an important driver determining programme participation. It is therefore important that programme designers be careful to set eligibility criteria that enable their target group of householders to participate.

(2) Assistance sufficient to make change possible

Some households will be unable to afford the financial costs associated with a change to cleaner heating, improved energy efficiency and warmer homes.⁵⁸ If participation by these households is desired, then programmes need to ensure that there is assistance available, and that the assistance is sufficient to make change possible. The level of assistance required is likely to vary, with some households requiring a 100% grant to enable change.

This driver has been recognised by programme designers in New Zealand and overseas, where there are programmes that provide 100% grants to households (‘low-income’) that cannot afford change. Some examples include, Environment Canterbury’s (ECan) clean air initiatives, Nelson City Council’s clean air initiatives, the UK’s Warm Front programme (DEFRA, 2004a), and the US’s Weatherization Assistance Programme.⁵⁹

(3) Financial incentive sufficient to ‘tip’ the decision

Some households can afford the financial costs associated with a change to cleaner heating, improved energy efficiency and warmer homes, but for various reasons decide not to make this change. Providing a financial incentive may be a way to ‘tip’ the decision in favour of investing in change. Economic policy theorists may argue that regulation is more efficient and fairer on the rest of the community, and therefore from an economic theory perspective should be preferred. However, other forms of behavioural rationalism support the notion that ‘tipping points’ are a useful and pragmatic policy concept.

⁵⁸ KI Interviews: Pamela Storey, HEET; Ken Lawn, ECan.

⁵⁹ See www.energy.gov/

Some programmes overseas and in New Zealand have adopted this approach. Examples include ECan's clean air initiatives, Nelson City Council's clean air initiatives, the Centre for Sustainable Energy's Somerset Warm and Well programme,⁶⁰ and the Centre for Sustainable Energy's Warmer Lets programme.⁶¹

The difficulty with this approach lies in determining the level of financial incentive needed to 'tip' the decision. The number of households attracted to participate in the ECan and Nelson City Council clean air programmes through a financial incentive has not been as high as programme designers would have liked. The level of incentive offered has been suggested as one reason for this, but we would like to see more detailed consumer marketing analysis demonstrating whether other forms of assistance could be more effective in achieving programme objectives.

Inhibiting drivers

(4) Inflexible eligibility criteria as the only gateway to participation

Inflexible eligibility criteria will inhibit participation in programmes that help people change to cleaner heating, improved energy efficiency and warmer homes. Such criteria are usually the result of efforts by programme designers and managers to develop practical, simple, cost-effective ways to screen participants. For example, one of the most simple and cost-effective ways to identify a 'low-income' household (ie, a household that cannot afford to make change) is to set eligibility criteria based on possession of a Community Services Card, or receipt of an income-related benefit. Unfortunately, there will be households who do not meet this criterion but who are still in need of assistance. The most effective (but potentially expensive) way to address this issue is to assess individual circumstances (on a case-by-case basis), and/or use referrals from agencies that work in the community.

⁶⁰ See www.cse.org.uk/cgi-bin/projectprint.cgi?1025/

⁶¹ See www.cse.org.uk/cgi-bin/projectprint.cgi?1002/

5.6 Knowledge, understanding and skills to make decisions to change

Encouraging drivers

(1) Awareness of the programme

The first step to participating in a programme is being aware of its existence. Raising awareness is therefore a critical component of a programme's operation.

(2) A programme that is simple to understand

A programme that is simple to understand is more likely to attract and retain householder participation. For example, it should be simple for householders to understand what the programme offers, the programme objectives, the programme benefits, and eligibility criteria. How this information is presented, including the language used, will therefore be important.

(3) The role of in-home assessments to customise solutions

In-home assessments that customise solutions are an important factor influencing the success of programme objectives such as achieving warmer homes. The installation of certain pre-determined measures will not ensure warmer homes because households have different needs, determined by the type of house, the pre-existing heating and energy efficiency situation, and householder behaviours.

In-home assessments can also play a role in encouraging participation in programmes, because they provide an opportunity to clearly explain the options and benefits of participation for individual households. Boardman and Darby (2000) distinguish between 'advice' and 'information', by pointing out that 'advice' is specific to individuals and their circumstances, while 'information' is not specific to the person who receives it but is intended for general use. The authors argue that the best way to provide 'advice' is through home visits, because this enables a dialogue between the householder and the adviser, which is crucial to building knowledge and the ability to act to improve energy efficiency.

There are many examples of past and current programmes that have used or are using in-home assessments, including Environment Canterbury's clean air programme and various Community Energy Action programmes.

(4) Rising expectations of the quality of energy services, comfort and warmth

Rising expectations of the quality of energy services, comfort and warmth may encourage householders to participate in programmes.

Inhibiting drivers

(5) Eligibility requirements that are complicated and onerous

Eligibility requirements that are complicated and onerous are likely to inhibit participation in programmes that assist households to change to cleaner heating, improved energy efficiency and warmer homes (see sections 5.5(4) and 5.6(2)).

(6) Insufficient levels of social marketing to reach enough households

There is some concern that there are insufficient levels of social marketing to reach enough households, and that as a result the 2013 National Environmental Standard targets will not be met.⁶²

5.7 Influences from the public policy environment

Encouraging drivers

(1) Government leadership

Government leadership is likely to encourage household participation in programmes by increasing the availability of appropriate programmes, and by signalling that change is necessary and beneficial. The UK government has shown significant leadership in recent years by initiating debate, developing strategies and action plans, funding initiatives, implementing plans and initiatives, and facilitating involvement across all sectors.

(2) Co-ordination of policy and programme effort across government

Co-ordination of policy and programme effort across government is likely to increase the chances that programmes and initiatives that encourage household participation are developed. Some of the benefits of co-ordination include the ability to ensure that policies and programmes are consistent and resources are pooled.

⁶² KI Interview: Stephen Ward and Robert Tromop, EECA.

The UK government recognised the need for co-ordination when it established the Sustainable Energy Policy Network, a network of units across government departments, devolved administrations, regulators and key delivery organisations which work together to achieve a reduction in carbon dioxide emissions, and adequately and affordably heated homes through energy efficiency.⁶³

(3) Sustaining public programme efforts and promotions over the long term

A long term commitment is needed to raise awareness, change attitudes, achieve conversion/installation targets, and meet programme objectives.

(4) The role of incentives to accelerate change

Incentives can play a role in accelerating change to cleaner heating, improved energy efficiency and warmer homes by encouraging households who can afford to change to make changes before they might otherwise have planned to.

(5) The cross-compliance requirement to insulate homes

From a programme perspective, Environment Canterbury (ECan) reported that the cross-compliance requirements (ie, having to install insulation to a certain standard to become eligible for the cleaner heating subsidy) appeared to be a disincentive for households to participate in its Partial Assistance scheme. Is such cross-compliance necessary? It reduces uptake and also reduces the effective subsidy (by imposing an insulation cost). However, one insulation installer expressed the view that this cross-compliance feature was successful in encouraging some households to invest in insulation.

These apparently conflicting viewpoints may be explained by reference to differing segments of the market: the disincentive applied to households just above the Community Service Card threshold but with little discretionary expenditure and difficulties addressing the capital cost hurdle, while the incentive applied to households with sufficient discretionary expenditure for the capital cost not to be a hurdle, but that were nevertheless interested in receiving the clean heat subsidy as an inducement to change. A second explanation is that the viewpoints do not conflict at all. On the one hand fewer people get involved in the ECan programme than otherwise would, while on the other hand more people install insulation than otherwise would.

(6) Ineffectual deadlines

Deadlines can affect participation by householders in programmes. While having a fixed point in time by which action must be taken can serve as a motivating factor, having deadlines that are too distant can create a perception of a lack of urgency and therefore delay action to make change.⁶⁴

⁶³ See: www.dti.gov.uk/energy/sepn/index.shtml/

⁶⁴ KI Interview: David Jackson, Nelson City Council.

(7) Insufficient financial resources for promotion

Insufficient financial resources for the promotion of a programme can inhibit participation, because it results in a lack of awareness of the programme, its objectives, and its benefits.

(8) Failure to build working relationships

A failure to build working relationships can inhibit participation by reducing the ability of programmes to target households and promote the programme.

(9) Staff turnover

Programme staff turnover can make it difficult to establish effective, ongoing working partnerships with health agencies and community groups.⁶⁵

(10) Commercial tendering procedures

Commercial tendering procedures tend to lead to a ‘winner takes all’ outcome, squeezing out other players, which in turn reduces the number of players in the marketplace who are actively seeking customer participation.

(11) Inability of programme implementers to target households

An inability of programme implementers to target households inhibits programme participation (see section 5.5(4)).

5.8 Influences from the community and the immediate social environment

Encouraging drivers

(1) Using organisations/people with established relationships to households to promote the programme

Participation is more likely when organisations/people with established relationships promote programmes, because they will have a greater understanding of what type of promotion will be effective, and will also be more likely to be trusted by those with whom they have established relationships.

⁶⁵ KI Interviews: Ann Curry, Community and Public Health; David Jackson, Nelson City Council.

(2) Using organisations/people with established relationships to households to deliver the programme

See sections 5.8(1) and 5.8(4).

(3) Information sources that are trusted

Programme participation is more likely if information sources are trusted.

(4) Local champions

Participation may be more likely when programmes use respected opinion leaders who can lead by example and convince others to follow suit.

(5) Skilled project managers for local projects

Successful project participation requires enlisting the involvement of a range of organisations in the community, good communication, maintaining high levels of motivation, etc. In other words, excellent people skills are an essential ingredient to manage local projects.

5.9 The orientation of home heating and related commercial services

Encouraging drivers

(1) Using registered installers who are audited

An emphasis on quality installations builds confidence in the programme and will help increase participation rates.

(2) The role of approved suppliers/installers in educating other professionals

Approved suppliers/installers can attract enquiries from other professionals (eg, architects, design consultants, contractors).

Inhibiting drivers

(3) Finance, mortgage (and energy sector) not engaged

The lack of involvement by the finance sector reduces assistance options for householders who want to make change but who would struggle to cover the associated costs. For example, the use of ‘revolving mortgages’ to finance change to cleaner heating and improved energy efficiency may increase participation.

5.10 Key points

There is a lot we can learn about programme participation drivers from past and current ‘incentive’ programmes in New Zealand and overseas. Key points include:

- the nature of targeting and eligibility criteria
- assistance and incentives
- information and advice
- funding and resources
- government and other sector involvement.

These all affect programme participation, and should therefore be carefully considered during programme design and implementation.

Appendix: List of Key Informant Interviews

Organisation	Interviewee
Air Con New Zealand	Stephen Tucker
Beacon Pathway/NOW Home	Nick Collins, Lynda Amitrano and others
BRANZ	Nigel Isaacs
Carrier Air Conditioning	Vijay David
Christchurch City Council	Terry Moody
Community Energy Action (ex-manager)	Jennifer Small
Community and Public Health	Anne Currie
Energy Efficiency and Conservation Authority (ECCA)	Stephen Ward, Philip Mladenow, Robert Tromop
Energy Efficiency Homes Ltd	Ron Theaker
EnergySmart	Robyn McKeown
Environment Canterbury	Ken Lawn
Gas Appliance Suppliers Association	Stephen Parker, Tony Hammond
Gas Assn of New Zealand	Stephen Parker, Tony Hammond
Housing New Zealand Corporation	Paula Comerford
Huntly Energy Efficiency Trust (HEET)	Pamela Storey
Insulation Services, Hawke's Bay	Mike Davis
Insultech – South Island	Lance Vercoe
Insultech – Auckland	John Patterson
LPG Association	Peter Gilbert
Negawatt Resources	Grant Dunford
Nelson City Council	David Jackson
Pegasus Health	Graham McGeoch
Property Investors Association – Christchurch	Martin Evans
Property Investors Association – Nelson	Glenn Morris
Solid Energy–Natures Flame	Andy Matheson
Strategic Energy	Glenn Seymour
Trustpower	Graham Purchas
Waitara Employment Trust	Ed Parker

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