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Warm Homes Technical Report: Social Drivers

Phase 2 Report

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Executive Summary

Overview

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 achieve warmer and healthier homes.

One key aspect of this investigation has been to investigate the *social drivers* behind householders' decisions on home heating, insulation and appliance choice. The objectives of this project have been to:

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

The social drivers work was carried out in two phases. Phase 1 focused on developing a conceptual framework, undertaking an international literature review, and analysing New Zealand's experiences of social drivers, based on a literature review and conducting 30 interviews with key informants. Phase 2, reported here, involved analysing issues and options for programme design, holding workshops in four communities throughout the country, interpreting the outputs of these activities into a pragmatic concept of 'a national programme', and producing a set of recommendations on how to develop incentives for behaviour change in relation to home heating and energy efficiency.

The consultants recommendations are based on eight key aspects of programme design:

- ensuring the programme (and associated policy) is firmly oriented towards desired Warm Homes outcomes
- maximising the scope for household participation and community buy-in
- ensuring that education, publicity and awareness raising are an integral part of the programme of action, and that different market segments are targeted appropriately
- designing a range of financial assistance packages to appeal to as wide a range of households as possible
- ensuring that 'carrots' (information and incentives) are backed up with meaningful rules
- developing a funding model that recognises a fair balance between central government and local resources
- ensuring that the Warm Homes package of measures both provides for customer choice and achieves wider social and environmental outcomes
- ensuring development of the programme is closely monitored, especially in the early stages, and that the monitoring focuses on outcomes, not just outputs.

Key messages

Following are what the consultants consider to be the key messages arising out of the social drivers investigations. The messages are aimed at all potential stakeholders who may become involved in initiatives under the Warm Homes banner.

Achievability of a national Warm Homes programme

1. A Warm Homes programme, combining the twin objectives of achieving warm healthy homes and clean air, is a challenge.
2. However, there are large social benefits to be gained from a multi-objective programme like this, in the form of premature deaths avoided, reduced incidence of chronic illness (resulting in fewer work and school absences), and significant and durable improvements to the housing stock. These benefits may not be achieved if the air quality objective is reached at the expense of home warmth.
3. Currently there is some understanding in communities around New Zealand of the nature, extent and consequences of the cold homes problem, but very little understanding of the air quality situation. This lack of awareness applies not only at the household level, but also among businesses and some local and regional government agencies. This situation is beginning to change since the introduction of the air quality standards.
4. Existing Clean Heat/Warm Homes-type programmes that have not totally engaged the health sector or local community-level organisations have experienced difficulties in involving the numbers of households necessary to improve air quality and to increase the standard of housing. These programmes have benefited from few, if any, agency referrals in recruiting households to participate.
5. To achieve the 2013 air quality target, and the intervening ‘downward trajectory’ of exceedances, many communities will need to embrace the fullest range of drivers discussed in this report.

Potentially conflicting objectives and resolving the conflict

1. For *some* households, the air quality objective can conflict with the Warm Homes objective when it constrains the range of acceptable and feasible home heating options, and thereby adds to the household’s financial costs for home heating. Many low-income families are strongly averse to using electricity for heating because of the problem of paying large winter power bills.
2. Achieving improved levels of dwelling insulation reduces this potential conflict. Better insulation helps achieve both air quality and warm homes objectives, by increasing the range of clean heating options that are viable and by making all forms of heating more effective at warming the house to adequate levels.
3. In a perfect market there would be no need to provide financial incentives or assistance for improving dwelling insulation because of the certain benefits that arise. However, the general understanding is far from perfect and a number of benefits remain unpriced. Where such market failures exist, government may have a role in addressing them.

Households' financial circumstances

1. The majority of benefits from changing to cleaner forms of heating will be public rather than private benefits. Society as a whole will benefit from improved health due to cleaner outdoor air. Private benefits will not be experienced until householders have to replace their existing appliance (either because it no longer works or because of other drivers, such as fashion or convenience). Regulation would be effective for bringing about change in this group.
2. Even though there will be both public and private benefits from a move to cleaner heating, households may require financial assistance to facilitate this change. A suite of tools that includes regulation, financial assistance, education and information will facilitate the move to cleaner heating and warmer homes whilst ensuring that a balance is achieved with equity and public health.
3. Overseas experience suggests that individuals tend to give more weight to perceived private benefits than to public benefits in their own financial decision-making. Furthermore, even private benefits of some kinds (such as reduction in the risk of illness, being non-monetary) are often overlooked by individual households in their home heating decision-making.
4. Private benefits from converting to clean heating in the home vary a great deal from one household to another, which means the private incentives to change vary considerably as well. This illustrates the need for a flexible financial tool (or tools) to meet the differing individual needs of a diverse range of households.

Diversity of community circumstances

1. Workshops conducted in four centres with air quality problems showed strong common issues, but also unique local circumstances. The extent of the air quality problem may be more or less acute; there may be some unique local drivers for existing behaviours or for alternatives; the history and effectiveness of organisational relationships will be unique; some will have more local resources at their discretion to support change than others; and some have already experienced publicly funded programmes of change while others have not.
2. In greater contrast to location variation is the segmentation in each community (low income, owner-occupied, rental, retired), which is of greater significance for the design of financial incentives and social marketing programmes to effect change.

A range of drivers

1. The combination of regulation, attention to other social drivers, and financial assistance will result in behaviour change over time leading to cleaner air and warmer homes. Any of these tools in isolation will be less successful.
2. Regulation alone is likely to result in a variety of perverse or adverse effects. Regulation will also be too slow to achieve the clean air outcomes required, particularly the need for a gradual improvement in air quality over time.
3. A wider range of financial instruments is needed, to engage a significant proportion of households, such as the design and introduction of loan schemes. Historically, financial

incentives in New Zealand have been mostly in the form of grants of public money. Appropriate loans schemes would reduce the overall social cost (government funding requirement) and could have low transaction costs if secured through a targeted rate on properties. It is recommended that such loan schemes be available to all households, thus accelerating uptake among households generally.

4. Overseas experience suggests that successful programmes of change are those that engage stakeholders across the whole spectrum – central government, regional government, local government, community, industry/private sector, individuals and households. Within this concept of broad engagement, however, it is important to have clear leadership at each level, and to ensure engagement begins at the earliest stages of the programme. Integrating mechanisms such as the Home Energy Rating Scheme and a long term perspective to achieve market transformation are considered critical to success in other countries.
5. A Warm Homes programme will require a national framework, with successful implementation enhanced via community-level responsiveness. Additionally, any programme should set out, from the outset, to appeal in the broadest way possible to as many people as possible.

Funding issues

1. The overall level of investment to improve air quality and to achieve warm homes is substantial. However, public funding requirement will be moderated to the extent that private funds – from households and business stakeholders – can be leveraged.
2. The transition to an economy that supports clean heating and energy efficient housing will build both labour and knowledge capacity. A key constraint, regardless of funding, is capacity in these sectors – a clear opportunity for both economic and employment growth.
3. Communities are beginning to ask, “Where is the public health sector funding to support a Warm Homes programme?”, given the economic benefits of health improvements to be accrued from improvements in air quality. If the benefits are seen as being a mix of better health outcomes (a local community benefit) and lower health costs (a saving to central government), then there is a strong argument for shared funding between central and local sources. Not only would this make economic sense in terms of where the benefits accrue, but it is also likely to make the target outcome more achievable in high-impact communities.
4. In achieving the clean air outcome, focusing assistance solely on low-income households is likely to be inefficient. It is recommended that incentives be available to all households.

Choices need to be available

1. The large-scale replacement of wood burners is a challenge current Warm Homes-type programmes have yet to face. For a number of reasons, it is recommended that programme implementation design allows for clean-wood-burning choices as much as possible (within the confines of the air quality objective).

Lack of outcomes focus

1. To date, there has not been enough effort put into evaluating policy outcomes so far, particularly social outcomes. Monitoring has tended to be ‘output’ focused (such as number of houses insulated or number of open fires converted), which undermines perceptions of programme effectiveness. This makes it difficult to transfer experience between programmes and to share learnings when similar outcomes can be achieved. Development of a Warm Homes ‘standard’ would help this outcomes focus and provide the basis for future programme design.

1 Overview of Social Drivers Work Programme

1.1 Introduction

This is the second of two reports delivered by the Taylor Baines consortium under their social drivers contract with the Ministry for the Environment, as part of the Warm Homes project. This report should be read in conjunction with the Phase 1 report, which outlines the policy context of the project, in particular the National Environmental Standard (NES) for Air Quality and the National Energy Efficiency and Conservation Strategy (NEECS). This description of the policy context refers explicitly to environmental and energy efficiency policy domains, which have traditionally been the responsibility of national agencies (the Ministry for the Environment and Energy Efficiency and Conservation Authority) and regional councils.

It was also noted that the Warm Homes project is influenced by the Sustainable Development Programme of Action (2003), which includes not only some important key principles¹ such as “seeking innovative solutions that are mutually reinforcing” and “using the best information available to support decision making”, but also a major work stream on Energy,² 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”.

1.2 The evolving context

It is evident that the policy context is evolving and broadening into related policy domains, most notably public health, and regional and local economic development. Public health outcomes associated with air quality and cold homes are a logical policy connection, and in this respect the policy context is evolving only in the sense that the public health sector is becoming more active in its warm homes policy responsibilities. The health outcomes of warm homes have been articulated in some quarters for several years,³ and research on the health benefits of warmer homes and the health consequences of poor winter-time air quality have informed public discussions for some time.

The problem of poor outdoor air quality is one that has been recognised by few communities, although the introduction of the NES has meant that now more communities are being engaged on this issue. Only very recently have regional councils begun to articulate the policy implications for regional and local economic development. It is not yet widely appreciated that failure by communities who live in polluted areas to comply with the 2013 target condition of

¹ Department of Prime Minister and Cabinet, *Sustainable Development for New Zealand: Programme of Action*, Department of Prime Minister and Cabinet, Wellington, 2003, p.10.

² Ibid, pp 16–18.

³ More correctly, the detrimental health effects from cold and damp homes have been highlighted.

“no more than one exceedance”, and the “downward trajectory” of exceedances, will mean that regional councils may refuse discharge consents for significant discharges in the airshed.

This policy implication forges the most direct link to the domain of economic development policy at the regional and local level. As just pointed out, it is apparent that the significance of this is only just beginning to be acknowledged. Even now, awareness of this issue is not great in the communities visited for the Phase 2 workshops, which suggests that awareness of this issue is low in many parts of the country.

1.3 Social drivers objectives

As noted in section 1.2 of the Phase 1 report, the objectives of this project, as set out in the 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 incentives (financial or otherwise) required to achieve behaviour change
- make recommendations on the most appropriate way to achieve behaviour change.

These objectives were to be achieved via a two-phase investigation.

Phase 1 work

Phase 1 of the investigations involved:

- developing a conceptual framework (as described in section 1.5 of the Phase 1 Report)
- an international literature review (with findings included in the analysis presented in sections 2 to 5 of the Phase 1 Report)
- analysing New Zealand’s experiences, based on reviewing New Zealand documentation and conducting 30 key informant interviews (with findings included in the analysis presented in sections 2 to 5 of the Phase 1 Report).

The Phase 1 Report presented the team’s findings on the mix of social drivers influencing household behaviours and choices in relation to home heating. The social drivers discussed were distinguished according to whether they *encourage* or *inhibit* particular choices or behaviours. They were analysed separately in relation to home heating, residential energy efficiency (eg, insulation and draught stopping) and participation in public programmes of change, such as a Warm Homes programme.

Phase 2 work

Phase 2 of the contract required the team to build on the findings of Phase 1 and produce a set of recommendations for the Ministry for the Environment on how to “develop appropriate incentives to enable behaviour change in relation to home heating and energy efficiency”. It was expected that the focus of this work would be on “testing various incentive options, as well as investigating other elements of innovative market design that will influence the likelihood of success, and receiving feedback from key informants on the incentive options proposed”.

Specific activities carried out during Phase 2 included:

- analysing issues and options for programme design (see below, and Appendix A)
- holding four community workshops in areas where there are currently air quality problems (see section 2 and Appendices B and C)
- interpreting the outputs of these activities into a pragmatic concept of “a national programme” (see section 3)
- producing a set of recommendations on how to develop appropriate incentives to enable behaviour change in relation to home heating and energy efficiency (see section 4).

The source materials and findings on social drivers were analysed by the team in terms of issues for programme design, and possible options for addressing these issues. Some of the issues identified at this stage have been considered important enough to include in the key messages presented in the Executive Summary of this report.

The issues and options were analysed under the following themes:

- policy and programme outcomes
- household participation and community buy-in
- education, information and market intelligence
- financial incentives and rules
- the rental market
- programme funding
- the overall need for policy refinement and programme improvement.

Tabulated details of the issues and options analysis are presented in Appendix A.

The issues and options were subsequently fine-tuned to inform the ‘Key messages’ and ‘Recommendations for a national programme’ sections of this report.

2 Four Local Workshops

2.1 The series of workshops

Originally, three workshops were planned. One was to be an incentives options policy workshop with a range of government officials in order to work through the pros and cons of options and other programme design matters at a central government policy level. The other two were to be community workshops, originally planned for Christchurch and Masterton.

In the event, the Ministry for the Environment substituted the policy workshop with another half-day workshop at which the social drivers project team presented progress results to a group representing parties involved in the existing Warm Homes-type programmes (Environment Canterbury, Christchurch City Council, Nelson City Council), Energy Efficiency and Conservation Authority, Building Research Association of New Zealand, Ministry of Health, and the South Waikato District Council, with whom the Ministry for the Environment was in the process of negotiating to establish a small Warm Homes pilot project from April to June 2005. The social drivers team was one of three contracted groups to make presentations, the others being Glenn Seymour (Strategic Energy) on aspects of modelling heating choice, and Emily Wilton (Environet) on emissions inventory work.

During the hour-long presentation by the social drivers team, topics covered included the approach and conceptual framework adopted, the findings on social drivers, the analysis of issues and options for maximising householder response, and some preliminary feedback from the Christchurch and Masterton workshops.

The Ministry then requested the addition of two further regional workshops, with the aim of extending and diversifying the range of community perspectives incorporated into the analysis. The two additional workshops were to be in Tokoroa and Timaru. Tokoroa provided an example of a larger town with an acute winter-time air quality problem, in a region with no previous involvement in public programmes to address the problem and very modest involvement (through Housing New Zealand) of energy efficiency upgrades to houses. Timaru provided an example of a provincial centre with a significant winter-time air quality problem and a regional council (Environment Canterbury) with considerable experience of its Clean Heat programme, but also with the opportunity to learn from Christchurch experience before implementing something similar in Timaru.

It should be noted that these locations were chosen as they are areas known to have serious air quality problems. The findings from the workshops will have this background to them and the solutions proposed for these areas may be more extreme than those required in other locations.

2.2 The purpose of the workshops

The express purpose of these workshops was to:

- provide information on the project team's findings about social drivers (ie, why people heat their homes the way they do, why people use/do not use energy-efficiency measures,

etc), and to elicit workshop participants’ ideas on which social drivers they consider to be most influential for home heating decisions in their communities

- discuss particular issues of programme design and implementation
- discuss potential improvements to existing energy-efficiency and clean-air programmes, and the implications for developing a nationwide integrated Warm Homes programme.

It soon became clear that, with the exception of the Christchurch workshop, these workshops were an important first or early step in raising awareness of the nature and extent of the air pollution problem in these local communities. They also served as an opportunity for smaller communities to consider how they might establish a co-operative process of programme implementation at the local level. In the case of Christchurch, the workshop served as an opportunity for local stakeholders (some of whom had been interviewed during Phase 1 because of their directly relevant experience) to discuss the merits of feasible improvements to the existing Clean Heat programme.

Attendance lists for each of the four community workshops are provided in Appendix B.

2.3 Workshop feedback on social drivers

Each workshop listed and prioritised key factors that influence people’s decisions about adopting less polluting forms of heating in their homes (Table 1). The colour coding illustrates groups of generic factors, which are discussed below.

Table 1: Summary of workshop responses on key influencing factors

Christchurch	Masterton	Tokoroa	Timaru
Factors positively affecting uptake			
Publicly funded programmes Regulations Busy lifestyles Household priorities – desire for warm home Improved technology options available Wide range of information available	Publicity around health and housing Provide education/advice on options Busy lifestyles and ageing population Relatively low electricity prices Publicly funded programmes Improved technology options available	Demonstrated benefits/information Long term publicly funded programmes Community leadership/enthusiasm	Education/advice Busy lifestyles Local projects Publicly funded programmes Regulations Community leadership/enthusiasm
Factors negatively affecting uptake			
Cost/affordability of change Reliability of electricity supply Cost of electricity Awareness/understanding Entrenched attitudes to heating	Cost/affordability of change Rental property barriers Household priorities elsewhere Awareness/understanding Wood is good, cheap and available locally	Capital costs of change Non-wood options less desirable and costlier Rental property barriers and transient population Household priorities elsewhere Awareness/ understanding	Cost/affordability of change Too much hassle/don't have to change Non-wood options less desirable Awareness/understanding Rental property barriers

Key points from this comparison

- There was a strong commonality of factors between all workshops.
- Most factors can be positive or negative – which stresses the reality that markets are segmented, where a positive attribute for one segment can be a negative attribute for another.
- A few factors of importance are specific to local circumstances.
- Cost/affordability issues were raised consistently across all workshops as the most important factor.

Implications for the Warm Homes project

- A national programme framework with a number of strong common elements would appear to be appropriate for all locations.
- There is, nevertheless, the need for ‘localisation’ – to build on community strengths and knowledge and to take account of specific local circumstances.
- Acknowledging the segmented nature of some of the factors, some parts of the programme need to be specifically tailored to market segments (a ‘horses for courses approach’). For example, specific information/awareness raising and support could be targeted at the elderly, while lifestyle/convenience/comfort factors could be used as a focus for marketing to other segments.

Analysis of specific factors

Financial issues, including the cost/affordability of change

This was the most commonly cited key factor across all four workshops. The issue mainly relates to the initial capital cost to move to a clean heating appliance (and other associated investments).⁴ Most workshops saw publicly funded programmes as an effective way to achieve positive change.

Relative desirability of heating options

This factor appears to be highly segmented: some workshop participants saw non-wood options as being less desirable because of higher costs and less heat output. In Christchurch, electricity costs and reliability were a concern. On the other hand, workshops also acknowledged the attractiveness of new technology options, with some attendees regarding cheap electricity prices as being a positive driver for some.

⁴ Note that workshop attendees had a strong weighting towards representation by social agencies, with a high awareness of affordability issues for these groups

Awareness and understanding of issues

Workshops identified raising awareness and understanding (particularly of the adverse health effects associated with cold homes and air pollution) as an important factor encouraging change, and the current lack of awareness and understanding (within some segments) as a barrier to change.

Lifestyle issues

Today's busy lifestyles were widely regarded as a factor pushing people towards instantaneous and fast heating systems – generally these systems use cleaner energy sources. On the other hand, some lifestyles were not amenable to this, with some householders being highly resistant to changing from established patterns.

Household priorities

As above, this factor could be both positive and negative depending on the market segment: the positive driver being when a household's desire for more warmth/cleaner heating aligns with the Warm Homes goals, the negative driver when households are amenable to changing their heating but can't afford it or can't put in the time to follow through.

Community leadership/enthusiasm

This factor was identified at two workshops as being a key factor in initiating positive change. Leadership is required at various levels in the community (eg, political through to community groups), but implicit is a high level of unity and consensus among the various players on the way forward.

Regulations

These were raised at the two Canterbury workshops as a positive driver of change, probably reflecting participants' local knowledge of the limited uptake of clean heating appliances (under the Clean Heat programme), in which only incentives have been available to drive change.

Rental property barriers

Most workshops identified that (private) rental properties present a particular barrier to change. Landlords have no legal requirements to invest in clean heating (other than complying with any local air plan regulations), and many landlords don't necessarily see a return from the investment, although there is a proportion of landlords who are willing to respond to tenants' requests for improved amenities. Tenants won't invest in a fixed capital item because it is not their property, and tenancies are typically of short duration (less than one year). The strongest resistance occurs in the low-income, more transient segment of the rental market.

2.4 Lessons learnt about community buy-in and programme participation

Discussions at each of the four workshops revealed distinct differences in the characteristics of the air quality/cold homes problem in each community, certainly when considered in combination. In a sense, these characteristics can be seen as describing social drivers that are particularly important in each community. They highlight the importance of acknowledging that any national programme must support local variation. To put it another way, the top-down elements of a national programme must complement and enable the bottom-up elements of community response.

The factors likely to influence the nature of community responses in each of the four communities were summarised under the following headings:

- extent of the air quality problem
- degree of the air quality problem
- resource/technical aspects influencing the response
- social/demographic/community aspects influencing the response
- community awareness of the problem
- experience of public programmes of any kind which address air quality and/or health issues or energy efficiency improvements
- agency networking and active collaboration
- programme local funding constraints in relation to the extent and degree of the air quality/cold homes problem and the socio-economic status of the community.

A comparison of these factors for each of the four communities is given in Appendix C.

In summary, the three workshops (not including Christchurch due to its level of engagement):

- validated and confirmed information obtained from other key sources, particularly the 30-plus key informant interviews carried out for the Phase 1 Report
- confirmed that while there are some notable differences, the situations and issues of each had more similarities than differences
- demonstrated that with strong local input to address the differences and obtain community buy-in, it will be possible to develop an implementation strategy that can work in each of the three communities
- identified the need to revisit the name 'Warm Homes' before a national programme is rolled out, because there is confusion with Healthy Homes projects, a name that is a broader and better established descriptor for a *narrower* range of activities (ie, health benefits through energy efficiency for low-income households).

3 Interpreting the Concept of a ‘National Programme’

3.1 The Ministry’s brief for the social drivers project

The social drivers work stream was commissioned as an integral part of the Ministry’s Warm Homes project. As noted earlier, the Warm Homes project is investigating and developing possible *national programmes* that work with regional and local government, energy suppliers, manufacturers and communities to achieve the aims discussed above.

How should the concept of ‘a national programme’ be interpreted in a practical way? What roles and responsibilities are to be exercised at central government level? What roles and responsibilities are to be exercised at regional government level? What roles and responsibilities are to be exercised at local government and community level? Note that in addressing these questions the discussion below is intended to be *illustrative rather than strictly prescriptive*.

3.2 Interpreting the concept of ‘a national programme’ in light of the findings on social drivers and the evolving context of the Warm Homes initiative

Many towns and cities around New Zealand currently experience significant winter-time air pollution problems, created predominantly by householders’ use of solid fuels to heat their homes. The problem has been recognised by policy-makers as sufficiently serious to trigger the development of a National Environmental Standard for Air Quality, which includes prohibitions on certain activities, design standards for home heating technologies, and targets for ambient air quality, with the requirement for regional councils to ensure compliance by 2013.

The policy drivers for a national response on air quality problems have included considerations of the health costs and consequences of the existing situation. The dual outcomes of warmer homes and cleaner air have significant public and personal health benefits. This has implications for advocacy efforts as well as national-level funding, since the latter is determined largely on a population basis anyway.

The National Energy Efficiency and Conservation Strategy (NEECS) also drew justification for some of its residential sector initiatives from the expectation that it would result in improved health and wellbeing outcomes. Since improvements to home insulation are an integral part of any response to air pollution/cold homes problems, alignment with the NEECS is desirable.

Consequently, the consultants recommend some identifiable roles and responsibilities for central government agencies in any national Warm Homes programme.

National-level components of a national Warm Homes programme

To begin with, there are some statutory responsibilities. The Ministry for the Environment is responsible for the NES for Air Quality and for holding regional councils accountable for its implementation. The Ministry of Health is charged with the responsibility for promoting improvements in public health outcomes, while the Energy Efficiency and Conservation Authority (EECA) is charged with promoting (among other things) improvements in the energy performance of the nation's housing stock, a role that may also relate to the statutory responsibilities of the Department of Building and Housing.

These national agencies have policy and strategy roles requiring co-ordination, including whole-of-government advocacy, co-ordination of central government funding contributions through various budget votes, and other specific initiatives that may help support a nationwide Warm Homes programme. However, these national-level agencies have little direct involvement in the implementation of such a programme; management of air quality is the responsibility of the regional councils.

Although they have to comply with the same outcomes, there should be no compulsion to adopt a standardised programme since each air shed and its communities may be very different (see Appendix C for examples). Regional and local levels of a national programme should be linked through adopting the same general principles, and by promoting the opportunity for communities in one part of the country to learn from experiences in other parts of the country.

Regional-level components of a national Warm Homes programme

Meeting the requirements of the NES is the statutory responsibility of regional councils. It should be noted that if a region does not have air quality problems, then there will be no additional requirements on the council. However, because of the nature of their statutory functions, regional councils do not generally have experience in dealing with large numbers of individual households in the same way that public health agencies and professionals are accustomed to doing.

Thus, while regional councils have the responsibility for developing a regional strategy/air quality plan, it is appropriate that this be implemented through regional partnership with district health boards and local partnerships with territorial local authorities (TLAs) and other community-level organisations to promote its implementation. Regional councils also have responsibility for addressing regional aspects of funding and any funding should be commensurate to the size of the problem.

It is important for regional councils to demonstrate programme leadership in their regions, but in ways that encourage the broadest possible involvement of other community agencies to help achieve successful programme implementation in the limited time available.

Local-level components of a national Warm Homes programme

Under the new Local Government Act, TLAs have the responsibility to work with their communities in pursuit of long term community outcomes – social, environmental and economic. The Local Government Act does not envisage that the TLAs be solely responsible for achieving the long term community outcomes identified in their Long Term Council Community Plans. Rather, the expectation is that TLAs will work with other groups in the community (and levels of government) to achieve these outcomes. This principle can be applied equally to achieving improved air quality and warm and healthy homes in each TLA area.

The concept of a national programme is played out at the local level by advocating and supporting the application of successful programme principles in local contexts, and by distributing central government resources to support local responses. At the local level TLAs are recommended to work with other local stakeholders to implement specific programmes that fall under the general Warm Homes umbrella. Thus TLAs are recommended to act to encourage community buy-in across all segments of residential ratepayers, foster local collaborative initiatives for service delivery, and encourage commercial stakeholders (with resource consenting interests) to become involved as early as possible, to build the broadest possible momentum for change. Programme leadership by TLAs is also important.

As noted above, it is recommended that TLAs work with other local stakeholders, including:

- any community organisations that have established relationships with significant groups of households in the community (eg, primary health organisations, and service organisations such as Plunket and Age Concern)
- commercial enterprises or community trusts directly involved in delivering home heating services (dwelling assessments, technology selection, technology installation, related funding)
- other organisations in the local community that have interests in terms of requiring new or renewed air discharge consents in the future.

It is vital that there be a shared vision, and close co-operation between the regional council and the TLA for each area.

Top-down versus bottom-up

Although the outline provided above suggests a top-down approach, starting with central government institutions, the consultants point out that the outline has been provided to illustrate roles, not a hierarchy. Indeed, the consultants make it very clear from the ‘Key messages’ and ‘Recommendations’ that key success factors for achieving the desired outcomes will require local action, including actions, initiatives and responses from non-government organisations and commercial players.

4 Recommendations for Developing a National Warm Homes Programme

4.1 Introduction

This section discusses the elements that the consultants see as being essential for developing a national Warm Homes programme. It is ‘national’ in the sense of country-wide coverage, with common elements provided by central government through the co-ordinated efforts of principal agencies (eg, the Ministry for the Environment, the Ministry of Health, the Energy Efficiency and Conservation Authority and district health boards). But it is also a decentralised programme, the concept being that the programme is run out of local bases, with community ownership, and allowing for regional/local differences in circumstances.

The analysis in this section has been informed by the social drivers framework (Phase 1 report), which covers:

- influences within the individual’s immediate day-to-day circumstances
- influences in terms of individual capabilities, particularly the level of knowledge, understanding and skills to make decisions to change
- influences from the public policy environment, particularly the decisions, commitments and agency behaviours most likely to be perceived by householders, and often mediated by the media
- influences from the community and the immediate social environment
- the orientation of home heating and related commercial services.

The analysis also draws on the key informant interviews undertaken as an integral part of Phase 1, the findings from the four workshops and the prioritisation of social drivers that were summarised in section 2.

4.2 Policy and programme outcomes

Key recommendations

- The Ministry for the Environment work with health agencies (eg, Ministry of Health, district health boards, iwi health providers, primary health organisations), the Ministry of Social Development and the Department of Building and Housing to develop an integrated outcomes framework that includes specifications for healthy homes as well as for air quality (ie, a warm homes standard that becomes the focus of policy, and is publicly endorsed and actively promoted across the relevant government agencies), so that health outcomes are put on a similar footing to environmental outcomes.

The Warm Homes agenda has mixed objectives that may conflict with each other

The mixed objectives include improving air quality, improving energy efficiency⁵ and improving the average temperature of homes. There is generally no conflict between improving energy efficiency and improving air quality or average temperature,⁶ but there may be a conflict between increasing temperature and improving air quality. Solid fuel heated homes tend to be warmer than electrically heated homes. Improving air quality may reduce the range of heating options and/or increase the cost of heating, which may reduce the amount of heating and hence the temperature.

There has tended to be a very mixed institutional framework in operation, with the clean air and healthy homes agendas largely going down separate tracks, although both are generally linked to improvements in home insulation.

The potential negative social impact of improving air quality addressed by large ratepayer subsidies

In pursuing their respective air plan objectives, both ECan and Nelson City Council have instituted a comprehensive package of assistance aimed mainly at lower-income households initially, and funded largely from the councils' ratepayer base. This has come about as a result of social impact analyses carried out by these councils, and a desire to avoid adverse income and health impacts on the low-income sections of their communities. Such targeting has received a favourable response from low-income households, but has largely failed to produce similar outcomes for households earning higher incomes.

Cold/unhealthy homes addressed through energy-efficiency retrofits

The cold homes agenda was largely initiated at the grassroots community level through concern about energy poverty. Many new organisations have formed in the past few years focusing on delivering a basic package of energy-efficiency measures to needy homes. Low-income households, or those with special needs, are generally targeted.⁷

Central government policy, specified in the NEECS, supports this energy efficiency focus. There are two main programmes: upgrading the energy efficiency of the country's older (pre-1977) housing stock through the EECA's EnergyWise home grants scheme (which embraced

⁵ This is taken as meaning increasing the benefits (sometimes described as *energy services*, eg, hot water, drive power from motors), derived per unit of energy used.

⁶ Although improving energy efficiency can be an objective in itself, it is more properly stated as a means to achieve other objectives. Often energy efficiency is pursued as a proxy for these other objectives. However, energy efficiency is subject to diminishing returns, so investment in further levels of energy efficiency may not always represent the cost-effective optimum.

⁷ Usually defined as those qualifying for a Community Services Card, but not exclusively so: some groups use other assessment criteria, such as a system of referrals from other agencies.

properties owned by local councils), and a 10-year retrofit programme initiated by Housing New Zealand for its 60,000 properties.

The programmes are currently strongly focused on *outputs* (ie, the number of energy efficiency measures implemented and theoretical energy savings) rather than *outcomes* related to healthy homes (ie, the numbers/proportion of households that are able meet a minimum warm home standard in winter time). At a local level, the involvement of district health boards has been shaped by the extent to which community enterprises (often iwi-based), established to carry out the retrofitting, have lobbied for money to complement funding made available from the EECA and other agencies.

A high-level, integrated, outcomes framework is needed

There is a need to define outcomes for both clean air and healthy homes within an integrated framework of thinking. For clean air, the pollutant limits have been defined through the NES, and these can be translated into specific policy objectives and actions via the respective regional councils. For 'healthy homes' activities, such outcomes have not been defined. In the absence of clear outcomes, various outputs (such as insulation improvements) have been used as de facto measures of achievement. Yet from the work reported in the Phase 1 report, such energy efficiency improvements on their own will only raise average indoor air temperatures by about 1°C, and will not necessarily provide for healthy indoor living environments.

The World Health Organisation recommends 18°C as the minimum indoor temperature for rooms occupied by the elderly, children and people with disabilities. Below 16°C and there are health risks. The Christchurch Older Persons Co-ordinating Group has recently established a preliminary Canterbury Warm Home Standard for older people of 18°C for the living area, and no less than 12°C as the minimum night temperature in the bedroom.⁸

There is a need to determine whether this is an appropriate *warm homes standard* that should apply across the country. After determining this, energy modelling can be carried out to ascertain the energy requirements needed to achieve those minimum standards, based on the Building Research Association of New Zealand house thermal model (annual loss factor, ALF) and the home heating options work undertaken as part of the Warm Homes project. This will enable optimal solutions for heating, appliance type and energy efficiency to be determined based on a number of standard house types in various areas around the country. This could then form the basis of some relatively simple standard solutions to be used by advisors in the field. The model could also be further developed as an in-field operational tool to enable a range of options to be compared quickly.

⁸ This standard has been developed by the Canterbury District Health Board, Christchurch School of Medicine and Health Sciences, Department of Public Health and General Practice, Medical Officer of Health, Older Persons Health, and community groups such as Community Energy Action, but it is undergoing review because of concern that the temperature standards are too low for the elderly and infirm.

4.3 Household participation and community buy-in

Key recommendations

- Communities focus initially on creating a multi-party steering group to take responsibility for developing a local programme of action. Involving local stakeholder groups who can contribute to the local Warm Homes programme should go hand in hand with identifying the nature and scale of change required to achieve the 2013 target date. A local steering group generates local ownership of the problem and provides a platform for facilitating co-operation and linking with support from regional and central government sources.
- The Ministry for the Environment consider funding a facilitator for the first few meetings to assist local start-up, and as a way of disseminating useful experience via its national programme. Similarly, the Ministry could consider funding further extensions to the series of regional/local workshops begun during this social drivers project.
- Regional councils and/or local trusts incorporate additional financing measures (eg, loans, particularly those that have low transactions costs) that will broaden the appeal of the programme.
- Funding agencies complement the Community Services Card eligibility criterion with different and/or more flexible ways of achieving participation (eg, referrals from particular community agencies) in order to encourage participation by households who might otherwise be overlooked.
- All funding agencies promote the private benefits of improved house insulation, and encourage home insulation loan schemes as part of the mix of financial assistance, to help increase levels of participation across the community.
- Funding agencies consider building on existing healthy homes advertising with national 'branding' support as one way to increase public awareness of the wider problem.
- Lessons from past and current programmes be made accessible to all new Warm Homes initiatives. This should include written material and case studies, as well as access to experienced practitioners.
- The Ministry for the Environment convene a national Warm Homes establishment group. Such a group would provide the breadth of views/experiences necessary to inform the establishment of a national programme, help to achieve local buy-in, and provide a forum for issues/views on programme design to be debated.

The 2013 timeframe set by the NES is a challenge

Compared to the time taken to make progress with clean air initiatives and energy efficiency, the 2013 NES timeframe is a challenge. For example, in Christchurch it has taken years of debate and policy development to reach a consensus on an air plan approach.⁹ Significant subsidy programmes have been under way for clean air since the late 1990s and have reached about 10,000 households. But within the next eight years a further 30,000 households will be required to change at least their heating appliance.

Energy efficiency projects funded by the EECA in 2003/04 reached about 4000 homes, yet if the targets specified in the NEECS are to be reached a rate four to five times higher will be

⁹ The air plan appeals process is still ongoing.

required. In particular, the Warm Homes initiative will need to get traction in smaller centres that so far have had limited awareness of cold homes and air pollution issues.

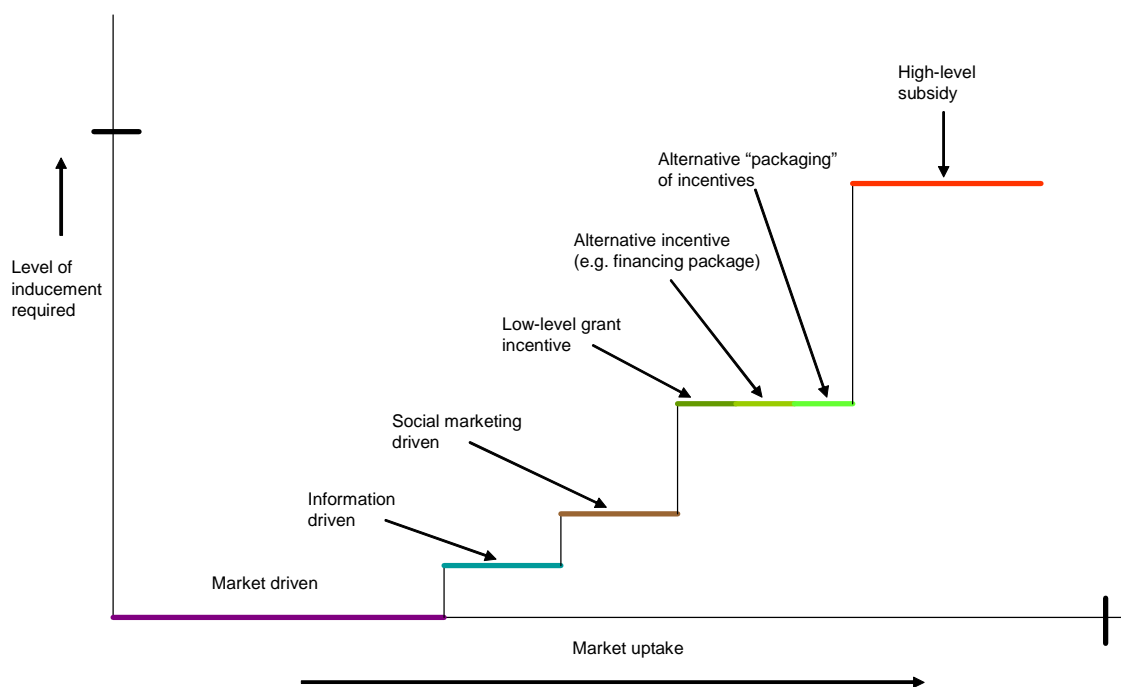
Achieving the outcomes will require a mix of policies and actions that work together in a synergistic way. The key elements of this mix are:

- developing a national Warm Homes framework, with successful implementation reliant on community-level responsiveness, utilising the momentum and sense of community that exists in smaller centres
- understanding the social drivers of people's heating decisions, with policies designed to 'work with the grain' of those social drivers
- implementing high-profile local programmes of change that are wide-ranging (ie, involve awareness raising, education, incentives, rules, etc)
- delivering the programme through a co-ordinated 'single hit' on each home – beginning with a comprehensive energy assessment, which is then followed up by the set of actions needed to bring the home up to the Warm Homes standard.

An important starting point is understanding that different things drive different people. The range of social drivers detailed in the Phase 1 report shows this. The prioritisation of social drivers undertaken at the four workshops showed that the same driver can act to enhance change for some market segments and individuals, but act as an inhibitor for others. The Warm Homes programme must therefore set out, from the outset, to appeal in the broadest way possible to as many people as possible.

Figure 1 sets out a schematic representation of the way a Warm Homes 'market' might work under a range of inducements. Starting at the left, there will be some level of market-driven response that will require no inducements. Beyond that, a range of inducements will probably be required if specific targets or outcomes are to be achieved. The inducements range from low-cost (eg, information-driven campaigns) through to high levels of financial assistance. From the point of view of programme design, as long as the required outcomes are being achieved in the desired ways, programme cost efficiency will be best achieved by exploring all the ways of getting market uptake with the lower-cost inducements.

Figure 1: Schematic representation of uptake under a range of inducements



Drive the programme of change through local, co-ordinated leadership

It is impossible to define the perfect institutional arrangements required in each local level from a national level. Each community will have their own circumstances: the extent of the air quality problem may be more or less acute; there may be unique local drivers for existing behaviours or for alternatives; the history and effectiveness of organisational relationships will be unique; some will have more local resources at their discretion to support change than others; and some may have already experienced publicly funded programmes.

A multi-agency approach is most likely to provide the platform to raise community awareness, locate households in need of change, and develop local capacity to service the changes required. Regional councils (or unitary councils) will have a key leadership role through their responsibility for clean air outcomes. Local health providers and social agencies have key roles in addressing the cold homes issue. District nurses, Plunket nurses, primary health organisations, general practitioners, etc. have important existing relationships with many households and are trusted by the community, so failure to incorporate them may effectively reduce programme accessibility to, or uptake by, many households.

Local agencies must also ensure that the innovation, enthusiasm and potential leadership offered by both the non-profit sector and the commercial sector are not marginalised. Failure to incorporate social service, community groups and local non-government organisations (NGOs) effectively reduces programme accessibility to many households, and misses out on local leadership and champions for promoting the programme, particularly for communities that are 'starting cold'. Involving a mix of community groups, service clubs, larger-scale local employers and so forth increases the likelihood of accessing households who need to change, and helps build positive peer influence and word-of-mouth reinforcement for change.

Creating a local ‘steering group’ will be a good start

The social drivers project team experienced much enthusiasm at the facilitated meetings in Masterton, Tokoroa and Timaru, indicating that communities are receptive, with some collaborative initiatives already under way. The creation of a local community ‘steering group’ which includes (at least) local government, health agencies, NGOs, energy sector representatives, commercial players, landlords and other property interests should be the foundation for each community getting started. This could evolve into a more formal local Warm Homes ‘partnership’. The consultants would expect the concept of ‘roving leadership’ to emerge, perhaps driven initially by the appointment of an education co-ordinator, and then evolving as programmes get under way (see next section).

Get local businesses involved by pointing out the implications for future resource consents

The NES is part of the broader national resource management framework. Consequently, failure of a community to meet the NES target will result in a situation where the regional council may decline future resource consents involving the significant discharge of PM₁₀ to air. The NES comes with an expectation that regional councils will devise a strategy to produce a downward trajectory of winter-time exceedances – from present levels down to one exceedance per year, which will be allowable from 2013 onwards. It is expected that the obligation on regional councils to decline air discharge consents will be triggered by any failure to keep below this ‘downward trajectory’. Consequently, local businesses have a very real and immediate interest in their community’s ability to meet these targets.

Lessons from past and current programmes should be carefully considered

Recent evaluation undertaken by ECan¹⁰ suggests that the main factors inhibiting people participating in the current Clean Heat programme are:

- the overall cost to the householder
- the perception that some of the required changes don’t offer many benefits
- the complexity of the process
- limited heating choices
- delays in processing
- not having to make the change immediately.

A related issue is the capacity to do the work required. If the required number of households are to be engaged, then the capacity of skilled people to make individual household assessments will need to increase significantly in the very near future. The same can probably be said of the capacity of enterprises offering high-quality home heating and insulation retrofits.¹¹

¹⁰ Personal communication, Ken Lawn, Director Operations, ECan.

¹¹ Experience has shown, however, that commercial services are generally able to gear up quite quickly to meet customer demand.

These lessons, and experience from the range of other programmes undertaken (both in New Zealand and overseas) should be tapped in to. No new Warm Homes initiative need ‘reinvent the wheel’. New initiatives should be able to get started quite quickly, largely avoiding some of the pitfalls experienced in the past. However, it will require all the elements for programme success to be meshing together, and for all the Warm Homes partners to be focused on delivering the outcomes required.

A national Warm Homes programme offers new opportunities in New Zealand

The discussion above has focused on localised action, largely reflecting the New Zealand experience where there has been no national programme of action. However, a commitment to a national Warm Homes agenda offers the opportunity for co-ordinating, resourcing and profiling this issue in completely different ways, perhaps in much the same way as has occurred in the UK with Warm Front.¹²

The consultants recommend that a high-level national establishment group comprising representatives from some of the parties identified for local groups, government officials and others offering specific expertise be set up to drive this initial process.

4.4 Publicity, awareness raising and education

Key recommendations

- Creating awareness of clean air / cold homes issues through consistent messages, delivered by trusted agents in the community, is a vital first step in the process. This needs to be co-ordinated across all levels – from local steering groups, to regional councils, to national agencies. Local implementers are in the front line, but support for their efforts should be provided by regional councils and national agencies, with funding for information materials.
- A generic set of communication tools be developed which, with assistance from the Ministry of the Environment, can be customised by each community.
- The Ministry for the Environment and the EECA co-operate in promoting a Home Energy Ratings Scheme (HERS). The HERS is an ‘active’ information tool that needs to be developed to the point of market acceptance and become an integral part of the Warm Homes programme.
- A key aspect of the communication process will be individualised advice specific to each householder’s situation, providing customised information that can help to modify individual attitudes and behaviours, and thereby assist householders to make appropriate decisions about their home heating circumstances. Programmes must ensure that this aspect of capacity development is addressed at the start. Regional councils and local steering groups should ensure that steps are taken to build up local assessment capacity in support of Warm Homes implementation.

¹² Warm Front is the UK Government’s nationwide grant-funded scheme for tackling fuel poverty. See: <http://www.defra.gov.uk/environment/energy/hees>

- Work on a national awareness and information programme should begin as soon as possible, even if the implementation programmes are not begun until July 2006, as seems likely.

There needs to be a systematic drive to raise awareness of Warm Homes issues and solutions

Outside Christchurch and Nelson there appears to be a relatively low awareness of air pollution issues and their related health impacts. There is little awareness about the air pollution issue, the NES, and the limitations on granting new resource consents for significant discharges to air in already polluted airsheds..

There is, however, growing awareness of cold homes issues among social agencies, with many communities now having programmes of some type under way to address cold homes and the unaffordability of home heating. However, there needs to be a focus on raising awareness and educating particular groups who are at risk from cold-induced health effects (and from air pollution). In particular, the elderly need special attention because of behavioural/psychological barriers, such as a tendency towards frugality and doing without, not spending money on heating, objecting to paying higher prices for electricity, etc. Information is needed to specifically address and counter some strongly held attitudes.

There are other groups who for various reason are more vulnerable to negative health impacts, including infants, who have under-developed immune systems; people with existing respiratory health conditions; people with physical disabilities, who are less mobile than others and who therefore require higher ambient temperatures in their homes; and people recuperating at home after stays in hospital. Special efforts are needed to assure such households that their circumstances will not be overlooked in a Warm Homes programme.

Awareness raising is a necessary first step in galvanising community support and focusing on solutions

There will be a time delay between awareness-raising campaigns and public acceptance and willingness to take action. For this reason, publicity programmes can, and should, commence as soon as is practicable, even if implementation does not begin until July 2006, which seems likely. There will always be people who are ready to change immediately, and the programme needs to accommodate these people and avoid creating frustrating delays. Such early adopters are vital to building change momentum in the community, and provide local experience of positive change.

Consistency of messages from trusted agents is vital

It is vital that there be a consistent message coming from all sources. It would be fair to observe that so far consistent consumer information has been lacking. For example, the benefits of retrofitting insulation improvements are often misrepresented: typically 30–40% savings on energy are cited, but experience shows that such savings are rarely achieved in New Zealand's under-heated houses. Rather, a large proportion of the theoretical savings is taken back as

improvements in comfort and health. From the Warm Homes perspective, this is a benefit that should be more widely cited and promoted.

Information and awareness-raising is most likely to succeed by working through local agencies and groups (and commercial agents) with established relationships to households. This creates a local network of agencies, all promoting consistent messages. People are receptive to some forms of messages coming from some particular players and not from others, but they still need to receive the same message. Some suggestions for how this could occur are to:

- involve key local community agencies and businesses in education/training, and then in developing educational/information resources
- employ an education officer/co-ordinator/advisor
- set up an information centre – a one-stop shop for Warm Homes information and programme facilitation
- have national-level resources to call on (ie, generic material that can be localised, national identities who can champion the cause, etc).

Initiating educational and information programmes, raising awareness within communities, developing attitudinal and behaviour change and supporting householder decisions through customised information can be considered an initial part of *the local capacity building* required in each community.

Develop ‘active’ information tools that will help to stimulate the market

Educational, informational and awareness-raising activities need to be reinforced by providing more ‘active’ information, such as the Home Energy Ratings Scheme (HERS). If home energy ratings were actively used in the marketplace, then it would be possible to see energy improvements in houses being recognised through the HERS, and some degree of value being attributed by the market to these improvements (including the rental market). This would reinforce the market as a driver of energy efficiency and clean heating improvements. A HERS may also help in the development of a Warm Homes standard.

The more the value of a warm home can be reflected in marketplace information, and the more the private benefits of changes to heating can be promoted, the more voluntary change is likely to occur – without resorting to large subsidies/ incentives. Information resources should also be focused on messages reinforcing the private benefits of change.

Personalised advice

The Warm Homes concept (achieving a warm, healthy indoor environment while minimising external pollution) can be technically complex to achieve. Many householders will require specific guidance about the current status of their house and heating system, the advantages/disadvantages of their options, the applicability of incentives available and how to access them, etc.

ECan’s Clean Heat programme includes an individualised household assessment and advice, which has proven to be a vital part of the process. Community Energy Action also includes a

household check and heating advice with all its energy efficiency retrofits, but because these retrofit packages generally do not include subsidised heating the feedback from customers about the value of the advice is not as positive (eg, householders will often respond with, “Why are you telling me about this when I simply can’t afford it?”).

The key lessons are:

- all programmes need skilled and trained people to communicate the concepts of the programme and provide individualised technical advice to households
- if information/advice is to be useful, the ‘total package’ offered by the Warm Homes programme must include sufficient opportunities to enable all households to act.

4.5 Financial assistance and incentives

Key recommendations

- Trial (and monitor) energy loans and mortgage options as a matter of priority. Government agencies such as Housing New Zealand Corporation, the Centre for Housing Research and Kiwibank have a mandate to lead such innovation.
- Engage with the financial services sector to encourage the supply of suitable new financial products for householders (eg, investigate the possibility of low transaction cost loans through a targeted local authority rate).
- Investigate better means of recognising social needs for assistance (health authorities in consultation with local agencies and providers).
- Provide greater transparency over the rationale for incentives and assistance, including developing a fairer and more rational basis for eligibility.
- Avoid the prospect of ‘incentive creep’ by ensuring that all elements of the behaviour change programme are in place together (and will be enforced).

Reasons for using financial incentives/assistance

Financial incentives and assistance are widely regarded as being essential within the mix of measures necessary for inducing behaviour change towards warm homes. In theory, additional regulation could be used as the sole means of achieving a shift to clean air compliance, but in practice regulation alone is likely to result in a number of perverse and adverse effects. These include the likelihood of exacerbating cold homes impacts, pushing people towards low-initial-cost appliances that have other adverse health effects (such as unflued gas heaters), probably creating a community sense of unfairness, and a likely high level of non-compliance. Regulation will also be too slow to achieve the required outcomes because of the time taken to finalise rules through the Resource Management Act process.

Similarly, in theory the issue of cold homes might be addressed by requiring minimum standards in homes, or through high levels of awareness-raising and education. In practice however, the willingness/ability to pay for capital investment is generally the biggest barrier in those segments of the market where there are cold home health risks. Providing incentives and assistance has proven to be relatively effective in addressing this issue.

The current levels of publicly funded incentives range from the 100% for clean-air and energy-efficiency packages associated with ECan's and Nelson City Council's programmes for low-income homeowners (Community Services Card holders); 75–90% (typically) for energy-efficiency packages part-funded through the EECA's residential grants programme;¹³ and 30–50% (typically) through clean-air assistance schemes for non-Community Services Card homeowners and for landlords. The higher levels of incentive exist entirely for social reasons: to achieve change without incurring social costs on the target group, and to avoid perverse effects.

Efficient reduction in air pollution suggests non-discriminatory funding

An efficient reduction in air pollution is one that is achieved at least cost. This will likely be achieved by focusing on:

- appliances that are the heaviest polluters
- households where the change away from a heavily polluting appliance can be achieved at minimal cost.

The trajectory of pollution reduction specified by the NES will put an emphasis on achieving immediate and ongoing air pollution gains.¹⁴ While there may be some coincidence between high-pollution open fires and low-income households, there is no reason to suppose that focusing the programme on low-income earners achieves the outcome efficiently. Indeed, if high-income people use more fuel they are likely to generate more pollution, and high-income households will be less likely to be restricted by the cash-flow constraints that inhibit change.

Incentives should be transparent and based on need

There is the argument that any cut-off level or criterion for assistance is arbitrary. Those just above the Community Services Card level – the 'kiwi battlers' – are just about as unable to afford the payments as those who are just below the cut-off, and are often those with much higher levels of other household expenses such as mortgages. This particular group has been consistently identified throughout the consultation undertaken for this project as a group who are disadvantaged by current eligibility policies.¹⁵ Also, there are some people who are eligible for a Community Services Card but choose not to have one. Better and more flexible ways of identifying need in the community are required.

¹³ The total incentive comprises a mix of both central government funding through the EECA, and local funding derived from a range of sources.

¹⁴ This is to show that ambient air quality is consistently moving down to the designated 2013 target.

¹⁵ Note that any means-tested subsidy may raise issues concerning effective marginal tax rates at whatever cut-off level is chosen.

Limited forms of incentive can't cater for a wide range of needs, and may increase public costs

The almost exclusive focus of incentives has been on providing one-off grants. The key gap has been the provision of time payments or loans. Energy loans offer the potential to:

- provide greater coverage in the market and cater for households where the current system of grants may not be suitable
- go beyond the basic package of energy-efficient heating initiatives being offered at present to include higher-priced options such as double glazing (which would be effective and attractive to many households)
- reduce the overall call on public money (or increase the total number of households benefiting from the same level of public expenditure).

An appropriate loan scheme would reduce the social cost (eg, government interest rates rather than private sector rates), and would have low compliance costs (eg, security through a targeted rate on properties with a loan). There has been limited experience with the use of loans,¹⁶ and more is needed to gauge uptake and market potential. Also, the financial services sector has so far not been active in providing such services, and efforts need to be put into encouraging the sector to provide financial services that support the Warm Homes agenda.

Try to avoid incentive 'creep'

Part of the philosophy of incentivising households through the Clean Heat programme was to provide a time-limited incentive, with the idea that this would reward early movers. However, experience suggests that because uptake has been slow in some incentive streams, the (institutional) tendency is to try to correct this by offering greater levels of inducement as time goes on. The net result is that slow movers are rewarded, early movers are effectively disadvantaged, and public costs increase – which achieves the exact opposite of what was intended.

If the general public perceive this to be the usual typical institutional response, then it would be predicted that a certain amount of 'gaming' of the system as people hold off changing in the belief that doing so will result in more generous subsidies being offered later. If this sort of incentive creep is to be avoided, all the required elements of inducements need to be present from the start: a range of incentives set at realistic levels (and able to be responsive to genuine need), publicity and information encouraging change, plus real rules and regulation that could (and would) be applied.

¹⁶ The EECA's Solar Water Heating loans scheme was launched in 2004, and ECan is currently considering a loans scheme that would allow payback via individually targeted rates.

4.6 Regulations and rules

Key recommendations

- The Ministry for the Environment help fund a comprehensive inventory of solid-fuel appliances in each area with air pollution issues.
- The Department for Building and Housing to consider whether Warm Homes outcomes could be enhanced through changes to the Residential Tenancies Act and the Building Code.
- Look at ways that councils can resolve any issues around the length of time taken to establish effective rules under the Resource Management Act processes.

Air plan rules take time to become operative

The time taken to give effect to rules promulgated through the Resource Management Act planning processes may be several years (allowing for consultation, appeals, etc). For ECan, the process was begun several years ago, and could be a further two years before the rules become operative. For some other councils this process has barely begun.

Both Nelson City Council and ECan have developed rules limiting the types of appliances that can be installed, and providing cut-off dates for when certain classes of solid-fuel appliance need to be phased out. The main implication for councils is that in the absence of the ability to apply rules, the options come down to the threat of a future rule (which has proven to be a very poor driver of change), information and persuasion, and financial incentives. Without the effective back-up of rules to ensure appliance phase-out and compliance, councils may lack the ability to pursue Warm Homes outcomes efficiently, and may have to revert to higher levels of incentives than would otherwise be the case. Yet experience suggests that even very large incentives may not be sufficient to induce some people to change.

Implementing rules requires good information

Effective implementation of rules often comes down to effective targeting, and effective targeting requires good quality information. For example, if a 15-year age exclusion rule for enclosed solid-fuel burners is to be implemented, councils should have a good quality database that enables all such appliances to be known by location (ie, a complete inventory of all solid-fuel appliances in use, including their types, age, location, etc). This will enable every applicable household to be effectively targeted, both for the provision of information and incentives, and for compliance monitoring.

Integrate Warm Home objectives into other rule-making jurisdictions

Warm Homes objectives might also be pursued beyond the Resource Management Act/NES air quality framework. For instance, it will be worth considering whether Warm Homes outcomes could be usefully enhanced through requirements within the Residential Tenancies Act and the Building Code, both currently being reviewed, led by the Department for Building and Housing.

4.7 Funding sources

Key recommendations

- A key aspect of the Warm Homes programme (perhaps handled at the level of the Establishment Group) should be to develop a fair funding model.
- Fund incentives through a mix of central government and local funding in recognition of where the benefits lie, and in recognition of the fact that the funds required would impose a burden on some communities that is probably beyond their ability to pay.

Current funding and products provided

Current sources of funding for clean air and socially focused energy-efficiency retrofit programmes are as follows.

- ECan and Nelson City provide 100% assistance for Community Services Card holders, with lower incentive levels for landlords and non-card homeowners. Money is mainly sourced from local rates, with the EECA making a small contribution to the insulation component. Overall, ratepayers are shouldering the cost for what are mainly social outcomes, which means that those on ‘non-low’¹⁷ incomes are paying to improve community health.
- The EECA, through the EnergyWise home grants scheme, aims to achieve a 1:3 (government: local sources) funding ratio, although in practice funding is generally in the 1:1 to 1:2 range.
- Housing New Zealand are retrofitting houses throughout New Zealand with energy efficiency measures and some heating appliances. This project is fully self-funded via central government.

Organisations using EECA funding supplement this support with a range of other funding sources, including local energy trust funds, health funding, employment-based funding sources, energy lines companies, energy retailers, local rates, community funding trusts, other one-off grants and donations, as well as customer contributions.

¹⁷ This term has been used deliberately by the consultants. Many households that miss out are not on high incomes, and include those whose incomes are just above the cut-off point for defining ‘low-income’.

Extrapolating current funding arrangements to a national Warm Homes programme will place an unwarranted burden on local ratepayers

The total cost for Christchurch to convert 30,000 homes over eight years is estimated to be about \$90 million.¹⁸ The Christchurch Clean Heat scheme has been able to be sustained largely by ratepayer contributions because:

- the ratepayer base is being used to fund less than 40% of households (ie., the costs can be spread to a wider population)
- the scheme (and its predecessors) was intended to run for a 15+ year period, allowing costs to be spread over time.

Compare this to other areas of the country, where up to 75% of households use solid-fuel heating and there may need to be a rethink on heating types in order to improve air quality. As well, the change will have to be made within an eight-year timeframe (to 2013). The consultants conclude that an extrapolation of the Christchurch/Nelson funding arrangements may be unsustainable in many of these communities.

The overall level of investment in change required to achieve the NES target by 2013 may be substantial – possibly in the hundreds of millions of dollars nationally. While this is a large sum, it needs to be put into the context of annual household heating expenditure and potential savings in government health expenditure.

The need for a fair and efficient funding model

If the benefits are seen as being a mix of better health outcomes, which is a local community benefit, and lower health costs, which is a saving to central government, then there is a logical argument for perhaps half of the funding to come from central government. Not only would this make economic sense in terms of where the benefits accrue, but it is also likely to make the target outcome achievable in high-impact communities.

¹⁸ This is total investment, not public funding (average of around \$3,000 per household).

4.8 The Warm Homes package of measures

Key recommendations

- The Warm Homes programme needs to provide for customer choice.
- Energy efficiency is part of the package – energy efficiency reduces potential conflict between the objectives of clean air and healthy homes.
- In the design of programme implementation, clean wood-burning choices should be provided for as much as possible (within the confines of the air-quality parameter).

Providing for customer choice

People's willingness to change is strongly influenced by the heating choices available, and the perceived benefits offered by those choices.

The psychological impact of losing the comfort/flame effect of an open fire is real, and there may also be a perceived loss of a social and convivial atmosphere. But experience has shown that when a *package* of measures is offered that provides an overall warmer, more comfortable environment with a more easily controllable heating system, many of these initial barriers can be overcome. The experience in both Christchurch and Nelson suggests that when the capital cost of alternatives to open fires is fully subsidised, about 70% of people choose a heat pump (despite qualms about cost and reliance on electricity figuring strongly as a social driver inhibiting change). Post-installation surveys have overwhelmingly shown high levels of satisfaction with the outcomes.¹⁹

Improving insulation is an integral part of the change

Part of the reason for the very high levels of satisfaction referred to above is that ceiling and floor insulation are provided as part of the *total package*. Improving dwelling insulation helps to achieve both air-quality and cold homes objectives – potentially reducing the household demand for heat, increasing the range of clean heating options that are viable, and making all forms of heating more effective in warming the house to adequate levels. Insulation helps reduce the conflict between air quality and cold homes objectives.

¹⁹ Community Energy Action 2003/04 surveyed 22 Christchurch households that had been assisted out of an open fire to a heating package involving a heat pump and energy efficiency measures (as part of either ECan or Housing New Zealand programmes). The survey was undertaken one winter after the change, and sought quantitative information on changes in electricity use, as well as qualitative information on the householder's attitudes and behaviours. See: <http://www.cea.co.nz/Reports/Heat%20Pump%20Survey.pdf>

Insulation is a means to achieve healthy homes and clean air, not an end in itself

There are limits to the effectiveness of insulation as a sole solution. Because there are diminishing returns to insulation investment, and because insulation investment is not the only route to the outcomes being sought, there will be ‘optimum’ insulation levels for Warm Homes outcomes as part of an integrated package of measures.

The requirement for insulation to be part of the total package of ECan’s Clean Heat measures has met with some resistance from householders, who have regarded it as an added cost burden with little benefit. While this mainly shows a lack of understanding of the benefits of the investment (also, until an HERS is actively promoted in the marketplace, insulation investment is often ‘invisible’), in some cases this might be true, as where the additional insulation simply tops up existing insulation and provides minimal energy saving.

‘Clean’ wood-fuel burning needs to be part of the solution

Patterns of home heating, especially those related to solid-fuel burning, are often strongly entrenched. Solid-fuel heating has a number of strong drivers, including historical habit, perceptions of comfort, ready access to cheap sources of wood supply, ability to heat larger areas of the house, cost considerations, heating of hot water as well, and a reluctance to depend on electricity (especially in parts of the country that can count on extended outages several times a year).

Accommodating clean wood burning as part of the solution, as much as possible, offers benefits of low cost and readily available sources of supply, avoidance of higher electricity system winter loads, and the security associated with retention of diverse energy sources.

One of the issues that has not really been faced by current clean air programmes, but which will likely be a central focus of a Warm Homes programme, is the phase-out of large numbers of old polluting wood burners. Arguably this may be where some of the biggest challenges associated with programme participation will lie, because wood burner replacements may not be so amenable to other options – apart from replacement by another burner (ie, for reasons of high energy output, access to cheap or self-collected wood supplies, house may already have insulation, etc).

However, the challenge may lend itself to some innovative approaches, such as:

- promoting the benefits of pellet fires as an option (stressing flame effect, low running costs, low pollution and high heat output, with controllability and high efficiency)
- developing messages that don’t victimise the solid-fuel burner, but instead encourage a positive attitude to change
- an incentivised appliance exchange concept – “out with the old, in with the new” etc., which might achieve a relatively high rate of clean appliance investment.

Of course this will all need to be done within the context of achieving the air quality outcome in that community, bearing in mind the number of solid-fuel burners that will be able to be sustained within the air shed. At the very least, clean wood burning needs to be part of a longer-term transition. The extent to which it continues in the long term will probably be different in different parts of the country.

Incentivising increased electricity load

Current Clean Heat-type programmes are resulting in a large proportion of participants taking up electrical heating (through heat pumps). Even although the appliances are highly efficient, they appear to be adding load to the system at peak times.²⁰ It is unclear at this stage whether overall this represents a significant cost that will end up being borne by electricity users.

4.9 Monitoring and programme evaluation

Key recommendations

- Programme funders build outcome monitoring and evaluation into the Warm Homes programme as an integral part of the programme design.
- Some current projects be used to develop and trial an appropriate toolbox of monitoring approaches, with the aim of having available for future programmes a set of outcome-focused monitoring tools.

Re-orientate monitoring towards outcome evaluation

Subsidised home energy efficiency programmes have been running for almost 10 years in New Zealand, and while there has been a lot of publicity over achievement (numbers of homes insulated, personal stories of benefits, etc.), until recently there has been very little actual outcome monitoring of warmth and achievement of healthy indoor living conditions. The monitoring and surveys that have been done have tended to focus on *output* achievement (eg, numbers of houses retrofitted, theoretical kWh savings from efficiency measures), or have been market-type surveys addressing issues around programme participation.²¹ Although it is important that this form of monitoring continue, if Warm Homes outcomes are to be achieved then the type of monitoring undertaken should reflect this re-orientation.

The Wellington School of Medicine Healthy Homes project has now provided a short-term body of knowledge related to the health effects of a warmer, drier indoor environment resulting from insulation retrofitting.²² Some other forms of outcome evaluation are now taking place, such as the Community Energy Action survey of houses retrofitted with insulation and heat pumps.²³

²⁰ Community Energy Action, op. cit.

²¹ See C Lamb, Christchurch Household Survey: A survey of Christchurch residents' opinions of proposed air pollution control methods and clean air incentives and assistance, Report No R02/27, Environment Canterbury, Christchurch, 2002.

²² See: <http://www.wnmeds.ac.nz/academic/dph/research/housing/insulation.htm>

²³ This initial survey has now been extended longitudinally, with data collection for the second winter, and further attitude/behaviour questions added.

More extensive monitoring of programmes will enable the outcomes achieved to be judged against the proposed Warm Homes standard, and will enable ongoing programme improvements to occur from a base of knowledge and understanding. The monitoring can also serve as an excellent information base for case studies, publicity and promotion, etc. In this way the monitoring can be used as an active tool to promote wider participation in the community.

Develop methods of outcome monitoring that can be achieved at low cost

Some forms of outcome monitoring can be very expensive, involving data logging of indoor temperatures, appliance use, etc. To provide the required level of monitoring at a reasonable cost, the consultants suggest that a monitoring process be established that brings together a number of monitoring tools into a package that can be readily applied during and after programme implementation. The tools might include simple before-and-after checklists of measures installed, some quantitative temperature monitoring in individual houses, perception attitude and behaviour surveys of participants, as well as setting up a few houses where longitudinal studies might be carried out.

A number of current programmes offer good opportunities for developing this toolbox approach. For instance, the Canterbury Elderly Persons project would be appropriate because it has set out with an *outcome* focus, and hence mirrors the orientation suggested for the Warm Homes programme.

Appendix A: Analysis of Issues and Options for Programme Design

Tabulated details of the issues and options analysis are presented in this Appendix.

Issue theme	Specific issue	Implication for policy/programmes	Options for response
(1) Policy and programme outcomes.	Mixed objectives can create confusion and participant resistance.	<ul style="list-style-type: none"> Optimising policy interventions is more difficult with multiple objectives. 	<ul style="list-style-type: none"> Accept that the mix is real. Pursue a single policy objective at a time (eg, cleaner air) and do everything to maximise the policy outcomes desired while mitigating unacceptable impacts. Reduce the number of policy objectives being pursued simultaneously and accept a degree of complexity. Distinguish main from subsidiary objectives.
	Focusing on programme outputs rather than outcomes.	<ul style="list-style-type: none"> Monitoring outputs provides little scope for learning as the programme evolves. Output orientation does not necessarily achieve the desired outcomes. 	<ul style="list-style-type: none"> Institute an 'outcomes' framework as the core basis for programme design. Institute more systematic and timely evaluation of outcomes.
	No minimum standard for Warm Homes, while specific standards exist for other policy objectives (ambient air quality, individual emissions levels, dwelling insulation).	<ul style="list-style-type: none"> Lack of a standard: <ul style="list-style-type: none"> disadvantages the achievement of the Warm Homes objective makes Warm Homes outcomes somewhat arbitrary and potentially inconsistent from home to home. 	<ul style="list-style-type: none"> The Ministry for the Environment should work with health agencies to develop a pragmatic minimum standard for warm homes.
(2) Household participation and community buy-in.	Current emphasis on low-income households diverts effort and attention from opportunities across the whole household sector.	<ul style="list-style-type: none"> The current emphasis: <ul style="list-style-type: none"> misses large numbers of polluters misses some households with a need for Warm Homes retrofits has the potential to undermine the credibility and public acceptability of existing incentive programmes does not engage the commercial sector as much as it could (ie, creates something of an artificial market). 	<ul style="list-style-type: none"> Increase efforts to educate all households about the benefits of changes in home heating, emphasising health and comfort (private gains) rather than just air quality (public gain). Increase efforts to promote partial assistance programmes, using more proactive social marketing and working through community networks. Incorporate additional financing measures (eg, loans), which broaden the appeal of the programme.

Issue theme	Specific issue	Implication for policy/programmes	Options for response
	Lack of engagement with local health agencies.	<ul style="list-style-type: none"> • Clean heat and warm homes are both primarily health issues; a failure to work through health agencies risks 'pressing the wrong buttons' and therefore being less successful in promoting participation. • Local health professionals (district nurses, Plunket nurses, GPs, etc.) have important existing relationships with many households and are trusted, so failure to incorporate them effectively reduces programme accessibility to many households. • Failure to work through local health agencies makes it difficult to reach households that do not 'volunteer' to participate, for whatever reason. 	<ul style="list-style-type: none"> • Create a local community 'steering group' which includes health agencies and associated NGOs.
	Lack of engagement with other community groups/NGOs that have established relationships with households.	<ul style="list-style-type: none"> • Failure to incorporate social service, community groups and local NGOs effectively reduces programme accessibility to many households, and misses out on local leadership and champions for promoting the programme, particularly for communities that are 'starting cold'. 	<ul style="list-style-type: none"> • Create a local community 'steering group' which includes health agencies and associated NGOs.
	Affordability of change.	<ul style="list-style-type: none"> • Cost is a persistent barrier to participation in publicly funded programmes. 	<ul style="list-style-type: none"> • Introduce loans into the mix of financial assistance available. • Emphasise the private benefits of change. • Broaden the scope of higher incentives to include the group just above the Community Services Card threshold and others in need. • Complement the Community Services Card eligibility criterion with different/more flexible ways of achieving participation (eg, referrals from particular community agencies).
	The role of electricity tariffs as a significant social driver.	<ul style="list-style-type: none"> • Electricity tariffs seem to be influential for both longer-term strategic thinking by households as well as short-term decisions, but the messages are mixed and influence clean heat and insulation decisions differently. 	<ul style="list-style-type: none"> • Revisit the public policy debate on electricity tariffs and tariff structures.
	Concern over the lack of heating capability of non-solid-fuel alternatives.	<ul style="list-style-type: none"> • The high heating capability of some old log burners is real – householders expect at least as good performance. • Resistance to the programme of change is possible. • The reputation of the programme might suffer. 	<ul style="list-style-type: none"> • Allow flexibility/exceptions to eligibility criteria in certain circumstances. • Insulation should be part of the package. • Provide appliance choice and flexibility.
	Concern over loss of water-heating capability.	<ul style="list-style-type: none"> • There may be resistance to the programme of change. 	<ul style="list-style-type: none"> • Provide appliance choice and flexibility. • Provide insulation as part of the package.
	Home ownership trends – rapid turnover of properties.	<ul style="list-style-type: none"> • There may be unwillingness to commit to investment where there may be no benefits. 	<ul style="list-style-type: none"> • Promote HERS to indicate the private benefit of home improvements on capital/resale value.

Issue theme	Specific issue	Implication for policy/programmes	Options for response
	In towns and cities that do not comply with the NES for Air Quality, but where the existing problem is not extreme, it will take a long time to build consensus and community ownership of the problem.	<ul style="list-style-type: none"> There may be: <ul style="list-style-type: none"> difficulty gaining local commitment to partner central government difficulties for local government in justifying expenditure of local rates on a centrally determined problem higher risk of failure to meet deadlines. 	<ul style="list-style-type: none"> Create community engagement through local forums and local champions. Develop a united front from key agencies. Tie clean air improvements to messages on private benefits (health, comfort, control of costs, etc).
(3) Education, information and market intelligence.	Lack of good consumer information on the cost-effectiveness of change at the individual household level; lack of knowledge by householders of the financial implications of spending money on insulation and alternative heating; energy advice needs to get smarter.	<ul style="list-style-type: none"> Lack of information hinders individual household decision-making and therefore may reduce participation in the programme, particularly where full subsidies are not available. 	<ul style="list-style-type: none"> Institute more systematic and timely evaluation of outcomes and use the findings to educate and inform households, the commercial sector, and health and social agencies (ie, all programme participants).
	Difficulties targeting households in need to promote and implement change.	<ul style="list-style-type: none"> While solid-fuel burning is a visible criterion, cold homes are not 'visible', which hinders the effective promotion of the Healthy Homes objective and the effective targeting of information, education and assistance to such households. 	<ul style="list-style-type: none"> Work through local agencies and groups with established relationships to households. Create local networks of referral agencies.
	Lack of data on the relative significance of various social drivers.	<ul style="list-style-type: none"> This hinders the search for what might be the most cost-effective improvements to existing programmes. The absence of information to differentiate the important social drivers between one market segment and another gives us no guidance on what might be useful and more effective segmentation in programme design. 	<ul style="list-style-type: none"> Introduce systematic evaluation of responses to existing programmes. Commission consumer/householder research on social drivers.
	Deeply ingrained attitudes to frugal heating.	<ul style="list-style-type: none"> The messages about health consequences are not getting through. 	<ul style="list-style-type: none"> Involve local health professionals in programme delivery. Use community education efforts, again using locals who have established relationships and are trusted.
	Deeply ingrained attitudes to the reliability of particular energy sources, and suspicion about energy company motives in promoting cleaner heating options.	<ul style="list-style-type: none"> This creates householder resistance to converting to electricity for space heating or total dependence on electricity. 	<ul style="list-style-type: none"> Government and sector initiatives improve system reliability and reserve capacity. Run (ensuing) information campaigns about improved system reliability and reserve capacity.
	Lack of attention to education in schools about home heating issues	<ul style="list-style-type: none"> Children are an important avenue of community learning to build receptiveness. 	<ul style="list-style-type: none"> Work with education agencies on associated curriculum initiatives.
(4) Financial incentives and rules.	Limitations in the present focus of incentives – mostly on direct household subsidies.	<ul style="list-style-type: none"> The present focus on direct household subsidies with relatively little expenditure on, for example, education and capacity building in local networks for implementation, may not be the most cost-effective application of public funds. This is potentially significant for the scale of public funds involved. 	<ul style="list-style-type: none"> Encourage existing programme funders to devote a higher proportion of financial resources to other aspects of programme implementation. Apply partner funding and partner 'in-kind' contributions to education and capacity building for local projects.

Issue theme	Specific issue	Implication for policy/programmes	Options for response
	The limited forms of incentives used so far: no use of loans in the major Clean Heat programmes or energy efficiency programmes.	<ul style="list-style-type: none"> • They may not be cost-effective. • There is the potential to reduce the overall call on public money, or potential to increase the total number of households benefiting from the same level of public expenditure. 	<ul style="list-style-type: none"> • Introduce loans into the mix of financial assistance available, ranging from 100% low-interest loans through to part loan/part grant arrangements (with loans sourced from government funds at the public sector discount rate).
	Pragmatic programme rules don't recognise particular segments of the market and local circumstances.	<ul style="list-style-type: none"> • There is an inability to target appropriate financial incentives to some households. • This will affect the cost-effectiveness of public funding. • Complexity of incentive design may be influenced. 	<ul style="list-style-type: none"> • Accept the degree of simplicity or crudeness in the current segmentation of incentives. • Introduce loans into the mix of financial assistance available, thereby achieving a better potential match between the need for assistance and the type of assistance offered. • Evaluate the uptake of loans across different market segments. • Introduce different / more flexible ways of achieving participation (eg, referrals from particular community agencies).
	Householders may not be as interested in air quality and efficient home heating as policy-makers and programme designers might like them to be; ie, members of the public may not share public policy-makers' priorities.	<ul style="list-style-type: none"> • A strictly 'rational' approach to programme design is likely to significantly under-achieve its expected outcomes. 	<ul style="list-style-type: none"> • Increase the proportion of public investment in promoting programmes and encouraging and educating householders. • Promote and implement programmes through a variety of channels. • Adopt pro-active approaches to programme implementation, particularly to accessing households; and don't rely on commercial channels alone.
	Lack of engagement with the finance sector.	<ul style="list-style-type: none"> • This lack: <ul style="list-style-type: none"> – leaves gaps in the financial products available to help promote home heating change – inhibits potential market uptake and puts a greater burden on public funding – restricts opportunities to fund improvements beyond a basic Warm Homes package. 	<ul style="list-style-type: none"> • Central government needs to engage financial services in public/private partnership at a sectoral level. • Target education at financial services providers (eg, Sentinel) that have potentially useful new 'products', particularly for the private loans/mortgage market. • Develop pilot funding mechanisms and incorporate them as part of existing programme options.
	Lack of immediate compulsion to change.	<ul style="list-style-type: none"> • This may create disincentives or delays in participation, with consequent programme scheduling issues. 	<ul style="list-style-type: none"> • Introduce regulations which embody earlier <i>phased</i> deadlines (eg, open-fire phase-outs, wood-burner replacements).
	Complexity of programme design and co-ordination under multiple objectives.	<ul style="list-style-type: none"> • This discourages participation with cross-compliance requirements for eligibility. 	<ul style="list-style-type: none"> • Assist compliance (eg, the need to install insulation to qualify for a heating subsidy) by packaging an assessment and installation service as part of the incentive programme.
	Lack of market-oriented supports for participation and investment by householders in Clean Heat and Warm Homes programmes.	<ul style="list-style-type: none"> • This: <ul style="list-style-type: none"> – undervalues the private motivations for participation in these programmes – is a missed opportunity for an incentive or driver. 	<ul style="list-style-type: none"> • Introduce the Home Energy Rating Scheme (HERS). • Work with property investor associations to promote HERS ratings as a desirable marketing tool for their members. • Work with Real Estate Institute of New Zealand branches to promote recognition of HERS in the residential property market.

Issue theme	Specific issue	Implication for policy/programmes	Options for response
	The Building Code as an important regulatory instrument.	<ul style="list-style-type: none"> In the past the conservatism of the Building Code has not been as supportive of raising insulation levels as it might have been. 	<ul style="list-style-type: none"> Consider differential insulation standards for different climatic zones in the country, linked to a (proposed) minimum standard for warm homes.
(5) The rental market.	Dwelling tenure where owners' and occupiers' interests are not aligned (ie, residential rental accommodation).	<ul style="list-style-type: none"> This requires specific programme design considerations for rental properties. In some sectors it can be more difficult to achieve change in home heating that is affordable. 	<ul style="list-style-type: none"> Make assistance programmes available to non-resident property owners. Work with property investor associations to promote the private benefits of improved housing stock. (See below under 'Difficulties engaging residential property investors').
	Difficulties engaging residential property investors.	<ul style="list-style-type: none"> This is a significant and growing segment of the residential market. 	<ul style="list-style-type: none"> Introduce measures/standards into the Residential Tenancy Act review. Run an information and education campaign through property investor associations. Promote dwelling assessments (by registered installers) through property managers.
	Home ownership trends – an increasing proportions of New Zealanders living in rented accommodation.	<ul style="list-style-type: none"> More households are moving to the 'harder to engage' rental sector. 	<ul style="list-style-type: none"> See Government's policy initiatives regarding home ownership.
(6) Programme funding.	Mixed institutional jurisdictions create organisational challenges: programmes addressing air quality have been established under regional councils because of their Resource Management Act responsibilities, but programmes addressing fuel poverty or lack of insulation have generally been created by a mix of community groups and commercial organisations.	<ul style="list-style-type: none"> This creates challenges for institutional responsibilities and programme co-ordination. Similar programmes lack integration. Differing incentives can create confusion for recipients. 	<ul style="list-style-type: none"> Establish a common incentive platform from central government for particular outcomes or a package of outcomes. Establish a common 'brand' of programme. Seek agreement between central and local government and between environment and health agencies on financial contributions and how these may be applied to various elements of programme implementation.
	Funding inconsistencies between current programmes are not mutually reinforcing: the EECA requires but rarely achieves 1:3 co-funding for socially focused investments, and regional councils commit up to 100% local (rates) funds, a large proportion of which ends up supporting social outcomes.	<ul style="list-style-type: none"> National and regional initiatives with overlapping objectives fail to reinforce each other. There are perceived inequities between programmes. There is a mismatch between funders and the outcomes achieved. 	<ul style="list-style-type: none"> Establish a common incentive platform from central government for particular outcomes or a package of outcomes. Seek agreement between central and local government and between environment and health agencies on financial contributions and how these may be applied to various elements of programme implementation.
	Partial engagement by some potential funding parties (particularly Health).	<ul style="list-style-type: none"> This misses out on: <ul style="list-style-type: none"> additional sources of funding institutional commitment/promotion from other funding parties. 	<ul style="list-style-type: none"> Develop partnerships at all levels, including: central government agencies, regional councils and local health providers, and networks of community-level services with links to a wide range of groups in their communities.
	Sheer quantity of public investment implied.	<ul style="list-style-type: none"> There is a need to optimise the application of public funding in the most cost-effective way. The distribution of responsibility for public funding at central, regional and local government level needs to be determined. 	<ul style="list-style-type: none"> Include loans in the funding mix. Experiment with different levels/mixes of financial incentives in the pilots. Encourage private mortgage arrangements (eg, Sentinel-type mortgages).

Issue theme	Specific issue	Implication for policy/programmes	Options for response
Overall need for policy refinement and programme improvement.	Current rate of change, even with public policy intervention, is insufficient to meet established targets, or progress is uncertain.	<ul style="list-style-type: none"> • This has consequences of non-compliance for regional councils. • Environmental and health costs continue if targets are not met. • It is time to re-evaluate existing programmes and re-design them to achieve faster rates of household change. 	<ul style="list-style-type: none"> • Implement 'feasible improvements' to existing programmes. • Run pilot programmes in other centres with variations. • Institute an 'outcomes' framework as the core basis for programme design. • Institute more systematic and timely evaluation of outcomes.

Appendix B: Attendance Lists for the Four Community Workshops

Christchurch

Ken Lawn, Environment Canterbury
Mike Gaudin, Environment Canterbury
Terry Moody, Christchurch City Council
Andy Matheson, Nature's Flame
Stephen Tucker, Air Con New Zealand
Lance Vercoes, Insultech
Stephen Godfrey, Orion
Martin Evans, Christchurch Property Investors
Russell Walker, Community Energy Action
Caroline Fyfe, Community Energy Action
Ann Currie, Canterbury District Health Board
Laila Cooper, Canterbury District Health Board
Andrew Dickerson, Age Concern
Bill Chudleigh, Christchurch Elder Persons Project
Glenn Seymour, Strategic Energy
Jennifer Small, Consultant
(TBA Consortium Project Team: Ian McChesney, Geoff Butcher, Bronwyn Morgan)

Masterton

Deborah Walker, Greater Wellington Regional Council
Amy Trass, Masterton District Council
Tania Madden, Wairarapa Primary Health Organisation
Maggie Morgan, Choice Health (Wairarapa District Health Board)
Diane Chapman, Wairarapa Organisations for Older Persons
Robyn McKeown, EnergySmart
Dave Bertram, The Heat Shop (home heating)
Lyn O'Brien, BW O'Brien Ltd (home heating)
Francis Orr, Genesis Energy
(TBA Consortium Project Team: Norman Smith)

Tokoroa

Neil Sinclair, Mayor, South Waikato District Council
Herman van Rooijen, South Waikato District Council (councillor)
Jeanette Black, CEO, South Waikato District Council
Roger Fisher, South Waikato District Council (staff)
Kelson Diffey, South Waikato District Council (staff)
John Anderson, South Waikato District Council (staff)

Jeff Smith, Environment Waikato (staff)
Viv Smith, Environment Waikato (staff)
Lesley Soper, Housing New Zealand Corporation
Milton Timu, Housing New Zealand Corporation
Karen Fredericksen, Housing New Zealand Corporation
Marion Brown, Raukawa Trust Board
Ed Mercer, Carter Holt Harvey – Kinleith Mill
Robin Black, Carter Holt Harvey – Forests
Lois Livingston, Environment Waikato (councillor)
Dell Hood, Waikato District Health Board (staff)
Larnie Chrystall, Genesis Energy
Grant Dunford, Negawatt Resources (Wellington)
Gloria Koia, Kokako Trust
(TBA Consortium Project Team: Norman Smith and James Baines)

Timaru

Alan Ferris, Age Concern South Canterbury (SC)
Dave Ives, Line Trust SC
Rosalene Davidson, SC Asthma Society
David Jack, Thompsons Refrigeration (also Timaru District councillor)
Chris de Joux, Thompsons Refrigeration
Leigh Crowe, Alpine Energy
Robyn Baldwin, Timaru Senior Citizens
Gillian Morgan, Anglican Care SC, Energy Efficiency Trust
Ross Carrick, Line Trust SC
Owen Smith, SC Property Investors Association
Anne Millhouse, Timaru Hospital
Mary Brown, St Vincent de Paul
Peter Thompson, Timaru District Council
Rapa Whiu, Work and Income
Merali Taylor, Work and Income
Judy Fowler, Aoraki Budget Service
Ken Lawn, ECan, Christchurch
Mike Gaudin, ECan, Christchurch
(TBA Consortium Project team: James Baines, Ian McChesney)

Appendix C: Comparative Analysis of the Four Warm Homes Workshops

This appendix lists the factors likely to influence the nature of community responses to a national Warm Homes programme in each of four communities where workshops were held. Note that some values are indicative only, while other values have not been researched for this investigation.

Extent of the air quality problem²⁴

(As indicated by the typical number of winter-time air quality exceedances currently being experienced, the proportion of households using solid fuels for home heating.)

Tokoroa	<ul style="list-style-type: none"> • 40 nights per year • 80% households using solid fuels
Masterton	<ul style="list-style-type: none"> • no data provided • 75% households using solid fuels
Christchurch	<ul style="list-style-type: none"> • 30 nights per year • 55% households using solid fuels
Timaru	<ul style="list-style-type: none"> • 20 nights per year • 70% households using solid fuels

Degree of the air quality problem

(As indicated by the extent to which 24-hour bad-pollution conditions typically exceed the NES 'Alert' threshold.)

Tokoroa	<ul style="list-style-type: none"> • worst nights are typically 50% above the threshold value
Masterton	<ul style="list-style-type: none"> • no data provided
Christchurch	<ul style="list-style-type: none"> • worst nights can often be up to two or three times the threshold value
Timaru	<ul style="list-style-type: none"> • worst nights can occasionally be up to two times the threshold value but are typically only marginally over the threshold value

²⁴ Note that these figures are approximate only.

Resource/technical aspects influencing response

(As indicated by relative accessibility of different heating fuels.)

Tokoroa	<ul style="list-style-type: none"> ready access for most households, including low-income households, to very inexpensive wood supplies nearby mains gas pipeline passes through Tokoroa
Masterton	<ul style="list-style-type: none"> ready sources of wood in vicinity of town expensive electricity compared to other parts of the country no reticulated gas leading to heavy use of unflued LPG heaters
Christchurch	<ul style="list-style-type: none"> access to 'free' firewood is relatively limited no reticulated mains gas supply in the city significant potential distribution constraints for electricity to some parts of the city
Timaru	<ul style="list-style-type: none"> no reticulated mains gas supply in the city

Social/demographic/community aspects influencing response

(As indicated by levels of household income/social deprivation, ethnic diversity, proportion of households in rental accommodation, proportion of absentee property investors.)

Tokoroa	<ul style="list-style-type: none"> high proportions of low-income households significant proportions of Maori and Pacific Islands households above-average proportions of households in rental accommodation significant proportions of absentee property investors (eg, Australians)
Masterton	<ul style="list-style-type: none"> LPG heaters offer low-income households a measure of control over bills wood fires popular across the socio-economic spectrum, by tradition
Christchurch	<ul style="list-style-type: none"> small Maori, Pacific Islands and immigrant communities (therefore requiring specific channels of access)
Timaru	<ul style="list-style-type: none"> predominance of Pakeha households

Community awareness of the problem

(As a health problem as well as an air quality problem.)

Tokoroa	<ul style="list-style-type: none"> the Warm Homes workshop was the first introduction to the nature and extent of the problem; extremely low levels of awareness of either air quality or related health problems
Masterton	<ul style="list-style-type: none"> awareness of health issues / energy efficiency from Healthy Homes project little present awareness of an air quality problem
Christchurch	<ul style="list-style-type: none"> extended history of public debate about winter-time air quality problems. with a high degree of community acceptance that a problem exists; much lower levels of community awareness of related health problems
Timaru	<ul style="list-style-type: none"> moderate levels of awareness of the extent of the air quality problem and related health problems

Experience of public programmes of any kind which address air quality and/or health issues or energy efficiency improvements

Tokoroa	<ul style="list-style-type: none"> • none to this point; Ministry for the Environment's pilot Warm Homes project with six homes in Tokoroa was initiated at the same time as the workshop was being set up
Masterton	<ul style="list-style-type: none"> • Healthy Homes project initiated about three years ago has raised awareness of the health benefits of energy-efficiency upgrades to address energy poverty in low-income households
Christchurch	<ul style="list-style-type: none"> • major Ecan-driven Clean Heat programme has been in place for the past 18 months to two years, with some successes, mainly in the low-income, full assistance segment • previous subsidised programmes driven by Christchurch City Council, with modest uptake mainly among middle to upper income households • a number of EECA-facilitated projects aimed at improving the energy performance of private residential dwellings in the city
Timaru	<ul style="list-style-type: none"> • major initiative with EECA and local funding just getting under way to improve insulation in several hundred houses over the next three years involving the Energy Efficiency Trust

Agency networking and active collaboration

Tokoroa	<ul style="list-style-type: none"> • Environment Waikato and South Waikato District Health Board (SWDHB) prominent in launching the Tokoroa initiative at the workshop • the workshop deliberately invited participation by iwi, local health providers and local business interests • SWDC is intent on fostering business involvement with the community in addressing social and environmental issues
Masterton	<ul style="list-style-type: none"> • good collaboration between community agencies (eg, elderly, local government and health services providers, DHB) working together on the Healthy Homes initiative
Christchurch	<ul style="list-style-type: none"> • little active collaboration between ECan and Canterbury DHB; the latter has subsequently become involved in a separate but complementary initiative through an elder care project • no engagement of community groups in promoting the ECan Clean Heat programme so far
Timaru	<ul style="list-style-type: none"> • local networking around the South Canterbury Healthy Homes Project and the Energy Efficiency Trust initiative

Programme local funding constraints in relation to the extent and degree of the air quality/cold homes problem and the socio-economic status of the community

Tokoroa	<ul style="list-style-type: none"> • extensive air quality problem involving large majority of residents who are typically in lower-income brackets • very small ratepayer base
Masterton	<ul style="list-style-type: none"> • neither elderly nor low-income households have the financial resources, and landlords will be disinclined to invest in improvements
Christchurch	<ul style="list-style-type: none"> • extensive air quality problem involving a significant majority of residents but spread across all income brackets • relatively large ratepayer base
Timaru	<ul style="list-style-type: none"> • extensive air quality problem involving a significant majority of residents but spread across all income brackets • relatively small ratepayer base