Programme Review
Warm Up New Zealand

Document purpose:	This document is the result of the programme reviews EECA and MBIE conducted across EECA's programme portfolio in 2016. The reviews were in response to a requirement to reprioritise the EECA's portfolio in the context of the new NZEECS, the new EV programme, and expanded levy. The framework for the review is available here. The reviews were based on existing documentation and workshops with MBIE, PwC and EECA staff.

About the Warm Up New Zealand programmes

EECA estimates that, of New Zealand's 1.8 million privately owned dwellings, over 600,000 are under-insulated or un-insulated. Under-insulated houses are difficult and inefficient to heat, and expose occupants to increased risk of illnesses related to cold, damp living conditions.

Since 2009 the Warm Up New Zealand: Heat Smart (July 2009 to June 2014) and Warm Up New Zealand: Healthy Homes (September 2013 to June 2016) programmes have helped nearly 300,000 households insulate their houses. In Budget 2016 the Government allocated $18 million to extend Warm Up New Zealand for a further two years, with the aim of insulating 20,000 rental properties occupied by low-income tenants. This review will focus on the new rental programme.

The programme's key components are:

- Government subsidies for ceiling and/or underfloor insulation retrofits for houses built prior to 2000. EECA contracts insulation installers ("service providers") to install insulation.
- A quality assurance regime administered by EECA, which includes independent on-site audits of around 5% of insulation retrofits completed under the programme.
- Targeted promotion campaign to raise awareness among landlords and eligible tenants of the programme. Service providers are responsible for their own 'lead generation', but this is supported by EECA's promotion campaign.
- ENERGYWISE website providing public information on the programmes, eligibility criteria, contact details for service providers, and general information on the benefits of insulation and other home energy efficiency improvements. This website assists service providers to generate leads to eligible households.
- Development of funding partnerships with third parties to leverage the Government's investment, and to maximise the number of houses insulated and the impact of the intervention on the market.

Conclusions

Warm Up New Zealand has been successfully refined and retargeted several times to reflect evolving Government priorities. The programme has achieved scale and is high value-for-money. The Government's investment of $465 million has subsidised the retrofitting of insulation into nearly 300,000 houses, resulting in significant public health benefits in the form of reduced pharmaceutical costs and reduced hospital admissions.

It has built industry capability through its quality assurance mechanisms. The quality of retrofits delivered by service providers in the market has significantly increased. There is now a high-quality, industry-supported insulation standard (NZS 4246), and EECA's Quality and Audit Manual provides a resource for service providers to ensure retrofits are properly and safely completed.

Further, Warm Up New Zealand has increased the importance of home insulation to home-owners and tenants. Insulation is more highly valued by New Zealand households than it was prior to the launch of the programme. The households which have benefitted from insulation have now been exposed to the benefits of improved thermal performance, and this is expected to make them more likely to demand adequate thermal performance from their next house.

Warm Up New Zealand has also provided a better understanding of the return on investment to the Government in terms of the health benefits arising from a home insulation programme.

The problem of under-insulated or uninsulated homes still exists. Low-income households, and low-income rental households in particular, still face significant barriers to insulating the homes in which they live. Warm Up New Zealand is the only government programme which addresses these barriers. Landlords do not yet have sufficient understanding of their obligations under the *Residential Tenancies Act*, and vulnerable tenants are unlikely to raise their landlords' non-compliance with the RTA.[1] Further, all private rental homes must be insulated by July 2019; if the majority of landlords decide to insulate their properties closer to this deadline, there is a potential risk that service providers will not be able to meet demand.

Recommendations

EECA's exit strategy should support industry to maintain its capability once the programme has finished. This will mean that the problem of under-insulated houses will continue to be addressed by the market and industry can meet future demand due to new regulations under the RTA.

In order to continue insulating households, and to ensure that landlords and service providers are ready for the requirements in the RTA, EECA should consider what other levers it can access across government, and evaluate a broader range of options with the Ministry of Business, Innovation and Employment and the Ministry of Health. For example, as the primary public benefit is improved health outcomes, this should be considered for any future funding arrangement (e.g. through the health prioritisation process).

[1] Submission on the Residential Tenancies Amendment Bill

Contents

1 The problem

Improving the thermal performance of houses is expensive and landlords do not understand the benefits of insulation versus other investments in their home. There are also split incentives between landlords and tenants as the latter receive the primary benefits of insulation (improved health outcomes).

1.1 Why is it a problem?

EECA estimates that 600,000 of New Zealand's 1.8 million privately owned dwellings are under- or un-insulated houses in New Zealand. Of this number, around 300,000 are low-income households, of which at least 100,000 are low-income rental households.[2]

Uninsulated houses are inefficient to heat, and expose occupants to increased risk of illnesses related to cold, damp living conditions.[3] The most cost-effective way to improve the thermal performance of an uninsulated house is through installation of ceiling and underfloor insulation.[4, 5] Low-income households face significant barriers to retrofitting their houses with high quality ceiling and underfloor insulation, which costs on average around $3,000 per retrofit.[6]

1.2 The programme

Since 2009, Warm Up New Zealand has provided government subsidies to retrofit ceiling and underfloor insulation in over 295,000 houses that were built prior to 2000.[7]

The programme has undergone three iterations:

- **Warm Up New Zealand: Heat Smart** from 2009 to June 2014;
- **Warm Up New Zealand: Healthy Homes** from September 2013 to July 2016;
- **Warm Up New Zealand: Healthy Homes extension targeting rental properties** from July 2016 to June 2018.

In Budget 2016, the Government allocated $18 million, including $16.5 million in grant funding, to extend Warm Up New Zealand: Healthy Homes.[8] This extension exclusively targets rental houses occupied by low-income tenants. It aims to insulate at least 20,000 rental properties occupied by low-income households and compliment new minimum insulation regulations in the *Residential Tenancies Amendment Act 2016* which will take effect for all private rental houses in July 2019. The focus of this review is on this third iteration of the programme – the extension targeting low-income

[2] These figures are from EECA's analysis of the 2010 BRANZ Housing Condition Survey data. Please note that EECA expects to update these figures following the 2015 BRANZ Housing Condition Survey. See tab titled "Overview WUNZ vs MQS# of house"

[3] See *Cost Benefit Analysis of the Warm Up New Zealand: Heat Smart Programme*, 2011;and *The impact of retrofitted insulation and new heaters on health services utilisation and costs, pharmaceutical costs and mortality*, 2011.

[4] See Bob Lloyd et al. "Retrofit alternatives for State Houses in Cold Regions of New Zealand", University of Otago, September 2007

[5] See EECA's analysis of technical potential of residential home improvements, tab titled "Potential for Project Board", column I

[6] EECA programme data

[7] ..\..\..\..\..\..\..\Grants & Funds (GF)\12 WUNZ - HH\08 Reporting\04 Governance Reporting\20160729 - HH Min numbers - JULY 2016.xlsx

[8] See page 91: http://www.treasury.govt.nz/budget/2016/estimates/v1/est16-v1-buscin.pdf

rental properties.

The key components of all three Warm Up New Zealand programmes are as follows:

- Government subsidies for ceiling and/or underfloor insulation retrofits for houses built prior to 2000, as well as additional optional measures to support house thermal performance.[9] EECA contracted insulation installers ("service providers") to install insulation.
- Quality assurance regime administered by EECA, including independent on-site audits of around 5% of insulation retrofits completed under the programme.
- Public promotion/marketing campaign. Note the original Warm Up New Zealand: Heat Smart programme featured a mass media marketing campaign, whereas Warm Up New Zealand: Healthy Homes only featured a targeted promotion campaign because it was only available to eligible low-income households with health needs. Service providers are responsible for their own 'lead generation', but this is supported by EECA's promotion campaign.
- ENERGYWISE website providing public information on the programmes, eligibility criteria, contact details for service providers, and general information on the benefits of insulation and other home energy efficiency improvements. This website assisted service providers to generate leads amongst eligible households.
- Development of funding partnerships with third parties to leverage the Government's investment, and to maximise the number of houses insulated and the impact of the intervention on the market. Since 2009, EECA has raised over $150 million in third party funding[10] to support the Government's investment in Warm Up New Zealand. For the Healthy Homes rentals extension, EECA expects to raise an additional $16.5 million at minimum.

For a detailed breakdown of the differences between the three programme iterations please see Table 1.

[9] See 'Funded Measures' in Table One.
[10] EECA raised around $80 million to support delivery of WUNZ:HS, and around $76 million to support delivery of WUNZ:HH

***Table 1:** Characteristics of the three Warm Up New Zealand programmes*

	Heat Smart (2009-2014)	Healthy Homes (2013-2016)	Healthy Homes Rental programme (2016-2018)
Government investment	$347m over five years $318m grant funding	$100m over three years $92.5m grant funding	$18m over two years $16.5m grant funding
Eligible households	All owners of houses built pre-2000 including landlords 60% grants available only to Community Services Card (CSC)-holders	Owner-occupiers of houses built pre-2000 with Community Services Card (CSC), within specific age bands and with housing-related health needs Landlords of houses built pre-2000 with tenants with a CSC, within specific age bands and housing-related health needs	Rental households occupied by either: • a named tenant with a valid Community Service Card (CSC) or CSC-endorsed SuperGold card; or • a named tenant with demonstrable income-related need and one or more occupants of the house has a referral from a medical practitioner registered with the Medical Council of New Zealand, or a nurse registered with the Nursing Council of New Zealand stating that the occupant suffers from a respiratory illness; or • a tenant who is referred by a Ministry of Health-recognised Healthy Housing Initiative provider to an insulation installer contracted by EECA to provide retrofits under this programme
Funding available	33% of total insulation cost for all homeowners, up to $1,300 60% for CSC holders. Some projects with third party funding provide retrofits at low or no cost to the homeowner	Up to 60% for eligible households, capped to $1,800 on average across a provider contract Government grants will be topped up by third party funders to provide retrofits at no cost to households (except where a contribution is required from landlords)	Up to 25% for eligible households capped at $750 on average across a provider's contract Government grants will be topped up by both third party funders and landlords to ensure retrofits are completed at no cost to eligible tenants
Number of installations	Target: 188,500 Achieved: 241,000 (about 50,000 per year)	Target: 46,000 Achieved: 54,000 retrofits in total (about 16,000 to 20,000 grants per year)	13,000 in 2016/17 and 7,000 in 2017/18 (at least 20,000 retrofits in total)
Geographic Coverage	Available nationwide to all households in houses built pre-2000	Available to eligible households in areas where projects are set up Projects will not be available in all areas; some households will not be able to access the grant	Available to eligible households in areas where projects are set up. Projects may not be available in all areas due to localisation provisions in third-party funding; some eligible households may not be able to access the grant
Funded measures	Ceiling and under-floor insulation Efficient heaters Optional measures: hot water cylinder wrap, ground vapour barrier, draught proofing and pipe lagging	Ceiling and under-floor insulation, pipe lagging in Zone 3 only and remedial work in specific circumstances Optional measures: hot water cylinder wrap, ground vapour barrier, draught proofing and pipe lagging	Ceiling and under-floor insulation, pipe lagging in Zone 3 only and remedial work in specific circumstances Ground vapour barrier capped at a $200 subsidy per property

1.3 Market structure

The main actors in the residential market for energy efficiency home improvements are:

- service providers
- home-owner-occupiers
- landlords
- tenants

1.3.1 Service providers

The key suppliers are insulation service providers, of which some are also manufacturers of insulation. A small number of service providers have nationwide operations, while a larger number only operate in one or a few regions. Most service providers also offer a wide range of products and services in addition to ceiling and underfloor insulation (i.e. a 'whole of house' suite of improvements).

Competition in the private residential retrofit market is primarily based on brand, price, ability to generate leads via marketing, and the range of energy efficiency improvements a service provider can offer.

The average price per retrofit under Warm Up New Zealand to date is around $3,000.[11] The variables which affect price under the programme are:

- house size (square metres per ceiling and underfloor)
- lead generation costs on average $50 per lead[12]
- pre-installation in-home assessment costs on average $150 per visit[12]
- logistics, in particular how far a house is located from a service provider's centre of operations and the concentration of potential leads in a particular area
- administrative cost of complying with EECA's quality assurance regime
- the quality of insulation product used.

The price per retrofit outside the programme varies widely. The same factors which impact prices within the programme impact the price of private retrofits, with the exception of the administrative costs which are particular to the programme. In particular, the higher average cost per retrofit under Warm Up New Zealand reflects the cost to service providers of complying with EECA's quality assurance regime.

1.3.2 Home-owner-occupiers, private landlords, tenants

The key buyers in the market for private insulation retrofits are private home owners and private landlords. Tenants can also influence a decision by a landlord to retrofit a rental property.

Prior to the launch of Warm Up New Zealand: Heat Smart in 2009, a significant percentage of private home-owners, landlords and tenants had little understanding of the benefits of ceiling and underfloor insulation, and did not know whether their own houses were sufficiently insulated. However, since 2009, there has been a significant increase in awareness and understanding of the benefits of ceiling and underfloor insulation.[13]

[11] Note that under the current Warm Up New Zealand: Healthy Homes rental programme, the average price per retrofit will be no more than $3,000 under the terms of EECA's contracts with service providers.
[12] Reported to EECA by Warm Up New Zealand contracted service providers in 2015.
[13] While there is no consistent longitudinal research showing this, it is generally accepted. For example, "People are also much better educated these days on the ill effects of poor insulation and ventilation."

On the basis of a 2007 BRANZ report, EECA estimates that at least 11,000 retrofits per year were completed privately prior to the launch of Warm Up New Zealand: Heat Smart.[14] On the basis of conversations with service providers currently delivering the programme, EECA estimates that around 15,000 private retrofits are currently completed per annum.[15]

2 Strategic fit

The Government's commitment to the efficient use of energy, developing our renewable energy resources and supporting new technologies is also reflected in the New Zealand Energy Efficiency and Conservation Strategy (NZEECS) 2011-2016 (a companion document to the New Zealand Energy Strategy). As the strategy which gives "effect to the Government's policy on the promotion in New Zealand of energy efficiency, energy conservation, and the use of renewable sources of energy",[16] the NZEECS is critical in determining the role of EECA, other government agencies, businesses and households in better energy use.

The current NZEECS goal in the residential sector is to achieve "warm, dry and energy efficient homes with improved air quality to avoid ill-health and lost productivity".[17] One of EECA's current strategies for achieving this goal is to improve "…thermal performance by leveraging funding to support retrofits to avoid ill-health and lost productivity". The Warm Up New Zealand: Healthy Homes extension for low-income rentals is EECA's programme for implementing this strategy.[18]

The Warm Up New Zealand: Healthy Homes extension for low-income rentals will also support the Government's new insulation regulations for rental properties, introduced under an amendment to the *Residential Tenancies Act 1986*.[19] Under these regulations, all rental properties will need to have ceiling and underfloor insulation, installed to a minimum level of performance, by 1 July 2019.[20]

3 Role for government

3.1 Market failures and barriers

Prior to 2009, when the first Warm Up New Zealand programme was launched by the Government,

[14] 2007 BRANZ Report used data from 2005 Housing Condition Survey, and estimated ceiling insulation retrofit rate of 11,000 per annum from 1999-2004. See BRANZ report E466 "Insulation in existing housing", 2007 http://eecapedia.eeca.govt.nz/Research/index.php?title=Insulation_in_existing_housing

[15] Reported to EECA by Warm Up New Zealand contracted service providers in 2014: 20141111_GJ numbers outside of WUNZ.xlsx

[16] Section 10, *Energy Efficiency and Conservation Act 2000* http://www.legislation.govt.nz/act/public/2000/0014/latest/DLM2033879.html

[17] *New Zealand Energy Efficiency and Conservation Strategy*, page 18, available at http://www.mbie.govt.nz/info-services/sectors-industries/energy/energy-strategies/documents-image-library/nz-energy-strategy-lr.pdf

[18] See EECA's 2014/15 Annual Report, page 14: https://www.eeca.govt.nz/resources-and-tools/research-publications-and-resources/corporate-and-strategic-publications/

[19] See:http://www.legislation.govt.nz/act/public/1986/0120/latest/DLM94278.html; See: http://www.legislation.govt.nz/regulation/public/2016/0128/16.0/DLM6856201.html

[20] Note there are some exemptions, particularly where the design of the building does not allow retrofitting of ceiling and/or underfloor insulation.

well over half the privately owned housing stock (around 900,000 houses)[21] was under-insulated or un-insulated, and the dynamic of supply and demand in the market was not adequately addressing this problem. Not only was the rate of annual private retrofits low, quality was variable[22] and not transparent. Until EECA funded and advised on development of New Zealand Insulation Standard 4246 in 2006, there was no recognised performance standard for insulation in the industry. In addition, market barriers prevented home owners, landlords and/or tenants from insulating their houses.

In this context it is possible to argue that because Warm Up New Zealand was designed to transform the residential market for ceiling and underfloor insulation, rather than accelerating a trend already present in the market, Government subsidies were an appropriate market intervention.

3.1.1 Market failures

Imperfect information

Prior to the launch of Warm Up New Zealand: Heat Smart in 2009, it was identified that information about the thermal performance of a house, including the extent to which it is insulated or how well insulation has been installed, was often neither transparent nor visible to occupants or prospective house buyers or tenants at point-of-sale/lease. The reasons why are summarised below.

There is a lack of market-differentiation between insulated and non-insulated dwellings. Ceiling and underfloor insulation is hidden in the structure of a house, and does not possess physical or aesthetic traits which make its thermal performance readily discernible to a lay-person. This meant that insulation usually did not make a property more attractive or valuable to potential buyers or tenants.

The health and comfort benefits from insulation are undervalued. In addition, occupants who have only ever lived in under-insulated houses often do not understand the benefits of insulation in terms of improved health and comfort due to improved heating efficiency. This means information about the thermal performance (energy efficiency) of a house is under-valued, and has an inadequate impact on demand. This is compounded by current house price inflation due to a lack of supply (in particular in Auckland), which reduces buyer choice and therefore power in the sale process.
In the low-income rental market information about the thermal performance of a rental property is often not conveyed at point-of-lease, preventing prospective tenants from making informed decisions. This problem has prompted further action from the Government, which has introduced new regulations under the *Residential Tenancies Amendment Act 2016*. From 1 July 2016 private landlords are required to disclose whether a rental property is insulated on the tenancy agreement.[23]

Split incentives

In the rental market there is a split-incentive (principal-agent) issue because the primary benefits of

[21] See Table 4 in BRANZ report E466 "Insulation in existing housing", 2007. Note that sufficient insulation is defined as 75mm or more thickness and 100% ceiling coverage in Climate Zones 1 and 2, and 100mm or more, and 100% coverage, in Climate Zone 3. This compares to 120mm used for EECA programmes. Hence this report underestimated the number of under-insulated houses in NZ at the time based on the WUNZ insulation standard.

[22] http://eecapedia.eeca.govt.nz/Research/index.php?title=Investigating_quality_of_insulation_in_new_build_residential_homes

[23] Section 13A(1A) Residential Tenancies Act 1986: http://www.legislation.govt.nz/act/public/1986/0120/latest/DLM95024.html

insulation are improved health and well-being and the main beneficiaries of insulation are the house occupants, rather than the landlord.

The main benefit to landlords of insulation is that it may improve the value of a property,[24] and may provide an additional selling point with which to attract tenants. In some regions, the low supply of rental properties reduces tenant choice and power in the process, and further decreases the incentive for landlords to invest in insulation.

3.1.2 Barriers

Despite the benefits, there are barriers which prevent owner-occupiers, landlords and tenants from installing insulation to their houses.

Affordability

The average cost of a ceiling and underfloor retrofit under Warm Up New Zealand is around $3,000.[25] Outside the programme, the cost can range from between $2,000 and $3,000 per retrofit. This cost prevents many low-income home-owners from insulating their houses,[26] despite the long term return from a health and wellbeing, and/or financial investment perspective. In addition, given the health benefits of insulation are spread over 30 years, many home owners and tenants may be prevented from investing in a retrofit due to present bias.[27]

Preferences

Landlords and tenants have a range of options for investing in their home and may prioritise these investments over insulation. For example, landlords could build a guest house to increase the capital return of the property or tenants could install cable TV/internet or buy a pet dog to improve their in-home comfort.

We have developed a better understanding of these preferences and how they have changed from the success of previous iterations of Warm Up New Zealand.

In 2015/16 EECA commissioned qualitative 'deep dive' research using the Energy Cultures framework, which provided more detailed and nuanced insight into the way in which households make decisions which affect energy use in the home. Key themes were:

Motivation

- Homes provide 'belonging' and 'enjoyment' – warmth and appliances enable this.
- Warmth is the key for improving home performance, other benefits are secondary.
- Trigger points are feeling cold, kids or home improvement.
- Some home owners are not feeling motivated to solve key issues.

Capability

- Some home owners are oblivious to or don't know the cause of problems.

[24] See page 12, EECA Residential Retrofit Validation Report 27 January 2015: 14-065747 EECA Retrofit Validation Residential - FINAL REPORT 27 01 14.lnk

[25] "X:\Governance & Strategic Planning (GV)\16 Operating Model\04 Portfolio Management\01 Programme reviews\02 Reviews\02 Programmes\06 WUNZ\20160812 RE Latest APPR under WUNZ Ross Tangye.msg"

[26] EECA Consumer Change In State Research – Additional Audience Analysis (Low Income), Nov 2014

[27] See slide 53: ..\..\..\..\..\..\..\Marketing & Communications (MC)\08 Market Research\01 Consumer Monitoring\03 Reports\Finals\20160505 EECA Consumer Monitor (Jan-Mar 16) Report - FINAL.pptx

- Some home owners are not thinking about what they should be doing next.
- Some home owners are not making good/informed decisions.
- Home owners are not thinking about their home's performance as a whole.

Opportunity

- Generally home owners felt there was enough information and advice out there.
- Most home owners would go to suppliers for advice or information, but there is some lack of trust.
- Most are aware of the rates funding option.
- Some home owners are not taking action due to lack of a good solution.

3.2 Potential benefits

Table 2: Types of expected benefits

	Public benefits	Private benefits
Landlords		• Increased capital value • Increased rents • Tenant retention
Tenants	• Health (primary) • Productivity	• Health

3.2.1 Primary public benefits

A 2012 cost-benefit analysis of Warm Up New Zealand: Heat Smart found that approximately 99 per cent of the total benefits of ceiling and underfloor insulation are health benefits associated with the 'take-back' effect of adequately heating houses that are insulated.[28] The report valued the total health benefits of retrofitting ceiling and/or underfloor insulation at $636 per house, or $854 where the house is occupied by a low-income household (i.e. a Community Services Card-holder). Of these total health benefits of insulation, around 12 per cent are public health benefits in the form of reduced pharmaceutical costs and reduced hospital admissions related to respiratory illnesses.[29]

Other studies have shown that improving the warmth and dryness of homes through retrofitted insulation and heating systems has been shown to reduce GP visits, absences from school/work, and rates of hospitalisation.[30, 31, 32] In April 2015, the Canterbury District Health Board and Community Energy Action completed a quantitative analysis of the impact of retrofitting houses with insulation and heating appliances on the health and well-being of occupants. One of the key results of the

[28] See *Cost Benefit Analysis of the Warm Up New Zealand: Heat Smart Programme, 2011*. See *The impact of retrofitted insulation and new heaters on health services utilisation and costs, pharmaceutical costs and mortality, 2011*.
[29] See *Cost Benefit Analysis of the Warm Up New Zealand: Heat Smart Programme, 2011*, Table 20, page 22.
[30] Jacobs et al (2010) A Systematic Review of Housing Interventions and Health: Introduction, methods and Summary Findings. Journal of Public Health Management & Practice, 16(5): S5 – S10; Rohani, M., McFarlane, K., Birchfield, D and Adler, M (2014). Auckland Council retrofit your home financial support programme: a social return on investment (SROI) evaluation. Auckland Council technical report, TR2014/020.
[31] Howden-Chapman, P., et al, *Effect of insulating existing houses on health inequality: cluster randomised study in the community*. British Medical Journal, 2007(334): p. 460.
[32] Howden-Chapman, P., et al., *Effects of improved home heating on asthma in community dwelling children: randomised controlled trial.* British Medical Journal, 2008. 337: p/ a1411.

study was that there was a 29.2% reduction in hospital bed days attributable to the retrofits, equating to annual Canterbury District Health Board savings of approximately $945,000.[33]

A *Motu report* has quantified reduced mortality and health benefits imputed from other studies (reduced GP visits, reduced time off work and school). Reduced mortality comprises around 75 per cent of the health benefits, and other imputed health benefits between 11 per cent and 14 per cent of the total health benefits.

3.2.2 Other public benefits

Cold, damp homes also reduce occupants' participation in work and social activities, reducing economic productivity.[34] Retrofitting insulation can therefore provide public goods in the form of increased productivity, and increased participation in other social activities (including childhood education).

3.2.3 Private benefits

The primary private benefits are benefits to the home-owner in the form of an increase in the capital value of the house. Other benefits may include improved tenant retention, and the ability to attract tenants willing to pay higher rents.

3.3 Potential costs

There is no evidence that suggests the Government's efforts to address information gaps, affordability and split incentives issues via the latest Warm Up New Zealand programme has crowded out private sector investment or had unintended consequences.

Any crowding out effect should also be considered in the context of recent amendments to the *Residential Tenancies Act* which include the first New Zealand regulations to require the retrofitting of insulation in dwellings. These will take effect from 1 July 2019 for private rental properties.

Key to the success of Warm Up New Zealand has been the success of the quality assurance regime. In contrast to the Australian Home Insulation Programme, where the lack of an effective quality assurance regime resulted in the death of four insulation installers, house fires and other non-fatal injuries, Warm Up New Zealand has been delivered without any significant health and safety incidents.

4 Intervention

This section will focus on the Warm Up New Zealand: Healthy Homes extension for rentals, which will run from July 2016 until June 2018.

[33] ..\12 WUNZ 3\20160215 Minister's office request\20160216 Attachment A Healthy Homes Quantitative Evaluation Canterbury DHB.pdf

[34] Howden-Chapman, P. (2007) Effect of insulating existing houses on health inequality: cluster randomised study in the community, The BMJ (The British Medical Journal).

The primary investment objective is to use Government subsidies (total available $16.5 million) to insulate at least 20,000 rental properties occupied by low-income tenants.

4.1 Intervention logic

The intervention logic is supplied in Appendix One.

4.2 Investment objectives

The primary investment objective is as follows:

- Use $16.5 million in Government subsidies to install ceiling and/or underfloor insulation to at least 20,000 rental properties occupied by low-income tenants in the next two years (13,000 low income rentals in 2016/17 and 7,000 in 2017/18)
- Use $1.5 million in Government funding to administer Warm Up New Zealand, including to:
  - independently audit around 5% of all installs.
  - promote the programme.
- Raise a minimum of $16.5 million in third party funding via an open competitive RFP to support the Government's two-year investment

4.3 Options

An options analysis was conducted in 2015 and 2016 in the lead up to Budget 2016.[35]

***Table 3:** Alternative options considered*

Option	Comment	Benefits	Costs	Ease of implementation
Do nothing	This option would have meant Government subsidies for insulation were no longer available after 30 June 2016. This would have created the risk that the industry was not able to adequately meet demand or quality requirements in the lead-up to the implementation of the RTA in July 2019.	Low	Low	High
Status Quo	This option was a continuation of the Warm Up New Zealand: Healthy Homes programme.	High	High	High
Tighter WUNZ	This option was similar to status quo but with funding ratio changed to 50 per cent Government/50 per cent third party contribution.	High	High	High
Rental focus	Under this option the Government funding ratio for low-income home owners would stay the same, but for low-income rentals the Government funding would be reduced to a third of the cost of a retrofit, with third party funders and landlords funding the balance.	High	High	Medium

[35] Briefing to the Minister

Option	Comment	Benefits	Costs	Ease of implementation
Landlord push	This option is similar to the rental focus option, but requiring greater contribution from landlords, resulting in the insulation of fewer houses.	High	High	Medium
Low-income rental only option	Under this option, the programme would only be available for rental properties occupied by low-income tenants. This option would have a reduced total Government investment, reduced Government funding contribution per retrofit, and would have targeted insulation of 70,000 rental properties.	Medium	Medium	Medium

4.4 Potential impact

The Warm Up New Zealand: Healthy Homes rental programme's potential impact is quantified in the forward-looking benefit-cost ratio provided in Section 5.3.

4.5 Market readiness

Due to the sustained success of Warm Up New Zealand since 2009, the market is well prepared to deliver the outcome EECA is seeking (at least 20,000 low-income rental properties insulated). Since 2009, EECA has facilitated delivery of between 60,000 and 140,000 retrofits per annum, which demonstrates the capacity and capability of the market to deliver the required number of retrofits, to the required standard.

The unknown factor is landlord demand for the programme, and the capability of service providers to generate leads among landlords with eligible low-income tenants. To date, EECA has insulated over 54,000 rental properties, out of a total of 295,000 (17%). However, under Warm Up New Zealand: Healthy Homes, rentals comprise 35% of all retrofits, and in 2015/16 rentals comprise 42% of all retrofits, which suggests that landlord demand for subsidised retrofits is increasing, and/or service providers have improved capability to generate leads among low-income rentals.

Service providers delivering the programme will initially be selected via open and competitive RFP. Under the RFP, demonstrating quality comprises 50% of the weighted score. This will ensure that service providers are able to meet demand while maintaining the required quality standards. Delivery volumes under the Warm Up New Zealand: Healthy Homes rental programme will be lower than under previous iterations.

4.6 Risks

***Table 4:** Risks to success of the programme*

Risk	Explanation	Probability	Impact	Mitigation
Demand exceeds available supply of subsidised retrofits	EECA estimates there are at least 100,000 low-income rental households. The risk is political, and a risk to delivery management/phasing	Moderate	Moderate	Active monitoring of programme delivery and careful targeting of promotion to manage demand; contractual provisions managing service provider delivery phasing
Industry is not positioned to meet landlord demand after the programme ends	Risk that industry does not maintain high quality standards after the programme ends, in particular due to increase in demand between 1 July 2018 and 1 July 2019 when RTA regulations take effect	Moderate	High	The RTA regulations require that all retrofits comply with NZS4246

4.7 Interdependencies

The programme has a clear interdependency with new insulation regulations introduced under the *Residential Tenancies Act 1986*, as it will help industry target landlords. The promotion campaign for Warm Up New Zealand will be linked to the promotion campaign for the new regulations.

The programme has some degree of interdependency with EECA's ENERGYWISE consumer information campaign and brand, which provides information on home energy efficiency.

The Budget 2016 appropriation of $1.5 million to administer the programme has implications for EECA's resourcing.

4.8 Resource allocation

- 4 FTE
- $18m over two years

5 Performance

5.1 Effectiveness

To date, the Warm Up New Zealand programmes have insulated 296,482 houses; this is 25% above target without any increase in cost to Government. EECA has audited five per cent of installations, with a pass rate of 97.7%.

A comprehensive evaluation of the initial programme was conducted by Motu.. This found that the programme resulted in significant health benefits, especially amongst the very young and old, but

that there were minimal energy savings due to people taking the benefit of a warmer home rather than reducing their energy use and retaining a similar indoor temperature.[36]

5.2 Achieved benefits

Previous Warm Up New Zealand programmes have exceeded expectations. Based on the Motu report analysis, EECA has calculated that the benefit-to-cost ratio of the programmes to date is 3.1:1, with a net present value of $2.4 billion. More detail is available in Appendix Two.

5.3 Value-for-money

This analysis is forward-looking and evaluates the 2016/17 and 2017/18 Warm Up New Zealand house insulation programme (Table 6). The two year programme entails the insulation of 20,000 houses:

- Schedule of installations: 13,000 in 2016/17 and 7,000 in 2017/18
- All houses to have a Community Services Card-holding tenant and be built before 2000
- 22.8% of the insulation costs of to be paid by EECA with the remainder paid by private funders and house owners.

Assumptions are detailed in Appendix Three.

***Table 6:** Results of cost-benefit analysis for Warm Up New Zealand: Healthy Homes Rental*

Metric	Description	Value	Comment
Net present value		$170m	Based on a total of 20,000 installations in 2016/17 and 2017/18
Benefit-cost ratio	PV all benefits/PV all costs	4.0:1	Consistent with EECA's 2016 submission to Treasury.
ROI - Government	PV public (government) benefits/PV public (government) costs	3.7:1	Reflects the high leverage of private funds from EECA's contribution to insulation costs

5.4 Programme future

EECA is operating on the assumption that the Warm Up New Zealand: Healthy Homes extension for rentals will be the final iteration of the programme, and that after 30 June 2018 Government subsidies for insulation retrofits will no longer be available. Whether or not the programme is extended further beyond this timeframe will be a question for Government in the lead up to Budget 2017 or 2018.

[36] http://www.healthyhousing.org.nz/research/current-research/evaluation-of-warm-up-new-zealand-heat-smart/

In 2016/17 and 2017/18, EECA will deliver on, and monitor performance of, the new Warm Up New Zealand: Healthy Homes Rental programme against its target of insulating 20,000 houses by 30 June 2018.

6 Lead organisation

EECA has successfully administered Warm Up New Zealand since 2009, and, before that, other government home insulation programmes. Under Warm Up New Zealand, EECA has helped to insulate over 295,000 houses. In addition to administering the programme, EECA has also been influential in helping to foster the development of a mature insulation industry. In particular:

- EECA developed the Quality and Audit Manual, which is a tool for service providers and auditors to ensure their work meets programme standards.[37]
- EECA continues to have extensive technical input to the development and review of the New Zealand Insulation Standard NZS4246.
- EECA had significant influence on the development of new insulation regulations under the *Residential Tenancies Act*.
- EECA has extensive connections to the insulation industry and relevant third-party funding providers.

7 Conclusions

Warm Up New Zealand has been successfully refined and retargeted several times to reflect evolving Government priorities. The programme has achieved scale and is high value-for-money. The Government's investment of $465 million has subsidised the retrofitting of insulation into nearly 300,000 houses, resulting in significant public health benefits in the form of reduced pharmaceutical costs and reduced hospital admissions.

It has built industry capability through its quality assurance mechanisms. The quality of retrofits delivered by service providers in the market has significantly increased. There is now a high-quality, industry-supported insulation standard (NZS 4246), and EECA's Quality and Audit Manual provides a resource for service providers to ensure retrofits are properly and safely completed.

Further, Warm Up New Zealand has increased the importance of home insulation to home-owners and tenants. Insulation is more highly valued by New Zealand households than it was prior to the launch of the programme. The households which have benefitted from insulation have now been exposed to the benefits of improved thermal performance, and this is expected to make them more likely to demand adequate thermal performance from their next house.

[37] https://www.energywise.govt.nz/funding-and-support/payment-options-for-insulation-and-heating/quality-manual-and-guidelines/

Warm Up New Zealand has also provided a better understanding of the return on investment to the Government in terms of the health benefits arising from a home insulation programme.

The problem of under-insulated or uninsulated homes still exists. Low-income households, and low-income rental households in particular, still face significant barriers to insulating the homes in which they live. Warm Up New Zealand is the only government programme which addresses these barriers. Landlords do not yet have sufficient understanding of their obligations under the *Residential Tenancies Act*, and vulnerable tenants are unlikely to raise their landlords' non-compliance with the RTA.[38] Further, all private rental homes must be insulated by July 2019; if the majority of landlords decide to insulate their properties closer to this deadline, there is a potential risk that service providers will not be able to meet demand.

8 Recommendations

EECA's exit strategy should support industry to maintain its capability once the programme has finished. This will mean that the problem of under-insulated houses will continue to be addressed by the market and industry can meet future demand due to new regulations under the RTA.

In order to continue insulating households, and to ensure that landlords and service providers are ready for the requirements in the RTA, EECA should consider what other levers it can access across government, and evaluate a broader range of options with the Ministry of Business, Innovation and Employment and the Ministry of Health. For example, as the primary public benefit is improved health outcomes, this should be considered for any future funding arrangement (e.g. through the health prioritisation process).

[38] Submission on the Residential Tenancies Amendment Bill

9 Appendices

9.1 Appendix One – Intervention logic

9.2 Appendix Two – Retrospective cost-benefit analysis for all Warm Up New Zealand programmes

This analysis evaluates the Warm Up New Zealand programme since its start in 2009/10 through to the end of 2015/16 and includes both Heat Smart and Healthy Homes. The methodology is the same as that used for the analysis of the Warm Up New Zealand: Healthy Homes forward programme through to the end of 2017/18:

- All expenditure made by EECA for opex and grants and by third parties for insulation costs is taken from EECA's records. These are complete and up to date.
- Health and energy savings are sourced from Motu's 2012 cost-benefit analysis.[39] Distinction is made between the benefits accruing to general and low income households.

Cash flows and key outputs are shown in the following tables:

		2010	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*	*2020*
Energy Saved PJ		0.000	0.016	0 031	0.051	0 069	0.079	0.084	0.088	0 088	0.088	0.088
CO2 Reduction tpa		0	607	1201	1963	2634	3009	3232	3389	3389	3389	3389
Nominal Costs												
Expenditure $ million												
EECA		-72.29	-66.07	-80 89	-73.16	-46 99	-34 56	-21.65	0.00	0 00	0.00	0.00
Third Parties		-83.08	-84.74	-112.76	100.21	-48 37	-23 33	-19.45	0.00	0 00	0.00	0.00
Value of Energy Saved $ million		0.00	0.36	0.76	1.25	1 68	1 92	2.06	2.16	2.16	2.16	2.16
Value of Emissions Reduction $ million		0.00	0.00	0 00	0.01	0 01	0 03	0.05	0.08	0 08	0.08	0.08
Value of Public Health Benefits $ million		0.00	9.97	17 57	28.33	38 66	46 38	52.89	56.32	56 32	56.32	56.32
Value of Private Health Benefits $ million		0.00	26.34	51 04	83.16	112 51	136 34	157.80	169.14	169.14	169.14	169.14

		2010	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*	*2020*
Cash Flow $2016 million	*PV 2016 $M*											
EECA Costs	*-522.0*	-77.715	-68.147	-82.148	-74.224	-45 855	-34 591	-21.647	0.000	0 000	0.000	0.000
Third Party Costs	*-629.7*	-89.317	-87.404	-114 508	-101.664	-47.198	-23 354	-19.452	0.000	0 000	0.000	0.000
Energy Saved/ Private Health Benefits	*2667.3*	0.000	27.531	52 607	85.638	111.426	138.386	159.863	171 302	171 302	171.302	171.302
CO2 Reduction/Public Health Benefits	*886.4*	0.000	9.249	17 846	28.750	37.740	46.456	52.939	56.406	56.406	56.406	56.406
Net Present Value	*2401.9*											
Ratios												
All Benefits/All Costs	*3.09*											
Public Benefits/Public Costs	*1.70*											

Whilst the performance of the programme is strongly positive in terms of overall and public benefits, the benefit to cost ratios are somewhat lower than those determined in other analyses. This is due to the methodology used which is consistent throughout the current programme review:

- The benefit to cost ratio of 3.1:1 for a mix of general and low income households is equivalent to a ratio of 4.4:1 for low income households only and therefore is consistent with both the forward programme analysis and EECA's 2016 submission to Treasury.
- The public benefit to public cost ratio is 1.7:1, reflecting the leverage of private funds from EECA's contribution to insulation costs.
- The benefit cost ratio increases to 6.2:1 when determined according to Motu's original methodology which applied a discount rate of 4%, accounted for deadweight costs and adjusted installation costs for the associated producer surplus.

[39] Cost Benefit Analysis of the Warm Up New Zealand: Heat Smart Programme, Motu et al, 2012

9.3 Appendix Three – Cost-benefit analysis for WUNZ: Healthy Homes Rental (forward looking)

1 Scope

This analysis evaluates the 2016/17 and 2017/18 WUNZ house insulation programme. The two year programme entails the insulation of 20,000 houses:

- Schedule of installations: 13,000 in 2016/17 and 7,000 in 2017/18
- All houses to have a Community Services Card-holding tenant and be built before 2000
- 22.8% of the insulation costs to be paid by EECA with the remainder paid by private funders and house owners.

2 Cost Data

- The average cost of insulating each house is $3,000 based on EECA's insulation programme to date.
- EECA's cost of managing the programme over the two years is $2 million.

3 Benefits

All benefits have been developed using data from Motu's 2012 review[40] of the Warm Up New Zealand: Heat Smart programme, adjusted to a $2016 basis. The review determined that insulation resulted in warmer houses improving the health of the occupants whereas energy savings were minimal. For this analysis, benefits have been categorised as follows:

- Public health benefits due to reduced hospitalisations, pharmaceutical costs, reduced GP visits, and reduced time off work and school.
- Private health benefits resulting from reduced mortality, based on the value of a statistical life. This constitutes about 75% of the total benefits from the programme.
- Energy savings (private benefits) contribute about 1% of the total value of the benefits
- Carbon dioxide emissions reduction (public benefits) associated with the energy savings. These have been valued at $25 per tonne after 2015/16.

Energy benefits are assumed to last for 10 years after installation whereas the value of health benefits is based on a 30 year life.

Treasury's default discount rate of 7% is applied.

4 Outputs

Applying EECA's cost benefit analysis methodology and that in Treasury's CBAx template[41]:

- The net present value of the programme is $170 million (see table below) based on a total of 20,000 installations in 2016/17 and 2017/18.

[40] Cost Benefit Analysis of the Warm Up New Zealand: Heat Smart Programme, Motu et al, 2012
[41] CBAx template used in EECA's submission to Treasury for WUNZ extension in March 2016

		2017	2018	2019	2020	2021	2022	2023	2024
Energy Saved PJ		0.000	0.004	0.006	0.006	0.006	0.006	0.006	0.006
CO2 Reduction tpa		0	137	211	211	211	211	211	211
Cash Flow: $2016 million	*PV 2016 $M*								
EECA Costs	*-14.3*	-10.392	-5.288	0.000	0.000	0.000	0.000	0.000	0.000
Third Party Costs	*-42.3*	-30.108	-16.212	0.000	0.000	0.000	0.000	0.000	0.000
Energy Saved/ Private Health Benefits	*174.0*	0.000	10.018	15.413	15.413	15.413	15.413	15.413	15.413
CO2 Reduction/Public Health Benefits	*52.4*	0.000	3.008	4.628	4.628	4.628	4.628	4.628	4.628
Net Present Value	*169.8*								
Ra ios									
All Benefits/All Costs	*4.00*								
Public Benefits/Public Costs	*3.66*								
Public Benefits/Private Benefits	*0.30*								
Private Costs/Public Costs.	*2.95*								

- This corresponds to a benefit to cost ratio of 4.0:1 and is consistent with EECA's 2016 submission to Treasury.
- The public benefit to public cost ratio is 3.7:1, reflecting the high leverage of private funds from EECA's contribution to insulation costs.
- The benefit cost ratio increases to 6.0:1 when determined according to Motu's original methodology which accounted for deadweight costs and adjusted installation costs for the associated producer surplus.