

BBS/8

The Value Case for Building Back Smarter

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1 Summary

The case for the Build Back Smarter approach of house performance retrofits to be undertaken as part of earthquake repairs of houses in Canterbury is very strong.

There is substantial opportunity to undertake the retrofits:

- There are an estimated 50,000 homes yet to be repaired, many of which have substantial damage.
- 90% of affected homes in Canterbury are expected to need at least insulation retrofits.
- Retrofits at the time of repair represent a once in 30 year opportunity to substantially improve the performance of Canterbury's homes.
- Retrofits are easily able to be accommodated with repairs, without disrupting or slowing the repair process.

The impact of such an approach will be very substantial:

- Improving the health of Canterbury residents – particularly vulnerable citizens (old, young, sick).
- Energy conservation gains – particularly where whole house insulation (ceilings + floors **AND** walls) is undertaken.
- Benefits in terms of both reduced greenhouse gas emissions from energy efficiency – and increased resilience to climate change.
- Resource efficiency benefits – particularly energy and water.
- Improvements in the value of housing assets – through both the reduced maintenance requirements of dry houses and the value added by performance improvements. Housing represents the major asset of most Canterbury households.
- Reduction in fuel poverty - particularly for households who have moved into fuel poverty as a result of the impact of the earthquakes.
- Employment benefits – particularly in the insulation industry which is now downsizing as a result of Warm Up New Zealand contracts coming to an end.

The pilot Build Back Smarter project, with its 10 case study homes, has identified the key areas where retrofit *at the time of repair* is critical. These are the opportunities to improve house performance which, if not picked up at time of repair, will be lost for the foreseeable future.

Key interventions identified are:

- ceiling insulation retrofit to skillion and low pitched roofs where roofing or ceiling linings are being repaired.
- underfloor insulation and ground vapour barrier installation under normally inaccessible suspended floors where foundation repairs are occurring – often these involve lifting the house creating a unique access opportunity to the underfloor.
- wall insulation retrofit where recladding or wall linings are being replaced.
- increasing specification of windows being repaired/replaced (double glazing, advanced glazing such as low emissivity/argon filled, thermally broken aluminium frames).

- cutting hatches to access “hard to insulate” places – these are common in roof extensions and “popped tops”.
- installing externally vented extract ventilation systems in kitchens and bathrooms.
- installing heat transfer systems where ceilings are being repaired.
- replacing downlights with surface mounted fittings.
- relocating or replacing poorly located/sized/ performing heating systems such as heat pumps and wood burners – it is worth noting that poorly located and sized heat pumps has been a common feature of Build Back Smarter houses.

This opportunity to intervene in a region’s housing stock has substantial societal benefits. However, the capacity of Canterbury residents to be able to take up this once-in-a-generation opportunity is unlikely to be high for either owner occupiers or rental property owners. Therefore, there is a strong rationale for local and central government agencies to play a role in facilitating homeowners to be able to “build back smarter”.

2 Introduction

This report provides an assessment of the value case for the Build Back Smarter approach and wider roll out of this across houses which require earthquake repairs in Canterbury. It follows on from:

- The experience of Beacon as part of the Build Back Smarter pilot project, whereby a number of case study/demonstration homes have received house performance retrofits as part of earthquake repairs;
- Research by Beacon into the cost effectiveness of different retrofit measures, their ease of implementation and ways to support homeowners in making good decisions around retrofit measures for their houses; and
- The ongoing discussions and debates around fuel poverty, minimum standards for rental housing and the need to ensure that houses are not having adverse effects on the health and well-being of New Zealanders.

3 Scale of the opportunity

A large number of Canterbury houses have had extensive internal lining (ceiling and wall), cladding and foundation damage as a result of the earthquakes – approximately 42,800 homes have yet to receive their EQC repairs – many of these are quite seriously damaged, and a further 6,500 homes are yet to receive their insurance repairs.

To date EQC has repaired 38,786¹ or around 45% of homes; however, these are mostly those which have suffered a lesser quantum of damage. Insurance companies have repaired a very small number: 59 homes have been repaired by IAG² and 83 have been repaired or replaced with a new home by Southern Response³. These two insurance companies represent 80% of the homes subject to insurance repair – so far 0.13% of these homes have been repaired. The vast majority of homes where wall insulation could be installed at the time of repair, therefore, still remain in an unrepaired state.

It has been estimated that 15,000 EQC homes⁴ and all the insurance company homes (6,500) could have wall insulation installed through the majority of the dwelling, without the usual cost of removing wall linings or cladding. In addition, a further, unknown, proportion of EQC homes could have partial wall insulation installed, for example, in bedrooms or living areas.

¹ EQC Scorecard 10 June 2013. <http://www.eqc.govt.nz/canterbury-earthquakes/progress-updates/scorecard> Accessed 12th June 2013.

² IAG Canterbury Recovery Update 9 April 2013.

<http://www.iag.co.nz/News/Documents/Canterbury%20Recovery%20Update%20April%202013.pdf>. Accessed 17th April 2013.

³ Southern Response Progress Update 9 April 2013 <http://www.southernresponse.co.nz/progress/>. Accessed 17th April 2013

⁴ Estimate from Tasman Insulation February 2012

As repairs of the more substantially damaged homes get underway, the Beacon experience⁵ is that replacement of damaged plasterboard on walls and ceilings is likely to be greater than estimates. This is largely because the cost in labour and time of wallpaper stripping and repairs to damaged plasterboard is often greater than complete replacement of the plasterboard. Wherever plasterboard is replaced, the opportunity to install wall insulation is created. For those large number of houses with low pitched ceiling cavities and skillion roofs (both common in houses built from the 1960s onwards), the opportunity to install ceiling insulation in otherwise inaccessible or hard to access locations is also created.

Recladding and re-roofing also create substantial opportunities for wall and ceiling insulation retrofit, with recladding of brick and block veneer construction, in particular, being a common earthquake repair.

Foundation repairs create a substantial opportunity to install underfloor insulation and ground vapour barriers in otherwise inaccessible underfloors. That is because many foundation repairs involve jacking up the house, often for several weeks or even months.

Given that most of the “easy to repair” EQC jobs have been done, it is likely that a substantial proportion of the houses yet to be repaired by either EQC or insurers could be expected to need some Build Back Smarter priority measures – with the repairs being the best time and opportunity to install these.

4 Build Back Smarter retrofits at time of earthquake repair is a once-in-a-generation opportunity

63% of Canterbury houses were built before minimum insulation standards were introduced into the Building Code⁶ so these houses are unlikely to have any wall insulation. It can be expected that a similar proportion of earthquake-damaged homes will have no wall insulation whatsoever and, despite the Warm Up New Zealand programme, many of these homes will similarly have no or inadequate ceiling and underfloor insulation.

Compounding this is the fact that early insulation products were thinner than current minimum standards and a number of products used in early installations have now been shown to have a high failure rate due to slumping or general ineffectiveness (e.g. gib backed foil, macerated paper). With regard to ceiling and underfloor insulation, EECA considers that all houses built pre-2000 are likely to be inadequately insulated, and support for retrofit to current Building Code minimums is provided through Warm Up New Zealand. If a similar benchmark was applied to wall insulation retrofit, then 90% of Canterbury homes might be expected to have inadequate wall insulation.

⁵ *Easton and Cowan (2013)*

⁶ *Page and Fung (2008)*

Retrofitting insulation to existing homes is most easily done when claddings or linings are being removed and/or replaced. Therefore, effecting earthquake repairs of linings and claddings represents a substantial opportunity to improve the overall insulation of the home by installing insulation.

The situation is similar for other activities which require disruption to ceiling linings (e.g. cutting hatches to access ceiling cavities, installation of extract ventilation and heat transfer systems, replacement of downlights with surface mounted fittings) and replacement of windows which in normal circumstances will damage wall linings and window surrounds.

Even more than the opportunity to provide Build Back Smarter priority interventions offered by the large number of homes requiring substantial repair, is the opportunity lost by **not** doing so. Once earthquake repairs are complete, most homeowners will possess a house which has had substantial cosmetic renovation. Assuming normal renovation patterns occur in the future, in these homes, it can be expected that the opportunity to undertake these measures –and see a substantial lift in the performance of Christchurch homes, is unlikely to occur again for 30 years⁷.

5 Damp and cold housing is affecting Canterbury residents' health

The housing environment is a key setting with impacts on human health. Surveys indicate that New Zealanders spend about 70 percent of their lives in the indoor home environment⁸. Housing factors which contribute significantly to health outcomes include temperature, humidity and ventilation, overcrowding, affordability and fuel poverty.

The World Health Organization has recommended a minimum indoor temperature of 18°C and a 2-3°C warmer minimum temperature for the very young and the very old. Temperatures below 16°C, particularly in the presence of high humidity, are associated with adverse health consequences and temperatures below 12°C are a health risk for vulnerable groups. Cold homes have both direct and indirect effects on health.

Direct effects of cold homes on health include excess mortality (people dying sooner) from cardiovascular and respiratory disease amongst the elderly, increased respiratory problems in children, increased illnesses such as colds and flu, mental health problems and the exacerbation of conditions such as arthritis⁹. During every winter around 1600 more New Zealanders die than in other seasons¹⁰. This excess winter mortality isn't experienced in other OECD countries,

⁷ *Information supplied by Winstone Wallboards*

⁸ *Canterbury District Health Board (2012)*

⁹ *Canterbury District Health Board (2012)*

¹⁰ *Phipps (2007)*

such as Canada or the UK. Cold and damp housing is most probably an important contributing factor in this phenomenon¹¹.

There is a substantial body of research¹² that shows that many New Zealand homes are cold, with temperatures regularly falling below the World Health Organisations' recommendations. Alongside this, home heating, energy costs and fuel poverty are key housing issues with implications for health outcomes in Canterbury¹³.

The 2011 evaluation of the impact of Warm Up New Zealand funding on health outcomes¹⁴ found that retrofitted insulation had a significant impact on reducing mortality, hospitalisation and pharmaceutical costs with a total annual benefit of \$563.

The Otago University Housing, Health and Insulation Study¹⁵ of 1,400 households with respiratory illnesses found improvements to health from ceiling and underfloor insulation included fewer days off school and work, fewer symptoms of wheeze and colds, and fewer hospital admissions. The study calculated a cost-benefit ratio of 2:1.

In its review of health studies on the impact of dampness and mould on occupant health, the World Health Organisation¹⁶ found that:

- There is sufficient evidence for an association between dampness and health outcomes in relation to:
 - Asthma exacerbation
 - Upper respiratory tract symptoms
 - Cough
 - Wheeze
 - Asthma development
 - Dyspnoea
 - Current asthma
 - Respiratory infections

- There is suggested evidence of an association between dampness and health outcomes in relation to:
 - Bronchitis
 - Allergic rhinitis

¹¹ *Davie (2004)*

¹² *e.g. French et al (2006); Howden-Chapman et al (2008); Saville-Smith et al (2010)*

¹³ *Canterbury District Health Board (2012)*

¹⁴ *Telfar Barnard et al (2011)*

¹⁵ *Howden-Chapman et al (2008)*

¹⁶ *World Health Organisation (2009)*

Studies in the United States and Finland¹⁷ attributed 12-29% of the annual costs of asthma alone to mould and dampness in houses – at a cost in the United States of USD\$3.5 billion.

As a result, in its guidelines for indoor dampness and mould, the World Health Organisation¹⁸ recommends that dampness and mould-related problems should be prevented – there is no level of mould that is considered acceptable. They recommend that where dampness and mould occur, they should be remediated and that the focus of design, construction and maintenance of building envelopes needs to be on the prevention and control of excess moisture and microbial growth. The guidelines recognise that management of moisture requires proper control of both temperature and ventilation to avoid excess humidity, condensation on cold surfaces and excess moisture in materials. In New Zealand it is generally recognised that at temperatures of less than 16 degrees and relative humidity levels of greater than 70% mould is likely to occur. Condensation on surfaces will also often occur at higher temperatures. Warm dry surfaces discourage mould growth.

Research undertaken by Beacon prior to the Canterbury earthquakes¹⁹ showed that cold and dampness was a problem in nearly all monitored Christchurch homes. 75% had winter average living room temperatures of less than 18 degrees and 96% had winter average bedroom temperatures of less than 16 degrees. A further 38% had monitored humidity levels of greater than 80% surface humidity (i.e. moisture settled on the internal linings). Indoor temperatures below 18°C will lead to dampness and condensation, which in turn contributes fungi and dustmites, as well as increased susceptibility to infectious disease²⁰.

The Canterbury District Health Board has identified people with Chronic Obstructive Pulmonary Disease (COPD) as being a priority group for interventions aimed at improving housing quality due to the strong link between cold and damp conditions in patient's houses and the need for acute admissions to hospital. Sheerin et al²¹ found that respiratory illnesses were one of the primary “avoidable admissions” and “avoidable mortality” conditions in Christchurch Hospital with respiratory disorders responsible for 9,034 bed days in 2003.

¹⁷ *Fisk and Seppenen (2007); Mudarri and Fisk, (2007)*

¹⁸ *World Health Organisation (2009)*

¹⁹ *Saville Smith et al (2010)*

²⁰ *Phipps (2007)*

²¹ *Sheerin et al (2006)*

6 Fuel poverty is an increasing problem

Fuel poverty is of increasing concern in Canterbury, particularly following the earthquakes where many houses were made more difficult to heat.

McChesney²² found that there is a clustering of multiple fuel poverty characteristics: higher rates of cold homes and under-heating, difficulting with energy bill paying, periods of disconnection and poor heating appliance effectiveness and efficiency. These characteristics link to the multiple clustering effects around health. McChesney estimates that as of 2008:

- 1) 5% of households display symptoms of chronic fuel poverty, with a concentration of adverse factors accompanied by other deprivations.
- 2) Another 10-15% of households display varying levels of energy service deprivation and associated adverse factors and who may be in this situation for some years.
- 3) A further number display low level deprivation and some cold homes issues, but this is most likely a temporary hardship or heating culture issue.

It is groups 2 and 3 in this analysis which are most likely to have increased in numbers and severity of fuel poverty as a result of the Christchurch earthquakes.

McChesney²³ notes that the largest number of at-risk households appears to be those with children; while one-parent families display the highest rate. Other risk factors include living in rental accommodation, being unemployed, and having existing health conditions including disabilities. Maori and Pacific households feature in these higher risk groups.

The general trend in Canterbury has been a move to replace wood burners with heat pumps, in response to air quality issues. This has been further increased through the emergency repairs and heating programme where 18,740²⁴ heating units have been installed in earthquake damaged homes. Almost all of these have been heat pumps, and have replaced open fires and solid fuel burners.

Beacon²⁵ and BRANZ²⁶ research shows that even modest sized fully insulated new houses in Canterbury heated with heat pumps can consume approximately 14,000 kWh electricity per annum. Older homes are inherently less airtight and harder to heat. During the Build Back Smarter project, two of the ten pilot houses had poorly located heat pumps, and undersizing was also a common problem. Both the Warm Up New Zealand and Environment Canterbury Clean Heat programmes have subsidised clean heating devices. The overwhelming majority of these,

²² *McChesney (2012)*

²³ *McChesney (2012)*

²⁴ *EQC Scorecard 10 June 2013. Available online at www.eqc.govt.nz > [Canterbury earthquakes](#) > [Progress and updates](#)*

²⁵ *Easton and Blackmore (2012)*

²⁶ *Fung (2010)*

however, have been heat pumps, including into rental and low income households – substantial fuel switching has therefore occurred from solid fuels.

In parallel with this change to all electric heating, electricity price rises have continued to rise. Between 2002 and 2010 average residential electricity prices rose by 4.7% a year in “real” terms - over and above the general rate of inflation²⁷.

Since 2010, electricity prices have continued to rise. In Christchurch between 2010 and 2013 the price rises ranged between 16% (Genesis) and 38% (Powership) with an average 7.8% per annum electricity price increase across the providers. Table 1 outlines the price increases across the range of electricity suppliers.

Table 1: Comparison of electricity price increases in Christchurch

Power Company	Price Increase 2010-2013	Average Annual Increase
Genesis	16%	5.3%
Contact	17%	5.7%
Trustpower	18%	6.0%
Empower	23%	7.7%
Mercury Energy	31%	10.3%
Powershop	38%	12.7%
Meridian ²⁸	8% since 2011	4%

Source: http://www.powerswitch.org.nz/powerswitch/price_trends/region/62

As heating energy typically consumes at least one third of total household energy, and considering the costs of wood versus electricity, substantial cost increases are being faced by households who have moved from wood as the main heat source to electricity. For those households whose homes previously had wetbacks (a relatively common occurrence in Christchurch), or who were sourcing wood for free, these cost increases are likely to have been very substantial.

The Canterbury District Health Board has also highlighted the risks that affordability and fragility of the electricity system pose to the health of the most vulnerable community members²⁹.

²⁷ www.consumer.org.nz/reports/electricity-prices

²⁸ Prices for Meridian were not available for the same time period as the other electricity providers

²⁹ Canterbury District Health Board (2012)

7 A range of whole of house retrofit features are needed

7.1 Walls need to be insulated

It is well recognised through research³⁰ that retrofitting ceiling and underfloor insulation has substantial benefits in terms of improved occupant health and reduced costs. However, while ceiling and underfloor insulation is a significant improvement on the uninsulated state, partially insulated houses are still cold and inefficient to heat³¹. In particular, research has found that with ceiling and underfloor insulation retrofits, very small energy savings are made³². This is because the occupants choose instead to better heat their homes (“take back”): one of the main reasons why good health benefits arise from ceiling and underfloor insulation retrofit.

Research has also shown however that houses with just ceiling and underfloor insulation, still often have high relative humidity levels and dampness, and are still often colder than World Health Organisation recommended minimum temperatures³³.

Dampness and cold temperatures are strongly implicated in a wide range of health problems, as outlined in Section 5 above.

However, when wall insulation is included in the retrofit, ease of heating substantially increases, energy savings are able to be made and dampness is able to be controlled. In the Beacon Papakowhai research project³⁴, reticulated energy savings of between 23% and 33% were made *at the same time* as temperatures increased to greater than World Health Organisation minimums where full thermal envelope (ceiling + underfloor + wall) insulation retrofits were undertaken.

Table 2: Energy savings from houses with whole house thermal envelope retrofits, Papakowhai Renovation Project

Case Study House	Total (Annual) Reticulated Energy Savings (kWh/year)	Percentage Energy Savings
P03	2480 kWh/year	33%
PO8	4220kWh/year	33%
P10	930 kWh/year	23%

³⁰ *e.g. Telfar Barnard et al (2011)*

³¹ *McChesney and Amitrano (2006)*

³² *Grimes et al (2011); Burgess et al (2009)*

³³ *Easton (2009); McChesney and Amitrano (2006)*

³⁴ *Burgess, et al (2009); Easton (2009)*

7.1.1 Partial wall insulation retrofit is also worthwhile

While in ideal circumstances whole house wall insulation installation is preferable, partial retrofit is still worthwhile. In terms of simple payback, EECa modelling using ACCURATE has shown that the simple cost benefit from an energy savings perspective alone gives a payback of 1.88 years for bedrooms, and 7.72 years for living rooms, in Canterbury when wall insulation is installed at the same time that wall linings are replaced.

Table 3: Results of ACCURATE modelling of wall insulation retrofit at time of earthquake repair

Room	Simple Payback	IRR
Living	7.72 years	15.7%
Bedroom	1.88 years	57%
Kitchen	7.39 years	16.7%
Utility Rooms	8.65 years	14.3%

Assumptions from this modelling were:

- Living room heated to 20°C 7-9am and 5-11pm – with a woodburner (cheapest form of heating)
- Kitchen heated to 18°C 7-9am and 5-11pm – electric heating
- Bedrooms heated to 16°C 5pm-9am – electric heating
- Other utility rooms – no heating

It can be seen in Table 3 above, that considering the average 30 year replacement time for wall linings, even retrofitting wall insulation into bathrooms and laundries is well worthwhile if the wall linings are replaced.

In terms of benefits to the occupants, the benefits of partial wall insulation also accrue in terms of occupant comfort, particularly in locations (such as bedrooms, and living rooms) where people might stay in the same location for long periods of time. Uninsulated wall surfaces will radiate cold temperatures which are felt by the human skin, even when air temperatures are higher due to heating. So an occupant with their bed located next to an uninsulated external wall, will feel the cold surface of the wall radiating cold into the room.

It is generally acknowledged³⁵ that most households in New Zealand, and particularly low income households, do not heat their bedrooms. Positive benefits of insulating one external bedroom wall on the occupant's experience of room temperatures will therefore occur.

³⁵ French et al (2006)

7.2 Removal of moisture is also required

As discussed above, the extensive studies done on the efficacy of retrofitting insulation in New Zealand confirm that this is a cost effective and critically important measure for improving the health of New Zealanders. However, insulation alone will not make a home warm; adequate heating is required in order for healthy temperatures to be reached. As discussed in Section 5, dampness itself is associated with significant health issues, and dampness and temperatures are closely interlinked. A damp house is much harder to heat, and conversely a dry house is much warmer than a damp one.

Research has identified the main sources of moisture and dampness in New Zealand homes as:

- Dampness under floor
- Use of unflued gas heaters
- Indoor clothes drying
- Bathrooms
- Kitchen cooking
- Leaks (e.g. roof, windows).

Installation of ground vapour barriers and installation of extract ventilation in kitchens and bathrooms are well proven measures to address dampness in houses. However, few older homes have these features.

Installation of ground vapour barriers in particular is a common measure which has been included in Warm Up New Zealand and precursor insulation retrofit programmes. BRANZ research³⁶ has found a benefit cost ratio of 2.9 (\$2.9 benefits for every \$1 spent) for ground floor vapour barriers due to the combined health, ease of heating and reduced maintenance cost benefits. However, many houses damaged by the earthquakes have not been the subject of this form of retrofit and in the case of particular typologies (e.g. villas, art deco houses and many 1960s and 1970s constructed dwellings), the ground clearance is normally insufficient to allow a vapour barrier to be retrofitted. The foundation work associated with many repairs provides a unique opportunity for vapour barriers to be installed as houses are raised to enable repairs. Once foundation repairs are completed, it is unlikely that further opportunities *in the life of the building* will be gained to get access to install a ground vapour barrier.

Installation of extract ventilation in kitchens and bathrooms is also strongly linked to the renovation cycle. Where wall and ceiling linings are being replaced, the “30 year opportunity” to address issues which have a cosmetic effect on those rooms occurs. Installation of kitchen and bathroom extract *vented to the outside* is a key intervention which should be considered alongside lining replacement. Benefit cost ratios of 1.9 (kitchen extract ventilation) and 1.3 (bathroom extract ventilation) have been calculated for these measures by BRANZ.

³⁶ Page (2009)

7.3 Adequate heating and heat transfer

As part of earthquake repairs, including emergency repairs, heating systems are being replaced in a large number of houses. This follows on from the Warm Up New Zealand and Clean Heat programmes which have had extensive heater replacement components. In all cases, however, the focus has been in installing heating devices in the main living area. Where solid fuel devices in particular are used, excess heat is often available but is not being transferred to bedrooms. In the pilot homes assessed through Build Back Smarter, heat transfer to bedrooms has been identified as a common practical intervention which should be included at the time of ceiling and wall lining replacement. In addition, it has been noted that, in the pilot homes, poor positioning of heat pumps has been a common problem which is most easily addressed at the same time.

As discussed in Section 5, studies on bedroom temperatures in Christchurch homes pre-earthquakes have identified that the overwhelming majority are inadequately heated. Repositioning heat pumps and installation of heat transfer systems have been identified as key measures which should be undertaken at the time of repair.

8 Priority Build Back Smarter measures

The pilot Build Back Smarter project, with its 10 case study homes, has identified the key areas where retrofit *at the time of repair* is critical. These are the opportunities to improve house performance which if not picked up at time of repair, will be lost for the foreseeable future. Key interventions identified are:

- ceiling insulation retrofit to skillion and low pitched roofs where roofing or ceiling linings are being repaired.
- underfloor insulation and ground vapour barrier installation under normally inaccessible suspended floors where foundation repairs are occurring – often these involve lifting the house creating a unique access opportunity to the underfloor.
- wall insulation retrofit where recladding or wall linings are being replaced.
- increasing specification of windows being repaired/replaced (double glazing, advanced glazing such as low emissivity/argon filled, thermally broken aluminium frames).
- cutting hatches to access “hard to insulate” places – these are common in roof extensions and “popped tops”.
- installing externally vented extract ventilation systems in kitchens and bathrooms.
- installing heat transfer systems where ceilings are being repaired.
- replacing downlights with surface mounted fittings.
- relocating or replacing poorly located/sized/ performing heating systems such as heat pumps and wood burners – it is worth noting that poorly located and sized heat pumps has been a common feature of Build Back Smarter houses.

9 Conclusions

There is a strong case for the implementation of a whole of house retrofit approach alongside the earthquake repair process. The earthquakes have created a once-in-a-generation opportunity to address some of the root causes of poor health and fuel poverty in Canterbury households.

The types of interventions recommended (insulation, heating and ventilation improvements) to improve the quality of Canterbury housing for improved health outcomes strongly align with residential damage being repaired post earthquakes. As a result, the work to upgrade homes is best implemented at the time of repair.

This opportunity to intervene in a region's housing stock has substantial societal benefits: reduced health costs, reduced days off work and school, and improved well-being of the community. However, the capacity of Canterbury residents to be able to take up this once-in-a-generation opportunity is unlikely to be high for either owner occupiers or rental property owners. Therefore, there is a strong rationale for government agencies to play a role in facilitating homeowners to be able to “build back smarter”.

EECA's transformative Warm Up NZ programme raised the awareness of the benefits of warm homes in the minds of many New Zealanders. Building Back Smarter has the potential to be similarly transformative for Canterbury and perhaps other regions. Wide-scale slipstreaming of upgrades at point of repair has the potential to reveal a silver lining in the residential earthquake repair process – get your home back, but better than it was.

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