NZGBC
TE KAUNIHERA HANGANGA TAUTAIAO

Closing the gap

Hidden emissions and untapped potential of buildings to reduce costs and deliver for carbon budgets

May 2024

Toitū te marae a Tāne-Mahuta, toitū te marae a Tangaroa, toitū te tangata

If the land is well and the sea is well, the people will thrive

Forward

Kiwis spend over 90% of their time in buildings either working, playing or at home. They are places where we create memories with friends and family, where we work with our teams and where we enjoy our free time.

This report sets out some simple steps New Zealand can take to make energy use of our buildings transparent. This will enable the construction and property sector to measure the energy efficiency of buildings and homes more accurately.

This is sensible. The more accessible and clear energy use is for New Zealanders, the easier it is for designers, builders, investors, potential owners and others to prioritise buildings that use less energy or reduce carbon emissions.

In NZ we hear too little about the final energy consumption. Buildings and homes use a tremendous amount of energy, particularly at peak times. Reducing this load will make our grid more resilient and free up energy for other uses such as electrifying transport.

We commend the NZGBC for a useful report and encourage you to seriously consider the findings. We are in a climate emergency and steps must be taken. Delivering healthier lower carbon buildings and homes is good for our health, energy system and Aotearoa.

Sam Stubbs
Co founder/Managing Director
Simplicity

More action is urgently needed to achieve New Zealand's emissions targets. The Climate Change Commission's latest advice to the Government estimates that "meeting the second emissions budget will require 20,700 kilotonnes (kt) of emissions reductions in addition to the policies and measures already in place".

The Commission further warns that meeting subsequent carbon budgets will also be challenging without prompt action - "seemingly small delays in the near term can lead to much higher costs and/or emissions over a budget period".[1] Although New Zealand is succeeding in beginning to bring emissions down, the Commission's recommendation to decrease the 2026-30 emissions budget from 305,000kt to 286,000kt highlights the need for more action.

Building and housing policy can play an important part in meeting our goals.

The building and construction sector is responsible for over 15% of New Zealand's greenhouse gas emissions. These emissions consist of:

- gas and electricity used in the operation of buildings
- leakage from refrigerants in heat pumps and air-conditioning systems
- gas and electricity used in the manufacture of building products and materials
- direct carbon emissions from chemical processes involved in the manufacture of steel and concrete

These emissions are only gradually reducing. Without faster emissions reductions from the building sector, New Zealand will not be able to meet its emissions targets.

The Emissions Trading Scheme alone will not effectively drive change in emissions from the sector due to split incentive problems (eg builders make materials choices that affect upfront carbon emissions, house buyers pay for the house and are mainly driven by price) and capital costs of retrofitting existing homes. Other policies are needed to complement and support the ETS.

Government action is needed because industry inertia will otherwise prevent these outcomes from being achieved. The Building Code, for example, creates minimums that are, in practice, the standard that homes are built to. Therefore, to improve building standards, the Building Code must be updated. The retrofit of existing homes implies significant upfront costs that are only recouped through lower operational costs over time and will also require government leadership to make it happen at the scale and pace required.

A set of bold but practical policies to improve the energy efficiency of our buildings can reduce New Zealand's emissions by 6,100kt* between 2026 and 2030, significantly closing the gap between New Zealand's emissions goals and our current path. Emissions savings would continue to accumulate beyond 2030, delivering 93,000kt of savings by 2050, equivalent to taking half of the current petrol car fleet off the road permanently.

Moving quickly to improve the quality of our homes will make it easier to meet our international emissions commitments, saving the country from spending billions on overseas carbon offsets. Reduced energy demand from buildings will lower the cost of switching to 100% renewable electricity, and more energy efficient homes are also healthier to live in, saving on health costs.

New Zealand is bound by international law, enforceable through the new EU Free Trade Agreement, to meet its Nationally Determined Contribution emissions reductions under the Paris Agreement.

If these emissions are not reduced or offset domestically, they will need to be offset by purchasing credits from overseas, at significant cost to the Government. Using Treasury's shadow carbon price model,[2] avoiding 93,000kt of emissions by 2050 would be worth between $19b and $39b. Additional benefits include reduced health costs and lower energy demand, which reduce costs for the electricity network. These benefits outweigh the costs. Many of the recommendations in this paper come at no cost to the Government.

* Emissions savings are rounded to two significant figures

Closing the gap

A summary of the report

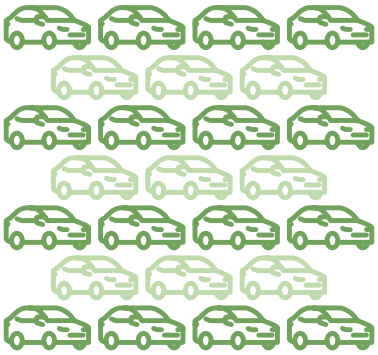
New Zealand is bound by law and trade agreements, to reduce carbon emissions in line with Paris Agreement.

NZ Climate Change Commission warn we are not on track.

> "20,700 kilo tonnes of CO2e of emissions reductions are needed by 2030 to meet the second emissions budget".

This will increase as climate policies (Clean Car Discount, GIDI & others) are rolled back.

Almost a third of those savings can be delivered by the built environment.



This is equal to taking over 600,000 petrol cars off the road for five years.

The policies;

- an improved Building Code
- phasing out gas
- making energy use transparent

will reduce costs for kiwi families and businesses, improve health and go on to save 93,000 kilo tonnes by 2050 (a saving of $19-39bn)*.

OR

...the NZ can pay hundreds of millions to fund other countries to reduce emissions (offsetting).

* Using Treasury's shadow carbon price

Policy recommendations

There are practical, low-cost steps that can be taken quickly to reduce both 'upfront carbon emissions', emissions resulting from the manufacture of building components and construction of the building, and 'operational emissions', emissions from the running of the building – heating, water, electric appliances, etc.

The practical steps include:

- Improving the Building Code to deliver substantially less carbon emissions by 2030 for both homes and commercial buildings. 2,700kt of emissions avoided by 2030 and 42,000kt by 2050. No direct fiscal cost to the Government.
- Phasing out fossil gas in homes and commercial buildings. 2,400kt of emissions avoided by 2030 and 40,000kt by 2050. An estimated cost of $75m a year to the Government.
- Energy labelling of commercial buildings and homes. 920kt of emissions avoided by 2030 and 11,000kt by 2050. No direct fiscal cost to the Government.

In total, these policies, if introduced from 2025, will reduce cumulative emissions by 6,100kt by 2030, helping deliver almost a third of the required savings the Climate Change Commission have set out are needed.

This will also reduce the emissions from housing by a third in the latter part of this decade.

Over time, the emissions benefits of these policies accumulate as more and more homes and commercial buildings built or upgraded to low emissions standards. By 2050, 93,000kt of emissions will be avoided, with savings running at nearly 5,000kt per year.

This report focuses on carbon savings due to the urgent need to reduce these emissions in line with international legal obligations and trade agreements, but there are other important reasons to make these changes, as well.

Transpower's 2020 Te Whakamana I te Mauri Hiko[3] report sets out that demand for electricity is to rise over 70%. Saving energy, as these policy proposals will do, significantly reduces the need for new generation and frees up energy for use for other sectors such as electric vehicles.

Peak load is an issue in New Zealand. We often have a significant demand for electricity in winter months that cannot be met in drier years. Analysis of our energy system[4] shows that this peak in demand is almost completely down to residential space heating. It reflects the poor quality of New Zealand housing stock.

New Zealand homes are often chronically underheated leading to significant health issues.[5] Building to higher standards and retrofitting homes to energy-efficiency standards, as proposed in this paper, can help reduce peak load significantly and so help to reduce many of our health problems.

Note the carbon savings set out in this report are based on in-depth research provided by BRANZ, NABERS, the Climate Change Commission and others. This illustrates the potential impact of these policies. It should not be assumed that the timeframes set out in the report by these experts align exactly with the policy asks of the New Zealand Green Building Council – they are illustrative of the fact that practical and rapid change is possible and would drive significant emissions reductions.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About the New Zealand Green Building Council

The Council is a 700-member organisation comprising construction firms, suppliers, major property owners, banks, and research institutions focused on improving the environmental sustainability of buildings and building methods. We represent the construction industry's expertise on sustainability and, with thorough input from industry experts, design and operate the Green Star, NABERSNZ, and Homestar certification programmes that are the benchmarks for the environmental sustainability of buildings in New Zealand.

New Zealand's 2030 emissions goals

In its *2023 Advice on the direction of policy for the Government's second emissions reduction plan*,[6] the Climate Change Commission found that "meeting the second emissions budget will require 20.7 MtCO2e of emissions reductions in addition to the policies and measures already in place". This significant gap between our targets and our current path is set to widen as climate policies, such as the Clean Car Discount, GIDI, and Warmer Kiwi Homes, are rolled back and exploration for oil and gas resumes.

New Zealand is bound by international law, enforceable through the new EU FTA, to meet its Nationally Determined Contribution emissions reductions under the Paris Agreement. The Climate Change Commission estimates that, even if New Zealand achieves its first and second emissions budgets, it will need to buy 99,000kt of carbon credits from overseas, at a cost in the billions of dollars. If the second emissions budget is not achieved, as the Climate Change Commission warns will be the case on our current track, the cost will grow.

Much more aggressive policies are going to be needed to close the gap between New Zealand's commitments and its actual emissions.

The property and construction sectors are significant sources of emissions, with big opportunities for emissions reductions.

Recent analysis by BRANZ[7] shows that residential housing alone will generate 55,000-60,000kt of emissions over the decade under BAU policy settings, with research undertaken by Thinkstep estimating that commercial building is contributing a similar amount. In other words, buildings are set to emit 20% of New Zealand's emissions budget. If buildings do not make significant reductions in their emissions, the sectors will be required to make unrealistic emissions cuts to achieve our 2030 commitment.

Reducing building emissions by 6,100kt by 2030 through practical steps and proven technology will get New Zealand closer to achieving our emissions commitment and reduce the cost of going over budget.

Context

A) Emissions from Buildings – operational and embodied

A high proportion, approximately 50% in New Zealand of a building's lifetime emissions are embodied emissions, created during the manufacture of building components from materials including concrete and steel, and the breakdown of construction waste (which accounts for half of all waste generated here).[8]

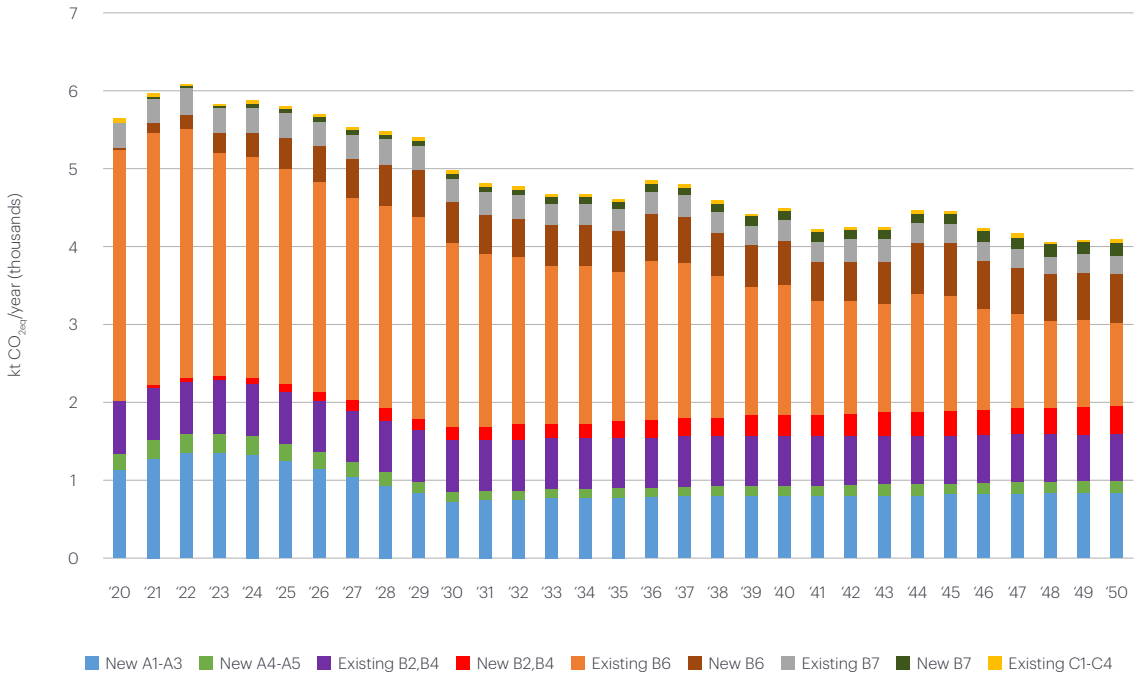
Operational emissions take place over a much longer time, but New Zealand's high proportion of renewable generation for electricity means that, unless the building directly uses fossil fuels (such as reticulated fossil gas) for space and water heating, operational emissions are lower than from buildings in other countries. However, there are still significant emissions from these sources. In total, most emissions come from existing buildings, not from construction, because the number of existing buildings far exceeds the build rate – for example, the number of homes (two million) is 50 times the annual build rate (40,000).

To achieve significant emissions reductions from buildings, both operational and embodied emissions, need to be reduced. Upfront carbon emissions can be reduced quickly by changing building practices for new builds, while operational emissions reduce more slowly as existing homes are retrofitted and the proportion of renewables in electricity generation grows.

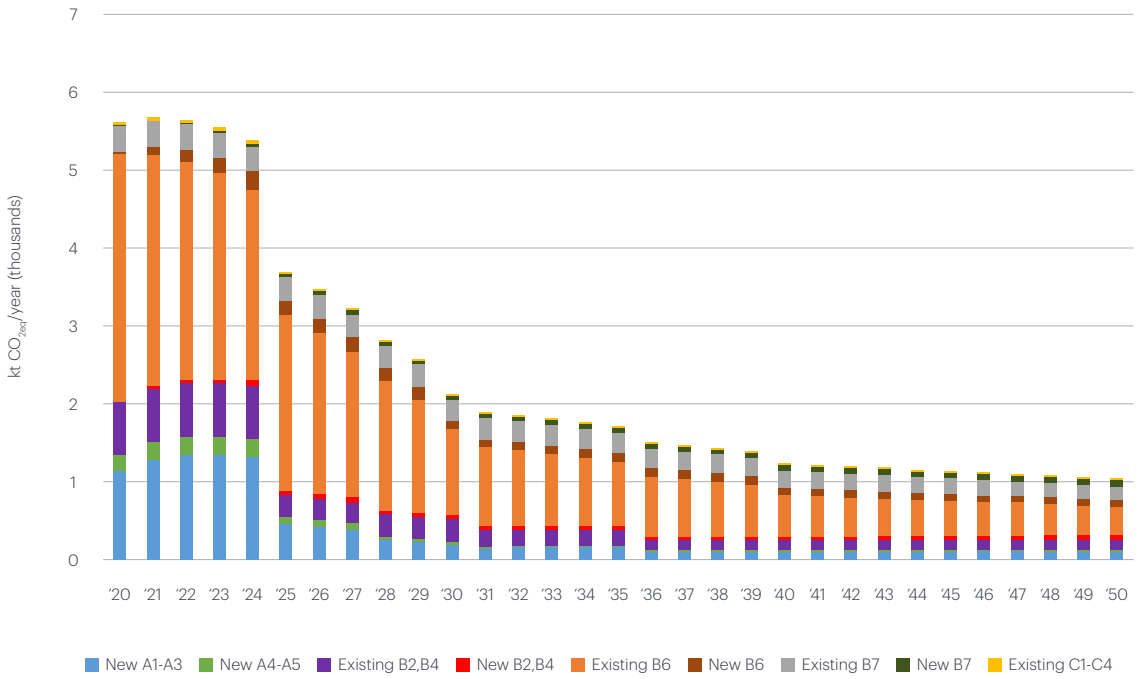
BRANZ's Housing stock strategies responding to New Zealand's 2050 carbon target report shows that rapid decarbonisation of buildings is possible with steps to reduce both operational and embodied emissions. In the period from 2025 to 2030, the bulk of emission reductions that can be made are by reducing embodied emissions.

Its modelling shows a step change emissions reduction from upfront carbon emissions resulting from reducing the average upfront carbon emissions per square metre in a new home to 84kg in 2025-2030, 60kg in 2031-35, and 40kg in 2036-50 – based on NZGBC's Homestar rating system. This is accompanied by a gradual reduction in operational emissions from new builds, from 1.08kg per square metre in 2025-30, to 0.81kg in 2031-35, and 0.54kg in 2036-50.

Annual Carbon Footprint by Module and Age
(BAU scenario)



Annual Carbon Footprint by Module and Age
(EMERGENCY PLUS scenario)



BRANZ's 'Emergency Plus' scenario, which comprises practical, low-cost policy changes (but under a different timetable than proposed in this paper), would see residential buildings' emissions fall sharply, making New Zealand's 2030 target much more achievable, with less reliance on international credits.

B) Climate Change Commission recommendations on buildings

The Climate Change Commission's newly released advice to the Government sets out a clear case for achieving greater emissions reductions from the built sector. The following paragraphs are directly from the Climate Change Commissions advice. The bolded sections show where the Climate Change Commission recommendations align with the policies set out in this paper.

> "While emissions from the operational energy use of buildings account for about 4% of long-lived greenhouse emissions, they are estimated to account for about 20% of total greenhouse gas emissions through a consumption-based accounting lens. **The Government's Building for Climate Change programme has started the process of addressing operational and embodied emissions from new builds. It is essential to deliver on this commitment to high quality new builds.** However, much work remains to achieve the same with the existing building stock.
>
> Heat pumps have rapidly reduced in cost, a trend which is projected to continue. Over their lifetime, heat pumps can save consumers money as they are more energy efficient than gas heaters. **Coupling heat pump installation with better insulation, improved weathertightness, and adequate ventilation will immediately reduce the amount of energy required to heat or cool a home to the same temperature.**
>
> Reducing electricity demand through building thermal performance improvements can also reduce the pressure to build new generation assets and network infrastructure. Transpower estimates peak demand could increase from 7.3 GW in 2020 to 8.9 GW by 2035 and 10 GW by 2050. Network planning, innovative pricing approaches, and demand-side measures could further help to minimise peak demand growth.
>
> Initiatives to inform and educate consumers on how to identify energy efficient options and use and/ or enforcement of minimum energy performance standards and mandatory energy performance labelling can address some of these barriers. **Delivering on the commitment to introduce mandatory energy performance certificates for certain building types,** and ensuring compliance with and enforcement of the Healthy Homes Standard, **also remain important.**
>
> Targeted support may be required to address barriers for lower income households and small businesses with limited financial resources and information, as well as for renters, who have less autonomy. With initiatives underway to develop options to provide specialist advice, grants to support households, and options to expand eligibility under the Warmer Kiwi Homes programme, it may be possible to implement support by the start of the second emissions budget period or earlier.

Embodied carbon can increasingly be addressed

Embodied carbon will increasingly need to be measured, reported, and addressed during the second emissions budget period. The Ministry of Business, Innovation and Employment's Building for Climate Change programme has proposed whole-of-life embodied carbon reporting requirements for new buildings from 2025. Embodied carbon caps in new buildings are proposed to be phased down from 2026. Emissions reduction policy measures for embodied carbon emissions in existing buildings are set to be developed in 2030.

Increasing use of timber products in buildings can reduce embodied emissions

Engineered wood products (EWPs) such as laminated veneer lumber, glulam, and cross-laminated timber can displace some steel and concrete used in building construction. Increasing use of EWPs may require a corresponding increase in domestic consumption of logs. This could be an opportunity to diversify the forestry and wood processing sector as part of an emerging bioeconomy.[6]

C) International recommendations for action

The International Energy Agency has recently released a comprehensive analysis of the improvements needed to keep to the target of limiting global warming to 1.5 degrees: *Net Zero Roadmap: A Global Pathway to Keep the 1.5 °C Goal in Reach*.[9]

They found that, to achieve the 1.5 goal, it is necessary that "2.5% of buildings in advanced economies are retrofitted each year from 2030 onwards and all new buildings are zero-carbon-ready". While homes are retrofitted every year, few are being given the deep retrofits needed to achieve near zero energy standards, which result in meaningful emissions savings:

> Buildings in advanced economies have relatively long lifetimes, about 80 years on average. Over 90% of the buildings that will be in use in these countries in 2030 have already been built.... Making buildings zero-carbon-ready means that existing buildings need to undergo deep retrofits and that new buildings need to meet very stringent standards and be equipped with technologies that will be fully decarbonised by 2050....
>
> In the past decade, between 2-14% of buildings a year in at least some advanced economies have undergone some kind of a retrofit, but fewer than 1.5% of buildings have been retrofitted sufficiently each year to lower energy demand by 30% or more (Figure 3.10). Achieving bigger energy savings from each retrofit will require consistent and robust policy support from governments.

In its *New Zealand 2023, Energy Policy Review*,[10] the IEA suggests specific policies for reducing emissions from buildings:

- In co-ordination with the buildings sector, quickly advance updates to building codes to align with international best practices
- Consider a mandatory energy ratings programme for residential buildings
- Building off the success of the Warmer Kiwi Homes programme, expand energy efficiency programmes to benefit the wider stock of existing buildings, especially to promote deep retrofits that yield greater energy savings

The recommendations in this report build off these recommendations from the IEA, with specific dates and numbers, and estimates of emissions savings.

D) Catching up to the rest of the world

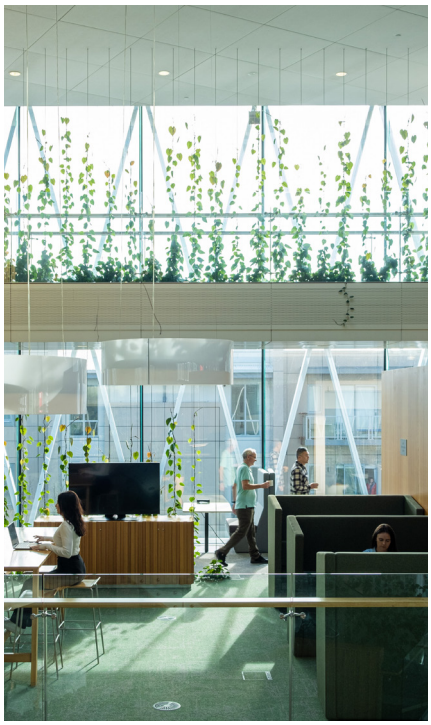
New Zealand is some way behind most first world countries. The European Union has required new buildings to predict and limit operational carbon emissions since 2006 and has recently published proposals to include embodied emissions in the requirements.[11] This is similar to policy option one laid out in this report.

The UK, although now out of the EU, has continued with the same approach having recently published proposals to further tighten emissions reduction requirements in new homes in 2021. The UK code already includes much tougher requirements around ventilation and overheating than the NZ Building Code.

The Australian National Construction Code was updated in 2022 to require a whole of home energy assessment in a similar manner.[12] All the of Australian States and Territories have either adopted or are in the process of adopting the standard.

The following countries have energy labelling requirements for buildings similar to policy option two in this paper: Austria, Australia, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania Slovakia, Slovenia, Spain, Sweden, and the United Kingdom.

There is a question as to why New Zealanders are not able to gain the health and cost of living benefits that much of the citizens of the OECD have.



Practical steps that can be taken to reduce emissions and lower costs for Kiwis

1) Aligning the Building Code with the Zero Carbon Act

The ETS alone has a relatively low impact on building practices. Decisions on building materials, design, and typology are made by developers while the costs are borne by the purchasers of the new homes and buildings. Costs arising from the ETS at the point of manufacture of materials like concrete are likely to be a small portion of the build cost of a home or other building that is not necessarily readily apparent to builders, and a low priority for builders to minimise. Furthermore, low emissions construction can add to the cost of construction and mean adopting new materials and practices that the often-conservative building industry is slow to adopt.

Building practice tend to treat the Building Code as the standard, not as a bare minimum. Extensive experience has shown that improving the Building Code is the best way to drive change in how buildings are constructed.

The Building Code can be modernised to require both low embedded emissions and low operational emissions. The Building for Climate Change programme envisages moving towards a near zero emissions standard for new homes in three steps.[13]

In the EU, building to a near zero energy standard has been mandatory since 2021, with a proposal now being discussed to enhance this to a near zero emissions standard by 2030.[14] The Council's Homestar system already lays out the requirements for homes to achieve these outcomes in New Zealand.

Embodied emissions per square metre in new buildings and homes can be reduced through use of low-carbon materials, smart design, and waste reduction and recycling.

Hundreds of buildings are already measuring and reducing carbon emissions through the use of green building rating tools. Tens of thousands of homes are doing the same.

Actions to help achieve the second emissions budget

There is no reason New Zealand could not also move to a near zero emissions standard for buildings in the 2030s. Ensuring our buildings and construction sector aligns with the zero carbon act requires the following improvements to the building code.

2025 Measuring operational and upfront carbon emissions at consenting stage

2028 20% reduction in both upfront and operational emissions in 2028

2030 40% reduction in upfront carbon emissions and near zero energy in operation

2034 60% reduction in upfront carbon emissions and near zero energy in operation

These targets are in line with World Green Building Council reductions.

To help inform buyers, an estimate of the lifecycle emissions of new buildings should be required as part of a building consent from 2025. This is not a novel proposal globally. The EU, the UK and Australia have all had similar requirements for some time, in the case of the EU for decades. This is the key first step this Government could take. The sector is supportive. It helps provide useful data and benchmarking for the sector. It also encourage designers to consider elements that can improve the health and energy efficiency of buildings such as reducing overheating risks a significant issue for new build homes.

With stepped reduction from 2028, by 2030 over 1,400kt of emissions would be avoided from new residential housing compared to business as usual. This would rise to 22,000kt by 2050.[15]

The 2019 report *The carbon footprint of New Zealand's built environment: Hotspot or not?* by Thinkstep estimates upfront carbon emissions from non-residential construction are 1,600kt per annum. While not all non-residential construction is amenable to readily available low-carbon alternatives in the short-term (supply of low-carbon concrete and steel is still low), reductions of 20% from 2028 and 40% from 2030 are practical, saving 1,300kt by 2030, growing to 20,000kt by 2050.[16] Indeed many sectors are making significant strides to reduce emissions. Aotearoa New Zealand's concrete industry have set a pathway to 44% less embodied carbon from concrete by 2030.[17]

This policy would not carry a direct fiscal cost for the Government.

Policy actions required

- Phased improvement of the Building Code to reduce emissions from residential and commercial buildings, avoiding 2,700kt of emissions by 2030 and 42,000kt of emissions by 2050.

2) Using information to drive uptake of energy efficient/low emissions options

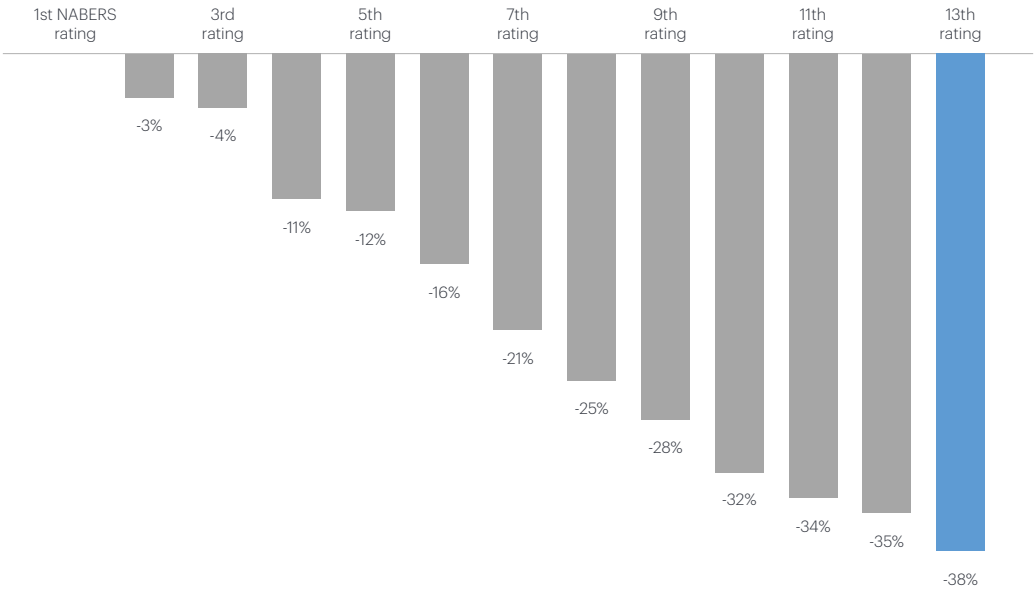
Market preferences for homes and buildings that are cheaper to operate and create less pollution can be a driver of energy efficient, low emissions building options and heating technology. But these preferences can only be realised if the market has information. Energy Performance Certificates (EPC) are a proven tool for increasing buyers and lessees'/ renters' awareness of the energy efficiency of homes and buildings they are considering. They help markets to function more efficiently.

Similar to energy efficiency labels for vehicles and appliances, they provide prospective buyers and lessees/renters with information on how well insulated and expensive to heat a home or building is. Information drives behaviour change by making potential buyers and renters more aware of the energy costs they will face in a home and more discerning on this point. In turn, this encourages sellers and potential future sellers to take opportunities to upgrade their homes.

In the EU, all homes and larger buildings that are offered for sale or rent must have an EPC and be rated on an A-G scale. Low rating homes are legally barred from being offered for rent. A UK study of EPCs showed that, if dwellings moved from their assessed EPC rating to their potential rating (eg, a house that rates D being retrofitted to its highest potential rating of B), total dwelling emissions would fall by 47%.[18]

In Australia, commercial buildings over 1,000sqm are required to have a NABERS energy and environmental rating certificate. Since NABERS became mandatory in 2010, average energy used per square metre has reduced 33%. The following image shows the reductions office buildings achieve on average after each rating. It shows that over time significant savings are made, reducing costs for the businesses in those buildings.

Energy savings in office building over time - Office
Over 3580 offices rates



It was the mandatory programme, called the Commercial Buildings Disclosure programme that has driven change. Over the life of the programme, rated buildings have saved AUD$1.7b on their energy bills and 11.7MT of emissions.

In New Zealand, all government offices above 2,000m² must have a NABERSNZ base build rating by December 2025. A tenancy rating is also required when a building is at or above 5,000m². Agencies entering a new lease or renewing an existing lease should achieve a minimum of four stars, while government agencies planning a new build project need to achieve a minimum rating of five stars.

Actions to help achieve the future carbon budgets

From 2028, require all residential homes put up for sale or rent to have an approved EPC, showing how energy efficient they are and the main drivers of energy use. Overseas experience shows that EPCs drive consumer preferences and enable banks and councils to develop policies that incentivise energy efficiency. We conservatively estimate this would lead to a doubling of the average annual per house reduction in operational emissions from 1% to 2%, saving 120kt by 2030, rising to 5,300kt by 2050.

From 2026, introduce a requirement for all office buildings over 1,000sqm to have a NABERSNZ certificate. In Australia, average energy savings of 42% have been realised over time through NABERS. Similar results would be achieved more quickly in New Zealand with the now-widespread availability of energy-efficient technology. By 2030, emission savings would be approximately 800kt, growing to 5,300kt by 2050.[20] The Benefit Cost Ratio of an energy performance certificate scheme for office buildings in New Zealand was found to be 1.7.[21] For every one dollar invested one dollar seventy cents would be returned.

These policies would not create direct costs for the Government.

Policy actions required

- Require all homes put up for sale or rent to have an EPC by 2028 and all office buildings over 1,000sqm put up for sale or lease to have a NABERSNZ certificate from 2026. Saving 920kt by 2030 and 11,000kt by 2050.

3) Electrification of heating

Fossil fuels for space and water heating are a major contributor to the operational emissions of buildings. According to the Climate Change Commission, heating residential homes with fossil fuels directly is creating 740kt of emissions a year in 2023 and this is projected to rise to 780kt by 2030, while commercial buildings emit 1,090kt in 2023 from heating, projected to fall marginally to 1,070kt in 2030.[6]

There are no technical barriers to replacing fossil fuel use for heating in buildings with heat pumps. While the electricity required for additional heat pumps carries an emissions cost, it is only about a ninth of the emissions per unit of heating delivered compared to fossil gas, due to heat pumps' high energy efficiency and the low emissions intensity of electricity.

However, the upfront capital cost is a barrier, despite the savings in operational costs to be made over time. While fossil fuels are subject to the ETS, the price impact is relatively small and often goes unnoticed by consumers. Given the long-time frame for the benefits to be realised against the immediate costs, the price signal from the ETS alone is likely to be insufficient to drive a significant number of retrofits.

As well as reduced emissions, heat pumps lower operating costs for homes, enabling occupants to keep homes warmer and improve health of the occupants, which flows through to savings in the health sector.

The Warmer Kiwi Home programme is paying for 80% of the cost of installing heat pumps, in a narrow range eligible homes that don't have existing heating like fossil gas. This programme is of limited scope and expires in 2027.

An additional problem with the continued use of fossil gas for heating is dwindling supply. Net production peaked in 2014 and has declined 28%, with no net fields coming into production since 2010.[23] Known reserves are in steep decline, with less than a decades' worth left.[24]

However, despite the clear benefits of electric heating over fossil gas, new homes continue to be built with gas connections. This needs to end to prevent locking in future emissions.

Actions to help achieve the future carbon budgets

Expand the Warmer Kiwi Homes programme to subsidise electrification of home heating from 2027, converting 25,000 homes a year. This will save 630kt of emissions by 2027, and 13,000kt by 2050.

End new residential fossil gas connections from 2026. This will save 190kt by 2030, growing to 4,100kt by 2050.[26]

A concerted programme, building on the successful replacement of coal boilers in schools and hospitals, to subsidise 10% of commercial buildings per year from 2026 to electrify would save 1,600kt by 2030, and 22,000kt by 2050.[27] It is estimated that such a programme would cost $75m a year.[28]

Policy actions required

- Phase out of fossil gas in homes and commercial buildings, avoiding 2,400kt of emissions by 2030 and 40,000kt of emissions by 2050.

Note on deep retrofit programme

Deep retrofits involve taking existing homes and improving their thermal envelope (insulation, double-glazing, weathertightness) to a near zero emissions standard, as well as replacing any fossil fuel or inefficient electric heating with efficient heat pumps.

Deep retrofit requires investment up front but generates long-term savings by decreasing the operating emissions and electricity use from housing, as well as extending the useable life of houses.

As the electricity system is moving towards fully renewable over time as well, the emissions savings from reduced electricity use in homes reduce over time, but the reduced electricity demand makes it easier for other sectors to electrify with reduced cost. As well as emissions reductions and electricity savings, deep retrofit creates health benefits for families living in the upgraded homes, which flows through to savings in the health sector.

European countries are rolling out deep retrofit programmes as part of their decarbonisation efforts. The Homes We Deserve campaign in New Zealand is proposing a similar programme here, calling for "a fully funded ambitious plan to roll out a pollution-busting home reno programme for at least 200,000 homes within nine years which will:

- Slash carbon emissions and household bills
- Improve the health of thousands of New Zealanders, young and old
- Create tens of thousands of jobs"[22]

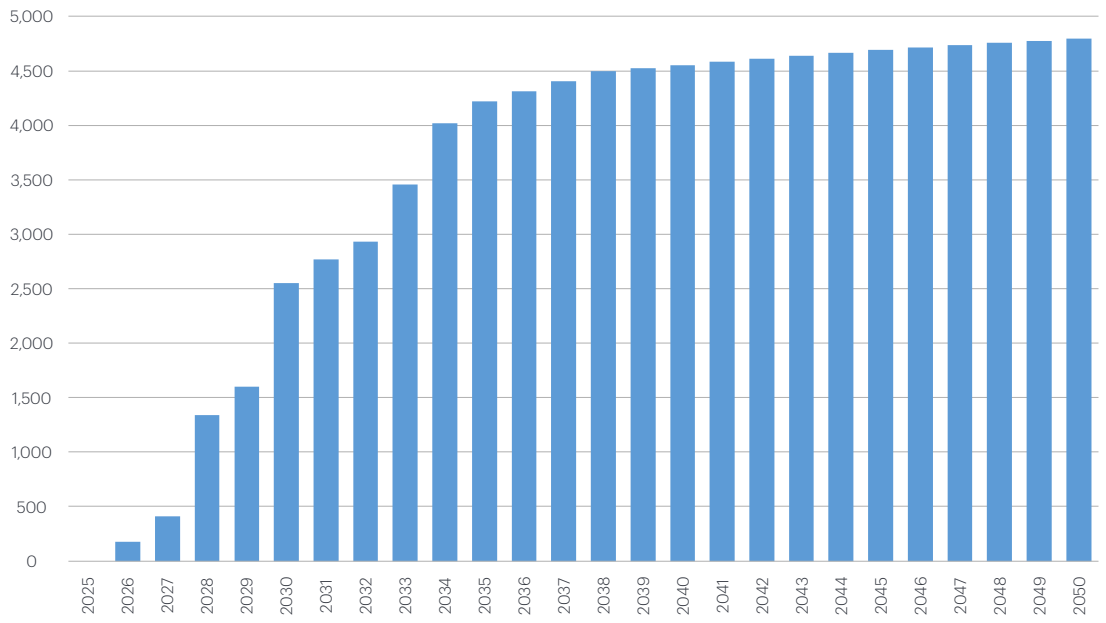
The campaign has the backing of 170 organisations.

Deep retrofit is an important component of the long-term adaptation of the building stock to a low-emissions economy. However, because the benefits of a deep retrofit programme are felt over the following decades, rather than in the immediate period to 2030 that this report is examining, while the costs are upfront, including an analysis of the impacts of a deep retrofit programme out to 2030 would present an unfair picture of the programme's benefits compared to its costs. Therefore, we have not undertaken that analysis for this report.

Ongoing emissions reductions

While this report focuses on the immediate need for policies to create emissions savings of measures to 2030, the policies set out in this report will also yield significant savings for subsequent emissions budgets, and those savings will accumulate to higher annual levels as more and more buildings are built to modern standard or improved.

Estimated annual emissions savings, kilotonnes



When the Building Code is improved this helps enable further future improvements to the Building Code in later years. BRANZ research shows that further improvements to the Building Code, built off the base of policies in this report, will yield millions of tonnes of additional savings for future emissions budgets. Delaying the initial steps will make meeting emissions budgets harder and more expensive.

In 2022, BERL found that that moving to lower carbon buildings standards more rapidly stands to benefit New Zealand's GDP by $147bn and deliver over 1.2 million additional FTE years.[29] It would also reduce the expected electricity demand from new build houses and offices by over 8,000gWh by 2050.

Electrification of both residential and commercial buildings realises compounding emissions reductions over time as more and more buildings convert, each making emissions savings in every subsequent year. The earlier the shift is made, the earlier these compounding benefits take effect.

The energy performance certificate policy set out in this report will yield significant savings in subsequent emissions budgets. The regime in Australia started with offices. NABERS is now used on hotels, warehouses, shopping centres, data centres and many more building types. The regime has extended to waste and water efficiency improving resilience and reducing waste to landfills and has delivered $1.7bn of savings for Australian businesses. The earlier we start here the more effectively we can shift the market and deliver millions of dollars of energy savings for New Zealand businesses.

Offsets may seem like a get-out-of-jail-free card. We can just pay another country to offset rather than reducing our emissions. This is a fallacy. Making greater strides to reduce emissions domestically means we set our selves up for even lower emissions in the future. Reducing emissions domestically also delivers co benefits such as lower living costs and improved health.

Offsetting is likely to mean we will need to offset again for future emissions budgets, meaning a large additional cost. Offsets also go against the grain of the international agreements New Zealand has committed to, and they encourage other countries to also not make domestic reductions.

Finally, Treasury states the costs are a significant fiscal risk. The Climate Economic and Fiscal Assessment 2023 report states that our existing offset commitment is "significant fiscal risk" which will absorb 4 - 28% of all new operating expenditure in the next seven government budgets.[30]

Everything points to reducing domestic emissions as being least risk and most cost-effective policy.

New Zealand's emissions budgets are designed to become ever stricter in the future. Greater carbon savings are required. The national grid is going to be under more pressure. Implementing these policies over the next few years sets New Zealand up in the best way to achieve these subsequent targets and significantly reduces future offset costs.

Conclusion

Under the proposed policies, all of which use proven technology and are in place in other countries in some form, substantial improvements can be made to the homes and buildings of New Zealand.

In total, these policies are estimated to reduce emissions by 6,100kt between 2026 and 2030. They go on to make millions of tonnes of emissions reductions post 2030 where emissions budgets are stricter, with a total of 93,000kt of emissions avoided by 2050.

We have a choice. If we act now more families can live in healthier homes with lower running costs and reduced emissions. Businesses can have lower operating costs. Or we can delay, increasing costs to the taxpayer and missing out on these dividends.

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