MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

# COVERSHEET

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| **Minister** | Hon Dr Megan Woods | **Portfolio** | Building and Construction |
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| **List of documents that have been proactively released** | | |
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| September 2022 | Proposed Building for Climate Change Amendments to the Building Act 2004 | Office of the Minister for Building and Construction |
| September 2022 | Appendix One: Regulatory Impact Statement – Proposed Building for Climate Change Amendments to the Building Act 2004 | Office of the Minister for Building and Construction |
| September 2022 | Appendix Two: Cost Benefit Analysis - Proposed Building for Climate Change Amendments to the Building Act 2004 | Office of the Minister for Building and Construction |
| 14 September 2022 | DEV-22-MIN-0216 Minute: Building for Climate Change – Proposed Amendments to the Building Act 2004 | Cabinet Office |

**Information redacted** **NO**

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**In Confidence**

Office of the Minister for Building and Construction

Chair, Cabinet Economic Development Committee

# Proposed Building for Climate Change Amendments to the Building Act 2004

## Proposal

1 This paper seeks Cabinet's agreement to policy proposals that set the legislative framework needed to reduce the building and construction sector's emissions and support the construction of more climate resilient buildings.

## Relation to government priorities

2 The proposals in this paper support:

2.1 The Climate Change Response (Zero Carbon) Amendment Act 2019 (the Zero Carbon Act) which requires all sectors of the economy to contribute to New Zealand reducing net emissions of all greenhouse gases, except biogenic methane, to zero by 2050;

2.2 New Zealand's first Emissions Reduction Plan (ERP), published in May 2022; and

2.3 New Zealand's first National Adaptation Plan (NAP), published in August 2022.

## Executive Summary

3 It is crucial that we decarbonise the building and construction sector if we are to meet New Zealand's emissions reduction goals. The sector generates direct emissions and is a key driver of emissions in the energy, industry and waste sectors. The sector was responsible for around 15 per cent of New Zealand's domestic emissions (excluding biogenic methane) in 2018.[1]

4 Good work is underway to reduce emissions under the existing legislative framework. Some examples include Kāinga Ora's Waste Minimisation Programme and the development of innovative, low-emissions construction materials and processes that are increasingly being used across the sector.

5 However, legislative change to the Building Act 2004 (the Act) is needed to enable Government and the sector to go further to reduce the sector's emissions and to enact key building and construction actions of the ERP.

[1] These figures reflect a whole-of-life 'consumption' approach that includes emissions accounted for in other sectors but for which building and construction is responsible (e.g. emissions from energy used in buildings and emissions from the manufacture of building materials). It also includes emissions related to imported goods but excludes exported goods.

6 I am seeking Cabinet decisions on a proposed package of changes to the Act that will:

6.1 require owners of certain buildings specified in regulation to hold and display a current energy performance rating (I intend these buildings to be new and existing commercial, public, industrial and large-scale residential buildings), which will enable better energy performance and reduce energy costs from across our existing building stock (progressing ERP Action 12.3.2)[2];

6.2 require building owners to provide a Waste Minimisation Plan to the relevant territorial authority when building or demolishing buildings, which will minimise construction and demolition waste going to landfill and contribute to the development of a more circular economy for New Zealand (progressing ERP Action 12.1.3);

6.3 clarify that one of the Act's purposes is to ensure the building system supports buildings to be designed, constructed and deconstructed in ways that contribute to emissions reduction, climate resilience and adaption, which is in line New Zealand's domestic climate change goals (progressing ERP Action 12.5.5);

6.4 introduce new climate change related principles to the Act and reorganise existing principles so they are interpreted in the context of emissions reduction, resilience and adaptation to the future climate (progressing ERP Action 12.5.5 and supporting NAP Action 7.4);

6.5 clarify that regulations can be made to set limits for carbon emissions of buildings (supporting ERP Actions 12.1.1 and 12.3.1);

6.6 enable the chief executive of the Ministry of Business, Innovation and Employment (MBIE) to collect information necessary to support emissions reduction and improving the resilience of buildings in adapting to the future climate, and enable consumers to assess and compare the embodied carbon, operational efficiency and climate resilience of buildings (supporting ERP Action 12.5.2); and

6.7 introduce offences and penalties for non-compliance with the new requirements.

7 Many of these proposals have been consulted on by the Climate Change Commission and during ERP consultation and have been informed by further targeted stakeholder engagement. Stakeholders broadly support these proposals.

8 In addition to helping to decarbonise the building and construction sector, this package of proposals will directly benefit building occupants and owners. For example, the proposed energy performance rating measures have strong potential to reduce people's energy bills, while the proposed waste measures

[2] Energy performance ratings also specifically rate carbon emissions, to differentiate between the efficient use of both renewable and fossil fuels.

could reduce construction costs and encourage more efficient practices and supply chain resilience.

9 Most of these proposals will require the development of regulations before they are implemented. The development of regulations will enable detailed consideration of potential trade-offs between up-front costs for consumers and the building industry, and long-term emissions, wellbeing, and productivity benefits.

10 To provide certainty and sufficient time for the sector to adjust, and to ensure that regulations are well aligned with the Government's goals, I propose that any regulatory requirements will not come into force before mid-2024.

## Background

11 The first ERP, published in May 2022, outlines that Government and the sector must strengthen our focus on reducing the embodied carbon of buildings and improving building energy efficiency to realise the scale of change that is required.

12 To this end, in April 2022 the former Minister for Building and Construction was invited to report back to Cabinet to seek policy decisions on the Building (Climate Change Response) Amendment Bill. This will seek to introduce enabling legislation and new regulation-making powers to the Act that are required to enable the building system to better respond to climate change [CAB-22-MIN-0080.01 refers].

## Wider context for change

13 I intend these proposed amendments to be a tangible set of actions to reduce the building and construction sector's emissions. Early analysis of the waste minimisation and energy performance rating proposals indicate that, when fully implemented, they could reduce emissions caused by the building and construction sector by 12.6 mega tonnes of carbon dioxide equivalent (Mt CO2-e) by 2050, or 0.465 Mt CO2-e per year.[3]

14 The proposed legislative amendments in this paper reinforce my broader building legislative reform programme, in particular the building consenting system review. It also aligns with broader work across Government including:

14.1 government's long term adaptation strategy as outlined in the NAP, which has a focus on embedding climate resilience across government strategies and policies;

14.2 system-wide initiatives in the ERP to reduce emissions in the energy and waste sectors and to support an equitable transition, such as the development of an energy strategy, a circular economy and bioeconomy strategy, and an equitable transition strategy;

[3] This analysis should be considered indicative as it makes assumptions about the proposals' scope and operational arrangements, which are intended to be set through subsequent regulations following stakeholder engagement and further analysis.

14.3 the Ministry for the Environment's work to develop a new national strategy and legislation regarding waste; and

14.4 the introduction of the Government Policy Statement on Housing and Urban Development.[4]

15 Longer-term work in the Building for Climate Change programme will consider possible Building Code amendments to lift operational efficiency and reduce embodied carbon in new buildings. This would be a significant change for the building system, but could drive progressive improvements in building performance, realise opportunities to create warmer, drier and more accessible buildings and generate efficiencies and cost savings for building users.

16 Developing the proposed Building Code changes will require robust consideration of costs and benefits, alongside implications for Government's housing affordability, urban development, and transport goals to ensure there are no perverse outcomes. I will be seeking Cabinet agreement to consult on these longer-term Building Code amendments in due course.

17 I am aware that the building and construction sector is currently facing both short-term and persistent challenges due to factors such as material supply, productivity, and workforce constraints. I am working with the sector to understand and address these, and they do not reduce my focus on reducing the sector's emissions and addressing the impacts of climate change.

**Supporting better energy performance of new and existing commercial, public, industrial, and large-scale residential buildings**

18 Early modelling suggests that around two-thirds of the buildings that will be in New Zealand in 2050 have already been built today. Improving the energy efficiency of our overall building stock will help us achieve our emissions reduction goals, and support our broader work to ensure all New Zealanders have a warm, dry place to live or work in.

19 Better information provision and more transparency across the sector is a vital first step to lift the energy efficiency of existing buildings:

19.1 Tenants and building owners currently have limited information about the energy performance of buildings, making it difficult to understand or compare the energy efficiency or running costs of buildings they may wish to rent or buy.

19.2 Building owners have limited incentive to invest in energy efficiency features or retrofits such as insulation, efficient building services, or

[4] The Government Policy Statement on Housing and Urban Development signals that homes should be stable, affordable, healthy and of a high quality, accessible, environmentally sustainable and energy efficient. It also signals that government will ensure that building and construction practices result in energy efficient buildings constructed from products with low levels of embodied carbon and with low levels of waste, and continue to incentivise the minimisation of construction and demolition waste.

low-carbon designs or materials beyond minimum Building Code performance requirements.

19.3 Government has limited understanding of buildings' energy use at a system level. This constrains our ability to target initiatives or set requirements for buildings that are major energy users.

20 Many overseas jurisdictions have mandated building energy performance programmes to address this information gap and support progressive, market-based improvements in buildings' energy efficiency. For example:

20.1 the United Kingdom has had mandatory Energy Performance Certificates since 2008 for most buildings sold or rented;

20.2 the European Union has had energy performance measurement and minimum energy performance requirements for buildings since 2010; and

20.3 Australia has had the Commercial Building Disclosure programme which requires energy efficiency information to be provided when commercial office space is offered for sale or lease since 2010.

21 The New Zealand government has taken a leadership approach to influencing energy efficiency in the commercial office market. As part of the Carbon Neutral Government Programme from January 2021 government agencies with large owned or leased office accommodation to undertake an energy efficiency assessment at the next opportunity (such as a lease renewal).[5] These buildings must achieve a minimum performance rating.

*Introducing a building energy performance rating scheme*

22 To address the information gap and unlock potential emissions reductions that other jurisdictions are already realising, I propose to require certain buildings to have their energy efficiency assessed, and to hold an energy performance rating. This progresses ERP Action 12.3.2.

23 Building energy ratings can incentivise building owners to invest in improvements to their buildings' energy usage, as a higher rating potentially provides increased value or improved rentability. Ratings can enable building owners to benchmark their building's performance against others and support prospective tenants or purchasers to compare buildings' operational costs before they buy a building or take on a lease.

24 Building energy rating schemes can also contribute to effectively reducing buildings' energy use and energy costs. For instance, the National Australian Built Environment Rating System (NABERS) is estimated to have saved customers an average of 30-40 per cent on their energy over 10 years. In New Zealand, the Energy Efficiency and Conservation Authority found in 2018

[5] This requirement applies to government agencies that are subject to the Government Property Functional Leadership Mandate which own or lease office accommodation with an occupied area that is 2000m2 or more.

that there is a positive cost-benefit ratio for businesses if office buildings were required to participate in the New Zealand equivalent of NABERS, known as NABERSNZ.

25 Energy rating schemes can also give decision-makers system-level information about building performance and carbon emissions. This can help support targeting, measurement and evaluation of programmes and investments, and differentiate between the efficient use of both low-emissions and fossil fuels.

26 In the first instance I intend these requirements to apply by regulations to commercial, public, industrial, and large residential apartment buildings, all of which must be over a regulated building size threshold. As an indicative example, the Australian Commercial Building Disclosure scheme initially set a building size threshold of 2,000 square meters. If a similar threshold was applied in New Zealand, there could be around 1,200 commercial and office buildings that would need an energy performance rating.[6]

27 Such a threshold would ensure that small businesses (for example small retailers or dairies) would not be impacted, and there would be no regulatory requirements for homeowners. Large buildings have greater emissions on a per building basis than smaller-scale or standalone residential buildings and may realise greater potential cost savings on energy bills to offset the cost of assessment.

28 For clarity, I am not proposing to set a minimum performance requirement for existing buildings. This proposal would only require the rating and reporting of buildings' current level of performance.

*Costs and benefits of an energy performance rating scheme*

29 The main cost for building owners of introducing an energy performance rating scheme would be an initial one-off cost of getting an energy performance rating. The cost of a NABERSNZ rating for a commercial building could cost between $1,000 to $6,000, depending on the type of rating, building size, and complexity of gathering data. Updating an existing rating is significantly cheaper.

30 MBIE analysis indicates that the benefits that tenants and building owners receive from reduced energy bills largely outweigh the costs from obtaining and updating energy performance ratings. In addition, this initiative could reduce the emissions for which the building and construction sector is responsible by 0.9Mt CO2-e by 2050.

*Proposed amendment to the Act*

31 I propose that the Act be amended to require:

31.1 owners of buildings of a type specified in regulations to hold a current energy performance rating for each of those buildings they own. This

[6] Based on estimates from the Building Energy End-Use Study

rating must indicate the building's estimated annual energy usage, actions

31.2 building owners to be provided with information on actions can be taken to improve their energy performance rating, and any other information prescribed by regulations;

31.3 building owners to display energy performance ratings in a place in the building to which users of the building have ready access; and

31.4 building owners to supply energy performance ratings to any persons specified in regulations (these may include, for example, prospective owners or tenants), in a manner and in circumstances specified in regulations.

32 These proposals will require the development of regulations before they are implemented. Any such regulatory requirements would be brought to Cabinet for consideration in due course following engagement with the sector. I intend regulations to be able to specify:

32.1 the building types to which these requirements apply;

32.2 a building size threshold to ensure that energy performance rating requirements are not needlessly onerous;

32.3 that energy performance ratings be provided to help prospective tenants and owners understand or compare the energy efficiency and running costs of buildings they may wish to rent or buy, and potentially incentivise investment in energy efficiency features or retrofits;

32.4 other information that must be provided along with an energy performance rating to support consumer understanding or improvement in buildings' energy performance;

32.5 a methodology that must be used to develop valid energy performance ratings, and any existing programmes that meet these requirements;

32.6 any exemptions for types of buildings; and

32.7 the transition period and timeframes within which eligible buildings will need to hold an energy performance rating.

33 I intend regulatory requirements to align with current Carbon Neutral Government Programme requirements, which will reduce the potential compliance and reporting burden for public sector agencies.

34 In future, I intend to consider how a form of energy performance ratings could be applied to homes. This could support emissions reductions across our entire building stock and enable New Zealanders to have information on the energy performance of the homes they live in or are intending to buy or rent. However, significant work is needed to understand how to implement such requirements, and how to inform consumers of how their home or rental

compares with other buildings' and how they can improve its energy efficiency of the building.

*Introducing offences and penalties for non-compliance with energy performance ratings requirements*

35 I propose that new offences and penalties be introduced to ensure that building owners conform to the new energy performance rating requirements. The proposed penalties associated with these offences are set in line with existing penalties in the Act.

36 I also seek agreement from Cabinet to introduce new infringement offences to supplement the enforcement of the new energy performance rating requirements. These will be introduced through regulations. The proposed infringement fees are to set in line with existing infringement offences in the Building (Infringement Offences, Fees, and Forms) Regulations 2007.

37 These offences and the associated penalties are detailed in Annex One. The penalties are in line with existing ones in the building system that were recently raised as part of the Building (Building Products and Methods, Modular Components, and Other Matters) Amendment Act 2021, and they are considered proportionate and sufficient to support compliance.

38 These offences will be enforced by territorial authorities as part of their functions under the Act. Under section 11(m)(ii), the chief executive may also enforce these offences where one or more territorial authorities are unwilling or unable to take enforcement action.

**Minimising construction and demolition waste**

39 Ministry for the Environment data reporting from 2020 shows that over 30 per cent of the 3.7 million tonnes of waste in municipal landfills was made of construction and demolition waste.

40 Construction and demolition waste is also a significant cost factor in most building projects. For example:

40.1 about 15 per cent of all building materials are wasted which generates costs passed on to consumers and reduces the supply of building materials available for other building projects.[7] By one developer's estimate, around $34,000 worth of materials may be wasted in every house built in New Zealand;

40.2 Auckland Council estimated that for every $1 in costs, there was $2.83 in benefits generated for reusing and recycling materials, and $2.27 for recovering waste.[8]

[7] Building Research Association of New Zealand, (2013). SR279 Prefabrication impacts in the New Zealand construction industry. BRANZ.

[8] *Cost benefit analysis of construction and demolition waste diversion from landfill. A case study based on the HLC Ltd development in Auckland*, M Rohani, T Huang, L Hoffman, M Roberts, and B Ribero (2019).

40.3 A 2021 Ministry of Education analysis found that while costs and benefits of waste recovery varied across the country, an enhanced business-as-usual approach that minimises waste is the best value money option once the waste levy rises to $60 per tonne for municipal landfills in 2023.[9]

41 However, other than an existing principle in the Act, there are currently no requirements in the building regulatory system that encourage the consideration or minimisation of construction and demolition waste.

42 Addressing this regulatory gap is an opportunity to:

42.1 reduce the building and construction sector's embodied carbon emissions and help mitigate supply constraints for construction materials and products, as less will be wasted on construction sites;

42.2 minimise waste and increase the recycling and re-use of materials. This could support the Ministry for the Environment's work to transform the waste system by developing a new national waste strategy and legislation to better regulate how we manage products and materials circulating in our economy; and

42.3 support the development of a more circular economy, supporting the cross-government work MBIE is leading on the development of a circular economy and bioeconomy strategy to step Aotearoa towards a circular economy and a thriving bioeconomy that delivers equitable and inclusive outcomes.

*Requiring Waste Minimisation Plans when constructing or demolishing buildings*

43 Some councils have already established bylaws that require Waste Minimisation Plans to be provided with building consent applications.[10] Other councils are actively exploring developing their own bylaws.[11] While many of these council-led initiatives have promising waste reduction potential, they vary by council and have been challenging for territorial authorities to enforce.

44 To realise the opportunity of construction and demolition waste reduction and build off the good work many councils are already doing, I propose to establish a consistent nation-wide requirement that a waste minimisation plan must be provided to the relevant territorial authority when a building consent is sought for new building work, and when demolishing a building unless the type of demolition is exempt by regulations.[12] This progresses ERP Action 12.1.3.

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[9] *Construction and Demolition Waste – Technical Report*, prepared for the Ministry of Education by Tonkin & Taylor Limited, May 2021.

[10] Including Wellington City Council and others in the greater Wellington region, Hamilton City Council, New Plymouth District Council and Selwyn District Council

[11] Including Auckland City Council and Dunedin City Council

[12] Waste Minimisation Plans will not address actions to limit waste from the operational of buildings. Work on operational waste will be progressed through other regulatory approaches, including actions outlines in the Waste and Circular Economy/Bioeconomy chapters of the ERP.

45 Waste minimisation plans would facilitate the reduction of construction and demolition waste by encouraging people to:

45.1 design and deconstruct buildings in a way that minimises the waste produced;

45.2 recycle and re-use building materials by use of a waste hierarchy;

45.3 minimise waste produced onsite; and

45.4 identify and use resource recovery, waste sorting and processing, and waste diversion or disposal facilities in their region.

46 Guidance, templates and other support could be provided to ensure waste minimisation plans are high quality and consistent, and do not add significant costs or compliance burdens.

*Costs and benefits of waste minimisation plan requirements*

47 Some territorial authorities already require some form of waste minimisation plan alongside certain building consents. Therefore, requiring waste minimisation plans would not significantly add to existing requirements in some areas. They are expected to largely require coordination and consideration of existing information and to nudge building sector participants to consider ways to reduce construction and demolition waste generated throughout the course of a project, from design to construction. I note they do not consider reducing waste from buildings' operation – this will be considered as part of the Ministry for the Environment's broader work on a new waste strategy and new legislation.

48 They also are a tool to encourage diversion of waste from landfill, so it can be recycled and re-used. There is significant potential of this – for example the New Zealand Green Building Council estimates at least 50 per cent, and often 60-70 per cent of waste can be diverted when building Homestar-rated buildings.

49 The main source of cost is the onsite implementation of the plan, which could include costs for facilities to separate waste and recycling, to transport waste to a recycling facility, or other initiatives that building owners may choose to include in the waste minimisation plan if they consider it appropriate for their site.

50 To manage potential costs, it is intended that regulations allow flexibility for waste minimisation plans to reflect individual local circumstances, particularly around the different resource recovery and waste management facilities available in the area. Waste minimisation plans are intended to enable the sector to consider options and use a waste hierarchy to enable waste minimisation at all stages of the building's lifecycle, from design to demolition, and not to set inflexible or unreasonably costly requirements.

51 MBIE analysis indicates that the benefits from reduced construction and demolition waste going to landfill largely outweigh the costs from creating and implementing waste minimisation plans. In addition, this initiative could reduce the emissions for which the building and construction sector is responsible by 11.7Mt CO2-e by 2050.

*Proposed amendment to the Act*

52 I propose that the Act be amended to require:

52.1 building owners to provide a Waste Minimisation Plan to the relevant territorial authority when a building consent is sought for building work, unless exempted by regulations, and implement it. This will include work to construct, demolish, and alter any type of building, ranging from a single use dwelling to a sub-division or a commercial office building;

52.2 building owners to provide a Waste Minimisation Plan to the relevant territorial authority before demolishing a building, even if building consent is not required for this building work, unless exempted by regulations, and implement this plan;

52.3 that Waste Minimisation Plans contain the required information set in regulations; and

52.4 that Waste Minimisation Plans be available on the building or demolition site and provided to parties specified in regulations.

53 I am conscious of the perception of adding red tape to the building consent system. While they would be submitted at the same time, I intend for waste minimisation plan requirements to sit independently of building consent requirements, with the approval of a building consent application not being dependent on the waste minimisation plan. I also intend there to be significant flexibility in the content of acceptable waste minimisation plans, which can be specified in regulations and outlined in guidance.

54 I also intend regulations to be able to specify:

54.1 the types of building work for which building owners are exempt from waste minimisation plan requirements;

54.2 the details regarding the required content of a waste minimisation plan; and

54.3 the parties to which building owners must provide a copy of their waste minimisation plan.

55 While this proposal may require additional work from territorial authorities and upfront time investment from building consent applicants, these costs will be mitigated by the significant waste reductions and use of Council waste infrastructure that could be realised. Specific financial implications for

territorial authorities are dependent on regulatory requirements and will be considered in depth as part of developing regulations.

56 A passive enforcement approach is proposed to avoid a significant workload increase for territorial authority staff. The focus of enforcement will be to inform and educate the sector on minimising waste as a first step in ensuring compliance. Officials have engaged with territorial authorities to understand current practices and sought to align these proposals with existing practices where possible.

Introducing offences and penalties for waste minimisation

57 I propose that new offences and penalties be introduced to ensure that building owners undertaking building work do so in compliance with the new waste minimisation requirements. The proposed penalties associated with these offences are set in line with existing penalties in the Act.

58 I also seek agreement from Cabinet to introduce new infringement offences to supplement the enforcement of the new waste minimisation requirements. These will be introduced through regulations.

59 These offences and their associated penalties are detailed in Annex One. The penalties are in line with existing ones in the building system that were recently raised as part of the Building (Building Products and Methods, Modular Components, and Other Matters) Amendment Act 2021, and they are considered proportionate and sufficient to support compliance.

60 These offences will be enforced by territorial authorities as part of their functions under the Building Act 2004. Under section 11(m)(ii), the chief executive may also enforce these offences where one or more territorial authorities are unwilling or unable to take enforcement action.

## Clarifying and strengthening the Act's focus on emissions reduction and climate resilience

61 I also seek to amend the purpose and principles of the Act to clarify the legislative foundation for future work on climate change that may be required in the building sector. This progresses ERP Action 12.5.5, supports NAP Action 7.4, and lays the groundwork for future work on ERP Actions 12.1.1 and 12.3.1.

*Clarifying the purpose of the Act to reflect climate change priorities*

62 Currently, one of the Act's purposes is to provide for the regulation of building work, and the setting of performance standards for buildings, to ensure that buildings are designed, constructed and able to be used in ways that promote sustainable development.[13] However, it is unclear in legislation what

[13] The Building Act 2004 has the following purposes:
(a) to provide for the regulation of building work, the establishment of a licensing regime for building practitioners, and the setting of performance standards for buildings to ensure that—
(i) people who use buildings can do so safely and without endangering their health; and

'sustainable development' requires and there may be confusion as to whether it incorporates modern climate change goals.

63 I propose to amend this purpose to embed a focus on promoting emissions reduction and climate resilience in line with our climate change goals as set out in the Zero Carbon Act. This will enable the regulation of building work, building practitioners, and performance standards for buildings to include requirements that reduce emissions and ensure buildings are climate resilient.

64 It will also send a signal that it is a core responsibility of the sector and regulators to consider the climate change and emissions implications of their decisions.

65 For the avoidance of doubt, I intend to also clarify that these changes provide grounds for regulations to be created in the Building Code that are intended to reduce the operational emissions and embodied carbon of buildings. Any such regulatory requirements would be brought to Cabinet for consideration in due course following engagement with the sector and broader public. We would take a system view to balance emissions reductions in building and construction with broader government climate change and adaptation goals associated with urban development, intensification and infrastructure.

*Strengthening the principles in the Act to align with climate change goals*

66 The Act currently requires certain persons (including the Minister, the chief executive, and territorial authorities) carrying out functions, duties, or powers under the Act to take into account certain principles. Annex Two lists the existing principles in the Act.

67 While many of the existing principles in the Act align with the climate change outcomes we are seeking to achieve, they are often not considered by those performing duties under the Act and have not been built on through building performance requirements. This suggests that the principles may be insufficiently clear where they relate to our climate change goals as set out in the Zero Carbon Act. This is a barrier to the building regulatory system's ability to contribute towards our climate change goals.

68 To address this, I propose to clarify the Act's principles by reorganising and contextualising them in a modern climate change framework. This way, they can be read and interpreted to reflect a clearer and stronger focus on climate change and can be built on by the regulator's stewardship function.

69 I propose that the Act be amended to include new principles on climate change, as outlined below:

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(ii) buildings have attributes that contribute appropriately to the health, physical independence, and well-being of the people who use them; and

(iii) people who use a building can escape from the building if it is on fire; and

(iv) buildings are designed, constructed, and able to be used in ways that promote sustainable development:

(b) to promote the accountability of owners, designers, builders, and building consent authorities who have responsibilities for ensuring that building work complies with the building code.

| Proposed new principles on | Rationale |
|---|---|
| The need to ensure that buildings minimise whole-of-life embodied carbon | To meet our climate change goals, we need to reduce buildings' whole-of-life embodied carbon which makes up around half of the building and construction sector's annual emissions. |
| The need to ensure that buildings are operationally efficient in terms of minimising operational emissions and contributing appropriately to the health, physical independence, and well-being of the people who use them | To meet our climate change goals, we need to reduce the emissions produced in operating a building over its lifetime, while balancing the need for building to be able to maintain a comfortable and healthy internal environment. |
| The need to ensure that buildings are built to be resilient and can adapt to changing climate conditions | Buildings need to be resilient to New Zealand's future climate which is predicted to have more frequent high wind and rainfall events, higher average temperatures, greater risk of wildfires, and more severe floods and droughts. This has implications for how buildings may need to be designed, constructed and maintained. |

70 I also propose to reorganise relevant existing principles relating to, for instance, energy efficiency, material efficiency and waste under these new principles.

71 Officials anticipate that clarifying and strengthening the principles of the Act will encourage people in the sector to undertake voluntary emissions reduction action and provide a clear signal for the sector to make investment and practice decisions to reduce their emissions. We also note that when they are implemented, the revised principles will be considered alongside wider issues such as construction costs, housing affordability and urban development.

**Improving the quality of information on building emissions and climate resilience**

72 Information on building sector emissions and climate resilience will play a key role in enabling Government to measure the progress and implementation of the proposed energy performance rating and waste minimisation plan measures, and support emissions reduction and climate resilience. It will also support MBIE to fulfil a stewardship function across the broader building regulatory system. Improving the quality of information supports ERP Action 12.5.2.

73 Government does not currently have the information needed to adequately inform policies and programmes to move the building and construction sector towards near-zero carbon emissions by 2050. Consistent data and information are necessary to support compliance and provide targeted support to the sector when future emissions reduction requirements may come into force.

74 To address this, I propose that the Act be amended to enable the chief executive of MBIE to require any person to provide any information or document necessary or desirable for the purposes of informing, monitoring, evaluating, and implementing policies, programmes and regulations that:

74.1 support emissions reduction related to buildings; or

74.2 support climate resilience and adaptation of buildings; or

74.3 enable consumers to assess and compare information on the emissions and climate resilience and adaptation of buildings.

75 I also propose that when the chief executive of MBIE requests this information, they be required to give written notice to the person from whom they are requesting information, specifying what, how and when that information should be provided.

76 Examples of the kinds of information MBIE could collect include information from territorial authorities about waste minimisation plans or buildings' operational efficiency. This information will be used to inform the design, costs and impacts of future policies and programmes such as extending energy performance rating requirements to small-scale residential buildings, or implementing requirements to reduce embodied carbon. It could also be used to support behaviour change by providing the public with information on the embodied carbon and operational efficiency of their buildings.

77 This power is intentionally broad and future-focused to enable MBIE to collect new or emerging information that may be required to understand the current and future situation, and to inform emissions reduction actions out to 2050. However, I intend legislation to specify that MBIE will not request information that it considers will be disproportionately onerous for parties to collect, maintain or provide.

*Introducing offences and penalties for not providing information*

78 I propose that new offences and penalties be introduced to ensure that people conform to the new requirement to provide MBIE with information on emissions, embodied carbon and climate resilience of buildings when requested. The proposed penalties associated with these offences are set in line with existing penalties in the Act.

79 I also seek agreement from Cabinet to introduce new infringement offences to supplement the enforcement of the new information provision requirements. These will be introduced through regulations.

80 These offences and their associated penalties are detailed in Annex One.

81 These offences will be enforced by the chief executive as part of their role under section 11 of the Act.

**Consequential changes to the role of the chief executive**

82 If the recommendations of this paper are approved, consequential changes will be needed to align the chief executive's functions (in section 11 of the Act) with the new purposes, principles, and functions that include reducing buildings' carbon emissions, lifting energy performance, supporting waste minimisation and collecting and providing information. These consequential changes will be set out in the Cabinet Legislation Committee paper for this Bill.

**Implementation (for relevant papers)**

83 This paper proposes enabling legislative changes to progress energy performance rating and waste minimisation requirements. Operational detail such as the scope of requirements, a transition approach to phase in requirements, and the expected cost of compliance will be provided for in regulations. This approach has been proposed to provide more flexibility in development of the requirements, and to enable tangible legislative action on emission reductions to take place quickly.

84 The development of regulations will involve:

84.1 Engagement with key stakeholders to ensure the proposed regulations are effective, implementable and cost effective;

84.2 Public consultation on proposed regulations and transition timeframes; and

84.3 Cabinet approval of regulations, including a Regulatory Impact Statement and Climate Implications of Policy Assessment to identify the costs, benefits and emissions implications of the proposed regulations.

85 MBIE also intends to develop an implementation and behaviour change plan to support the development of policies and regulations contained in this paper. This will align with ERP Action 12.5.3, which focuses on changing behaviours of households and the sector to reduce emissions.

**Financial Implications**

86 There are no direct financial implications from the decisions in this paper. However, there will be financial implications from the future regulations that are proposed, as outlined in the Regulatory Impact Statement. The main impacts are likely to include:

86.1 Resourcing costs for territorial authorities in implementing and enforcing the proposed energy performance rating and waste minimisation plan requirements (where they are not already doing so). These costs can be mitigated to some extent through a passive enforcement approach with a focus on education and information. These costs will be identified and addressed in the development of regulations.

86.2 Up-front costs for building owners in obtaining an energy performance rating and developing waste minimisation plans. These costs will be offset by improved building performance, reduced energy demand and energy bills (should building owners use their energy performance rating information to invest in energy efficiency features or retrofits), and reduced building materials wastage; and

86.3 Financial implications for MBIE in providing education, guidance and other support to consumers and the sector to help implement these changes.

87 Specific financial implications will depend on future Cabinet policy decisions about these proposals' scope and requirements, which will be considered when developing detailed regulatory requirements. MBIE will identify opportunities to manage and mitigate the potential impact of financial implications.

## Legislative Implications

88 The proposals in this Cabinet paper will be implemented through the Building (Climate Change Response) Amendment Bill, which Cabinet has agreed is a Category 4 Bill (to be referred to a select committee in the year) [CAB-22-MIN-0080.01 refers].

89 Following drafting by Parliamentary Counsel Office, a draft Bill will be provided to Cabinet Legislation Committee for consideration prior to introduction.

90 Regulations will be required to deliver the detail of these proposals. If the Bill were to be enacted, I anticipate it will not give rise to new requirements for the sector until at least mid-2024. This is intended to reduce the pressure on the sector which is currently facing several challenges, such as supply chain constraints, and to give time for officials to work closely with the sector to ensure regulatory requirements are workable. This will also provide certainty as to implementation of any legislation.

## Impact Analysis

### Regulatory Impact Statement

91 MBIE's Regulatory Impact Analysis Review Panel has confirmed that the information and analysis summarised in the Impact Summary meets the

criteria necessary for Ministers to make informed decisions on the proposals in this paper.

92 The Regulatory Impact Analysis indicates that the proposals in this paper have a benefit-cost ratio of 1.00. However, it notes that while there is good data on costs, there are several potentially significant benefits that cannot be reliably quantified at this time due to data constraints. For instance, the analysis was unable to incorporate potential benefits such as health, wellbeing, productivity, and asset value uplift, reduction in energy poverty, and the growth in building deconstruction, recycling, or other related jobs.

93 Future Regulatory Impact Analysis on detailed regulatory requirements will address some of this data uncertainty and provide a fuller picture of benefits balanced against costs.

#### Climate Implications of Policy Assessment

94 The Climate Implications of Policy Assessment (CIPA) team has been consulted and confirms that the CIPA requirements do not apply to this package of proposals as the likely emissions impact is indirect and unable to be accurately quantified due to the number of assumptions required about potential future regulatory requirements.

95 However, the proposals in this package will enable the creation of future regulations and policies that will enable emissions reduction. A CIPA or CIPAs will be provided when further decisions are sought. MBIE will work with the CIPA team to disclose the emissions impacts of proposals to Cabinet at the appropriate time.

## Population Implications

96 With the exception of the financial implications outlined above, there are no other direct implications for specific population groups arising as a direct result of decisions sought in this paper. The proposals outlined in this paper are high-level enabling provisions with specific requirements to be set in regulations at a later date. Those regulations which will be brought to Cabinet for consideration in due course.

97 Depending on their scope and other requirements, the introduction of energy performance ratings and waste minimisation requirements may have disproportionate implications for owners of older and less energy efficient buildings in regional centres, or for those seeking to build in areas with less access to waste infrastructure. These population implications and distributional impacts will be considered, outlined, and where relevant mitigated when developing regulations for these proposals.

98 It is intended that regulation development include transition planning and support to mitigate negative impacts on the building and construction sector, which is already stretched. This will help enable the benefits of the proposals to be realised without creating undue cost, stress or other impacts on the sector.

## Human Rights

99 The proposals in this paper are not inconsistent with the New Zealand Bill of Rights Act 1990 and the Human Rights Act 1993.

## Consultation

100 In October 2021, government consulted on proposals to include in New Zealand's first ERP, including energy performance and waste minimisation requirements.

101 Following ERP publication, MBIE convened a discussion group of sector representatives to advise on the specific proposals in this paper.[14] MBIE also engaged with the Building Advisory Panel during the development of the policies proposed in this paper. The Building Advisory Panel provide independent strategic advice on issues facing the construction sector. These engagements provided MBIE with constructive feedback from a wide range of building and construction sector organisations and showed that there is sector support for these proposals.

102 The following agencies and Crown entities were consulted in the development of this paper: Ministry for the Environment; Ministry for Primary Industries; Ministry of Justice; Ministry of Education; Ministry of Health; Treasury; Te Puni Kōkiri; Te Tūāpapa Kura Kāinga - Ministry of Housing and Urban Development; Ministry of Transport; Department of Corrections; Department of Internal Affairs; Kāinga Ora; and the Energy Efficiency & Conservation Authority. The Construction Sector Accord was also consulted in developing this paper.

## Communications

103 I intend to issue a media statement once Cabinet decisions have been made. This paper, and the Regulatory Impact Summary, will be made publicly available on MBIE's website.

## Proactive Release

104 This Cabinet paper and associated minute will be published on MBIE's website, subject to any necessary redactions.

## Recommendations

The Minister for Building and Construction recommends that the Committee:

1 **note** that in April 2022, Cabinet invited the Minister for Building and Construction to return in 2022 to seek approval for policy decisions on a Building (Climate Change Response) Amendment Bill [CAB-22-MIN-0080.01 refers].

[14] This discussion group was comprised of representatives from Wellington City Council, Selwyn District Council, Institute of Architects, BRANZ, Property Council New Zealand, Certified Builders, Registered Master Builders, New Zealand Green Building Council, Kāinga Ora and the Ministry for Environment.

2 **note** that the legislative proposals in this paper progress or support the following Emissions Reduction Plan actions: 12.1.1, 12.1.3, 12.3.1, 12.3.2, 12.5.2 and 12.5.5

3 **note** that the legislative proposals in this paper progress or support the National Adaptation Plan action 7.4

**Supporting better energy performance of new and existing buildings**

4 **agree** to require owners of buildings of a type, size, or with other characteristics specified in regulations to hold a current energy performance rating for each building they own

5 **agree** that an energy performance rating must indicate a building's estimated annual energy usage

6 **agree** that regulations may prescribe additional information that must be provided alongside an energy performance rating, to support consumer understanding or improvement in buildings' energy performance

7 **agree** that regulations may prescribe the methodology that must be used for a valid energy performance rating, and identify any existing programmes that meet these requirements

8 **agree** that regulations may exempt buildings of specified types, sizes or other characteristics from requirements to hold a current energy performance rating

9 **agree** to require building owners to display energy performance ratings in a place in the building to which users of the building have ready access

10 **agree** to require building owners to supply energy performance ratings to any persons specified in regulations, in a manner and in circumstances specified in regulations

11 **agree** regulations may prescribe the persons to whom building owners are required to supply energy performance ratings, how and in what circumstances

12 **agree** that it will be an offence for building owners to intentionally not hold a current energy performance rating for a building when it is required, with the following penalties:

12.1 on conviction, an individual is liable for a fine not exceeding $20,000; and

12.2 on conviction, a body corporate is liable for a fine not exceeding $60,000

13 **agree** that it will be an offence for building owners to intentionally not prominently display the energy performance rating of a building in a place in

the building to which users of the building have ready access when it is required, with the following penalties:

13.1 on conviction, an individual is liable for a fine not exceeding $20,000; and

13.2 on conviction, a body corporate is liable for a fine not exceeding $60,000

14 **agree** that it will be an offence for building owners to intentionally not provide the energy performance rating of a building to persons specified in regulations in circumstances set in regulations, with the following penalties:

14.1 on conviction, an individual is liable for a fine not exceeding $20,000; and

14.2 on conviction, a body corporate is liable for a fine not exceeding $60,000

15 **agree** that it will be an offence for building owners to knowingly make a false or misleading statement about the energy performance rating for a building, with the following penalties:

15.1 on conviction, an individual is liable for a fine not exceeding $20,000; and

15.2 on conviction, a body corporate is liable for a fine not exceeding $60,000

16 **agree** that the following will be infringement offences, when the building owner:

16.1 fails to hold a current energy performance rating for a building when it is required, with a fee of $1,000;

16.2 fails to prominently display the energy performance rating of a building in a place in the building to which users of the building have ready access when it is required, with a fee of $250;

16.3 fails to provide the energy performance rating of a building to persons specified in regulations in circumstances set in regulations, with a fee of $250; and

16.4 makes a false or misleading statement about the energy performance rating for a building, with a fee of $1,000

**Minimising construction and demolition waste**

17 **agree** to require owners to provide a Waste Minimisation Plan to the relevant territorial authority when a building consent is sought for building work, unless exempted by regulations

18 **agree** to require building owners to provide a Waste Minimisation Plan to the relevant territorial authority before demolishing a building, unless the type of demolition is exempt from requiring a Waste Minimisation Plan by regulations

19 **agree** that regulations may exempt certain types of building work from the requirements in relation to Waste Minimisation Plans

20 **agree** that regulations may prescribe the information that will be required to be contained in a Waste Minimisation Plan

21 **agree** to require building owners to make their Waste Minimisation Plans available on the building or demolition site

22 **agree** to require building owners to provide their Waste Minimisation Plans to persons as specified in regulations

23 **agree** regulations may prescribe the persons to whom building owners are required to supply a copy of their Waste Minimisation Plan, how and in what circumstances

24 **agree** that it will be an offence for owners to intentionally not provide a Waste Minimisation Plan when a building consent is sought for building work before carrying out that building work, unless that building work is exempted by regulations, with the following penalties:

24.1 on conviction, an individual is liable for a fine not exceeding $20,000; and

24.2 on conviction, a body corporate is liable for a fine not exceeding $60,000

25 **agree** that it will be an offence for building owners to intentionally not provide a Waste Minimisation Plan as required by regulations before carrying out demolition work, with the following penalties:

25.1 on conviction, an individual is liable for a fine not exceeding $20,000; and

25.2 on conviction, a body corporate is liable for a fine not exceeding $60,000

26 **agree** that it will be an offence for building owners to intentionally not make their Waste Minimisation Plan available on the building or demolition site, with the following penalties:

26.1 on conviction, an individual is liable for a fine not exceeding $20,000; and

26.2 on conviction, a body corporate is liable for a fine not exceeding $60,000

27 **agree** that it will be an offence for building owners to intentionally not provide their Waste Minimisation Plans to persons as specified in regulations, with the following penalties:

27.1 on conviction, an individual is liable for a fine not exceeding $20,000; and

27.2 on conviction, a body corporate is liable for a fine not exceeding $60,000

28 **agree** that it will be an offence for building owners to intentionally not implement their submitted Waste Minimisation Plan, with the following penalties:

28.1 on conviction, an individual is liable for a fine not exceeding $20,000; and

28.2 on conviction, a body corporate is liable for a fine not exceeding $60,000

29 **agree** that the following will be infringement offences when the building owner:

29.1 fails to provide the relevant territorial authority with a Waste Minimisation Plan when a building consent is sought for building work, with a fee of $1,000;

29.2 fails to provide the relevant territorial authority with a Waste Minimisation Plan before demolishing a building for which a Waste Minimisation Plan is required by regulations, with a fee of $1,000;

29.3 fails to prominently make the submitted Waste Minimisation Plan available on the building or demolition site, with a fee of $250;

29.4 fails to provide the Waste Minimisation Plan to persons specified in regulations in circumstances set in regulations, with a fee of $250; and

29.5 fails to implement the submitted Waste Minimisation Plan, with a fee of $1,000

**Clarifying and strengthening the Act's focus on emissions reduction and climate resilience**

30 **agree** to clarify that the Act’s purpose which provides for the regulation of building work and the setting of performance standards for buildings includes a focus on ensuring the building system supports buildings to be designed, constructed, and deconstructed in ways that contribute to emissions reduction, climate resilience and adaption, which is in line New Zealand’s domestic climate change goals

31 **agree** to align the principles of the Act with climate change priorities by adding a principle on the need to ensure that buildings minimise whole-of-life embodied carbon

32 **agree** that the new principle on minimising whole-of-life embodied carbon outlined in Recommendation 31 involves ensuring that:

32.1 each building is durable for its intended use;

32.2 the reduction in the generation of waste during the construction and demolition process is facilitated; and

32.3 the efficient and sustainable use of materials in buildings is facilitated.

33 **agree** to align the principles of the Act with climate change priorities by adding a principle on the need to ensure that buildings are operationally efficient in terms of minimising operational emissions and contributing appropriately to the health, physical independence and well-being of the people who use them

34 **agree** that the new principle on operational efficiency outlined in Recommendation 33 involves facilitating:

34.1 the efficient use of water and water conservation in buildings; and

34.2 the efficient use of energy and energy conservation and the use of renewable sources of energy in buildings.

35 **agree** to align the principles of the Act with climate change priorities by adding a principle on the need to ensure that buildings are built to be resilient to changing climate conditions

36 **agree** to clarify, for the avoidance of doubt, that regulations may be made in the Building Code to limit carbon emissions for which buildings are responsible

**Improving the quality of information on building emissions and climate resilience**

37 **agree** to provide the chief executive of MBIE with the power to require any person to provide any information or document considered necessary or desirable to obtain for the purpose of informing, monitoring, evaluating and implementing policies, programmes and regulations that:

37.1 support emissions reduction related to buildings

37.2 support climate resilience and adaptation of buildings; or

37.3 enable consumers to assess and compare the emissions and climate resilience and adaptation of buildings

38 **agree** that the chief executive of MBIE must give written notice to the person who they are requesting information from, specifying the information that must be provided, how and by when

39 **agree** that it will be an offence for persons to intentionally not provide MBIE with the information or documents requested under the new information provision requirements as specified in the written notice, with the following penalties:

39.1 on conviction, an individual is liable for a fine not exceeding $20,000; and

39.2 on conviction, a body corporate is liable for a fine not exceeding $60,000

40 **agree** that it will be an offence for persons to knowingly provide false or misleading statements about the information or documents requested by MBIE under the new information provision requirements, with the following penalties:

40.1 on conviction, an individual is liable for a fine not exceeding $20,000; and

40.2 on conviction, a body corporate is liable for a fine not exceeding $60,000

41 **agree** that the following will be infringement offences:

41.1 failing to supply information requested by MBIE under the new information provision requirements in the manner and timeframe specified in the written notice, with a fee of $500; and

41.2 providing false or misleading statements about the information or documents requested by MBIE under the new information provision requirements, with a fee of $1,000

**Consequential changes to the role of the chief executive**

42 **note** that if the recommendations of this paper are approved, consequential changes will be needed to align the chief executive's roles in section 11 of the Act with the new purposes, principles, and functions of the Act

**Legislative process**

43 **authorise** the Minister for Building and Construction to issue drafting instructions to the Parliamentary Counsel Office to give effect to the policy proposals in this paper

44 **authorise** the Minister for Building and Construction to make decisions, consistent with the proposals in these recommendations, on any issues which arise during the drafting process

45 **note** that the proposed amendment Bill holds a Category 4 priority (to be referred to a Select Committee in the year), and that the Minister for Building and Construction intends to introduce this Bill to House in 2022

46 **note** that the legislative proposals in this paper are enabling and will require further stakeholder engagement, consultation and the development of regulations to operationalise

47 **note** it is intended that no new regulatory requirements resulting from the Bill come into force before mid-2024

**Communications**

48 **agree** to proactively release this Cabinet paper package and associated Cabinet minute within 30 business days of Cabinet decisions.

Authorised for lodgement

Hon Dr Megan Woods

Minister for Building and Construction

## Annex One: Proposed offences and penalties

| Proposal | Proposed offence and penalty | Proposed infringement offence |
|---|---|---|
| **Energy performance rating scheme** | 1 An offence for building owners to intentionally not hold a current energy performance rating for a building when it is required<br>• on conviction, an individual building owner is liable for a fine not exceeding $20,000<br>• on conviction, a body corporate building owner is liable for a fine not exceeding $60,000.<br><br>2 An offence for building owners to intentionally not prominently display the energy performance rating of a building in a place in the building to which users of the building have ready access when it is required<br>• on conviction, an individual building owner is liable for a fine not exceeding $20,000<br>• on conviction, a body corporate building owner is liable for a fine not exceeding $60,000.<br><br>3 An offence for building owners to intentionally not provide the energy performance rating of their building to persons specified in regulations in circumstances set in regulations<br>• on conviction, an individual is liable for a fine not exceeding $20,000<br>• on conviction, a body corporate is liable for a fine not exceeding $60,000.<br><br>4 An offence to knowingly make a false or misleading statement about the energy performance rating for a building<br>• on conviction, an individual building owner is liable for a fine not exceeding $20,000<br>• on conviction, a body corporate building owner is liable for a fine not exceeding $60,000. | • A fee of $1,000 for building owners failing to hold a current energy performance rating for a building when it is required.<br><br>• A fee of $250 for building owners failing to prominently display the energy performance rating of a building in a place in the building to which users of the building have ready access when it is required.<br><br>• A fee of $250 for building owners failing to provide the energy performance rating of their building to persons specified in regulations, in circumstances set in regulations.<br><br>• A fee of $1,000 for building owners making a false or misleading statement about the energy performance rating for a building. |
| **Waste minimisations plans** | 5 An offence for building owners to intentionally not provide a Waste Minimisation Plan when a building consent is sought for building work before carrying out that building work, unless that building work is exempted by regulations | • A fee of $1000 for owners failing to provide the relevant territorial authority with a Waste Minimisation Plan when a building |

| Proposal | Proposed offence and penalty | Proposed infringement offence |
|---|---|---|
| | • on conviction, an individual building owner is liable for a fine not exceeding $20,000<br>• on conviction, a body corporate building owner is liable for a fine not exceeding $60,000.<br><br>6 An offence for building owners to intentionally not provide a Waste Minimisation Plan as required by regulations before carrying out demolition work<br>• on conviction, an individual building owner is liable for a fine not exceeding $20,000<br>• on conviction, a body corporate building owner is liable for a fine not exceeding $60,000.<br><br>7 An offence for building owners to intentionally not make their Waste Minimisation Plan available onsite<br>• on conviction, an individual building owner is liable for a fine not exceeding $20,000<br>• on conviction, a body corporate building owner is liable for a fine not exceeding $60,000.<br><br>8 An offence for building owners to intentionally not provide their Waste Minimisation Plans to persons as specified in regulations<br>• on conviction, an individual building owner is liable for a fine not exceeding $20,000<br>• on conviction, a body corporate building owner is liable for a fine not exceeding $60,000.<br>9 An offence for building owners to intentionally not comply with their submitted Waste Minimisation Plan<br>• on conviction, an individual building owner is liable for a fine not exceeding $20,000<br>• on conviction, a body corporate building owner is liable for a fine not exceeding $60,000. | consent is sought for building work.<br><br>• A fee of $1,000 for building owners failing to provide the relevant territorial authority with a Waste Minimisation Plan before demolishing a building for which a Waste Minimisation Plan is required by regulations.<br><br>• A fee of $250 for owners failing to make their Waste Minimisation Plan available onsite<br><br>• A fee of $250 for owners failing to provide their Waste Minimisaton Plan to persons specified in regulations, in circumstances set in regulations.<br><br>• A fee of $1,000 for owners failing to comply with their submitted Waste Minimisation Plan. |
| **Information provision** | 10 An offence for persons to intentionally not provide MBIE with the information or documents requested under the new information provision requirements | • A fine of $500 for persons failing to supply information or |

| Proposal | Proposed offence and penalty | Proposed infringement offence |
|---|---|---|
| | as specified in the written notice<br>• on conviction, an individual building owner is liable for a fine not exceeding $20,000<br>• on conviction, a body corporate building owner is liable for a fine not exceeding $60,000.<br><br>11 An offence for persons to knowingly provide false or misleading statements about the information or documents requested by MBIE under the new information provision requirements<br>• on conviction, an individual building owner is liable for a fine not exceeding $20,000<br>• on conviction, a body corporate building owner is liable for a fine not exceeding $60,000. | documents requested by MBIE under the new information provision requirements in the manner and timeframe specified in the written notice.<br><br>• A fine of $1,000 for persons providing false or misleading statements about the information or documents requested by MBIE under the new information provision requirements. |

## Annex Two: Existing principles in the Building Act 2004

**4 Principles to be applied in performing functions or duties, or exercising powers, under this Act**

**(1)** This section applies to—

**(a)** the Minister; and

**(b)** the chief executive; and

**(c)** a territorial authority or regional authority (but only to the extent that the territorial authority or regional authority is performing functions or duties, or exercising powers, under of Part 2 (which relates to earthquake-prone buildings) or in relation to the grant of waivers or modifications of the building code or the adoption and review of policy on dangerous and insanitary buildings or dangerous dams); and

**(d)** in subpart 6B of Part 2,—

**(i)** a person who may designate an area for the purposes of that subpart:

**(ii)** a responsible person as defined in section 133BB(1).

**(2)** In achieving the purpose of this Act, a person to whom this section applies must take into account the following principles that are relevant to the performance of functions or duties imposed, or the exercise of powers conferred, on that person by this Act:

**(a)** when dealing with any matter relating to 1 or more household units,—

**(i)** the role that household units play in the lives of the people who use them, and the importance of—

**(A)** the building code as it relates to household units; and

**(B)** the need to ensure that household units comply with the building code:

**(ii)** the need to ensure that maintenance requirements of household units are reasonable:

**(iii)** the desirability of ensuring that owners of household units are aware of the maintenance requirements of their household units:

**(b)** the need to ensure that any harmful effect on human health resulting from the use of particular building methods or products or of a particular building design, or from building work, is prevented or minimised:

**(c)** the importance of ensuring that each building is durable for its intended use:

**(d)** the importance of recognising any special traditional and cultural aspects of the intended use of a building:

**(e)** the costs of a building (including maintenance) over the whole of its life:

**(f)** the importance of standards of building design and construction in achieving compliance with the building code:

**(g)** the importance of allowing for continuing innovation in methods of building design and construction:

**(h)** the reasonable expectations of a person who is authorised by law to enter a building to undertake rescue operations or firefighting to be protected from injury or illness when doing so:

**(i)** the need to provide protection to limit the extent and effects of the spread of fire, particularly with regard to—

**(i)** household units (whether on the same land or on other property); and

**(ii)** other property:

**(j)** the need to provide for the protection of other property from physical damage resulting from the construction, use, and demolition of a building:

**(k)** the need to provide, both to and within buildings to which section 118 applies, facilities that ensure that reasonable and adequate provision is made for persons with disabilities to enter and carry out normal activities and processes in a building:

**(l)** the need to facilitate the preservation of buildings of significant cultural, historical, or heritage value:

**(m)** the need to facilitate the efficient use of energy and energy conservation and the use of renewable sources of energy in buildings:

**(n)** the need to facilitate the efficient and sustainable use in buildings of—

**(i)** materials (including materials that promote or support human health); and

**(ii)** material conservation:

**(o)** the need to facilitate the efficient use of water and water conservation in buildings:

**(p)** the need to facilitate the reduction in the generation of waste during the construction process.

**(q)** the need to ensure that owners, designers, builders, and building consent authorities are each accountable for their role in ensuring that—

**(i)** the necessary building consents and other approvals are obtained for proposed building work; and

**(ii)** plans and specifications are sufficient to result in building work that (if built to those plans and specifications) complies with the building code; and

**(iii)** building work for which a building consent is issued complies with that building consent; and

**(iv)** building work for which a building consent is not required complies with the building code

# Regulatory Impact Statement: Proposed Building for Climate Change amendments to the Building Act 2004

## Coversheet

| **Purpose of Document** | |
|---|---|
| Decision sought: | *Approval to amend the Building Act to support emissions reduction in the building and construction sector.* |
| Advising agencies: | *Ministry of Business, Innovation and Employment* |
| Proposing Ministers: | *Minister for Building and Construction* |
| Date finalised: | *2 September 2022* |

**Problem Definition**

This Regulatory Impact Statement (RIS) considers a legislative change designed to address three core policy problems, each of which is considered a barrier to the building and construction sector reaching near-zero emissions by 2050:

1. **The building regulatory system does not enable consumers and Government to easily understand the energy efficiency of buildings.**
   Consumers that lease or rent building space, and the Government have limited information on the energy performance of existing buildings. This may limit socially optimal investment by building owners in energy efficiency.

2. **The building regulatory system does not incentivise action on construction and demolition waste minimisation.**
   There are inconsistent requirements for people to consider, recognise or reduce the social cost of construction and demolition waste (information, regulatory and externality issues).

3. **There is a lack of clarity and focus on climate change for building and construction sector stakeholders and regulators.**
   The purposes and principles of the Building Act 2004 (the Act) do not clearly or sufficiently focus on New Zealand's climate change goals as set out in the Climate Change Response Amendment Act 2019 (the Zero Carbon Act).

Each of these core policy problems also intersect with a general issue around limited access to good quality information on building emissions and climate resilience.

**Executive Summary**

The Zero Carbon Act requires all sectors of the New Zealand economy to contribute to reducing net emissions of all greenhouse gases, except biogenic methane, to zero by

2050. As the building and construction sector is a key driver of emissions in energy, industry, and waste, it is crucial to decarbonise the sector.

New Zealand's first Emissions Reduction Plan (ERP) was published in May 2022. The ERP contains strategies, policies, and actions to meet New Zealand's first emissions budgets, as required by the Zero Carbon Act.

Currently, there is work underway as part of the Ministry of Business, Innovation, and Employment's (MBIE's) broader Building for Climate Change (BfCC) programme to reduce emissions within the existing legislative framework. However, legislative change is also being considered to enable Government and the sector to enact key building and construction actions of the ERP. These actions seek to address problems in the sector by clarifying and strengthening how the Act supports, and provides tools and powers to progress emissions reduction and climate resilience.

This RIS provides a high-level summary of the problems being addressed, the options proposed and their associated costs and benefits, and the proposed arrangements for implementation and monitoring.

The objectives of the proposals are to:

- **Objective 1 (Energy Efficiency):** Enable consumers, those that lease or rent building space, and the Government to have better information on the energy performance of existing buildings to improve energy efficiency across the building stock.
- **Objective 2 (Waste Minimisation):** Enable more consistent requirements for people to consider, recognise or reduce the social and environmental cost of construction and demolition waste (information, regulatory and externality issues).
- **Objective 3 (Align focus on climate change in Act):** Align the focus for both the building sector and regulators to support building emissions reduction and climate resilience.

Industry consultation has informed the objectives and proposals in this RIS. Many of the proposals were consulted on by the Climate Change Commission and during the ERP consultation process. Further targeted stakeholder engagement was also undertaken, with stakeholders broadly supporting the proposals.

## What options are being considered?

MBIE has considered a range of options to address the objectives outlined above. The objectives are distinct and are likely to respond differently to different interventions, so this RIS considers the options to address each objective separately. The preferred options have been highlighted in bold below.

### Options to address Objective 1 (Energy Efficiency)

Currently, the building regulatory system does not enable consumers and Government to easily understand the energy efficiency of buildings. This makes it difficult for consumers to understand the energy efficiency or running costs of buildings they may wish to rent or buy, and for government to target initiatives or set requirements for buildings that are major energy users. Enabling better information provision and transparency across the sector is

an opportunity to lift the energy efficiency of existing buildings. To address this, the following options were considered:

- 1a – Status quo
- 1b – Provide greater non-regulatory support to encourage adoption of voluntary energy performance rating systems
- **1c – Amend the Act to require buildings to hold an energy performance rating**
- 1d – Amend Act to do the above, plus set a minimum acceptable energy performance level

**Options to address Objective 2 (Waste Minimisation)**

Though data on construction and demolition waste is currently unreliable and incomplete, by some estimates it could account for up to 40 to 50 per cent of all material going to landfill. This results in adverse emissions impacts, primarily from the embodied emissions required to produce materials that are then not used and from the decomposition of organic materials. Despite this, the existing Principle (p) in the Building Act, is the only current requirement in the building regulatory system that encourages the consideration or minimisation of construction and demolition waste. To address this, the following options were considered:

- 2a – Status quo
- 2b – Provide greater non-regulatory support to encourage adoption of voluntary or Council-mandated waste minimisation requirements
- **2c – Amend the Act to require a Waste Minimisation Plan (*without* mandating minimum waste minimisation requirements)**—the changes will aim to enable better waste management and improve the quality of information on emissions
- 2d – Amend the Act to require Waste Minimisation Plans and set minimum requirements on waste minimisation and diversion from landfill

**Options to address Objective 3 (Align focus on climate change in Act)**

It is unclear in legislation what ‘sustainable development’ requires. Additionally, there may be confusion as to whether it incorporates modern climate change goals, specifically promoting emissions reduction and climate resilience in line with climate change goals as set out in the Zero Carbon Act. While many of the existing principles in the Act align with the climate change outcomes we are seeking to achieve, they are often not considered by those performing duties under the Act and have not been built on through building performance requirements. This suggests that the principles may be insufficiently clear where they relate to climate change goals as set out in the Zero Carbon Act. This is a barrier to the building regulatory system’s ability to contribute towards our climate change goals. To address this, the following options were considered:

- 3a – Status quo

**3b – Amend the Act's purposes and principles and enable the collection of information to align the sector and regulators' focus on building emissions reduction and climate resilience**

We consider that a **combination of options 1c, 2c and 3b** will best meet the objectives of the RIS. These enable legislative actions to support consistent and sustainable emissions reduction and climate resilience, while having flexibility and without being overly burdensome for the sector.

The purpose of this RIS is to provide high-level direction for next steps. If Cabinet agrees to the proposed options and legislation is progressed, the next steps (e.g. regulations) will come to Cabinet following passage of the Bill and engagement with the public. MBIE is developing an implementation plan that will outline what will be done to achieve the benefits of the proposed changes. This may include information and education campaigns to support the industry in understanding the impacts of and reasoning behind the proposed legislative changes. The implementation plan will ensure that changes are progressively implemented according to Cabinet decisions, and the sector is ready when the regulations come into force on or after mid-2024.

## Analysis of options

The options were analysed using a high-level multi-criteria analysis (MCA) followed by a cost-benefit analysis (CBA) of the remaining options. The MCA was implemented to compare how each option aligns with common dimensions of regulatory system effectiveness.

Options 1b to 1d, 2b to 2d and 3b each achieve the objectives to a greater degree than the status quo. However, Options 1c, 2c and 3b achieve all objectives at least as well, and in most cases better than the other options. For instance, the impact of WMPs may be more likely to occur sooner where Option 3b might be combined with Options 1c and 2c, as amendments to the purposes and principles of the Act could signal the need for the sector to move to this approach, encouraging earlier uptake. Furthermore, stakeholders indicated support for the measures in Options 1c, 2c and 3b.

This combination of options (1c, 2c, 3b) is proposed by MBIE and is assessed in detail in the CBA.

## Detailed Cost Benefit Analysis

Table 3 summarises the results of the CBA. The full CBA, including the methodology, is provided in a supporting document.

This analysis includes assumptions about policy design that could be progressed under the enabling legislative proposals. These can be further refined through policy development and engagement prior to implementation. The analysis also includes assumptions around how the proposals may change behaviour – for instance, while the proposals analysed would not require people to invest in energy efficiency upgrades or achieve a certain degree of waste reduction, we have assumed they will cause some voluntary uptake of such services.

Analysing the preferred options' impacts from 2023 to 2050, total monetised costs are $5,650 million and total monetised benefits are $5,687 million. The net cost to society is therefore estimated at $37 million and has a benefit-cost ratio (BCR) of 1.00.

However, as the options consider enabling legislative changes, each component within this option is subject to a number of sensitivities that could result in greater net quantified benefits or in some cases costs. Further, there are a number of benefits that have the potential to be significant but have not been able to be reliably quantified due to data constraints at this time. These benefits are described qualitatively in more detail in the attached CBA and should be considered alongside the quantitative analysis.

**Limitations and Constraints on Analysis**

Key areas of uncertainty/limitations are around:

1. Exact policy design/application. This package of changes analysed would be intended to set enabling frameworks to reduce the building and construction sector's emissions and support the construction of more climate resilient buildings. Many of these proposals would require detail or regulations to be developed before they are implemented. Any such requirements would be brought to Cabinet for consideration in due course following engagement with the sector and, potentially, separate regulatory impact analysis.

2. Available data regarding expected volumes, savings, and costs. Data around construction and demolition waste volumes and practices is currently poor. New Zealand-based information about the costs of energy efficiency investments or possible volumes is also inconsistent. For the purposes of analysis, international data has been used and information from smaller New Zealand-based studies has been extrapolated.

## Key assumptions

1. Finer details of the initiatives can be determined through subsequent design or regulation. The analysis has therefore assumed certain design features in keeping with the outlined intent, though as described in the Cabinet paper *Proposed Building for Climate Change Amendments to the Building Act 2004* it is intended that certain aspects be considered further. This is also described in the implementation section. Any adjustments would need to be considered at the time of analysing the impacts of proposed regulations, and this will allow for tailoring and further consultation where appropriate.

2. Best estimates have been used and assumptions documented, supplemented by sensitivity analysis around key uncertainties that would make a material difference to the resulting analysis. Analysis was focused on the major impacts noting that sensitivity analysis should allow for any further impacts that have not been able to be explored in greater depth.

3. General consultation was undertaken as part of the ERP and National Adaptation Plan (NAP) process, which included engagement with Māori. Further focused engagement also took place with a targeted cross-industry stakeholder group and with several existing stakeholder forums, such as the Building Advisory Panel and the Construction Sector Accord.

4. Risks are highlighted in the analysis. These can then be managed and mitigated through legislative drafting, subsequent regulations and guidance, and implementation.
5. Timeframe for implementation. The assumption is that initiatives or legislation could be introduced in 2023 and progressively implemented to 2025.

**Responsible Manager(s) (completed by relevant manager)**

*Suzannah Toulmin*

*Manager, Building for Climate Change*

*Ministry of Business, Innovation, and Employment*

*23 August 2022*

**Quality Assurance (completed by QA panel)**

| | |
|---|---|
| Reviewing Agency: | Ministry of Business, Innovation, and Employment |
| Panel Assessment & Comment: | Amendments completed – primarily around making the information clear to the reader. Assessed as now meeting all requirements. |

# Section 1: Diagnosing the policy problem

This section provides background to this Regulatory Impact Statement (RIS) and the problem of emissions from the building and construction sector. It provides context on the current regulatory settings.

## Context and background of the problem

It is estimated that in 2018, the building and construction sector was responsible for 15 per cent of all New Zealand's domestic emissions (except biogenic methane). As well as direct emissions, much of this contribution comes from the emissions the sector drives in other sectors such as energy, industry, and waste.

The Zero Carbon Act requires that:

> 'Net accounting emissions of greenhouse gases in a calendar year, other than biogenic methane, are zero by the calendar year beginning on 1 January 2050 and for each subsequent calendar year.'

To achieve this, all sectors of the economy will need to reduce emissions from all greenhouse gases, except biogenic methane, to net zero by 2050. As the building and construction is a key contributor to these emissions, reaching this goal requires decarbonisation of the sector.

To this end, in April 2022, Cabinet invited the Minister for Building and Construction to report back to Cabinet Economic Development Committee to seek policy decisions on a *Building (Climate Change Response) Amendment Bill* [CAB-22-MIN-0080.01 refers]. This Bill will seek to introduce enabling legislation and new regulation-making powers to the Act, which will enable the building system to better respond to climate change.

### Consultation and engagement have informed options being considered

In 2020, the Ministry of Business, Innovation, and Employment (MBIE) publicly consulted on two emissions reduction frameworks that proposed measures to reduce the embodied carbon and improve the operational efficiency of new buildings. MBIE received 374 submissions from across the building and construction sector, with feedback on the frameworks being largely positive.

In 2021, the Government consulted to inform New Zealand's first Emissions Reduction Plan (ERP). The consultation sought feedback on a range of proposals, including proposals to lift existing buildings' energy performance and support construction waste minimisation. The consultation included a targeted webinar with a Māori audience. The ERP consultation document's building and construction section received at least 278 submissions, including at least 85 organisations. MBIE analysed a subset of key organisations' submissions, and found most submitters supported the proposals.[1]

[1] The submissions were selected from a list provided by the Ministry for the Environment based on involvement with the building and construction sector and were made up of long-form submissions and email response submissions.

In 2022, MBIE convened a targeted stakeholder group of representatives from across the sector to discuss the proposals.[2] This group has met seven times across two months. MBIE also engaged the Building Advisory Panel to provide independent strategic advice on issues facing the construction sector. These engagements have resulted in constructive feedback on the proposals and broad support from across the sector.

Significant agency consultation has also informed the proposals. The Ministry for the Environment (MfE) has been engaged in the development of the waste minimisation proposals, and the Ministry of Justice in the development of offences and penalties. Impacted agencies such as the Ministry of Housing and Urban Development and Kāinga Ora: Homes and Communities have been involved.

### Support for the Government's overarching priorities

The Government's priorities for its current term are designed to help progress a cohesive Government work programme, to assist prioritising portfolio initiatives and resourcing, and to communicate the Government's agenda. These priorities relate to three objectives. Of relevance to this RIS are *Objective 2: Accelerating the Recovery* (Objective 2) and *Objective 3: Laying the Foundation for the Future* (Objective 3).

Objective 2's focus is to accelerate New Zealand's economic recovery by investing in people, jobs, small businesses, infrastructure, and global trade. The Objective outlines a five-part economic plan. Point five of this plan is to 'prepare for the future by making the most of our competitive advantage in renewable energy and waste production.'

Objective 3's focus is on reshaping the economy to be more productive, more sustainable, and more equitable. Part of the Objective is to take further action on climate change, including a focus on sustainability and pursuing carbon neutrality. While this objective does not mention the building and construction sector specifically, its broader focus on climate change and carbon neutrality is in line with reducing the sector's emissions.

## The current policy setting

New Zealand's building and construction sector is regulated under the *Building Act 2004* (the Act). The Act is intended to protect the public's safety and property, lift the sector's performance, and promote sustainable development. The Act also establishes compliance with the Building Code, which sets the minimum performance standards buildings must meet. All building work in New Zealand must comply with the Building Code.

### Energy performance

The Building Code sets the mandatory functional requirements and performance criteria that all new building work must comply with. Clause H1 of the Building Code sets objectives, functional requirements and performance requirements to support the energy efficiency of buildings. This clause requires enclosed spaces where temperature or humidity are modified to provide adequate thermal resistance and to limit uncontrollable airflow in certain buildings.

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[2] This group included representatives from Wellington City Council, Selwyn District Council, Institute of Architects, BRANZ, Property Council New Zealand, Certified Builders, Registered Master Builders, New Zealand Green Building Council, Kāinga Ora, and the Ministry for the Environment.

It also sets out physical conditions likely to affect energy performance, and requirements for hot water systems, artificial lighting and heating, ventilation and air conditioning systems.

This Building Code clause was introduced in 1992 and strengthened in 2008, meaning that buildings constructed before those dates did not need to comply with such energy efficiency requirements.

Under the Equipment Energy Efficiency (E3) programme, New Zealand regulates the energy efficiency of products sold in New Zealand. E3 develops two measures which cover products for home, commercial and industrial use:

- Minimum Energy Performance Standards (MEPS) – these require products to meet minimum energy efficiency standards to be sold in New Zealand; and
- Mandatory Energy Performance Labelling (MEPL) – this helps consumers compare energy efficiency and running costs of different products when deciding what to buy.

MEPS and MEPL regulations encourage New Zealanders to develop, import and sell more energy efficient products. However, these measures do not regulate the energy efficiency of buildings.

The BRANZ Building Energy End-Use Study final report (2014) offers insight into the stock, operation and management of New Zealand's non-residential buildings. It confirmed historic research that total energy use is strongly related to floor area – in broad terms, larger buildings use more energy. It also found significant diversity in non-residential building construction, size, location, ownership, management and use, and similarly significant diversity in energy use, performance, and building management.

Enabling better information provision and transparency across the sector is an opportunity to lift the energy efficiency of existing buildings. Currently, tenants and building owners have limited information about the energy performance of buildings. This makes it difficult for them to understand or compare the energy efficiency or running costs of buildings they may wish to rent or buy. Building owners also have limited incentive to invest in energy efficiency features or retrofits such as insulation, efficient building services, or low-carbon designs or materials beyond minimum Building Code performance requirements. Finally, government has limited understanding of buildings' energy use at a system level. This constrains our ability to target initiatives or set requirements for buildings that are major energy users.

### Waste minimisation

The primary legislation for waste in New Zealand is the Waste Minimisation Act 2008 (WM Act). The WM Act introduced a waste disposal levy of $10 per tonne on municipal waste from 2009. This had little impact on behaviours in the construction the sector as the majority of construction and demolition waste goes to cleanfills and other disposal sites which are not currently subject to the waste disposal levy.

Since 2021 the waste disposal levy has been progressively increasing and expanding to waste facilities such as construction and demolition landfills. When the waste disposal levy finishes rising in 2024, it will provide a more significant price signal to reduce waste while also generating revenue to invest in improving the waste system (including infrastructure) and generating more data about construction and demolition waste quantities.

The Ministry for the Environment (MfE) is progressing a significant waste reduction work programme centred around Government's focus on transitioning towards a low waste, low emissions, more circular economy. through for improving foundational aspects of waste. This

work programme includes reforming the WM Act, developing a waste strategy and long-term infrastructure plan, and improving data availability and collection to support a transformation of the waste system in New Zealand. The Waste Minimisation Fund, supported by the waste disposal levy, and funding through the Covid Response and Recovery Fund have supported construction and demolition waste projects and resource recovery infrastructure.

The existing Principle (p) in the Building Act, is the only current requirement in the building regulatory system that encourages the consideration or minimisation of construction and demolition waste.[3] This principle has not been built on through other regulatory requirements.

Some councils have established bylaws that require waste minimisation plans to be provided with building consent applications.[4] Other councils are actively exploring developing their own bylaws.[5] While many of these council-led initiatives have promising waste reduction potential, they vary by council and have been challenging for territorial authorities to enforce.

Though data on construction and demolition waste is currently unreliable and incomplete, by some estimates it could account for up to 40 to 50 per cent of all material going to landfill. This results in adverse emissions impacts, primarily from the embodied emissions required to produce materials that are then not used and from the decomposition of organic materials.

**Purposes and Principles of the Act**

Section 3 of the Act states the following purposes:

- *to provide for the regulation of building work, the establishment of a licensing regime for building practitioners, and the setting of performance standards for buildings to ensure that:*
    - *people who use buildings can do so safely and without endangering their health,*
    - *buildings have attributes that contribute appropriately to the health, physical independence, and well-being of the people who use them,*
    - *people who use a building can escape from the building if it is on fire, and*
    - *buildings are designed, constructed, and able to be used in ways that promote sustainable development.*
- *to promote the accountability of owners, designers, builders, and building consent authorities who have responsibilities for ensuring that building work complies with the Building Code.*

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[3] Subsection 4(2)(p) of the Building Act 2004 states that persons performing functions or duties, or exercising powers conferred under the Act must consider the need to facilitate the reduction in the generation of waste during the construction process.

[4] Wellington City Council, Hamilton City Council, New Plymouth District Council and Selwyn District Council

[5] Auckland City Council and Dunedin City Council

It is unclear in legislation what 'sustainable development' requires. Additionally, there may be confusion as to whether it incorporates modern climate change goals, specifically promoting emissions reduction and climate resilience in line with climate change goals as set out in the Zero Carbon Act.

Section 4(2) of the Act also contains a set of 17 principles that are to be applied when the Minister, Chief Executive, a territorial or regional authority, or under subpart 6B of Part 2 of the Act, a person who may designate land or a "responsible person"[6] performs functions, duties, or exercises powers under the Act.

Relevant in the context of emissions reductions are the following six principles:

- *the importance of ensuring that each building is durable for its intended use,*
- *the costs of a building (including maintenance) over the whole of its life,*
- *the need to facilitate the efficient use of energy and energy conservation and the use of renewable sources of energy in buildings,*
- *the need to facilitate the efficient and sustainable use in buildings of*
    - *materials (including materials that promote or support human health), and*
    - *material conservation,*
- *the need to facilitate the efficient use of water and water conservation in buildings, and*
- *the need to facilitate the reduction in the generation of waste during the construction process.*

While many of the existing principles in the Act align with the climate change outcomes we are seeking to achieve, they are often not considered by those performing duties under the Act and have not been built on through building performance requirements. This suggests that the principles may be insufficiently clear where they relate to climate change goals as set out in the Zero Carbon Act. This is a barrier to the building regulatory system's ability to contribute towards our climate change goals.

## What is the policy problem or opportunity?

Three core policy problems are relevant to this RIS. Note that each of these core policy problems also intersect with a general issue around limited access to good quality information on building emissions and climate resilience.

- **The building regulatory system does not enable consumers and Government to easily understand the energy efficiency of buildings.** The information available on building energy efficiency is inconsistent and not comparable. This makes it difficult for consumers (those that lease or rent building space) and the Government to access comparable information on a building's energy performance. This means there is limited ability and incentive for building occupiers to consider information to reduce energy usage and improve the resilience of New Zealand's energy system. Three key stakeholder groups are impacted:

[6] As defined in section 133BB(1).

- **Consumers** – Consumers can find it difficult to obtain information on, or understand, the energy efficiency of buildings they may wish to buy or rent (information asymmetry problem). Buildings with high energy efficiency are unable to differentiate themselves from others, and consumers are unable to allow energy efficiency to influence their consumption choices.
- **Building owners selling, renting or leasing buildings** – These stakeholders have limited incentive to invest in energy efficiency features or retrofits such as insulation, building service designs, or materials with lower embodied carbon. That is, there is limited reward for those leasing to ensure energy efficiency due to uncertainty over the ability to recover such costs (potential market failure) and not facing the full costs of existing arrangements (externalities, including emissions that go beyond the direct consumers).
- **The Government** – Government has a limited understanding of buildings' energy use at a system level (information asymmetry/problem). An information gap exists that limits the Government's ability to target initiatives effectively. The gap makes it difficult to effectively target building policy interventions related to emissions reduction and energy efficiency.

- **The building regulatory system does not incentivise action on construction and demolition waste minimisation.** Construction and demolition waste is considered inconsistently and effort to reduce it is often not prioritised. By some estimates building and construction waste could contribute to around half of the waste going to landfill. The amount of expensive building materials going to landfill indicates that cost and consistency efficiencies can be gained from reducing waste. The lack of specific requirements for waste are likely to result in greater emissions from embodied carbon of construction materials than other options. Further, market failures are resulting in the overproduction of construction and demolition waste. These arise from negative externalities, where the production of construction waste imposes negative effects on unrelated third parties. We consider the following market failures to be present:
  - **Information asymmetry** – Building owners having limited information on the quantity of waste produced, relative to the parties generating the waste. As the costs are ultimately borne by the building owners—who have limited oversight of the unnecessary costs—and not the parties producing the waste, there is limited incentive for waste minimisation.
  - **Costs of waste are not borne by the parties involved in the construction activity** – Not all contributors to the waste bear the cost of waste, leading to overproduction. For example, designers have limited incentive to minimise waste as their revenue is fixed, i.e. regardless of the waste produced and cost to the owner their revenue will remain the same, or their revenue may decrease if they redesign a project to minimise waste and the building owner may be less satisfied with the outcome. This cost is the negative externality present in the market for construction waste.
- **There is a lack of clarity and focus on climate change for building and construction sector stakeholders and regulators.** The purposes and principles of the Act do not clearly or sufficiently reflect New Zealand's climate change goals as set out in the Zero Carbon Act. This lack of clarity does not enable building practitioners to understand their roles and responsibilities in relation to climate

change and may limit the ability for to progress building performance requirements to support emissions reduction. A lack of clearly understood legislative purpose may result in unclear or inconsistent policies, investments and changes in practice to reduce emissions and ensure buildings are climate resilient.

- Currently, the Act has the purpose of ensuring that 'buildings are designed, constructed, and able to be used in ways that promote sustainable development'. However, the legislation is not clear on what 'sustainable development' requires. The definition is open to interpretation and does not explicitly reflect the climate change goals set out in the Zero Carbon Act, which could limit or confuse future action to reduce emissions.
- Persons carrying out functions under the Act, as described under 'current policy settings' above, must adhere to the set of principles set out in section 4 of the Act. However, the status quo for waste and energy efficiency indicates they are inconsistently considered or applied. The principles also lack clarity in how they relate to the climate change goals set out in the Zero Carbon Act. This lack of clarity is a barrier to the building regulatory system's ability to contribute to the climate change goals.

There is also limited information available on building emissions and climate resilience. This issue cuts across all the core policy problems. Currently, the Government does not have the necessary information to ensure the building and construction sector contributes to the goal of net zero carbon emissions by 2050. Information is required to inform policy decisions and programmes. For example, emissions and climate resilience data can be used to inform the costs and benefits of extending energy performance rating requirements. In addition, without accurate information, there is limited ability to track the progress of the sector and amend ineffective policy decisions. As the Act currently stands, there is no power to enable information on building sector emissions and climate resilience to be collected.

Feedback from the consultation and engagement described above has supported the nature of the problems as described here.

### What objectives are sought in relation to the policy problem?

The policy problems above are interconnected, in that they all consider the building and construction sector's response to climate change. However, they have discrete causes and drivers, and would respond differently to different interventions.

This RIS therefore has three objectives to address the range of problems outlined above:

- Objective 1 (Energy Efficiency): Enable consumers, those that lease or rent building space, and the Government to have better information on the energy performance of existing buildings in such a way that improves energy efficiency across the building stock (addresses problem 1);
- Objective 2 (Waste Minimisation): Enable more consistent requirements for people to consider, recognise or reduce the social and environmental cost of construction and demolition waste (addresses problem 2); and
- Objective 3 (Align focus on climate change in Act): Align the focus for both the building sector and regulators to support building emissions reduction and climate resilience (addresses problem 3).

# Section 2: Deciding upon an option to address the policy problem

## What criteria will be used to compare options to the status quo?

We use the following criteria to assess options, which are broadly aligned with the common dimensions of regulatory system effectiveness outlined by the Treasury:

- **Effective** - to what extent does the option deliver the intended outcomes and impacts
- **Efficient** - to what extent does the option minimise unintended consequences and undue costs and burdens
- **Durable and resilient** - how well does the option cope with variation, change and pressures
- **Fair and accountable** - how well does the option respect rights and deliver good process

As part of this analysis, we have considered whether options meet the objectives of this RIS, and if so, which best support the objectives and are expected to provide the greatest net benefits (considering both qualitative and quantitative benefits). Consideration has been given to distributional impacts and views of stakeholders raised during consultation.

## What scope will options be considered within?

The scope of the options considered in this RIS are only options that support the objectives stated above. That is, changes to the Act unrelated to climate change have not been considered, nor have those that address alternative problems (including those that form part of the wider BfCC package that would not require legislative change).

## What options are being considered?

A suite of 11 options is considered in this RIS. Because the objectives are distinct and are likely to respond differently to different interventions, the options are considered separately on a per objective basis.

### Options to address Objective 1 (Energy Efficiency)

- 1a – Status quo
- 1b – Provide greater non-regulatory support to voluntary energy performance rating systems
- 1c – Amend the Act to require buildings to hold an energy performance rating
- 1d – Amend the Act to require buildings to hold an energy performance rating and meet a minimum acceptable energy performance level

### Options to address Objective 2 (Waste Minimisation)

- 2a – Status quo
- 2b – Provide greater non-regulatory support to voluntary or Council-mandated waste minimisation requirements

- 2c – Amend the Act to require a Waste Minimisation Plan to be submitted when seeking a building consent (*without* mandating minimum waste minimisation requirements)
- 2d – Amend the Act to require a Waste Minimisation Plan, with mandatory waste minimisation requirements, to be submitted when seeking a building consent

**Options to address Objective 3 (Clarify role of climate change in Act)**

- 3a – Status quo
- 3b – Amend the Act's purposes and principles and enable the collection of information to align the sector and regulators' focus on building emissions reduction and climate resilience

## Alternative options not considered in depth

Several other options were briefly examined as solutions to the problems stated above. While these would address the problems, they each had attributes that meant they were inadequate (not in scope or would not address the objectives), and we consequently chose to exclude them from further analysis.

We summarise the alternative options and the reasons for their exclusion in Table 1 below. We note that for the problems inherent in the purposes and principles of the Act, no alternative solutions were considered.

**Table 1: Alternative options considered**

| Problem | Alternative solution | Reason for exclusion |
|---|---|---|
| All problems. | Develop full and prescriptive legislation to address each problem (as opposed to progressing enabling legislation). | Legislation of all the options would not be sufficiently flexible to adapt to processes and options as required. |
| Consumers, building owners, and the Government have limited information on the energy performance of existing buildings. | Set requirements for building owners to self-report specific information on energy performance. | This would be similar to the energy performance rating, more difficult for non-technical stakeholders to engage with, and significantly more difficult to achieve consistency and compliance across the sector. |
| There are no standard and enforced requirements in the building regulatory system that encourage the consideration or minimisation of construction and demolition waste. | Adjust waste disposal levy that applies to construction and demolition waste. This would internalise the negative externality.[7] | The waste levy has only recently been adjusted to cover construction and demolition waste. We are therefore looking at what is needed alongside the levy, which may |

[7] The negative externality arises from the social cost of construction and waste being greater than the private cost, resulting in overproduction, or in this case, more waste than the socially optimum outcome.

| | | |
|---|---|---|
| | | be hard to tailor perfectly to the externality in all cases.<br><br>In addition, price alone is not the only market failure. There is also a significant information asymmetry that leads to costs being passed on. The costs of waste do not always fall upon the party best able to influence waste outcomes (e.g., sub-contractors). |
| It is unclear that the current purposes and principles of the Act enable actions to drive emissions reduction, such as capping operational emissions and embodied carbon. | Publish a sector-wide announcement to inform the sector of the potential for upcoming regulatory change aimed at reducing emissions. | Does not set a long-term or predictable framework for change and may create potential for legal challenge. |
| Building emissions and climate resilience information is limited. | Ask sector participants to report or release information. | The proposals allow for this but the regulations that will apply to requirements are intended to consider what information is of sufficient value to warrant the cost of provision. Including through regulation allows greater ease of adjustment where this may be appropriate. |

## Describe the options in detail

The following section describes the 11 options in detail, as they correspond to each of the three objectives.

### Objective 1: Enable consumers, those that lease or rent building space, and the Government to have better information on the energy performance of existing buildings in such a way that improves energy efficiency across the building stock

- *1a – Status quo*

  Under this option, there will be no changes to the Act or regulations to assist the building and construction sector to achieve the goals stated in the ERP. Existing industry processes and initiatives to understand and improve buildings' energy efficiency, such as Building Code minimum performance requirements for new buildings and voluntary energy rating schemes like NABERSNZ (the New Zealand equivalent of the National Australian Built Environment Rating System), Home Star and Greenstar, will be relied on to reach near-zero emissions. [8]

[8] NABERSNZ is a system for rating the energy efficiency of existing office buildings. Home Star is a system for rating residential buildings at the design stage. Greenstar is a system or rating commercial buildings at the design stage.

Limited information about existing buildings' energy performance would be available to support consumer decision-making and would be limited incentive for building owners to understand or lift their buildings' energy performance.

- *1b – Provide greater non-regulatory support to voluntary energy performance rating systems*

  Under this option, there will be no changes to the Act or regulations to assist the building and construction sector to achieve the goals stated in the ERP. Existing industry processes and initiatives will be relied on to reach near-zero emissions.

  Additional non-regulatory support such as communications, guidance or financial incentives would be offered to support uptake of existing energy performance initiatives like NABERSNZ, Home Star and Greenstar.

- *1c – Amend the Act to require buildings to hold an energy performance rating*

  Under Option 1c, the pathway to achieving near-zero emissions will be assisted using several key requirements focused on requiring energy performance ratings and improving the quality of information. The requirements include amending the Act to:

  - *Introduce building energy performance rating requirements.* Owners of certain buildings will be required to hold and display a current energy performance rating. It is expected that regulations that specify requirements apply to new and existing commercial, public, industrial, and large multi-level apartment buildings in the first instance, based on these buildings' greater relative emissions on a per building basis, and therefore greater potential benefit. There may be building size thresholds to exclude cases where the requirements would be unduly onerous. Those leasing building space will be incentivised to invest in energy usage improvements as a higher rating can be rewarded in the market. This requirement provides an opportunity to improve the existing and future building stock's energy performance.

- *1d – Amend Act to require buildings to hold an energy performance rating and set a minimum acceptable energy performance level*

  In addition to the requirements set in Option 1c, this option would also set a minimum acceptable energy performance level that buildings must exceed to be rented or sold. It could be an offence to sell or rent a building that has been rated as having energy efficiency at a lower level than the acceptable threshold. This threshold would be set in regulations at a later date (following separate regulatory impact analysis) and reviewed regularly to drive progressive improvement in the performance of the existing building stock.

  This option would functionally require buildings with poor energy performance to be upgraded if their owner is to receive benefit from them.

**Objective 2: Enable more consistent requirements for people to consider, recognise or reduce the social cost of construction and demolition waste (information, regulatory and externality issues)**

- *2a – Status quo*

Under this option, there will be no changes to the Act or regulations to assist the building and construction sector to achieve the goals stated in the ERP. Existing industry and Government processes and initiatives to reduce construction and demolition waste, such as some existing Council-mandated waste minimisation plan requirements, will be relied on to reduce waste and reach near-zero emissions. Some level of increased information collection will be enabled under the Waste Minimisation Act.

- *2b – Provide greater non-regulatory support to voluntary or Council-mandated waste minimisation requirements*

  Under this option, there will be no changes to the Act or regulations to assist the building and construction sector to achieve the goals stated in the ERP. Existing industry and Government processes and initiatives to reduce construction and demolition waste will be relied on to reach near-zero emissions. Some level of increased information collection will be enabled under the Waste Minimisation Act.

  Additional non-regulatory support such as communications, guidance or financial incentives would be offered to support uptake of existing waste minimisation resources such as the BRANZ REBRI toolkit, or waste management services such as Green Gorilla.[9]

- *2c – Amend the Act to require a Waste Minimisation Plan (without mandating minimum waste minimisation requirements)*

  Under this option, the pathway to achieving near-zero emissions will be assisted using several key requirements focused on waste management and the quality of information. The requirements for Option 2c include amending the Act to:

  - *Require Waste Minimisation Plans*. Building consent applicants and those demolishing buildings would be required to develop and provide a Waste Minimisation Plan that outlines how they have considered designing out waste, and how re-use, recycling, and waste reduction will be realised during construction. Consistent but flexible minimum standards for these Waste Minimisation Plans could be set to enable tailoring to local circumstances, particularly around each area's waste management and resource recovery facilities. Regulations could specify to which building types and demolition projects these requirements apply.
  - Waste Minimisation Plan would be required at the same time as a building consent application is submitted, though the consent's approval will not depend on the plan.

[9] BRANZ's Resource efficiency in the building and related industries (REBRI) toolkit focuses on reducing the amount of building material wastes generated at construction and demolition sites that would otherwise be sent to landfill. Green Gorilla provides Auckland-based commercial waste collection, recycling & diversion services.

- Under this option there would be no required or minimum amount of waste that must be reduced or diverted from landfill. The process of developing the Waste Minimisation Plan would in of itself enable waste minimisation.

Penalties and infringement notices will be introduced to support compliance with these requirements. These are provided in Appendix One: Proposed offences and penalties.

- *2d – Amend the Act to require Waste Minimisation Plans and set minimum requirements on waste minimisation or diversion from landfill*

  In addition to the requirements set in Option 2c, this option would also set a minimum amount of waste that must be reduced or diverted from landfill in order for the building consent to be provided (for instance, 20-25% less waste than the average construction site). It could be an offence to not reduce or minimise waste to the level set out in the Waste Minimisation Plan. This threshold would be set in regulations at a later date (following separate regulatory impact analysis) and reviewed regularly to drive progressive improvement in waste minimisation and consider expanding waste infrastructure.

**Objective 3: Align the focus for both the building sector and regulators to support building emissions reduction and climate resilience**

- *3a – Status quo*

  Under this option, there will be no changes to the Act or regulations to assist the building and construction sector to achieve the goals stated in the ERP.

  *3b – Amend the Act's purposes and principles and enable the collection of information to align the sector and regulators' focus on building emissions reduction and climate resilience*

  Key changes under Option 3b include:

  - *Amending one of the Act's purposes to focus on promoting emissions reduction and climate resilience*. The amendment will enable building work, building practitioners, and buildings' performance standards to be regulated to reduce emissions and ensure climate resilience. It will send a signal that the sector needs to consider climate change and the emissions implications of their decisions. As part of these changes, it will be clarified that they provide grounds for regulation in the Building Code to be created to reduce the operational and embodied carbon emissions of buildings.
  - *Introducing new climate change principles to the Act*. The principles will be reorganised and contextualised in a modern climate change framework. Three new/reorganised principles are proposed around:
    - The need to ensure that buildings minimise whole-of-life embodied carbon emissions.
    - The need to ensure that buildings have a high level of operational efficiency while having attributes that contribute appropriately to the health, physical independence, and well-being of the people who use them.

        - The need to ensure that buildings are built to be resilient to changing climate conditions.

    - *Providing MBIE with the ability to collect information on building emissions reduction and climate resilience.* This information will be required to support emissions reduction, climate resilience, and enable consumers to assess and compare the embodied carbon, operational efficiency, and climate resilience of buildings. The information will assist future policies and track progress towards achieving near-zero emissions. It will also allow consumers to alter their consumption choices.

### Multi-criteria analysis of options against objectives

A multi-criteria analysis (MCA) was conducted by MBIE. The MCA compared the options, depending on the extent to which they meet the objectives described in Section 1.

Options 1c, 2c, and 3b each achieve the objectives to a greater degree than the status quo. However, the combination of Options 1c, 2c and 3b achieves all objectives at least as well, and in most cases better than each of the options as a standalone. Further, stakeholders indicated support for the components of the preferred option.

## How do the options compare to the status quo/counterfactual?

**Table 2: Multi-criteria analysis comparison of options**

**Objective 1:** Enable consumers, those that lease or rent building space, and the Government to have better information on the energy performance of existing buildings in such a way that improves energy efficiency across the building stock.

| **Criteria** | Option 1a – Status quo | Option 1b – Provide greater non-regulatory support to voluntary energy performance rating systems | Option 1c – Amend the Act to require buildings to hold an energy performance rating | Option 1d - Amend Act to require buildings to hold an energy performance rating and meet a minimum acceptable energy performance level |
|---|---|---|---|---|
| **Effective** | 0<br>Information on building energy efficiency is inconsistent and not comparable. This makes it difficult for consumers, those that lease or rent building space, and the Government to access comparable information on a building's energy performance. | +<br>Would generate some additional consumer information about building energy efficiency, but it is unlikely to be consistent or comparable and may not drive consumer decision-making. Voluntary requirements would not consistently drive action or investment by building owners to reduce emissions. | +++<br>Would generate more complete and comparable consumer information about building energy efficiency, and as requirements are consistent and mandatory are more likely to drive action or investment by building owners to reduce emissions. | ++<br>Would generate more complete and comparable consumer information about building energy efficiency, and as requirements are consistent and mandatory are more likely to drive action or investment by building owners to reduce emissions.<br>A minimum acceptable energy performance level may increase energy efficiency, but is likely to affect buy-in to the programme if building owners are unable to affordably meet acceptable performance levels or find these levels onerous or not credible. |
| **Efficient** | 0<br>Voluntary energy ratings schemes will continue, with existing limited levels of uptake. Greater awareness of climate change and carbon Neutral Government Programme requirements may drive a small increase in ratings.<br>Buildings with poor energy efficiency will be less likely to hold a rating, and when they are rated this information is less likely to be disclosed to potential tenants. | +<br>Greater uptake of ratings than status quo, but likely to result in lower and less consistent uptake of ratings than a mandatory scheme.<br>Buildings with poor energy efficiency are less likely be rated, and where they are rated are less likely to disclose this information to potential tenants.<br>Consumers would largely continue to have inconsistent and non-comparable information about buildings' energy efficiency. | ++<br>Sets consistent and understandable requirements, which would support building owners and tenants' understanding of their responsibilities.<br>Relatively simple to administer and enforce using existing energy performance rating systems. | +<br>Sets consistent and understandable requirements, which would support building owners and tenants' understanding of their responsibilities.<br>Would be complex and costly to develop, administer and enforce credible minimum levels of energy performance, and may not work with existing energy performance rating systems. May result in owners of buildings that are not energy efficient (e.g. heritage buildings) being unable to sell or rent them, leading to increased vacant building stock. |
| **Durable and resilient** | 0<br>Provides limited ability for building occupiers to consider information to reduce energy usage and improve the resilience of New Zealand's energy system. Will not result in long-term or systemic improvements to energy efficiency, which is required to progress the building sector's climate change response. | +<br>While it may improve information that is available to some building users and lead to small improvements in energy efficiency, this option is unlikely to result in long-term, systemic improvements in energy efficiency that are needed to progress the building sector's climate change response. | +++<br>Energy performance ratings for buildings will provide information to improve energy efficiency, and in doing so contribute to the resilience of the wider energy system.<br>This option also contributes to sustainable long-term system improvements to building energy efficiency, which is needed to progress the building sector's climate change response. | ++<br>Energy performance ratings for buildings will provide information to improve energy efficiency, and in doing so contribute to the resilience of the wider energy system.<br>This option also creates some long-term systemic improvements to the building and construction sector, but is likely to be costly, unsustainable and result in significant disruption for the sector. |
| **Fair and accountable** | 0<br>Information asymmetry continues between building owners and potential tenants. Consumers | +<br>Only a proportion of buildings are energy rated and there will be incomplete information available | +++<br>Addresses information asymmetry between | +<br>Addresses information asymmetry between |

| | | | | |
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| | who lease or rent building space will find it difficult to obtain comparable information on the energy performance of buildings.<br>Potential tenants cannot know the operational costs of running a building before they take on a lease, which may result in unaccounted for costs. | to building users to compare a building's energy performance.<br>There may be inconsistency with who is able to access support, creating potential distributional impacts. | building owners and potential tenants and creates consistent requirements for all building owners.<br>Provides flexible, non-compulsory opportunities for building owners to increase their buildings' energy efficiency if it is cost-effective or reasonable for them to do so for their specific situation.<br>More information means owners of buildings that are not energy efficient may find it more difficult to sell or rent buildings without investing in recommissioning or energy efficiency upgrades. | building owners and potential tenants and creates consistent requirements for all building owners.<br>There are likely to be distributional impacts, where some building owners will have to invest more to meet the standards than others, and could pass these costs on to tenants.<br>Owners of buildings with poor energy efficiency may be unable to afford to upgrade them to a minimum level required to rent or sell them, resulting in stranded assets. |
| **Overall assessment** | 0 | + | +++ | ++ |

**Objective 2:** Enable more consistent requirements for people to consider, recognise or reduce the social and environmental cost of construction and demolition waste.

| **Criteria** | Option 2a – Status quo | Option 2b – Provide greater non-regulatory support to voluntary or Council-mandated waste minimisation requirements | Option 2c – Amend the Act to require a Waste Minimisation Plan to be submitted when seeking a building consent | Option 2d – Amend the Act to require a Waste Minimisation Plan, with mandatory waste minimisation requirements, to be submitted when seeking a building consent |
|---|---|---|---|---|
| **Effective** | 0<br>Construction and demolition waste is considered inconsistently and effort to reduce it is rarely made.<br>Some Councils require waste minimisation plans and some building projects make use of waste minimisation infrastructure or services. | +<br>Could support some increased uptake and understanding of existing Council-mandated waste minimisation plan requirements, and development of new requirements by some Councils.<br>Construction and demolition waste may be considered more regularly and effort to reduce more regularly made.<br>Enforcement remains difficult and implementation remains inconsistent across New Zealand. | +++<br>A consistent nationwide requirement for waste minimisation plans with consistent enforcement will result in greater reductions in emissions from embodied carbon of construction materials. | +++<br>A consistent nationwide requirement for waste minimisation plans with consistent enforcement will result in greater reductions in emissions from embodied carbon of construction materials.<br>Setting minimum waste diversion requirements may reduce waste, but be difficult to implement equitably and without unintended consequences given the diversity of building types, local, and on-site conditions. It would require a significant amount of information that could be onerous to collect and be complex to administer. |
| **Efficient** | 0<br>By some estimates building and construction waste could contribute around half of the waste going to landfill.<br>The amount of expensive building materials going to landfill indicates that cost and consistency efficiencies can be gained from reducing waste. | +<br>Requirements may be clear within individual regions but differ between regions. This can be confusing and inefficient for designers and builders that operate between multiple regions.<br>Inconsistencies between Council waste minimisation plans can make it difficult for building participants to understand requirements and for decision-makers to obtain comparable information. | +++<br>Consistent, comparable, national Waste Minimisation Plan requirements will enable building participants to implement this requirement more easily and will provide better performance information for decision makers. Provides flexibility for different and appropriate waste minimisation opportunities to be considered in different regions or projects. | ++<br>Will provide the benefits of consistent, comparable, national plans. However, minimum requirements could be difficult to consistently enforce because of the different factors involved in generating building and construction waste. May also create unintended consequences or significant costs for building owners, which could drive non-compliance or reduce building activity. This would also put the focus on reducing waste from the site to landfill, rather than on better designs to reduce emissions further up the supply chain. |
| **Durable and resilient** | 0 | + | +++ | + |

| | | | | |
|---|---|---|---|---|
| | There are no clear or future-proofed considerations around waste in the regulatory system.<br>The lack of specific requirements for waste are likely to result in greater emissions from embodied carbon of construction materials than other options. | There are no clear or future-proofed considerations around waste in the regulatory system.<br>Inconsistent requirements will likely result in less concerted action to reduce waste and result in greater emissions from embodied carbon of construction materials than other options. | Sets a clear and future-proofed framework for considerations around waste in the regulatory system, which is complementary with MfE's waste minimisation work programme.<br>Consistent national requirements will be more straightforward to implement and likely to lead to less wastage and lower embodied carbon emissions form building materials. | Sets a clear framework for considerations around waste in the regulatory system, which is complementary with MfE's waste minimisation work programme.<br>However, mandatory waste minimisation requirements are likely to be difficult to measure or implement. They may affect the credibility of and buy-in from building stakeholders to this programme over the longer term and may have unintended impacts on the viability of some construction processes. |
| **Fair and accountable** | 0<br>Building owners bear the cost of higher levels of waste being transferred to landfills. | +<br>Building owners bear the cost of higher levels of waste being transferred to landfills in much of the country.<br>Inconsistent Council waste requirements could impose greater obligations on some building participants than others and have different degrees of penalties and levels of enforcement. | +++<br>Building owners are less likely to bear the cost of higher levels of waste being transferred to landfills in much of the country.<br>Nationally consistent requirements for waste minimisation plans would treat all building participants equally and enable people to understand more easily what is required of them. | +<br>Building owners are less likely to bear the cost of higher levels of waste being transferred to landfills in much of the country. However, they may bear increased costs from waste diversion that may not be appropriate to their region or project.<br>Mandatory levels of waste minimisation would create distributional impacts as some types of building work and localities may be unable to achieve the requirements without significant costs (e.g. rural areas being less able to access waste infrastructure). |
| **Overall assessment** | 0 | **+** | **+++** | **++** |

**Objective 3:** Align the focus for both the building sector and regulators to support building emissions reduction and climate resilience.

| **Criteria** | Option 3a – Status quo | Option 3b – Amend *the Act's purposes and principles and enable the collection of information to align the sector and regulators' focus on building emissions reduction and climate resilience* |
|---|---|---|
| **Effective** | 0<br>The purpose of the current Act is unclear in relation to climate change. This lack of clarity does not enable building practitioners to understand their roles and responsibilities in relation to climate change and may limit the ability for MBIE to progress building performance requirements to support emissions reduction.<br>Lack of information makes it difficult to progress, support or monitor success of initiatives to reduce emissions. | +++<br>Embeds a focus on promoting emissions reduction and climate resilience in the building system. Sends a signal that it is a core responsibility of building sector participants and regulators to consider the climate change and emissions implications of their decisions. Creates clear framework for MBIE to progress future building performance requirements that may be needed to support emissions reduction.<br>Information collection powers support the development, measurement and stewardship of future initiatives to progress emissions reductions and climate resilience. |
| **Efficient** | 0<br>A lack of clearly understood legislative purpose may result in unclear or inconsistent policies, investments and changes in practice to reduce emissions and ensure buildings are climate resilient. | ++<br>This option will enable regulators of building work, building practitioners, and those implementing building performance standards to more predictably and consistently introduce policies, investments and changes in practice that will be required to reduce emissions and ensure buildings are climate resilient. |

| | | |
|---|---|---|
| | Lack of information means inefficient and bespoke measures or proxies need to be used to support or monitor success of initiatives to reduce emissions. | Supports development of more coherent and efficient information collection systems, rather than requiring bespoke or ad hoc development and collection. |
| **Durable and resilient** | The unclear legislation and lack of information may not enable future regulatory or other system changes that may be needed to progress the building and construction sector's contribution to New Zealand's goal of achieving net zero carbon emissions by 2050. | +++<br>An enabling and future-proofed legislative and information collection framework whose principles require decision makers to consider how to reduce the operational and embodied carbon emissions of buildings will send a stronger signal that progressive reductions emissions will be required to achieve our climate change goals. |
| **Fair and accountable** | The lack of clarity in legislation and information collection means that the impacts of reducing emissions could fall unequally as some building sector parties undertake voluntary action, while others do not. Results in other sectors of the economy needing to take action to achieve net zero carbon emissions by 2050. | ++<br>A clear signal will be provided to all parties in the building sector that there is to be a focus on emissions reduction and climate resilience in the building system. Will support fair and consistent processes and decision-making in future information collection and policy and initiative development. |
| **Overall assessment** | 0 | **+++** |

**Scoping framework:**

| | |
|---|---|
| **+++** | significantly better than the status quo |
| **++** | better than the status quo |
| **+** | slightly better than the status quo |
| 0 | about the same as the status quo |

### A combination of options 1c, 2c and 3b is expected to best meet all the policy objectives

A combination of options 1c, 2c and 3b (the preferred combination of options) is best placed to meet the objectives of the RIS. When rated against the status quo across the three objectives, the preferred combination of options score highly.

The preferred combination of options will enable action to support emissions reduction and climate resilience. Waste Minimisation Plan requirements will act to minimise construction waste and reduce the associated environmental consequences. Buildings being required to hold an energy performance rating will aim to address the negative externalities associated with overconsumption of energy. Enabling information to be collected by MBIE will positively impact policies targeted at emissions reduction and climate resilience while amending the principles and purposes will place further focus on undertaking emissions reduction action.

The preferred combination of options also best supports actions under the ERP:

- The proposed Waste Minimisation Plan requirements support the Building and Construction Chapter's action to progress regulatory change to reduce embodied emissions of new buildings (Action 12.1.1), as well as the Waste Chapter's focus on reducing and diverting construction and demolition waste to beneficial uses (Focus Area 3).
- The proposed energy rating requirements support the Building and Construction Chapter's focus on improving building energy efficiency (Focus Area 3).
- The proposed clarifications to the Act's purpose and principles support the Building and Construction Chapter's action to establish an enabling legislative framework to set the foundations for future emissions reduction (Action 12.5.5).

The preferred combination of options will clarify how the sector will support emissions reduction and climate resilience while specifying how this action may evolve. The Waste Minimisation Plan, mandatory energy ratings, and information collection signal pathways through which the sector supports emissions reduction and climate resilience. In addition, amending the purposes and principles will signal and ease future legislative adjustments that may occur as part of the BfCC programme or over time.

### What are the marginal costs and benefits of the option?

Option 1c, 2c, and 3b are assessed in a detailed CBA. Potential costs and benefits are assessed from an economic perspective, focusing on the total resource loss or gain to New Zealand and the potential impact of emissions reduction or abatement.

The detailed CBA results and methodology is attached in a supporting document. In line with CBA best practice, the values reported below are for the marginal costs and benefits. That is, the figures reported are stated as incremental to the status quo.

Table 3 summaries the results of each option assessed in the CBA.

**Table 3: Summary of each option's results**

| (Million) | Option 1c | Option 2c | Option 3b |
|---|---|---|---|
| **Total monetised costs** | $830 | $4820 | Considered qualitatively due to potential cost and benefits largely being indirect. |
| **Total monetised benefits** | $801 | $4886 | |
| **Non-monetised benefits** | High (see Table 5) | Medium to high (see Table 6) | |
| **Net result** | $29 | $66 | |
| **BCR** | $0.96 | $1.01 | |

Costs and benefits are further categorised as direct or indirect. Direct impacts are those immediately associated with the option, whereas indirect impacts occur as a by-product of the option. Direct costs equate to $47 million. These costs are largely driven by the costs to the Government from implementing and monitoring the schemes, and to building owners from obtaining and renewing ratings. Indirect costs are $5,604 million and indirect benefits are $5,687 million. Interestingly, all benefits are indirect, though the majority of costs are also indirect with only a small portion of direct costs.

We note the figures do not account for the significant non-monetised benefits, such as impact on asset values or economic and employment opportunities that may be created for energy rating assessors or waste minimisation services. Opportunities to further quantify these benefits can be considered as the proposals are developed further. The information collection provisions considered in this analysis will play a key role in further supporting the quantification of benefits.

The options have not monetised the impacts from the information gathering requirements and the amendments to the purposes and principles. This is largely due to the inability to gather sufficient data and difficulty in measurement of the outcomes. Instead, these are qualitatively explored.

### Considerations

Table 4 summarises the considerations made in the CBA.

**Table 4: Considerations of the CBA**

| Considerations | Description |
|---|---|
| **Assumed certain design features** | The proposed changes set the legislative framework needed for future changes, with finer details of design of the initiatives intended to be determined through future regulations. The analysis has therefore assumed certain design features in keeping with the outlined intent. Though as described in the Cabinet paper it is intended that certain aspects be considered further. This is also described in the implementation section. |

| | |
|---|---|
| | The impact of any adjustments would need to be considered at the time of analysing the impacts of proposed regulations, but this will allow for tailoring and further consultation where appropriate. |
| **Best estimates and assumptions have been used where uncertainty exists** | All costs are estimated and based on limited cost information, in particular regarding construction and demolition waste quantities for which there is currently poor data. Best estimates have been used and assumptions documented, supplemented by sensitivity analysis around key uncertainties that would make a material difference to the resulting analysis. Analysis was focused on the major impacts, noting that sensitivity analysis should allow for any further impacts that have not been explored in greater depth. |
| **Non- monetised benefits have been identified and caveated** | Given the constraints and uncertainty in the data on which the analysis is based, it has been easier to quantify and monetise costs and more difficult to do so with benefits. Non-monetised benefits have been identified, described and appropriately caveated but have not been incorporated into the quantitative CBA. |
| **Consultation was limited to that of the NAP, the ERP, and targeted stakeholder groups** | Consultation was undertaken on the draft NAP and ERP as well as engagement with a targeted group representing cross-industry stakeholders and engagement with several existing stakeholder forums, such as the Building Advisory Panel and the Construction Sector Accord. Consultation is outlined in more depth in Section 1 of this RIS. |
| **Risks are highlighted where possible** | Risks are highlighted in the analysis, which can then be managed and mitigated through legislative drafting, subsequent regulations and guidance, and implementation. |

Following these considerations, the CBA estimated the marginal costs and benefits for Options 1c, 2c and 3b. The results for each option are followed by sensitivity testing of the key areas of uncertainty. The impacts of the information requirements and the amendments to the purposes and principles are qualitatively explored below the CBA results.

### Key parameters

The key parameters used to derive the CBA results are listed below:

- A discount rate of five per cent was used in line with the Treasury's guidance.
- The present value impacts are analysed out to 2050 to align with Zero Carbon Act's goal of near-zero emissions by 2050.
- Implementation costs are spread over 2024 and 2025.
- Impacts linearly increase over five years from 2025.

## CBA results for Option 1c (energy performance ratings)

Option 1c results in total monetised costs of $830 million and total monetised benefits of $801 million. These result in a net benefit of -$29 million and BCR of 0.96.

Option 1c's results are displayed in Table 5 below. The figures stated are for the scenario in the CBA with industrial buildings included.

**Table 5: CBA results for Option 1c (present value to 2050)**

| Affected groups | Comment | Impact (millions) | Evidence Certainty |
|---|---|---|---|
| **Additional costs compared to taking no action** | | | |
| Building owners | New ratings for buildings (ongoing) | $37 (direct) | Medium |
| | Metering upgrades (one-off) | $0.8 (indirect) | Medium |
| | Energy efficiency upgrades (ongoing) | $789 (indirect) | Low |
| Government | Implementation and monitoring of Energy Performance Ratings (one-off and ongoing) | $3.5 (direct) | Medium |
| **Total monetised costs** | | **$830** | Medium |
| **Additional benefits compared to taking no action** | | | |
| Building users | Power bill savings (ongoing) | $688 (indirect) | Low |
| All New Zealanders, including to the environment | GHG emissions reduction (ongoing) | $113 (indirect) | Low |
| **Total monetised benefits** | | **$801** | Medium |
| **Non-monetised benefits** | • Health, wellbeing, and productivity benefits<br>• Asset values<br>• Energy infrastructure demand decreases | High | |

### Sensitivity of Option 1c's results

Option 1c's sensitivity testing focuses on assumed energy savings, and assumed energy costs, given these are the largest drivers of costs.

**The cost-effectiveness of energy performance ratings will depend on the payback period and efficacy of energy efficiency upgrades and the extent to which energy reduction can be achieved in the industrial sector.**

Under our current modelling of the energy performance ratings, we estimate a BCR of 0.96 from the impacts of introducing energy performance ratings. This incorporates assumptions that energy performance ratings drive some people to invest in energy efficiency improvements for their buildings. This outcome is dependent on a number of uncertain parameters relating to the cost and efficacy of energy efficiency upgrades. We have tested these outcomes through sensitivity analysis below. However, note that in reality it is most likely that building owners will undertake their own analysis to understand if the costs of particular energy efficiency upgrades or actions on their buildings will outweigh costs. The

policy proposals being analysed do not include requirements to invest in energy efficiency upgrades.

To test these outcomes, we undertook three sets of sensitivity tests to determine the impacts of changing these parameters on our results:

1. Payback period of 1, 3 (base) and 5 years for energy efficiency upgrades
2. Proportion of existing buildings able to undertake no-cost upgrades from 0 per cent, 10 per cent (base) and 15 per cent
3. Changes to the energy use intensity (EUI) reduction rate of -50 per cent, 0 per cent (base) and +50 per cent.

Our first set of tests found that an increase in the payback period to 5 years decreased the BCR to 0.57 while a payback period of 1 year increased the BCR to 2.55. This suggests that even with a longer payback period, there could still be an argument for the policy if the non-quantified benefits are determined to be significant enough.

Our second set of tests found that where 15 per cent of existing building stock were able to undertake no-cost upgrades, the BCR increased to 1.02. However, where none of the existing buildings are able to undertake no-cost upgrades, the BCR decreased to 0.87.

However, our third set of tests found that a 50 per cent reduction in the effectiveness of EUI reductions resulted in the BCR decreased to 0.47, while a 50 per cent increase in effectiveness increased the BCR to 1.46. This suggests that the effectiveness of upgrades to achieve the desired reductions in energy usage (approximately an additional 1.5 per cent in EUI reduction from baseline levels) is a critical parameter for the model to achieve a positive BCR.

Furthermore, while we have incorporated the industrial sector into our modelling, we recognise that the profile of buildings in this sector may not all be suitable for energy efficiency upgrades. We find that as long as the product of the percentage of each of these factors exceeds approximately 75 per cent, there is a resulting positive net present value. That is, if we assume 100 per cent of the resulting EUI reduction and 75 per cent of the average floor area is due to buildings captured by the policy, then there is still a positive net present value from the policy. If these factors were to be significantly reduced (e.g. less than 75 per cent of the average floor industrial area is impacted by the policy), this would likely reduce the BCR to below 1.0.

### CBA results for Option 2c (Waste Minimisation Plan)

Option 2c results in total monetised costs of $4,820 million and total monetised benefits of $4,886 million. These result in a net benefit of $66 million and BCR of 1.01.

Under this option, we have assumed that Waste Minimisation Plans would be required when a building consent is sought for new building work, and when demolishing a building. Waste diversion quantities (which is the main driver of costs) are based on maximum feasible waste diversion rates for different material types (timber, glass, concrete, etc.), which we have assumed can be achieved from 2030. We note that other interventions, such as the MfE's work on waste, is also underway and care will need to be taken to attribute the potential benefits from this intervention to its costs.

Option 2c's results are displayed in Table 6 below.

**Table 6: CBA results for Option 2c (present value to 2050)**

| Affected groups | Comment | Impact (million) | Evidence Certainty |
|---|---|---|---|
| **Additional costs compared to taking no action** | | | |
| Building owners | Material recovery cost – recycling and re-use (ongoing) | $4,816 (indirect) | Medium |
| Government | Implementation and monitoring of Waste Minimisation Plan (one-off and ongoing) | $6 (direct) | Medium |
| **Total monetised costs** | | **$4,820** | Medium |
| **Non-monetised costs** | | | |
| **Additional benefits compared to taking no action** | | | |
| Building owners | Avoided landfill disposal costs (ongoing) | $2,377 (indirect) | Medium |
| | Avoided material costs (ongoing) | $1,479 (indirect) | Medium |
| All New Zealanders, including to the environment | Avoided costs of embedded emissions | $724 (indirect) | Medium |
| | Avoided disamenity cost of landfill | $195 (indirect) | Medium |
| | Avoided natural gas use from incinerated timber | $112 (indirect) | Medium |
| **Total monetised benefits** | | **$4,886** | Medium |
| **Non-monetised benefits** | • Alignment with Māori values and concepts<br>• Impacts on biodiversity<br>• Reduced susceptibility to environmental impacts such as floods<br>• Jobs created through the development of the recycling, material recovery and reuse industry<br>• Waste prevention through low-waste design and improved on-site management<br>• Reduced pollution to land, air and water from heavy metals and toxic chemicals.<br>• Cost savings for building owners and developers from not paying for materials that are not needed | Medium to High | |

| | | | |
|---|---|---|---|
| | • Avoided emissions from more efficient building designs leading to needing and using less materials | | |

### Sensitivity of Option 2c's results

The key sensitivity for Option 2c lies in material recovery costs and waste volumes. We also tested the time period of analysis. Other sensitivities are not reported, though it is noted that the largest cost category already reflects recent changes in landfill costs as a result of changes to the waste levy. Further analysis when developing the regulations will further consider sensitivities in relation to material costs, the inclusion of additional materials if data becomes available, any changes if appropriate to assumptions around future carbon prices (or updates to emissions factors) or changes to gas prices.

**Material recovery costs**

The net present value (NPV) is highly sensitive to the material recovery costs, which, depending on assumption sources, could result in a range from -$1.5 billion to $1.8 billion given the volumes to which this applies. We also note that material recovery costs would also only need to decrease 24% under the higher overall cost assumption set to result in a positive NPV. We consider this is feasible given that requiring a Waste Minimisation Plan is likely to drive demand for material recovery services, which may encourage more businesses to enter, innovate and compete in the industry (as well as expand their geographic presence). In addition to increasing economies of scale, competition between suppliers may well decrease the material recovery costs over time.

Under a scenario where material recovery costs are low, the BCR is 1.60. Were material recovery costs to be high, the BCR is 0.77. Further sensitivity analysis of time horizons has taken place which indicates that the longer the time horizon modelled, the greater the resulting BCR.

**Waste volumes**

Waste Minimisation Plans have the potential to reduce total waste volumes in New Zealand through better on-site management and/or designing out waste in the early development or planning stage. This could realise some benefits through reduced material requirements and reduced embodied carbon, without the significant cost of material recovery.

Sensitivity analysis indicates that a 25 per cent reduction in waste resulting from waste being designed out waste and reduced through improved onsite management bring the BCR to 1.16.

## CBA results for Option 3b (Amend the Act's purposes and principles and enable the collection of information to align the sector and regulators' focus on building emissions reduction and climate resilience)

The costs and benefits of this option are largely qualitative and would support the implementation of Options 1c and 2c. The attached CBA outlines these considerations, noting that:

- costs include the direct costs to draft and implement legislation, and
- benefits include greater ease of adjusting regulatory settings in future, greater certainty for the sector about initiatives that could be progressed to support net zero carbon emissions by 2050, and support for the implementation of energy performance ratings and Waste Minimisation Plans.

The CBA finds that Option 3b is expected to provide incremental (non-quantified) impacts. However, given the attribution of these impacts may be uncertain and are difficult to quantify, for the purposes of this RIS this option is considered to have neutral quantifiable costs and benefits. We have highlighted the impacts of the proposed changes to the purpose and principles of the Act under the preferred option in terms of:

- Improved compliance and understanding of climate change requirements
- Early and/or increased adoption (impacting costs and benefits)
- Potentially increased enforcement (impacting costs and benefits)

In addition to these impacts, the changes to the purpose and principles are likely to result in greater:

- Direct cost to implement the legislation (drafting, consultation, etc). For instance, a prior study in 2012 suggested that the average cost per page of legislation at the time was around $45,000.
- Ease of adjusting settings as required to support climate objectives (reduced relative cost), where the same source above estimated the average cost of a new Act at the time was $3.3 million compared to the average cost of new regulation of $0.5 million.
- Certainty for the public in relation to meeting emissions budgets.

The proposed information collection powers would have additional costs and benefits that are not able to be specifically quantified. Under these powers, MBIE may require certain information to be provided to it as set out in regulations, noting that the impacts of seeking such information will be considered when determining what is sought. Therefore, the impacts of this requirement have been incorporated into the CBAs of Waste Minimisation Plans and energy performance ratings in terms of costs to:

- developers or building owners when providing information to MBIE (expected to be negligible where the information is already being provided elsewhere).
- MBIE to receive and maintain the information requested.

However, we also note that if:

- additional information is sought beyond Waste Minimisation Plans and energy performance ratings, MBIE will need to consider the costs to those providing and receiving the information when this is considered in designing the associated regulations.
- MBIE were to publish this information, as it does in the register for earthquake prone buildings, this would bring additional information and technology costs (similar to the register) and also reduce search costs in relation to energy

performance ratings and Waste Minimisation Plans which could improve compliance, energy efficiency, and waste reduction.

## CBA results for preferred combination of options (1c, 2c and 3b)

The preferred combination of options results in total monetised costs of $5,650 million and total monetised benefits of $5,687 million. These result in a net benefit of $37 million and BCR of 1.00. These primarily result from the Waste Minimisation Plan and energy performance rating requirements, with costs and benefits regarding information requirements and strengthening the Act's purposes and principles being qualitatively described.

We note that a significant number of benefits cannot be quantified at this stage. This potentially means the analysis is skewed in favour of costs rather than benefits. Some of the benefits cannot be quantified as there is weak or little New Zealand-based evidence, or too much uncertainty about final policy design to make reasonable assumptions about the degree of these benefits. Further work to design regulations and progress information collection powers will enable greater certainty about quantified benefits in future analyses. **Table** 5 below states the results of the CBA for the preferred option. For the costs and benefits relating to the energy performance ratings, the figures stated are for the scenario in the CBA with industrial buildings included.

**Table 5: CBA results for the preferred option (present value from 2050)**

| Affected groups | Comment | Impact (million) | Evidence certainty |
|---|---|---|---|
| **Additional costs compared to taking no action** | | | |
| Building owners | Material recovery cost – recycling and re-use (ongoing) | $4,814 (indirect) | Medium |
| | New ratings for buildings (ongoing) | $37 (direct) | Medium |
| | Renewed ratings for existing buildings (ongoing) | $12 (direct) | Medium |
| | Metering upgrades (one-off) | $0.8 (indirect) | Medium |
| | Energy efficiency upgrades (ongoing) | $789 (indirect) | Low |
| Government | Implementation and monitoring of Waste Minimisation Plan (one-off and ongoing) | $6 (direct) | Medium |
| | Implementation and monitoring of energy performance ratings (one-off and ongoing) | $3 (direct) | Medium |
| **Total monetised costs** | | **$5,650** | Medium |
| **Non-monetised costs** | • Potential increases in rents<br>• Administrative burden for Councils | Low | |

| Additional benefits compared to taking no action | | | |
|---|---|---|---|
| Building owners | Avoided landfill costs (ongoing) | $2,377 (indirect) | Medium |
| | Avoided material costs (ongoing) | $1,479 (indirect) | Medium |
| Building users | Power bill savings (ongoing) | $688(indirect) | Low |
| All New Zealanders, including to the environment | Avoided costs of embedded emissions | $724 (indirect) | Medium |
| | Avoided disamenity cost of landfill | $195 (indirect) | Medium |
| | Avoided natural gas use from incinerated timber | $112 (indirect) | Medium |
| | GHG emissions reduction (ongoing) | $113 (indirect) | Low |
| **Total monetised benefits** | | **$5,687** | Medium |
| **Non-monetised benefits** | • Health, wellbeing, and productivity benefits<br>• Asset values<br>• Energy poverty<br>• Alignment with Māori values and concepts<br>• Impacts on biodiversity<br>• Reduced susceptibility to environmental impacts such as floods<br>• Jobs created through the development of the recycling industry<br>• Waste prevention through low-waste design and improved on-site management<br>• Reduced pollution to land, air and water from heavy metals and toxic chemicals.<br>• Cost savings for building owners and developers from not paying for materials that are not needed<br>• Avoided emissions from more efficient building designs leading to needing and using less materials | High | |

## Non-monetised costs

These costs have not been monetised in the CBA to avoid double-counting, because New Zealand-based data and evidence is currently weak, or because they are dependent on assumptions about final policy design or uptake that cannot be made at this stage. They will be further developed through future work.

### Potential increases in rents

There is the potential for rents to increase as a building's energy efficiency increases, as energy-efficient buildings will be more desired by tenants and have lower operational costs. Landlords will have increased market power and will be able to charge higher rents.

However, rent increases are a function of reduced energy bills, i.e. a transfer from tenant to landlord. Where rent increases are equal to the energy bill decreases, this has already been captured in the CBA. To the extent the rent increases are greater or less than the reduction in energy bills, there would be an additional benefit or cost to those captured in the CBA.

### Administrative burden for councils

Amending the purposes and principles could result in an additional administrative burden for councils. This burden may arise from the time spent reviewing the current published guidance documents and updating for any necessary changes. This cost will vary widely between councils and is inherently hard to estimate. It was therefore not quantified in the CBA.

## Non-monetised benefits

These benefits have not been monetised in the CBA because New Zealand-based data and evidence is currently weak, or because they are dependent on significant assumptions about final policy design or uptake that cannot be made at this stage. They will be further developed through future work.

### Health, wellbeing, and productivity benefits

The built environment can impact our health and wellbeing and productivity through a variety of factors including light, noise (indoor and outdoor), temperature, humidity, ventilation and air movement, indoor air quality and chemical contaminants from indoor and outdoor sources.

Research shows that these built environment factors above can lead to or exacerbate a range of health conditions, such as respiratory illness (e.g. asthma), and other preventable outcomes.[10,11] These factors in workplace environments can lead to reduced productivity, increased absenteeism, and increased staff turnover.

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[10] HEAL (2020), HEAL Briefing: Healthy buildings, healthier people. HEAL.

[11] Ministry of Health (2022). Healthy Homes Initiative, https://www.health.govt.nz/our-work/preventative-health-wellness/healthy-homes-initiative

There is a wide body of research and evidence of the links between buildings and health,[12] and the health impacts of living in energy-inefficient buildings, which have been studied extensively in New Zealand and the United Kingdom.[13] Ultimately, there is a cost to society from the health outcomes of unhealthy buildings, particularly the health sector.

However, the relationships between buildings and health are complex, and these interventions focus on realising energy efficiency outcomes rather than health outcomes. While the relationships are well established in the literature, accurate estimation is difficult and unreliable, so we did not attempt to estimate the health and wellbeing benefits of the proposed changes at this stage.

### Asset values

Studies have found that energy efficient buildings (equivalent to high NABERSNZ) can increase the asset value for the building owner. One study found an 8 per cent increase in asset value over traditional buildings.[14] This finding reflects the demand for energy efficiency. Building owners desire energy efficient building and are therefore willing to pay a premium for it.

Similar to the argument for increases in rent, asset value increases are a function of rent increases, i.e. the asset value is equal to the sum of all future cash flows, all else being equal. Where rent increases are equal to the resulting reduction in energy bills, this has already been captured in the quantified CBA. However, if investments enable the building owners to attract new and more profitable tenants as a result of their investments, or asset value increases are greater than the net present value increases that occur as a result of rent increases, this would be an additional benefit to that captured in our quantified benefits as would cashflows beyond the period modelled.

### Energy infrastructure demand decreases

Reduced demand for energy – captured in the model as part of reduced power bills – will reduce or delay the need for the construction of new electricity generation, transmission and distribution infrastructure in New Zealand. This impact on infrastructure will avoid significant monetary and embodied carbon costs. In addition, this reduction in demand for electricity will relieve the pressure on electricity that will arise from the electrification of fossil-fuel reliant sectors such as transport and industrial process heat.

### Preventing waste through low waste design

By some estimates, around a third of construction waste originates from building design decisions.[15] We anticipate that Waste Minimisation Plan requirements would drive more people to consider waste earlier in the building design process, leading to low- or no-cost reductions in waste generated. In addition, onsite practices and management once construction has begun can also reduce waste. Waste Minimisation Plan requirements could

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12 Chisholm et al. (2019). What can we learn from Healthy Housing Initiatives? New Evidence from the Wellington Well Homes scheme, https://blogs.otago.ac.nz/pubhealthexpert/what-can-we-learn-from-healthy-housing-initiatives-new-evidence-from-the-wellington-well-homes-scheme/

13 HEAL (2020)

14 NABERS (2022), https://www.nabersnz.govt.nz/why-nabersnz/owners/

15 C.Llatasa, M.Osmanib (2016) Development and validation of a building design waste reduction model.

reduce this by supporting businesses to consider better onsite management such as reducing over-ordering, promoting re-use of materials onsite, or encouraging better waste minimisation practises by sub-contractors.

However, these are difficult to quantify in the New Zealand context and to reasonably scale up to a national context. Some estimates of these impacts are included in the CBA's sensitivity analysis of Option 2c, but they have not been incorporated into the headline BCR due to data uncertainty.

### Alignment with Māori values and concepts

Reducing construction waste sent to landfill and supporting a more circular, less extractive economy is inherently linked to Māori values and concepts. Reducing waste sent to landfill and promoting Te Ao Turoa (intergenerational resource sustainability) stresses the kaitiakitanga (guardianship) role that Māori have to care for the environment and provide for the next generation.[16] The role requires the exchange of treasured resources between generations to provide for the cultural practices the previous generation enjoyed. However, while acknowledged, there is limited scope to measure and quantify these benefits in monetary terms.

### Impacts on biodiversity

Biodiversity will be positively impacted from the proposed changes' environmental impacts. The nature and extent of this biodiversity impact is difficult to measure and there has therefore been no attempt at monetising the impact.

### Reduced susceptibility to environmental impacts such as floods

Changing the Act's purpose and principles may support activity to increase resilience, which could reduce buildings' susceptibility to environmental impacts such as floods. However, the level of reduced risk that can be attributed to the preferred option in particular is inherently difficult to measure accurately and therefore the impact has not been quantified.

### Jobs created through the development of the recycling industry

Economic opportunities result from expansion of the building recycling industry and development of the market for the recovery and reuse of building materials for other purposes. While we have not included any potential job creation impacts in our CBA, we note that Rohani et al. (2019) cites studies by the United States Environmental Protection Agency (in 2002) and Institute for Local Self Reliance (in 1997) that estimate additional job creation from the recycling or waste recovery and reuse, with estimates from 1 (for incineration) to 296 jobs per 10,000 tonnes of waste recovered or reused. The MfE's 2020 Regulatory Impact Statement *Increase and expansion of the waste disposal levy* includes some analysis of potential benefits that incentives to minimise or divert waste may have for the resource recovery sector. These economic benefits could be interrogated in more depth as part of future work to develop the specific policy design of these options.

### Reduced pollution to land, air and water from heavy metals and toxic chemicals

Reduced waste will reduce the pollution to land, air, and water from heavy metals and toxic chemicals. This impact would have positive environmental impacts beyond those captured in

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[16] Rohani et al., (2019)

the CBA. No accurate measure of this reduced pollution exists, meaning the impact is difficult to monetise.

# Section 3: Delivering an option

## How will the new arrangements be implemented?

MBIE is developing an implementation plan that will outline what will be done to achieve the benefits of the proposed changes. This may include information and education campaigns to support the industry in understanding the impacts of and reasoning behind the proposed legislative changes. The implementation plan will ensure that the sector is ready when the regulations come into force on or after mid-2024.

Stakeholder engagement has been key throughout the development of these proposals. This will continue to be an important factor in ensuring that the new requirements are implemented as effectively and efficiently as possible. Under s403 of the Act, consultation will be undertaken to inform the development of the regulations enabled by these proposals. Stakeholder feedback will help shape the final regulations proposed. Before any new requirements come into effect, MBIE will undertake work to ensure that people are aware of these changes.

The proposed changes are modelled after existing programmes that have been in use in New Zealand and overseas for some time, specifically:

- The energy performance ratings proposal is modelled after the existing Commercial Building Disclosure regime in Australia. Various overseas jurisdictions have also used mandated energy performance programmes to provide consumers, building owners, and government with information about the energy performance of buildings. For example, the United Kingdom has implemented mandatory energy performance certificates for most buildings sold or rented since 2008, and the European Union has set energy performance measurement and minimum energy performance requirements for buildings since 2010. Voluntary systems such as NABERSNZ are already in use in many commercial buildings in New Zealand to help companies make their buildings healthier, greener and more efficient.[17] It is intended that the proposal leverages these existing compulsory and voluntary systems.
- Waste minimisation plans are widely used internationally (e.g. in the United Kingdom, United States of America, Hong Kong and Mexico) as a tool to minimise construction and demolition waste. In New Zealand, an increasing number of councils have introduced bylaws under the Waste Minimisation Act 2008 that require certain building consent applicants to provide waste minimisation plans with their building consent applications.[18] While many of these regimes have promising waste reduction potential, they vary by council and have been challenging for territorial authorities to enforce.

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[17] The full list of buildings using NABERSNZ is available online at https://www.nabersnz.govt.nz/about-nabersnz/currently-rated-buildings/

[18] For example, Hamilton City Council, Wellington City Council, New Plymouth District Council, Selwyn District Council have waste minimisation bylaws.

The proposed new offences are intended to be enforced by territorial authorities as part of their functions under the Act. Under section 11(m)(ii), the Chief Executive may also enforce these offences where one or more territorial authorities are unwilling or unable to take enforcement action. While this may require additional work from territorial authorities and upfront time investment from building consent applicants and building owners, these are mitigated by the significant waste reductions and cost savings that could be realised through these proposals.

To further mitigate the additional work and time that may be required by these proposals, a passive enforcement approach is proposed to avoid a significant workload increase for territorial authority staff. The focus will be to inform and educate the sector on the new requirements as a first step in ensuring compliance. Officials have engaged with territorial authorities to understand current practices and sought to align these proposals with existing practices where possible.

### How will the new arrangements be monitored, evaluated, and reviewed?

The amendments to the Act are part of MBIE's larger Building for Climate Change (BfCC) programme. This programme includes a Monitoring and Evaluation Workstream tasked with developing an overall approach to assessing the implementation of BfCC initiatives and their success at meeting the intended objectives. This workstream has involved developing a logic model which identifies the outcomes in the short, medium, and longer term that will contribute to achieving the goal of near-zero building related emissions by 2050.

The proposed amendments to the Act will contribute to the following outcomes captured in the logic model:

- 'low carbon is embedded as the norm in building design and process'
- 'all building materials are re-used, recycled, or diverted from landfills'
- 'all new buildings meet requirements for operational efficiency'
- 'carbon calculation is integrated into the consenting process'.

A framework to monitor and evaluate progress towards these outcomes is currently in development.

The preferred options will set the enabling legislative framework for initiatives such as requiring buildings to hold an energy performance rating, and will require subsequent regulations to develop the specific policy. Monitoring and evaluation activity will be developed for these key changes to determine if the regulations are working as intended. Details of these specificities will be developed for future RIS which are likely to involve:

- collection of regular information to assess the impact of the BfCC programme on building and construction emissions,
- evaluating the implementation of the new regulations to ensure they are fit-for-purpose for building system users, e.g. designers, architects, builders, building consent authorities, and
- evaluating the impacts of the regulations including any unintended consequences.

The Act is regularly reviewed to ensure it provides effective stewardship for the building regulatory system. Review of the legislation changes will be part of this regular process.

# Appendix One: Proposed offences and penalties

The Ministry of Justice has been consulted on the following. Their feedback has been incorporated in the proposed offences and penalties below.

| Proposal | Proposed offences and penalties | Proposed infringement offence |
|---|---|---|
| **Energy performance rating scheme** | An offence to intentionally not hold a current energy performance rating for a building when it is required.<br>• On conviction, an individual building owner is liable for a fine not exceeding $20,000.<br>• On conviction, a body corporate building owner is liable for a fine not exceeding $60,000.<br><br>An offence to intentionally not prominently display the energy performance rating of a building in a place in the building to which users of the building have ready access when it is required.<br>• On conviction, an individual building owner is liable for a fine not exceeding $20,000.<br>• On conviction, a body corporate building owner is liable for a fine not exceeding $60,000.<br><br>An offence to knowingly make a false or misleading statement about the energy performance rating for a building (for example, where the rating is inaccurate because of significant change to the property).<br>• On conviction, an individual building owner is liable for a fine not exceeding $20,000.<br>• On conviction, a body corporate building owner is liable for a fine not exceeding $60,000. | • A fee of $1,000 for failing to hold a current energy performance rating for a building when it is required.<br>• A fee of $250 for failing to prominently display the energy performance rating of a building in a place in the building to which users of the building have ready access when it is required.<br>• A fee of $1,000 for making a false or misleading statement about the energy performance rating for a building. |
| **Waste minimisations plans** | An offence to intentionally carry out building work without providing a Waste Minimisation Plan as required by regulations.<br>• On conviction, an individual building owner is liable for a fine not exceeding $20,000.<br>• On conviction, a body corporate building owner is liable for a fine not exceeding $60,000.<br><br>An offence to intentionally carry out demolition work without providing a Waste Minimisation Plan as required by regulations.<br>• On conviction, an individual building owner is liable for a fine not exceeding $20,000.<br>• On conviction, a body corporate building owner is liable for a fine not exceeding $60,000. | • A fee of $1000 for failing to provide the relevant territorial authority with a Waste Minimisation Plan when a building consent is sought for a new building.<br>• A fee of $1,000 for failing to provide the relevant territorial authority with a Waste Minimisation Plan when demolishing a building for which a |

| | | |
|---|---|---|
| | An offence to intentionally not make their Waste Minimisation Plan available onsite or provide to parties to the build as specified in regulations.<br>• On conviction, an individual building owner is liable for a fine not exceeding $20,000.<br>• On conviction, a body corporate building owner is liable for a fine not exceeding $60,000.<br>An offence to intentionally not comply with the submitted Waste Minimisation Plan.<br>• On conviction, an individual building owner is liable for a fine not exceeding $20,000.<br>• On conviction, a body corporate building owner is liable for a fine not exceeding $60,000. | Waste Minimisation Plan is required by regulations.<br>• A fee of $250 for failing to make their Waste Minimisation Plan available onsite or failing to provide to parties to the build as specified in regulations.<br>• A fee of $1,000 for failing to comply with the submitted Waste Minimisation Plan. |
| **Information provision** | An offence to intentionally not provide MBIE with the information or documents requested under the new information provision requirements by the deadline specified in regulations.<br>• On conviction, an individual building owner is liable for a fine not exceeding $20,000.<br>• On conviction, a body corporate building owner is liable for a fine not exceeding $60,000.<br>An offence to knowingly provide false or misleading statements about the information or documents requested by MBIE under the new information provision requirements.<br>• On conviction, an individual building owner is liable for a fine not exceeding $20,000.<br>• On conviction, a body corporate building owner is liable for a fine not exceeding $60,000. | • A fine of $500 for failing to supply information or documents requested by MBIE under the new information provision requirements by the deadline specified in regulations.<br>• A fine of $1,000 for providing false or misleading statements about the information or documents requested by MBIE under the new information provision requirements. |

# Cost benefit analysis of Building for Climate Change amendments to the Building Act 2004

Report for the Ministry of Business, Innovation and Employment

David Moore, Angus White, Corina Comendant, William Li, Michelle Hall, April Chiu, and Zabard Hartmann

1 September 2022

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# Glossary

| Abbreviation | Stands for |
|---|---|
| BAU | Business as usual |
| BCAs | Building Consent Authorities |
| BCR | Benefit-cost ratio |
| BEES | Building Energy End-use Study |
| BRANZ | Building Research Association of New Zealand |
| C&D | Construction and demolition |
| CBA | Cost benefit analysis |
| DVR | District Valuation Roll |
| EECA | Energy Efficiency and Conservation Authority |
| ERP | Emissions Reduction Plan |
| EUI | Energy Use Intensity |
| EPRs | Energy performance ratings |
| GDP | Gross Domestic Product |
| GHG | Greenhouse gas |
| HUD | Ministry of Housing and Urban Development |
| KtCO2e | Kilotonnes of $CO_2$ equivalent |
| MBIE | Ministry of Business, Innovation and Employment |
| MtCO2e | Megatonnes of $CO_2$ equivalent |
| NABERSNZ | NABERSNZ is an adaptation of the National Australian Built Environment Rating System (NABERS) |
| NPV | Net present value |
| NZGBC | New Zealand Green Building Council |
| WMP | Waste minimisation plan |

# Executive summary

The Ministry of Business, Innovation and Employment (MBIE) is proposing changes to the Building Act 2004 (the Act) to support actions towards the Government's Emissions Reduction Plan (ERP). As part of the Building for Climate Change work programme, MBIE has considered a range of policy options to meet three key objectives for amendments to the Act.

MBIE proposes a combination of changes (Options 1c, 2c, and 3b) to address all three objectives, as summarised in the table below.

| Objectives | | MBIE's preferred option |
|---|---|---|
| 1 | Enable consumers, those that lease or rent building space, and the Government to have better information on the energy performance of existing buildings in such a way that improves energy efficiency across the building stock. | **Option 1c: Energy performance ratings** – amend the Act to require certain buildings to hold an energy performance rating. |
| 2 | Enable more consistent requirements for people to consider, recognise or reduce the social cost of construction and demolition waste (information, regulatory and externality issues). | **Option 2c: Waste minimisation plans** – amend the Act to add waste minimisation plan requirements. |
| 3 | Align the focus for both the building sector and regulators to support building emissions reduction and climate resilience. | **Option 3b: Clarify role of climate change in Act** – Amend the Act's purposes and principles and enable the collection of information to align the sector and regulators' focus on building emissions reduction and climate resilience. |
| All | To address all three objectives. | **Combined package (Options 1c, 2c, 3b).** |

MBIE has asked us to assess the above options for legislative changes to the Act. This report provides a cost benefit analysis (CBA) for MBIE's recommended changes. There are separate CBAs for the introduction of waste minimisation plan requirements (WMP) and energy performance rating (EPR) requirements. We assess the combined package of changes in the final section of our report. Alongside our quantitative CBA, we highlight important potential non-quantified impacts and sensitivities that should be considered together with the quantitative figures.

**Context within which the CBA results should be considered**

Our CBA results should be considered within the context that:

- further details on the exact application of the proposed changes are expected to be refined through policy development and the design of associated regulations
- there are significant gaps in the data currently available, which demonstrates the issues some of the proposed changes are intended to address. As such, we have had to make best use of available data in the time available. We highlight where there are challenges and have undertaken sensitivity analysis of key inputs that make a material difference to

the results. This shows the issues the proposed information provision requirements aim to address and illustrates the unquantified benefits from informing policy design and decision-making with better knowledge and confidence of impacts.

- the direct costs from the proposals are small relative to indirect impacts, there is greater uncertainty in the indirect impacts, and the quantitative results need to be considered alongside the sensitivities and the non-quantified impacts. Further, the policies provide a nudge to consider waste minimisation and energy efficiency but actions that lead to the indirect impacts are voluntary, as the proposals are currently stated. We therefore expect parties will only make investments where they feel the payoff warrants it and the infrastructure and markets exist to support certain decisions. For instance, if recycling/reuse is not an option in some areas, waste reduction may be all that is achievable in those areas. This suggests that sensitivities where indirect benefits to parties exceed the associated indirect costs should be more likely in practice.

## Our findings

**The net result for energy performance ratings is sensitive to assumptions, with significant non-quantified benefits**

The proposed EPR requirements for owners of new and existing commercial, public, industrial, and large-scale residential buildings generate a quantified net present value (NPV) of between -$606 million and $487 million (with a central estimate of -$29 million) between 2023 and 2050 and a benefit cost ratio (BCR) of 0.47 – 2.55 (with a central estimate of 0.96). This suggests relatively neutral and uncertain implications in terms of quantitative costs and benefits.

These results are dependent on several uncertain parameters. Like early analyses undertaken with respect to office buildings, we assumed that EPR requirements would indirectly incentivise building owners to invest in energy efficiency upgrades (resulting in energy cost savings). There are gaps in the available evidence base and a range of investments that vary from simple behaviour changes to large capital investments. Given this, we estimated upgrade costs based on a conservative repayment period of three years (consistent with early analyses) but consider one- and five-year options and different rates of possible no-cost upgrades in our sensitivity analysis. As our BCR is close to 1, improvements in either benefits or costs would result in the benefits breaking even.

In addition, the results are very sensitive to the assumed Energy Use Intensity (EUI) savings as a result of the policy. Our sensitivity tests revealed that, separate to efficiency upgrade costs, it would not take a significant increase to EUI reduction rates to produce a positive quantified NPV/net benefits. Further, past studies using the more specific data available in relation to New Zealand office buildings have also identified net benefits in applying the policy to larger office buildings, suggesting that the building types covered by the policy may warrant further analysis when designing regulations.

Importantly, the quantitative NPV also needs to be considered alongside the significant potential non-quantified benefits from improved productivity and health due to heathier and more energy-efficient buildings. For example, an Australian review suggests that including productivity benefits could increase net benefits of mandatory ratings for commercial buildings by between AU $110.5 million to

AU $167.8 million, two to three times the net benefits of the programme, though noted the estimates were too uncertain to include in its quantitative estimate as well.[1]

**The waste minimisation plans are marginally beneficial, and very sensitive to material recovery costs, but potentially significant if able to reduce overall waste volumes**

The quantified NPV of WMPs is $66 million between 2023 and 2050, with a BCR of 1.01. However, the result is highly sensitive to the indirect costs arising from the recovery of materials, which, depending on assumption sources, could result in a range from -$1.5 billion to $1.8 billion given the volumes this applies to. We have taken the mid-point where there are different potential sources for inputs of material recovery costs and note the most recent estimate looks beyond Auckland and has lower overall costs than the Auckland-based study. Further, we expect material recovery costs would decrease as a result of additional demand from this policy.

The quantified NPV may also be larger if waste volumes reduce over the period to 2050 as a result of this policy (with sensitivities ranging from a quantified NPV of $108 million to $657 million if the time horizon to 2050 is taken),[2] as may be expected based on certain findings in the literature.

Further, the quantitative NPV needs to be considered alongside the potential non-quantified benefits associated with this policy.

**Proposed changes to the purposes and principles of the Act are expected to provide incremental (non-quantified) impacts**

The proposed changes to the purposes and principles of the Act would provide incremental impacts to the introduction of WMPs and EPRs, which we have not quantified, including:

- improved compliance
- early and/or increased adoption (impacting costs and benefits)
- potentially increased enforcement (impacting costs and benefits).

In addition to these impacts, the changes to the purposes and principles are likely to result in greater:

- direct cost to implement the legislation
- ease of adjusting settings as required to support climate objectives (reducing the relative cost)
- certainty for the public in relation to meeting emissions budgets.

**The quantitative impact of the package of all proposed changes is also marginal, with significant non-quantified benefits that need to be considered**

Table 1 shows the overall quantified results for the combined package of changes. Noting the sensitivities above, this shows marginal net quantitative benefits of $37 million that need to be considered relative to the sensitivities and potentially significant non-quantified benefits. Incorporated

[1] *Commercial Building Disclosure Program Review*, ACIL Allen 2015, p57. Cited in Energy Action and EnergyConsult (2018).

[2] The result is as low as -$12 million if a shorter time horizon is used.

in this figure are the benefits associated with reducing emissions by 12.6 megatonnes of $CO_2$ equivalent (MtCO2e).[3]

In addition, there are potential dynamic impacts in terms of driving markets for material recovery and reuse/recycling and the breadth/uptake of energy efficiency upgrades. These dynamic impacts have benefits that are not easily quantified. We note that the direct costs from the proposals are a very small portion of the impacts of the proposals and are significantly outweighed by the indirect impacts to developers and building owners.

Table 1: Quantified CBA results

| | NPV | BCR | Included emissions reduction |
|---|---|---|---|
| Waste minimisation plans | $66m | 1.01 | 11.7 MtCO2e |
| Energy performance ratings | -$29m | 0.96 | 0.9 MtCO2e |
| **Total package** | **$37m** | **1.00** | **12.6 MtCO2e** |

[3] https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references or https://databank.worldbank.org/metadataglossary/millennium-development-goals/series/EN.ATM.CO2E.KT

# 1. Introduction

The building and construction sector is an important contributor to New Zealand's community, businesses, and economy. The sector is New Zealand's fourth-largest employer, accounting for 10 per cent of New Zealand's workforce, and is the nation's fourth-largest industry by GDP[4] (valued at $22.46 billion in 2021).[5] It is also estimated that in 2018 the building and construction sector was responsible for 15 per cent of all New Zealand's domestic emissions, and construction and demolition (C&D) waste accounted for 40-50 per cent of all material going to landfill.[6] The Ministry of Business, Innovation and Employment (MBIE) is proposing changes to the Building Act 2004 (the Act) to reduce the building and construction sector's emissions and support the construction of more climate-resilient buildings.

MBIE has asked Sapere Research Group (Sapere) to undertake a cost-benefit analysis (CBA) of the proposed legislative changes. In this report, we set out detail on our approach and the results of our analysis. Further details relating to the design and implementation of the proposals are planned to occur through subsequent development of the regulations. As such, to estimate impacts, we have made assumptions about what and who the regulations may apply to, and how behaviour may change.

## 1.1 What is being proposed and why

New Zealand's first Emissions Reduction Plan (ERP), published in May 2022, sets out actions to support the goals contained in the Climate Change Response (Zero Carbon) Amendment Act 2019 (the Zero Carbon Act). These include actions for the building and construction sector to reach near zero emissions by 2050. In response, MBIE has set up the Building for Climate Change programme.

As part of the Building for Climate Change work programme, MBIE has considered a range of policy options to meet three key objectives for amendments to the Act. MBIE proposes a combination of options are implemented (options 1c, 2c, and 3b) to meet these objectives, as summarised in Table 2 below. Consultation undertaken on the ERP and targeted stakeholder engagement indicate support for the changes proposed.

[4] MBIE, *Discussion Document: Building System Reform* (April 2021)
[5] The value of the construction sector measured by the value of building consents for all buildings in New Zealand in FY20 according to Stats NZ.
[6] Level, (2022). Minimising waste, https://www.level.org.nz/material-use/minimising-waste/

Table 2: Objectives for amendments to the Building Act 2004 and MBIE's preferred policy options to address each objective

| Objectives | | MBIE's preferred option |
|---|---|---|
| 1 | Enable consumers, those that lease or rent building space, and the Government to have better information on the energy performance of existing buildings in such a way that builds energy efficiency across the building stock. | **Option 1c: Energy performance ratings** – amend the Act to require certain buildings to hold an energy performance rating. |
| 2 | Enable more consistent requirements for people to consider, recognise or reduce the social cost of construction and demolition waste (information, regulatory and externality issues). | **Option 2c: Waste minimisation plans** – amend the Act to add waste minimisation plan requirements (*without* mandating minimum waste minimisation requirements). This aims to enable better waste management. |
| 3 | Align the focus for both the building sector and regulators to support building emissions reduction and climate resilience. | **Option 3b: Clarify role of climate change in Act** – Amend the Act's purposes and principles and enable the collection of information to align the sector and regulators' focus on building emissions reduction and climate resilience. |

The changes are intended to support actions in the ERP and address three core policy problems (discussed in greater detail in the regulatory impact statement):

- **The building regulatory system does not enable consumers and Government to easily understand the energy efficiency of buildings.** The information available on building energy efficiency is inconsistent and not comparable. Consumers, those who lease or rent building space, and the Government have limited information on the energy performance of existing buildings, and there are externalities (impacts to parties beyond those making the decisions giving rise to the impact) and potential market failures in relation to building energy performance.
- **The building regulatory system does not incentivise action on construction and demolition waste minimisation.** There are inconsistent requirements for people to consider, recognise or reduce the social cost of construction and demolition waste (with information, regulatory and externality issues).
- **There is a lack of clarity and focus on climate change for building and construction sector stakeholders and regulators.** The purposes and principles of the Act do not clearly or sufficiently reflect New Zealand's climate change goals as set out in the Zero Carbon Act.

There is also limited information available on building emissions and climate resilience. This issue cuts across all the core policy problems.

## 1.2 We have used a cost benefit analysis framework to assess the proposals

The CBA framework looks at the incremental costs and benefits that arise relative to the counterfactual – usually the status quo (the Base Case).[7] Once the incremental costs and benefits are identified for each option within the specified timeframe, the CBA then sums all the discounted cash flows (costs and benefits) for each option to calculate the net present value (NPV). The NPV is calculated by subtracting the total present value of benefits from the total present value of costs. Generally, if the NPV of an option is positive, this means that the option generates net benefits to the New Zealand community and is preferred relative to the Base Case. One limitation of a CBA is that it sometimes is only used to consider quantitative costs and benefits. Our report highlights the importance of non-quantified costs and benefits, which we have noted in this report but are not included in the summary CBA/BCR (benefit-cost ratio) tables.

We also calculated a BCR. The BCR is estimated by dividing the total present value of the quantified benefits for each option by the total present value of the quantified costs for each option. If most impacts can be quantified, or the unquantified costs and benefits make little difference overall, then a positive BCR (>1) indicates that the option generates a net benefit to the community, while a negative BCR (<1) indicates the option generates a net cost to the community, relative to the Base Case. Note that a BCR, like an NPV, only captures quantified costs and benefits, so unquantified impacts need to be considered alongside the BCR. The BCR can also be interpreted as a measure of return. For example, if an option had a BCR of 1.5, this could be interpreted as the option generating $1.5 in benefits for every $1 invested into the option.

## 1.3 Quantitative analysis focuses on energy performance ratings and waste minimisation plans

We have undertaken a separate CBA for EPRs (Option 1c) and WMPs (Option 2c). As part of these assessments, we have included the cost of collecting information that is expected to be required for these specific initiatives. We separately discuss the qualitative impacts of information requirements if they are applied beyond WMPs and EPRs as part of proposed changes to the purposes and principles of the Act (Option 3b), and the additional costs and benefits that these may generate. We then report on the combined CBA for these changes as a package, as proposed by MBIE.

## 1.4 Report outline

This remainder of this report is set out as follows:

- Section 2 outlines the methodology and impact assessment for **EPRs (Option 1c)**.
- Section 3 outlines the methodology and impact assessment for **WMPs (Option 2c)**.

[7] A counterfactual is a common point of comparison that allows the identification of incremental costs and incremental benefits. In this analysis the Base Case is the counterfactual because the proposed regulations an expansion of the Base Case.

- Section 4 discusses the costs and benefits that may apply to **information requirements** and changes to the **purposes and principles (Option 3b)**.
- Section 5 presents the results for the whole package (Options 1c, 2c and 3b).
- Appendix A provides detail on our modelling and assumptions.

# 2. Cost benefit analysis of energy performance ratings

The proposed energy performance rating requirements generate a quantified NPV of between -$606 million and $487 million (with a central estimate of -$29 million) between 2023 and 2050 and a BCR of 0.47 – 2.55 (with a central estimate of 0.96). This suggests relatively neutral and uncertain implications in terms of quantitative costs and benefits. Included within the central estimate is the quantified benefit associated with decreasing emissions by 857 kilotonnes of $CO_2$ equivalent (ktCO2e) over the period.

The result is highly sensitive to the assumptions made the about the efficiency upgrade costs that indirectly arise from this option and which make up 95 percent of total costs.

However, the quantitative NPV needs to be considered alongside past estimates with higher results for large office buildings only as well as the significant potential non-quantified benefits. For instance, a review of the Australian commercial building disclosure programme estimated that total productivity benefits could increase the net benefits of the programme by 2 to 3 times,[8] which if applicable would result in net benefits for this option.

This section outlines the CBA approach and framework for the proposed regulations on energy performance ratings and summarises the results.

## 2.1 Options for analysis

This cost benefit analysis compares the **Base Case** with the policy intervention:

- **Base Case:** we assume no further changes to the Building Act or other policies or regulations relating to energy efficiency of buildings (while changes may be possible, they would need to be separately assessed and we would not wish to predict these).
- **Option 1c:** energy performance ratings are required for owners of new and existing commercial, public, industrial and large-scale residential buildings (with associated penalties and infringement fees for non-compliance).

The analysis below focuses on comparing the implementation of EPR requirements (Option 1c) with the Base Case.

For **Option 1c**, while we note the legislation is enabling, for the purposes of estimation we assume:

[8] *Commercial Building Disclosure Program Review*, ACIL Allen 2015, p57. This report found that total productivity benefits for the Australian programme were in the range of AU$110.5 million to AU$167.8 million but were excluded due to the lack of robust evidence.

- EPR requirements are implemented from 2024, with implementation costs spread over 2024 and 2025 and impacts linearly increasing over five years from 2025.
- EPRs are required for existing commercial, public, industrial and large multi-level apartments over 2,000 square metres. We have excluded government-leased offices from any incremental impacts when assessing the policy intervention as government agencies with large owned or leased office accommodation are already required to undertake an energy efficiency assessment as part of the Carbon Neutral Government Programme.[9]
- We have modelled costs out to 2030 (when the policy is expected to be fully implemented), as well as the resulting benefits associated with those costs to 2050.We have not considered or modelled any costs and benefits of re-ratings, which could be considered further when designing the scheme.
- Penalties and infringement fees apply if building owners intentionally do not hold, prominently display, or provide an EPR to those required under regulations, or knowingly making a false or misleading statement about an EPR.
- A passive enforcement approach from MBIE and local authorities.

We expect future regulations will provide detail on the design and application of EPRs such as whether they apply as a base or whole building rating.[10] We have provided analysis on whole buildings given data is not available on base consumption for most building types considered. As a result, we have assumed a lower portion of energy savings than earlier analysis undertaken in relation to commercial office spaces by Energy Action and EnergyConsult (2018).

## 2.2 Our cost benefit analysis framework

It is important to note that our CBA model only accounts for costs incurred up to 2030 and the benefits arising from these costs. This is because buildings will likely have access to a different set of technologies and tools to reduce energy usage rates beyond 2030, but we do not have any estimates of the potential efficacy of such upgrades. Rather than speculating on the potential efficiencies that these future upgrades could achieve, we have instead chosen to undertake a conservative estimate based on costs and subsequent benefits that can be attributed to changes (such as upgrades and rating costs) that occur between 2023 and 2030. Detail on our modelling assumptions can be found at 5.Appendix A.

### 2.2.1 Quantified cost categories

Table 3 summarises the quantitative costs of EPR requirements (Option 1c), relative to the Base Case.

[9] This has applied to government agencies since January 2021. It applies to government agencies that are subject to the Government Property Functional Leadership Mandate which own or lease office accommodation with an occupied area that is 2000m2 or more.

[10] A base build rating measures the energy performance of a building's core services such as lifts, lobby and stairwell lighting, common toilets, and air conditioning. A whole building rating measures the base build rating as well as the floor and areas occupied by tenants, such as computers, lighting, data centres and staff kitchens. (https://www.nabersnz.govt.nz/about-nabersnz/types-of-ratings/, accessed 8 August 2022.)

Table 3: Quantified costs for EPRs

| Cost | Description | Relevant party |
|---|---|---|
| **Direct costs** | | |
| Rating costs | Cost of obtaining a rating from a qualified assessor in the market. We assume that the rating fees would be lower in the case that ratings are mandatory, as assessors join the market and competition increases, pushing down the rating cost. | Building owners |
| Implementation and ongoing costs | The government will incur costs in developing and monitoring the regulations. This is likely to also include guidance, monitoring receipt of information disclosed under disclosure requirements, and potential enforcement of the regulations. | Government (MBIE) |
| **Indirect costs** | | |
| Metering costs | To get a rating for a building, upgraded or additional metering equipment is likely to be required for some buildings, to allow for accurate energy consumption measurement. For instance, office buildings may not be wired separately to allow for base building systems and tenant distribution boards to be billed for their respective energy consumption. | Building owners |
| Energy efficiency upgrade costs | Better information provision about the energy efficiency of buildings is likely to incentivise building owners to invest in improved energy efficiency measures. | Building owners |

#### 2.2.1.1 Costs to building owners

Costs to building owners include the:

- direct cost of obtaining a rating, which would be incurred at recurring intervals as specified in the regulations (includes an estimated fee/cost for someone to undertake the rating)
- indirect costs of:
  - one-off cost of upgrading metering equipment (where necessary) to allow for accurate data as part of the rating assessment and data gathering required for the assessment
  - cost of energy efficiency upgrades, which building owners are likely to be incentivised to invest in when EPRs are compulsory to disclose (we discuss our approach and sensitivities around these costs further in section 2.4.1).

#### 2.2.1.2 Costs to government

The direct costs to government include implementation of the regulations and ongoing costs. Implementation costs would include developing the regulations and providing guidance to industry. Once implemented, there would be ongoing costs of MBIE's information management and compliance functions, which include education and enablement, monitoring, and compliance and enforcement activities.

### 2.2.2 Quantified benefit categories

Table 4 summarises the quantitative benefits of Option 1c, relative to the Base Case.

Table 4: Quantified benefits of EPRs

| Benefit | Description | Relevant party |
|---|---|---|
| **Indirect benefits** | | |
| Reduced energy bills | As an indirect effect of mandatory EPRs, building owners will be incentivised to invest in energy efficiency improvements to improve their building rating. As a result, upgraded buildings will experience a greater rate of energy use reduction. Tenants will receive the main benefit of this through reduced energy bills. There will also be reduced energy bills for the building owner where central services like heating and cooling systems, lifts and lighting are commissioned more effectively or changed to more energy-efficient technologies and/or building owners may be able to benefit from increased rents if they invest in improving building energy efficiency. | Tenant, building owners |
| Reduced carbon emissions | Increased energy efficiency of buildings could also result in reduced emissions. This would benefit all New Zealanders. | Society |

## 2.3 Quantified cost benefit analysis results for energy performance requirements

The results in Table 5 show the present value of total costs and benefits, relative to the Base Case. As previously mentioned, this only includes capital and ratings costs for business incurred up until 2030 and benefits through to 2050 that accrue from those costs.

Appendix A outlines the detailed data and assumptions underpinning the analysis. Note that these are rounded figures.

Table 5: CBA results in net present value ($million) for commercial, public (excluding offices), large-scale residential, and industrial buildings

| | NPV ($million) |
|---|---|
| **Costs** | |
| **Direct costs** | |
| New ratings for buildings | $37 |
| Costs to government | |
| Implementation costs | $0.5 |
| Ongoing costs (compliance, monitoring, enforcement, etc) | $3.0 |
| **Indirect costs** | |
| Metering upgrades | $0.8 |

| | |
|---|---|
| Energy efficiency upgrades | $789 |
| **Total costs** | **$830** |
| **Benefits** | |
| Indirect benefits | |
| Power bill savings – value ($) | $688 |
| GHG emission reductions – value ($) | $113 |
| Total benefits | **$801** |
| **NPV** | **-$29** |
| **BCR** | **0.96** |

### 2.3.1 Distribution of impacts

Figure 1 shows that the quantified costs are dominated by the costs to building owners which make up 99 per cent of costs. This includes the direct costs of ratings ($37 million) as well as the major indirect cost of efficiency upgrade costs ($789 million). In contrast, the direct one-off costs to MBIE to implement the regulations and the direct ongoing costs to both MBIE (associated with oversight and information management) and to territorial authorities (for compliance monitoring and enforcement) together only represent less than 1 per cent of costs.

Figure 1: Distribution of quantified EPR costs

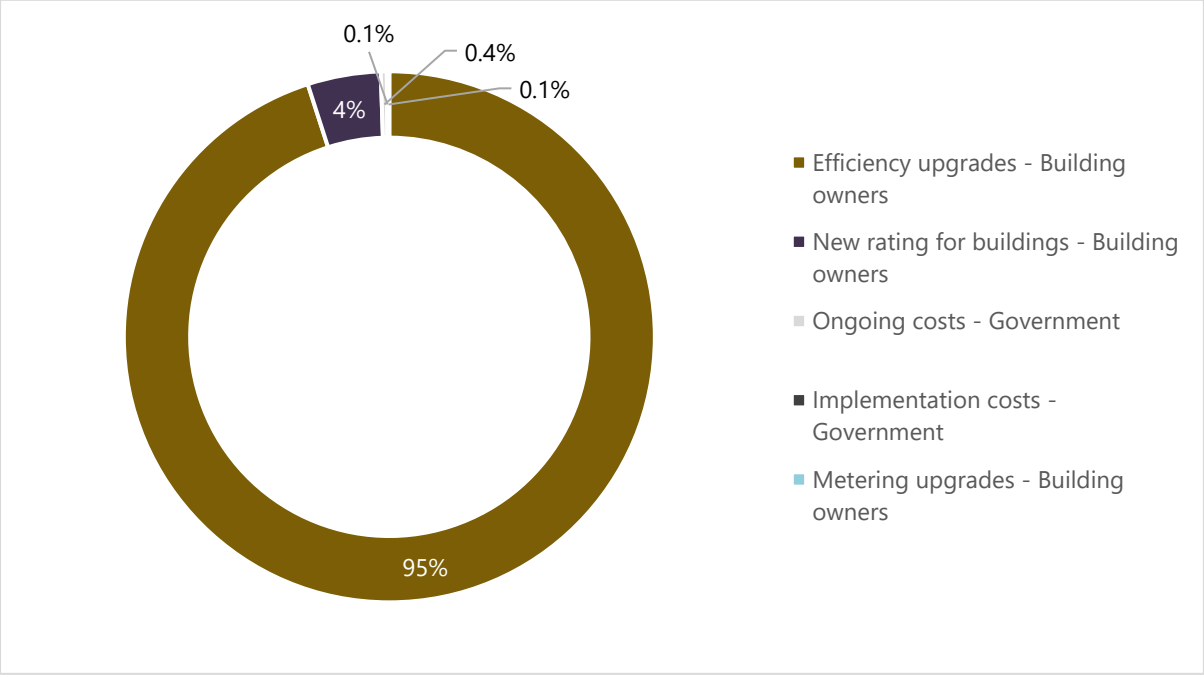
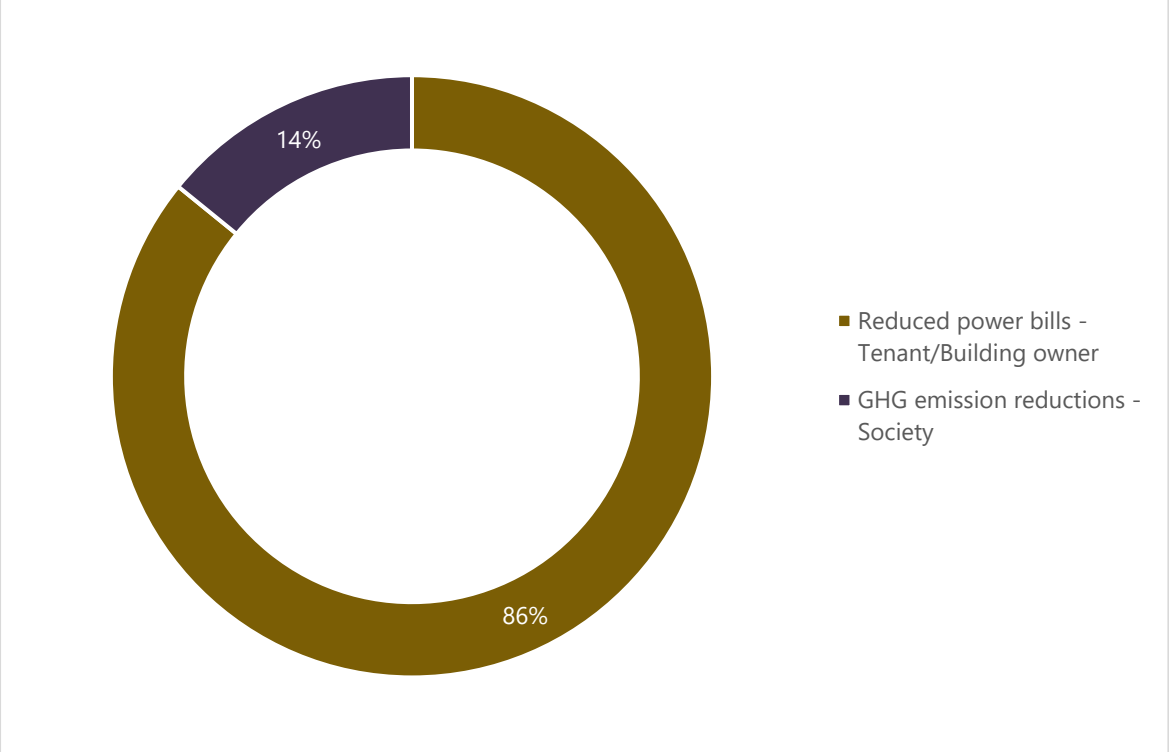



Figure 2 provides an overview of the quantified benefits of EPRs. Most benefits are indirect and come from reduced energy costs accruing to tenants or building owners ($688 million or 86 per cent of

quantified benefits). The GHG emissions reductions account for $113 million in present value terms, resulting from a modelled reduction of 857 ktCO2e over 2023-2050.

Figure 2: Distribution of quantified EPR benefits




### 2.3.2 Unquantified impacts

In addition to the quantified economic benefits, several non-monetised benefits exist. These are discussed below but are not quantified in the CBA, due to difficulty in estimating these types of impacts with the time and information available.

#### 2.3.2.1 Health, wellbeing, and productivity benefits

The built environment can impact our health, wellbeing and productivity through various factors including light, noise (indoor and outdoor), temperature, humidity, ventilation and air movement, indoor air quality and chemical contaminants from indoor and outdoor sources.

Research shows that these built environment factors above can lead to or exacerbate a range of health conditions, such as respiratory illness (e.g. asthma), and other preventable outcomes.[11,12] These factors in workplace environments can lead to reduced productivity, increased absenteeism, and increased staff turnover.

[11] HEAL (2020), *HEAL Briefing: Healthy buildings, healthier people*. HEAL.
[12] Ministry of Health (2022). Healthy Homes Initiative, https://www.health.govt.nz/our-work/preventative-health-wellness/healthy-homes-initiative

There is a wide body of research and evidence of the links between buildings and health[13] and the health impacts of living in energy-inefficient buildings, which have been studied extensively in New Zealand and the United Kingdom.[14] Ultimately, there is a cost to society from the health outcomes of unhealthy buildings, particularly to the health sector. As such, improving the building stock in both residential and workplaces is of interest to health.

However, the relationships between buildings and health are complex. While the relationships are well established in the literature, accurate estimation is difficult. The difficulty in estimation has meant we did not attempt to estimate the health and wellbeing benefits of the proposed changes.

#### 2.3.2.2 Asset values

Studies have found that highly rating buildings (equivalent to high NABERSNZ) can increase the asset value for the building owner. One study found an 8 per cent increase in asset value over traditional buildings.[15] This finding reflects the demand for energy efficiency. Building owners can desire energy-efficient buildings and are therefore willing to pay a premium for it.

Similar to the argument for increases in rent, asset values increases are a function of rent increases, i.e. the asset value is equal to the sum of all future cash flows, all else being equal. Where rent increases are equal to the resulting reduction in energy bills, this has already been captured in the quantified CBA. However, if investments enable the building owners to attract new and more profitable tenants as a result of their investments, or asset value increases are greater than the net present value increases that occurs as a result of rent increases, this would be an additional benefit to that captured in our quantified benefits as would cashflows beyond the period modelled.

#### 2.3.2.3 Energy infrastructure demand decreases

Reduced demand for energy from this policy, which is captured in the model as part of reduced power bills, would (all else equal) reduce or delay the need for the construction of new electricity infrastructure (generation and any resulting transmission and/or distribution infrastructure) in New Zealand. This would result in avoiding or deferring the associated monetary and embodied carbon costs. Electricity demand reductions that result from this policy would also relieve any pressure on electricity that may arise from the electrification of fossil-fuel reliant sectors such as transport.

## 2.4 Our analysis highlights the sensitivity of the final results

Our sensitivity analysis shows that the results are sensitive to changes in key assumptions. As our BCR is close to 1, improvements in either benefits or costs would lead us to break-even. As the results are

[13] Chisholm et al. (2019). What can we learn from Healthy Housing Initiatives? New Evidence from the Wellington Well Homes scheme, https://blogs.otago.ac.nz/pubhealthexpert/what-can-we-learn-from-healthy-housing-initiatives-new-evidence-from-the-wellington-well-homes-scheme/

[14] HEAL (2020).

[15] NABERS (2022), https://www.nabersnz.govt.nz/why-nabersnz/owners/

driven in large part by the assumed energy savings and energy efficiency costs, these are the sensitivities we have focused on.

### 2.4.1 Sensitivities on energy efficiency upgrade costs

In our analysis, we assumed that the proposed EPR requirements would indirectly incentivise building owners to voluntarily invest in energy efficiency upgrades, resulting in energy cost savings. We considered a range of options for how to factor in the costs of these energy efficiency upgrades, given different possible behaviours and scenarios that may result from the policy change.

Building owners are likely to only invest in upgrades where their private benefit outweighs the cost, but these will vary in the level of investment and benefit payback period. There may be many low or minimal cost changes that can result in large energy savings (such as programming heaters to turn off overnight, or ensuring even temperatures are maintained). More complex buildings may have more opportunity for energy efficiency improvement through building commissioning changes. There are also more capital-intensive investments that produce large benefits but at a significant cost (such as air conditioning or boiler upgrades). For instance, aggregate information from a major property group's portfolio in Australia from over 500 individual energy efficiency projects showed average costs ranging from $32,000 to $3.2 million, and average payback periods that ranged from 3.3 years to 167.3 years (CIE, 2019). In other cases, owners of older buildings may determine that it does not make financial sense to invest in efficiency upgrades, despite a low rating (such as Victorian buildings in regional areas like Oamaru, Timaru, Dunedin and Invercargill).

There were gaps in the data and information available about the costs of energy efficiency investments, their impact on energy savings, and importantly how these apply to different building types. For consistency, we followed the approach taken in a 2018 CBA analysis by Energy Action and EnergyConsult for mandatory ratings for office buildings.[16] The authors estimated an average cost of investment in efficiency upgrades by assuming that building owners implemented an investment equivalent to the energy savings over an average three-year simple payback period, following earlier work informed by discussions with EECA. In addition, we assume that 10 per cent of the existing building stock will achieve energy savings with no-cost upgrades.[17]

We considered this appropriate in lieu of more recent and relevant research, given the nature of the policy is likely to incentivise many building owners to first implement low-cost changes that deliver the highest pay-off, with the possibility that a smaller number of building owners decide to implement more significant investments with a much longer payback period at an appropriate renewal point. In practice, there will be variability in uptake of energy efficiency investments across different building

[16] In our modelling, we also assumed new building stock are built with improved energy efficiency measures so do not incur the same upgrade costs as existing building stock. Refer to Appendix A for further detail on our assumptions.

[17] This is an adjusted proportion, based off a US study which carried out a cost-benefit analysis of large commercial buildings to find an average of 15% of annual energy savings could be achieved through re-commissioning of the buildings (Mills et al. 2004). Given the age of the study (with improvements in energy saving technology since) and the difference in building cohort between US and New Zealand, we scaled this rate down by applying our baseline rate of energy reduction (-0.3%) and taking into account the number of years since the study and the fact that some small investment may still be required.

types within market segments. To be conservative, the variation in different building types, including where there would be a reduced tendency for owners to upgrade, is reflected in part through our use of conservative average rates of energy reduction.

We conducted sensitivity tests for the payback period used to calculate the cost of energy efficiency upgrades. These reveal a relatively high degree of sensitivity to the payback period for the cost of efficiency upgrades for existing building stock.[18]

In our modelling, we have assumed the central payback period of three years for the efficiency upgrades. However, a payback period of one year for the upgrades makes the policy significantly net positive in NPV. In contrast, the extension of the payback period to five years increases the cost by approximately 70 per cent. This is shown in Table 6 below.

Table 6: Sensitivity test results for changes in payback period for energy efficiency upgrades

| Payback period | One year | Three years (base) | Five years |
|---|---|---|---|
| **NPV ($million)** | | | |
| Total cost savings | $801 | $801 | $801 |
| Total cost to business | $311 | $827 | $1,404 |
| Total cost to government | $3.5 | $3.5 | $3.5 |
| **BCR** | 2.55 | 0.96 | 0.57 |
| **NPV** | $487 | -$29 | -$606 |

We also conducted a test on the proportion of buildings able to undertake no-cost upgrades. In our base case, we assumed a proportion of 10 per cent of the existing building stock, an adjusted figure based off a 2004 US study of 150 existing buildings.[19] This shows a slightly less degree of sensitivity to the change in percentage of stock assumed to be able to achieve energy savings with no-cost upgrades, with a positive BCR achieved with a 15 per cent proportion.

[18] Our modelling assumes that metering and efficiency upgrades are included as standard inclusions in all new buildings after FY30 and thus do not contribute additional costs beyond this point.
[19] Refer footnote 17.

Table 7: Sensitivity test results for changes in the proportion of buildings able to undertake no-cost upgrades

| Proportion of existing stock | 0% | 10% (base) | 15% |
|---|---|---|---|
| **NPV ($million)** | | | |
| Total cost savings | $801 | $801 | $801 |
| Total cost to business | $918 | $827 | $786 |
| Total cost to government | $3.5 | $3.5 | $3.5 |
| **BCR** | **0.87** | **0.96** | **1.02** |
| **NPV** | **-$117** | **-$29** | **$15** |

### 2.4.2 Sensitivities on energy saving benefits

A test of our results reveals a relatively high degree of sensitivity to the level of EUI reduction (which drives energy use savings) from buildings that would be achieved as a result of the policy changes. We adjusted the rate of EUI reduction by ±50 per cent to test the impacts of changes to the efficacy of the efficiency upgrades on our modelling results. This is summarised in Table 8 below.

Table 8: Sensitivity test results for changes in the level of EUI reductions from policy implementation

| Level of EUI reduction | 50% lower rate of EUI reduction | Base case | 50% higher rate of EUI reduction |
|---|---|---|---|
| Base rate of EUI reduction without efficiency upgrades | -0.31% | -0.31% | -0.31% |
| EUI reduction with efficiency upgrades | -1.00% | -1.68% | -2.36% |
| **NPV ($million)** | | | |
| Total cost savings | $386 | $801 | $1,216 |
| Total cost to business | $827 | $827 | $827 |
| Total cost to government | $3.5 | $3.5 | $3.5 |
| **BCR** | **0.47** | **0.96** | **1.46** |
| **NPV** | **-$444** | **-$29** | **$385** |

Our results show that the BCR drops significantly if the EUI reductions achieved by the policy are 50 per cent lower than our baseline, although a proportionate increase in BCR is also realised if the rate of reduction is 50 per cent higher than the base case.

This suggests that, separate to efficiency upgrade costs, it would not take a much greater EUI reduction rate to produce a positive quantified NPV/net benefits. Further, past studies using the more specific data available in relation to New Zealand office buildings have also identified net benefits in applying the policy to larger office buildings, suggesting that the building types covered by the policy may warrant further analysis when designing regulations.

### 2.4.3 Impacts for future analysis

There are a few areas of analysis that we were not able to interrogate further due to time and data limitations. These areas, outlined below, could be investigated in more detail through the development of the regulations. Importantly, implementation of the policies would allow for collection of the very data that would help to refine CBA analysis.

In terms of building types included in the proposed policy, we are cautious that the EUI and average floor area are both larger for industrial buildings than other building types, even though this total floor area may not be suitable for energy efficiency upgrades (as they are likely used for industry-specific purposes or equipment). It is possible that the industrial data as constructed in the model might overstate its impact. However, in earlier versions of our modelling, we did not see much of an effect when omitting the industrial building sector from the analysis.

In the time available, we were not able to identify more specific energy use or building stock information to use in the model. Our energy use figures came from MBIE electricity and gas use data, but we acknowledge these totals will be inclusive of energy use from industry processes which are likely to be specific and varied across industry sectors.[20] For instance, the Australian NABERS rating system has been gradually expanding into industrial building types, sector by sector, focussing on different groups of industrial buildings. NABERS has recently expanded into warehouses and cold stores.[21] If new or alternative data sources allow, future analysis could assess more granularly whether the inclusion of different industrial sectors (or even different parts of industrial buildings, such as the office part of a factory) in regulations would have different benefits.

Energy prices may also affect the results. However, how prices might change in the future will be complicated by how industries and different sectors respond to decarbonisation. It is possible that decarbonisation may lead to a large increase in demand for electricity which pushes energy prices up in the future. As mentioned in section 2.3.2.3, it could also be possible that mandatory EPRs reduce the demand for energy, delaying the need for the construction of new electricity infrastructure, but the effect of this on prices may be unclear. We have not been able to model the potential impacts of this with the time and information available, although we expect that if energy prices increased, this could increase benefits.

[20] Detail on our model inputs are in 5.Appendix A.
[21] https://www.nabers.gov.au/nabers-accelerate, accessed 18 August 2022.

# 3. Cost benefit analysis of waste minimisation plans

The proposed waste minimisation plan requirements generate a quantified NPV of $66 million between 2023 and 2050, with a BCR of 1.01. Included within this estimate is the quantified benefit associated with decreasing emissions by 11.7 MtCO2e over the period.

The result is highly sensitive to the material recovery costs that indirectly arise from this option, which, depending on assumption sources, could result in a range from -$1.5 billion to $1.8 billion given the volumes this applies to. However, we expect that material recovery costs would decrease as a result of additional demand from this policy.

The quantified NPV may also be larger if waste volumes reduce over the period to 2050 as a result of this policy, as may be expected based on certain findings in the literature.

Further, the quantitative NPV needs to be considered alongside the significant potential non-quantified benefits.

This section outlines the CBA approach and framework for the proposed waste minimisation plan (WMP) requirements and summarises the results.

## 3.1 Options for analysis

This cost benefit analysis compares the **Base Case** (the status quo) with the policy intervention:

- **Base Case:** no further changes to the Building Act or Waste Minimisation Act (while changes may be possible, they would need to be separately assessed and we would not wish to predict these). We assume the announced changes to the waste levy are implemented as announced.
- **Option 2c**: requirements introduced for WMPs from buildings owners when building or demolishing buildings (with associated penalties and infringement fees for non-compliance).

The analysis below focuses on comparing Option 2c with the Base Case.

For **Option 2c**, while we note the legislation is enabling, for the purposes of estimation we assume:

- WMP requirements are implemented from 2024, with implementation costs spread over 2024 and 2025. While the WMP may not in itself require waste minimisation actions to be implemented, we assume that the requirement to develop the plan will encourage people to consider these actions. We assume that indirect impacts related to diversion from landfill and associated costs and benefits ramp up from 2025 to 2030 (a full set of assumptions is in Appendix A).

- WMPs are required when a building consent is sought for new building work, and when demolishing a building. The requirements will apply to the demolition of all buildings, except those exempted through regulation. This means the requirements will apply to the demolition of detached buildings and building elements fewer than three storeys.
- Owners are subject to penalties and infringement fees if they intentionally do not:
  - provide a WMP when a building consent is sought or before carrying out demolition work as required by regulations,
  - make the WMP available onsite,
  - provide the WMP to those required under regulations, or
  - comply with their submitted WMP.
- A passive enforcement approach from MBIE and local authorities.

We note the WMP requirements aim to allow flexibility for different construction or demolition projects and local circumstances, particularly around each area's waste management facilities. The WMP will exist independently to the building consent process. A WMP will be required at the same time as a building consent application is submitted, although the consent's approval will not depend on the plan.

We separately consider the impacts on waste diversion from landfills to the impacts from changes to the waste levy. Appendix A provides further information on the assumptions used.

## 3.2 Our cost benefit analysis framework

We have modelled the costs and benefits of Option 2c relative to the Base Case based on the volume of waste diverted due to the implementation of WMPs. We used waste volume as the basis instead of the number of WMPs because of information difficulties around estimating WMP numbers and given the impacts relate more to the resulting impact on waste volumes. Further, there is recent existing literature that is relevant on the impact of other interventions (such as changes to the waste levy) on waste volumes that provide useful indicators.

### 3.2.1 Quantified cost categories

Table 9 summarises the costs of WMPs (Option 2c), relative to the Base Case.

Table 9: Quantitative cost categories for WMPs

| Cost | Description | Relevant party |
|---|---|---|
| **Direct costs** | | |
| Cost of implementing WMPs | The cost to implement regulations and provide guidance/training to territorial authorities, and the costs of monitoring and compliance for both MBIE and territorial authorities. | Mix of MBIE and territorial authorities |

| Indirect costs | | |
|---|---|---|
| Material recovery cost of recycling and reuse | The labour costs of sorting material, costs of collecting (cost of additional skip bins used for transporting deconstruction waste), and the cost of reuse or recycling (e.g. additional processing). Note: incorporated in this cost is the direct cost of developing the WMP itself.[22] | Developer |

The direct cost of WMPs to developers is incorporated within the indirect cost category of the material recovery cost associated with the recycling and reuse of materials. However, we note that Tran (2017) estimated costs at around $90,000 to develop a WMP for a project diverting 2,138 tonnes of construction and demolition (C&D) waste. This represented about 0.1 per cent of the overall costs of the project considered in this study. Further, we note that additional waste infrastructure investment has already been signalled in the sector and suggest that the material recovery costs already include the collection, sorting and reuse/recycling costs. As such, we have not separately modelled any additional infrastructure capital or operating costs to process and divert waste. We have not considered this as a specific sensitivity but note that if such costs were applicable, they would be small relative to the material recovery costs.

The values used to estimate the material recovery (indirect) costs are the mid-point of two sources: 1) a nation-wide CBA of C&D in schools by Tonkin + Taylor in 2021; and 2) a CBA of C&D of an Auckland housing development in 2019.[23] These vary considerably as shown in Table 13 and discussed further in the Appendix.

We also note that:

- Significant regional variation exists across the 78 Territorial Authorities. As the second source focuses on Auckland and the first source involves a study where five out of nine schools assessed were in Auckland, the mid-point values may over-weight the material recovery costs observed in Auckland. This is relative to the 40 per cent of national building consents that are from Auckland. We simply note this in the context of considering the results. However, future analysis could potentially adjust for labour costs outside Auckland.
- We have used the base values from the Tonkin + Taylor (2021) report as our smaller estimates for material recovery costs. However, these values could be even smaller if the costs only apply to a proportion of the material flows, as suggested in the report.
- Material recovery costs are not specifically modelled by material type but are separated by materials being recycled or reused. We understand that costs vary by material (e.g. sorting/processing costs for concrete are lower than glass, wood, and metals). However, the Auckland study estimates are calculated on an average cost per tonne of waste (looking across materials) and the separate cost for processing concrete noted in the nationwide study are factored in that estimate and therefore the mid-point values.

[22] While not separately reported in our analysis, we note that estimates of the cost of WMPs have been in the vicinity of $90,000, for a project with over 2,000 tonnes of C&D wate by Tran (2017).

[23] Rohani et al (2019) *Cost Benefit Analysis of Construction and Demolition Waste Diversion from Landfill – A case study based on HLC Ltd development in Auckland.*

### 3.2.2 Quantified benefit categories

Table 10 summarises the benefits of WMPs (Option 2c), relative to the Base Case.

Table 10: Quantitative benefits of WMPs

| Benefit | Description | Relevant party |
|---|---|---|
| **Indirect benefits** | | |
| Avoided landfill costs | Avoided transport costs to landfill and avoided landfill disposal costs | Developer |
| Avoided material costs | Avoided costs of timber, ferrous and non-ferrous metals, concrete/rubble, and glass. | Developer |
| Avoided negative externalities | Avoided cost of embedded emissions of recycled and reused timber, metal, concrete/rubble, and glass. | Developers/society |
| Other benefits | Avoided disamenity effects: noise, litter, odour | Community |
| | Avoided natural gas use from the use of incinerated timber | Users of timber for incineration |

All key data, assumptions and modelling parameters are detailed in Appendix A. We have included the following materials in our modelling:

- Timber
- metal
- concrete/rubble
- glass.

Other C&D landfill waste not included in our modelling includes:

- plasterboard
- paper
- plastics
- putrescibles
- textiles
- rubber
- potentially hazardous materials.

Although there was insufficient data to include these other materials in our analysis, the material modelled represents over 87 per cent of C&D waste sent to class 1 landfill and 98 per cent of waste sent to class 2-4 landfill according to figures from Eunomia 2017 (and that range is broadly consistent with data from MfE's 13 August 2021 written evidence to the Environment Select Committee on reducing C&D waste going to landfill). While the avoided material costs for some of these other materials may be lower, we note that there are facilities that use recycled plasterboard for fertiliser production in New Zealand.

## 3.3 Quantified cost benefit analysis results for waste minimisation plans

Table 11: CBA results for WMPs in net present value ($ million)

| | NPV ($million) |
|---|---|
| **Costs** | |
| Direct: Cost to implement and monitor WMPs | 6 |
| Indirect: Material recovery costs | 4,814 |
| Total costs | **4,820** |
| **Benefits** | |
| Indirect: Avoided landfill disposal costs | **2,377** |
| Indirect: Avoided material costs | **1,479** |
| Indirect: Avoided costs of embedded emissions | **724** |
| Indirect: Avoided disamenity cost of landfill | **195** |
| Indirect: Other benefits | **112** |
| Total benefits | **4,886** |
| **NPV** | **$66** |
| **BCR** | **1.01** |

### 3.3.1 Distribution of quantified impacts

Figure 3 shows that the quantified costs are dominated by the indirect costs to developers associated with the recovery cost materials, which make up 99 per cent of costs. This estimate includes the direct costs to developers of developing WMPs. The vast majority of this are the costs associated with material recovery costs for recycling (given the assumed volumes recycled compared to those reused). In contrast to material recovery costs, the direct one-off costs to MBIE to implement the regulations and the direct ongoing costs to both MBIE associated with oversight and information management and to territorial authorities for compliance monitoring and enforcement together only represent 0.1 per cent of costs.

Figure 3: Distribution of quantified WMP costs

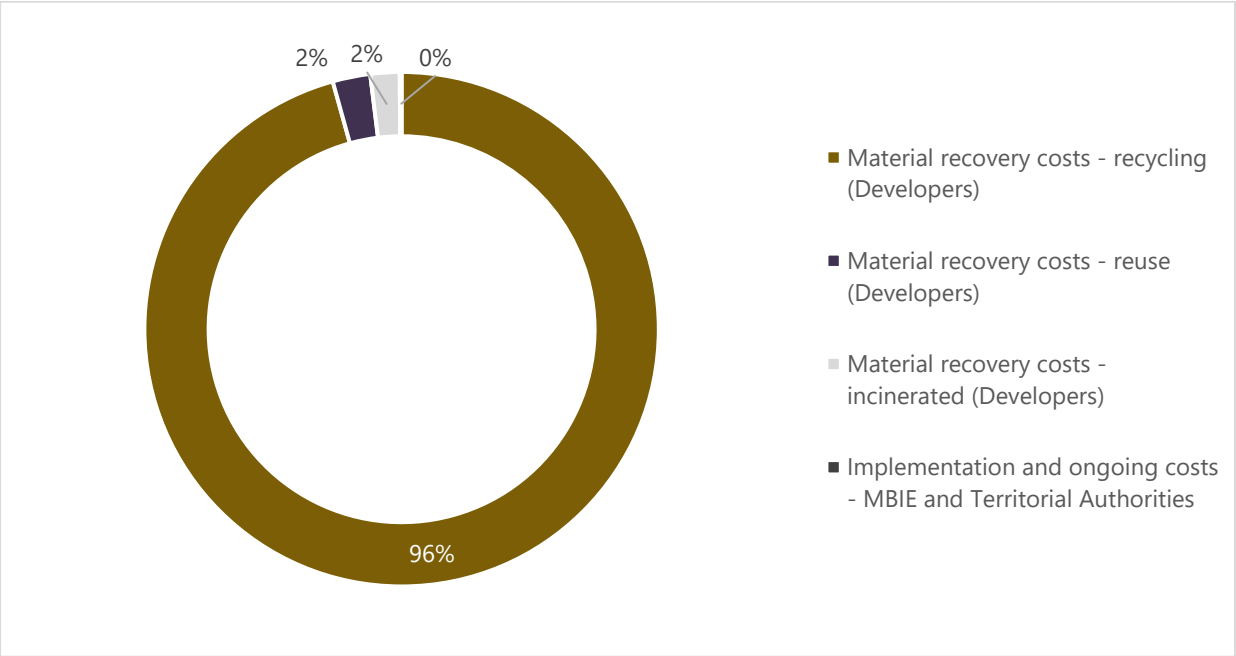
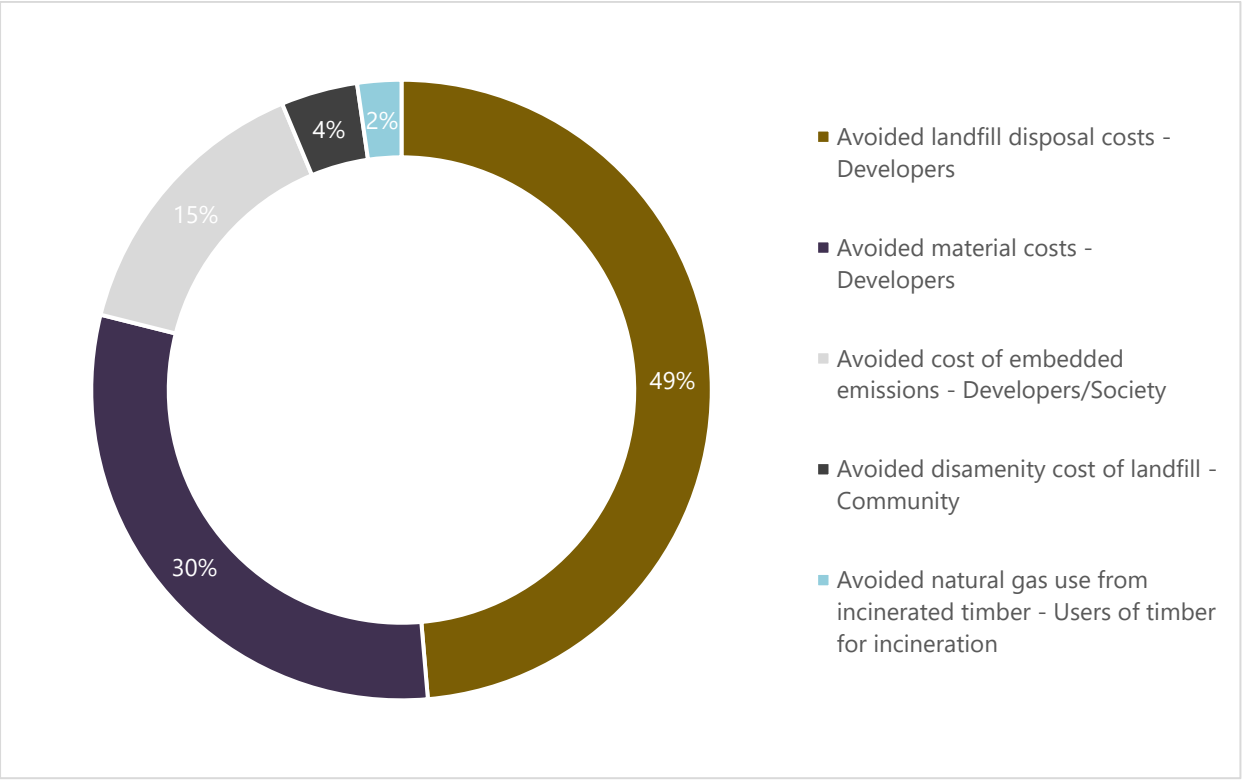



Figure 4 provides an overview of the quantified benefits of WMPs. Like costs, most benefits fall to developers. This includes the largest cost categories of avoided landfill costs ($2.4 billion) and avoided material costs ($1.5 billion). The avoided costs of emissions account for $724 million in present value terms, resulting from a modelled reduction of 11.7 $MtCO_2e$ over 2023-2050.

Figure 4: Distribution of quantified WMP benefits



### 3.3.2 Unquantified impacts

In addition to the quantified costs and benefits included in the analysis above, there are also a number of potential benefits from WMPs that we have not been able to quantify with the information and time available. These include the potential impacts of WMPs on:

- biodiversity, through reduced use of landfill and potential hazards surrounding landfill material and reduced impact on habitats resulting from greater reuse of materials that would otherwise be extracted from the natural environment
- reduced susceptibility of landfills to natural hazards such as floods relative to the Base Case where greater volumes of waste go to landfill
- economic opportunities resulting from expansion of the recycling industry and development of the market for the reuse of materials. While we have not included any potential job creation impacts in our CBA, we note that Rohani et al. (2019) cites studies by the United States Environmental Protection Agency (in 2002) and Institute for Local Self Reliance (in 2002) that estimate additional job creation from the recycling or waste recovery and reuse, with estimates from 1 (for incineration) to 296 jobs per 10,000 tonnes of waste recovered or reused.
- improved potential for reuse of landfill sites due to reduced potential health hazards, which would also improve associated land values
- reduced pollution to land, air and water from heavy metals and toxic chemicals.

Further, the following impacts were not quantified in our central estimate but are considered in the sensitivity analysis discussed in the next section. These are, to the extent that waste minimisation plans encourage designers to use less material or use material more efficiently in building designs, the resulting:

- reduced costs to building owners and developers, and
- reduced emissions from the extraction, manufacture and transportation of building materials.

## 3.4 Our analysis highlights the sensitivity to material recovery costs, time horizons and waste volumes

The above CBA results shows the key sensitivity for WMPs lies in material recovery costs and waste volumes that indirectly arise from this option. As a result, we report below the sensitivity to assumptions around cost, time horizon and volumes. We do not report other cost sensitivities and note that the largest cost category already reflects recent changes in landfill costs as a result of changes to the waste levy.

Future analysis when developing the regulations could consider sensitivities around material costs, the inclusion of additional materials if data becomes available, any changes if appropriate to assumptions around future carbon prices (or updates to emissions factors), or changes to gas prices. However, we focus on the most material factors for our results below.

### Material recovery costs and time horizon

The NPV is highly sensitive to the material recovery costs, which, depending on assumption sources, could result in a range from -$1.5 billion to $1.8 billion given the volumes this applies to. We have taken the mid-point where there are different potential sources for inputs of material recovery costs.

We note that our analysis draws on past studies that have estimated these costs in New Zealand. However, the requirement for WMPs would be a significant policy change that is intended to support the market for the reuse and recycling of building materials. As a result, we expect material recovery costs may decrease as the market matures. Requiring a WMP will drive demand for material recovery services. This may encourage more businesses to enter, innovate and compete in the industry, and expand their geographic presence. In addition to increasing economies of scale, competition between suppliers may well decrease the material recovery costs over time.

We also note that there is greater uncertainty the further into the future that is modelled and without information on the number of WMPs, we have had to model impacts based on assumed changes in waste volumes (which reduced last year, we assume due to the change in the waste levy). As a result we have considered sensitivity to the time horizon modelled and note that NPV results reduce in magnitude if a shorter time horizon is used as shown in Table 12. The associated inputs for material recovery costs for the material cost scenarios is shown in Table 13 (note these are discussed further in Appendix A along with the other assumptions used). The results modelling out to 2030 turn negative over a shorter time horizon as there are fewer years where the benefits from increased diversion from landfill are considered (given the impact is only modelled to take full effect by 2030).

Table 12: WMP sensitivity analysis results for material recovery costs and time horizon

| Material recovery cost scenario | 2030 NPV (BCR) | 2035 NPV (BCR) | 2050 NPV (BCR) |
|---|---|---|---|
| Low | $258m (1.54) | $708m (1.56) | $1,836m (1.60) |
| Central | -$18m (0.98) | -$20m (0.99) | **$66m (1.01)** |
| High | -$259m (0.74) | -$655m (0.75) | -$1,474m (0.77) |

Table 13: Material recovery cost input assumptions for sensitivity analysis

| | Low | Central | High (original inputs) |
|---|---|---|---|
| Sorting – recycle | $26.41 | $104.205 | $182 |
| Collecting | $48.30 | $36.15 | $24 |
| Reuse | $33 | $33 | $33 |
| Sorting – reuse | $26.41 | $177.705 | $329 |
| Collecting | $48.30 | 60.65 | $73 |
| Reuse | $33 | $33 | $33 |
| Processing concrete | $10 | $10 | $0 |

### Waste volumes and time horizon

WMPs have the potential to reduce total waste volumes in New Zealand through better on-site management and/or designing out waste in the early development / planning stage. Evidence suggests that a large amount of waste (over a third) originates from poor design and management decisions (Llatas and Osmani, 2016).

We have modelled two scenarios:

1. A 10 per cent reduction in waste volumes due to better on-site management results in an NPV (BCR) of $537 million (1.12) in 2050. This better on-site management includes the WMPs' impact on reducing over-ordering, promoting reuse of materials on-site, or encouraging minimisation practices by sub-contractors. This is conservatively based on evidence found in a United Kingdom study where WMPs were associated with 15 per cent waste being generated.[24] No additional costs are modelled because on-site sorting costs are already factored into the estimated material recovery costs.

Figure 5: WMP sensitivity analysis results for on-site management and time horizon

| Waste volume scenario | 2030 NPV (BCR) | 2035 NPV (BCR) | 2050 NPV (BCR) |
|---|---|---|---|
| 10% reduction of on-site waste | $55m (1.08) | $173m (1.10) | $537m (1.12) |

2. A 15-25 per cent reduction in waste volumes due to better on-site management AND designing out waste in the early development / planning stage. This results in an NPV (BCR) between $108 million (1.02) and $657 million (1.16) in 2050. WMPs are expected to encourage developers to re-think and plan for managing waste. We assume this will incur additional costs for developers, not already factored into the estimated material recovery costs. The 15 per cent figure is consistent with the evidence referenced above (Llatas and Osmani, 2016) in relation to designing out waste, while the 25 per cent figure may apply if there were both a 15 per cent benefit from designing out waste and a 10 per cent benefit from better on-site management (considered separately above). Appendix A provides the method used to calculate the cost of designing out waste.

Figure 6: WMP sensitivity analysis result for on-site management, designing out waste, and time horizon

| Waste volume scenario | 2030 NPV (BCR) | 2035 NPV (BCR) | 2050 NPV (BCR) |
|---|---|---|---|
| 15% reduction from designing out waste | -$12m (0.98) | -$3m (1) | $108m (1.02) |
| 25% reduction from designing out and reduced on-site waste | $74m (1.11) | $222m (1.13) | $657m (1.16) |

[24] WRAP (2008) Achieving Good Practice Waste Minimisation and Management: Guidance for construction clients, design team and contractors.

# 4. Unquantified impacts of information requirements and changes to purposes and principles

## 4.1 Information requirements

The proposed options include that MBIE may require certain information to be provided to it as set out in regulations. The impacts of seeking such a given set of information will be considered when determining what information is required. We have incorporated the impacts of this requirement as part of assessing the CBAs of WMPs and EPRs in terms of costs to:

- developers or building owners of providing information to MBIE (expected to be negligible given the information is already being provided elsewhere)
- MBIE to receive and maintain the information requested.

However, we also note that:

- if additional information is sought beyond these two areas as intended in the regulatory impact statement Option 3b, MBIE will need to consider the costs to those providing and receiving the information when this is considered in designing the associated regulations
- if MBIE were to publish this information, like it does in the register for earthquake prone buildings, this would bring additional IT costs (like the register) and reduce search costs in relation to EPRs and WMPs, which could improve compliance, energy efficiency and waste reduction.

## 4.2 Changes to purposes and principles

The changes to the purposes and principles in Option 3b involve the following changes to the Act:

- Amending one of the Act's purposes to focus on promoting emissions reduction and climate resilience.
- Introducing new climate change principles to the Act. The principles will be reorganised and contextualised in a modern climate change framework with principles proposed around the need to ensure that:
  - buildings minimise whole-of-life embodied carbon emissions
  - buildings have a high level of operational efficiency while having attributes that contribute appropriately to the health, physical independence, and well-being of the people who use them
  - buildings are built to be resilient to changing climate conditions.

We considered these changes in relation to Option 3b and as a package below.

### 4.2.1 Considerations for Option 3b

The changes to the purposes and principles are likely to result in greater:

- direct cost to implement the legislation (including drafting and consultation); for instance, a study in 2012 suggested that the average cost per page of legislation at the time was around $45,000[25]
- ease of adjusting settings as required to support climate objectives (reduced relative cost), where the 2012 study estimated the average cost of a new Act at the time was $3.3 million compared to the average cost of a new regulation of $0.5 million, [26] and
- certainty for the public around initiatives that may be introduced or progressed to meet emissions budgets.

### 4.2.2 Considerations for the package of changes as a whole

The incremental impacts of the proposed changes to the purposes and principles of the Act when combined with the inclusion of WMPs and EPRs may result in:

- improved compliance
- early and/or increased adoption (impacting costs and benefits)
- potentially increased enforcement (impacting costs and benefits).

**Waste minimisation plans**

The RIS associated with this proposal notes:

> The amendment [to the Act's purposes] will enable building work, building practitioners, and buildings' performance standards to be regulated to reduce emissions and ensure climate resilience. It will send a signal that the sector needs to consider climate change and the emissions implications of their decisions. As part of these changes, it will be clarified that they provide grounds for regulations in the Building Code to be created to reduce the operational and embodied carbon emissions of buildings.
>
> ...
>
> This option [3b] will enable regulators of building work, building practitioners, and those implementing building performance standards to more predictably and consistently introduce policies, investments and changes in practice that will be required to reduce emissions and ensure buildings are climate resilient.

As a result, the impacts of WMPs may be more likely to occur sooner where Option 3b might be combined with Options 1c and 2c, as passing legislation could signal the need for the sector to move to this approach, encouraging earlier uptake. This may encourage greater emphasis from local

[25] See: https://www.otago.ac.nz/wellington/otago033080.pdf
[26] *Ibid*

authorities and a more rapid evolution of the market, which could decrease material recovery costs (which we note are the key driver of costs).

**Energy performance ratings**

In relation to EPRs, the proposed changes to the purposes and principles of the Act under Option 3b have the following potential incremental impacts (beyond those already considered in relation to Option 1c):

- Greater encouragement for investments in energy efficiency and resulting reductions in EUI. This would result in greater reduction in energy bills as well as greater costs associated with investments in energy efficiency, causing a net additional benefit.
- Possible impacts on enforcement efforts by territorial authorities, which could increase costs to these authorities but also improve compliance and resulting waste reduction, energy savings and wider benefits resulting from both.

# 5. Cost benefit analysis results for the package as a whole

The proposed package of changes generates a quantified NPV of $37 million between 2023 and 2050, with a BCR of 1.00. However, as noted earlier, each component within this option is subject to numerous sensitivities that could result in net quantified benefits or in some cases costs.
Further, the quantitative NPV needs to be considered alongside the non-quantitative benefits that have the potential to be significant. For instance, a review of the Australian commercial building disclosure programme estimated that total productivity benefits could increase the net benefits of the programme by 2 to 3 times. [27]

The results in Table 14 show the present value of total quantified costs and benefits of the whole package of changes (Options 1c, 2c and 3b) relative to the Base Case between 2023 and 2050, noting the significant additional non-quantified impacts identified in earlier sections would apply as well.

Appendix A outlines the detailed data and assumptions underpinning the analytical components.

Table 14: CBA results for package as a whole in net present value ($million)

| | NPV ($million) |
|---|---|
| **Costs** | |
| **Direct costs** | |
| WMPs | 6 |
| ERPs | 41 |
| **Indirect costs** | |
| WMPs | 4,814 |
| EPRs | 790 |
| Total costs | **5,650**[28] |
| **Benefits** | |
| **Indirect benefits** | |
| WMPs | 4,886 |
| ERPs | 801 |
| **Total benefits** | **5,687** |
| **NPV** | **$37** |
| **BCR** | **1.00** |

[27] *Commercial Building Disclosure Program Review*, ACIL Allen 2015, p57. This report found that total productivity benefits for the Australian programme were in the range of AU $110.5M to AU $167.8M but were excluded due to the lack of robust evidence.
[28] Note numbers do not add due to rounding.

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# Appendix A CBA detailed assumptions

## Common modelling parameters

Table 15: Common modelling parameters

| Parameter | Value/ assumption | Rationale |
|---|---|---|
| Discount rate (real) | 5% | New Zealand Treasury's recommended discount rate for regulatory proposals. |
| Modelling time frame | 2023 - 2050 | We assume that regulations are implemented from 2024, with implementation costs spread over 2024 and 2025 and impacts linearly increase over 5 years from 2025 as a transitional period. We model impacts to 2050 as this is the target timeframe for the reduction of net emissions to zero within the Zero Carbon Act. |
| Inflation rate | 2% | Broadly representative of Statistics New Zealand's historic inflation data. |

## Energy performance ratings

### Volume assumptions

Table 16: Volumes associated with mandatory energy performance ratings

| Category | Description | Assumption / estimation |
|---|---|---|
| Volumes | Property stock – Commercial office | **869 buildings**<br>**5,192,562 m$^2$**<br>**0.7 %pa growth rate**<br>From District Valuation Roll (DVR) data, supplied by Ministry of Housing and Urban Development (HUD). These are the buildings classified as Commercial Office minus the total estimate of public office buildings as estimated by EnergyAction and EnergyConsult in the 2018 CBA. Growth rate estimate from the Energy Action and EnergyConsult (2018) CBA. |
| | Property stock – Commercial retail | **1,234 buildings**<br>**7,012,236 m$^2$**<br>**0.7%pa growth rate**<br>From DVR. We have followed the same broad grouping of "retail" used in the Building Energy End-use Study (BEES) of commercial buildings in New Zealand, led by BRANZ (Amitrano et al., 2014)[29] as we take the estimate for retail EUI from the BEES research. Due to data and time constraints, we assume the same growth rate as that for commercial offices. |

[29] https://www.branz.co.nz/environment-zero-carbon-research/bees/.
Building Energy End-use Study (BEES) was a 6-year research project looking at energy and water use in NZ commercial buildings, which ran from 2007. "Retail" included DVR codes of CL, CM, CR, CS, ST, CV, CX.

| Category | Description | Assumption / estimation |
|---|---|---|
| | Property stock – Commercial non-office non-retail | **1,966 buildings**<br>**13,166,440 m$^2$**<br>**0.7 %pa growth rate**<br>From DVR. Due to data and time constraints, we assume the same growth rate as that for commercial offices. |
| | Property stock – Public non-offices | **1,829 buildings**<br>**11,210,310 m$^2$**<br>**0.6 %pa growth rate hospitals**<br>**0.1%pa growth rate schools**<br>From DVR, using the classifications of property types classified as "Other Education" and "Other Health".<br>The current proposal is for public buildings to be captured in the regulations. Given time and data limitations, we have focussed the analysis on hospitals and schools, which we consider to be the main buildings likely to be over 2000m$^2$. Public offices were excluded, as government offices are already subject to energy performance reporting requirements. Data on specific public building types, stock and area, was limited. We were not able to separate buildings that are publicly or privately owned. We considered the DVR source was more appropriate than alternative data sources available, such as LINZ data, which appeared likely to produce a significant undercount. That source enabled us to estimate building footprints, but not total area, and did not enable identification of private or public buildings. While the DVR could be filtered for "government-owned" buildings, the estimates appeared highly inaccurate. This is, likely because many buildings for public use such as schools and hospitals are owned by different entities in the wider public sector.<br>Growth rates are based on the growth rate of the number of hospital beds in NZ based on OECD estimates, and growth rate of count of schools in New Zealand. |
| | Property stock – Industrial | **7,889 buildings**<br>**37,956,573 m$^2$**<br>**0.7 %pa growth rate**<br>From DVR. Due to data and time constraints, we assume the same growth rate as that for commercial offices. |
| | Property stock – Large-scale residential | **1,285 apartment buildings**<br>**4,259,522 m$^2$**<br>**0.7%pa growth rate**<br>From DVR. Due to data and time constraints, we assume the same growth rate as that for commercial offices. |

## Quantified costs assumptions

Table 17: Quantified costs associated with mandatory energy performance ratings

| Cost category | Cost description | Cost assumption / estimation |
|---|---|---|
| Rating costs (cost to building owners) | NABERSNZ first assessment and certification | **$4,000 per rating — base case**<br>**$3,000 per rating — mandatory scheme**<br>Average value based on information from NABERSNZ.[30] In the case where ratings are mandatory, we assume fees are lower to represent increased competition in the market for assessors. This is based on information from NZGBC and follows the approach from the Energy Action CBA (Energy Action and EnergyConsult, 2018). |
| | NABERSNZ subsequent assessment | **$2,800 per re-rating — base case**<br>**$2,100 per re-rating — mandatory scheme**<br>We assume the initial rating will involve relatively more data collection and that subsequent ratings will accordingly be lower in cost. We have applied a 30% discount, based on information from NZGBC. |
| | Frequency of ratings | **Every 3 years**<br>We assume buildings are required to be rated every three years. We have based this on current requirements for government office buildings to be re-rated every three years where they do not meet the required target rating.[31] This is comparable to the requirement of a full re-rating every four years that the United Kingdom government has proposed in its regulations.[32] |
| Metering costs (cost to building owners) | Upgrades for buildings with insufficient metering | **$1.73/m$^2$**<br>Average costs based on the estimate in the Energy Action and EnergyConsult CBA (2018) (adjusted for inflation), originally estimated from a NZGBC assessment of a sample of 10 office buildings.<br>We assume this cost is a one-off and is required for 50% of existing office non-industrial building stock (excluding apartments given they are likely to already to have unit-level metering). We also assume that from FY31 onwards the required metering is standard in new building stock and no metering upgrades are required. |
| Energy efficiency upgrade costs (cost to building owners) | Investment in efficiency upgrades (commercial/ | **$10.81/m$^2$ –** commercial (offices)<br>**$9.80/m$^2$** – commercial (retail and other)<br>**$6.01/m$^2$** – large-scale residential<br>**$11.88/m$^2$** – public buildings |

[30] https://www.nabersnz.govt.nz/how-to-get-a-rating/assessment-costs/, accessed 5 August 2022.
[31] https://www.procurement.govt.nz/property/lease-and-facilities-management/energy-efficient-buildings/, accessed 5 August 2022.
[32] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/970368/performance-based-policy-framework-office-impact-assessment.pdf, accessed 5 August 2022.

| Cost category | Cost description | Cost assumption / estimation |
|---|---|---|
| [Indirect cost] | public/industrial/ large-residential) | **$20.62/m$^2$** – industrial<br>We estimate an average cost of investment in efficiency upgrades per square meter for each type of building based on the approach taken in the previous CBA by Energy Action and EnergyConsult (2018), but with our updated property stock, energy usage and tariff rates. We assume the energy efficiency upgrades have a useful life of 10 years.<br>This approach assumes that building owners implement an investment that equates to the amount of energy savings over an average three-year simple payback period (following earlier work informed by discussions with EECA). This may be a conservative estimate that could overestimate the costs of upgrades as there are many measures that building owners could take without significant costs, such as programming heaters to turn off overnight, or ensuring even temperatures are maintained. The Energy Action and EnergyConsult (2018) CBA also notes that the three-year average payback is more conservative than the 2.5 year payback used in the 2009 study examining the feasibility of a NABERSNZ scheme.[33] As with metering costs, we have assumed that these costs apply to existing stock and not to new building stock which is likely to be built with improved energy efficiency measures. |
| | Electricity tariff | **0.185 $/kwh – commercial**<br>**0.171 $/kwh – industrial**<br>**0.306 $/kwh – residential**<br>Based on the prices in the Climate Change Commission's July 2022 report on the unit limit and price control settings of the New Zealand Emissions Trading Scheme.[34] |
| | Gas tariff | **0.066 $/kwh – commercial**<br>**0.032 $/kwh – industrial**<br>**0.147 $/kwh – residential**<br>As above, based on the prices in the Climate Change Commission's July 2022 report.[35] |
| Implementation (cost to government) | Policy implementation to embed new regulations | **$500,000** for first two years<br>We follow the Energy Action and EnergyConsult (2018) CBA and assume MBIE incurs a one-off implementation cost of $500,000. We assume this is split between the first two years. |
| | Ongoing monitoring, | **$219,000 per year** |

[33] Cited in Energy Action and EnergyConsult (2018): Study of non-residential building energy rating schemes (BERS), Concept Consulting, 2009.

[34] https://ccc-production-media.s3.ap-southeast-2.amazonaws.com/public/ETS-advice-July-22/PDFs/NZ-ETS-settings-2023-2027-final-report-web-27-July-2022.pdf, accessed 8 August 2022.

[35] https://ccc-production-media.s3.ap-southeast-2.amazonaws.com/public/ETS-advice-July-22/PDFs/NZ-ETS-settings-2023-2027-final-report-web-27-July-2022.pdf, accessed 8 August 2022.

| Cost category | Cost description | Cost assumption / estimation |
|---|---|---|
| | compliance, and enforcement costs | We assume a light compliance function with 5 FTE and 50% on-cost loading. Based on the average annual salary of $87,600 for a public service employee.[36] |

## Quantified benefits assumptions

Table 18: Quantified benefits associated with mandatory energy performance ratings

| Benefit category | Benefit description | Benefit assumption / estimation |
|---|---|---|
| Reduced energy bills | Energy use intensity (EUI) – Commercial office | **239 kwh/m²**<br>Weighted average EUI based data from the BRANZ BEES report (Amitrano et al., 2014). |
| | EUI – Commercial retail | **216 kwh/m²**<br>176 kwh/m² electricity<br>40 kwh/m² gas<br>Total energy consumption from Table C of BRANZ report (Amitrano et al., 2014). Proportions of energy use estimated from MBIE energy consumption data. |
| | EUI – Commercial non-office, non-retail | **216 kwh/m²**<br>176 kwh/m² electricity<br>40 kwh/m² gas<br>Assume same electricity and gas use proportions as commercial retail, due to data limitations. |
| | EUI – Public non-offices (hospitals) | **466 kwh/m²**<br>379 kwh/m² electricity<br>87 kwh/m² gas<br>Based on estimates of hospital EUI from the iHub report on healthcare sector building and cooling cites of between 466-550 kWh/m2 in Scotland and the UK,[37] and between 393-467 kWh/m2 in Australia between capital cities and regional locations.<br>An article from Build Magazine states that average for a New Zealand hospital is 360kwh/m2/year. As we could not identify the source of this, we opted not to use it.[38]<br>Due to data and time constraints, we assume the electricity and gas use proportions as that for commercial. |
| | EUI – Public non-offices (schools) | **213 kwh/m²**<br>174 kwh/m² electricity |

[36] https://www.publicservice.govt.nz/our-work/workforce-data/remuneration-pay/wage-trends/, accessed 8 August 2022.

[37] https://ihub.org.au/wp-content/uploads/2020/06/LLHC1_Healthcare_Sector_Baseline_Energy_Report_V01.pdf

[38] https://www.buildmagazine.org.nz/index.php/articles/show/green-hospital-a-healthier-choice

| Benefit category | Benefit description | Benefit assumption / estimation |
|---|---|---|
| | | 39 kwh/m² gas<br>Average energy use estimated from Towards Zero Net Energy Schools report for BRANZ (Shahbazpour, 2017). Electricity and gas use proportions assumed the same as commercial retail, due to limited availability of more specific data on energy usage in different public buildings. |
| | EUI – Industrial | **746 kwh/m²**<br>362 kwh/m² electricity<br>384 kwh/m² gas<br>Estimated from MBIE total energy consumption for industrial users,[39] divided by the estimate for industrial property stock from DVR data. This number will be inclusive of energy use from industry processes which are likely to be specific and varied. |
| | EUI – Large-scale residential | **87 kwh/m²**<br>11 kwh/m² electricity<br>76 kwh/m² gas<br>Estimated from the EECA TIMES report (Gretton and Pugliese, 2022) for joined dwellings and average dwelling size (115m$^2$). Proportions estimated from MBIE energy consumption for residential user group.[40] |
| | Baseline change in EUI over time – non-industrial | **-0.3% pa**<br>We have adjusted and scaled down the baseline change in EUI over time that was used in the Energy Action and EnergyConsult (2018) CBA (-0.5%) by the base building/total building ratio from their CBA as we consider whole building rather than base building energy.<br>We note that energy intensity in New Zealand overall, as measured in terms of how much energy is required to produce a unit of GDP, is decreasing on average (1.4% between 1990-2019).[41] However, we were not able to find an equivalent parameter to use for the change in efficiency upgrades for businesses that implemented efficiency upgrades. For consistency and the purposes of tractability of modelling, we opted to use both figures from the 2018 CBA (Energy Action and EnergyConsult). |
| | Baseline change in EUI over time – industrial gas | **-2.4% pa**<br>Based on MBIE Energy data 2017-21 multiplied by ratio of base building EUI to total building EUI from Energy Action and EnergyConsult CBA (2018). |

[39] https://www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/energy-statistics-and-modelling/energy-statistics/electricity-statistics/ and https://www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/energy-statistics-and-modelling/energy-statistics/gas-statistics/

[40] https://www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/energy-statistics-and-modelling/energy-statistics/electricity-statistics/ and https://www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/energy-statistics-and-modelling/energy-statistics/gas-statistics/

[41] https://www.mbie.govt.nz/dmsdocument/16820-energy-in-new-zealand-2021, accessed 18 August 2022.

| Benefit category | Benefit description | Benefit assumption / estimation |
|---|---|---|
| | Baseline change in EUI over time – industrial electricity | **-1.6% pa**<br>As above. |
| | Change in EUI of businesses that implemented efficiency upgrades | **-1.68% pa**<br>Average of ratio of base building EUI/total building EUI for buildings over 1500m2 from the 2018 CBA (53%), applied to the -3.0% used by Energy Action and EnergyConsult (2018). |
| | Change in EUI of industrial businesses that implemented efficiency upgrades for gas | **-3.76% pa**<br>Based on the achieved difference between commercial buildings that did and did not implement energy efficiency upgrades (~1.5%) added to the baseline change in industrial usage of gas. |
| | Change in EUI of businesses that implemented efficiency upgrades for electricity | **-3.0% pa**<br>Based on the achieved difference between commercial buildings that did and did not implement energy efficiency upgrades (~1.5%) added to the baseline change in industrial usage of electricity. |
| Reduced carbon emissions | Reduced carbon emissions | Calculated as the total reduction in energy usage in kWh x emissions factors x carbon price. |
| | Emissions factors | **0.107 kgCO2/kwh – electricity**<br>**0.195 kgCO2/kwh – gas**<br>Average emissions factors published by the Ministry for the Environment.[42] |
| | Carbon price | Avoided emissions are multiplied by the NZ Treasury's shadow carbon price (real): **$96** in 2023, rising to **$174** in 2050. |
| Proportion and timing assumptions | Proportion of office buildings and large apartments which voluntarily report energy usage and actively seek to reduce energy usage | **8.0%**<br>Based on estimates from the EnergyAction and EnergyConsult (2018) CBA, which was the rate assumed to be achieved by 2018. We assume that this will hold for commercial offices and large residential, as some of these buildings will have an incentive to voluntarily report and reduce their energy usage to achieve better prices/value. |
| | Proportion of public non-office and commercial - retail and other which voluntarily report energy usage and actively seek to reduce energy usage | **2.0%**<br>We assume significantly less demand for buildings to voluntarily uptake and reduce usage across non-office and residential buildings, as these buildings have fewer commercial drivers for voluntary energy usage reductions. |
| | Proportion of office non-industrial buildings needing metering upgrades | **50%**<br>Based on estimates from the EnergyAction and EnergyConsult (2018) CBA, which assumed that half of the existing building stock would need metering upgrades to enable energy usage upgrades. |

[42] https://environment.govt.nz/publications/measuring-emissions-a-guide-for-organisations-2022-summary-of-emission-factors/

| Benefit category | Benefit description | Benefit assumption / estimation |
|---|---|---|
| | Timeframe to standard inclusion of energy usage technology | **FY30**<br>Our modelling assumes that metering and efficiency upgrades are included as standard inclusions in all new buildings after FY30 and thus do not contribute additional costs beyond this point. |
| | Proportion of buildings that can achieve energy use reductions with no-cost upgrades | **10%**<br>This is an adjusted proportion, based off a US study which carried out a cost-benefit analysis of large commercial buildings to find an average of 15% of annual energy savings could be achieved through re-commissioning of the buildings (Mills et al. 2004). Given the age of the study (with improvements in energy saving technology since) and the likely differences in building cohort (the existing buildings in the US study had a median size of around 14,000 m2), we scaled this rate down by applying our baseline rate of energy reduction (-0.3%) and taking into account the number of years since the study. |

# Waste management plans

## Modelled volumes

### Estimating total construction and demolition waste that could be additionally diverted

Diverted C&D waste includes waste that is recycled or reused. We estimate these volumes as a result of policy intervention by subtracting C&D waste that would be diverted in business as usual (BAU) from C&D waste that could be diverted from further recycling and reuse efforts as a result of WMPs. Based on C&D recovery data from Eunomia (2017), we focus on timber, concrete/rubble, glass, ferrous and non-ferrous metals diverted from all landfills.

We use 2015 data from Eunomia (2017) to estimate C&D waste volumes, assuming waste volumes grow at the same rate as real GDP. The following table presents the data for 2020. We assume no change until 2022, 1 per cent growth in 2023 and 2.2 per cent growth p.a. from 2024.

Table 19: Composition of C&D waste, 2020 (tonnes)

| Category | Class 1 landfills | Class 2-4 landfills | Total diverted |
|---|---|---|---|
| Paper | 16,008 | 2,705 | 0 |
| Plastic | 20,934 | 0 | 0 |
| Putrescibles | 16,624 | 43,285 | 0 |
| **Ferrous metal** | **29,554** | **2,705** | **53,179** |

| Category | Class 1 landfills | Class 2-4 landfills | Total diverted |
|---|---|---|---|
| **Non-ferrous metal** | **2,463** | **0** | **4,042** |
| **Glass** | **9,236** | **0** | **4,254** |
| Textiles | 19,087 | 0 | 0 |
| Sanitary paper | 616 | 0 | 0 |
| **Rubble and concrete** | **241,358** | **2,405,017** | **1,099,318** |
| **Timber** | **253,672** | **248,888** | **151,477** |
| Rubber | 4,926 | 2,705 | 0 |
| Potentially hazardous | 3,079 | 0 | 0 |

Source: Sapere estimates based on Eunomia (2017)

The table below provides the assumptions we used on BAU and maximum future diversion rates. The difference between the two scenarios indicates the maximum volumes of C&D waste that could be additionally diverted as a result of policy intervention. We assume the maximum potential can be achieved from 2030, with a linear ramp-up until then.

Table 20: Assumptions on BAU and future C&D waste diversion rates

| Category | BAU | Future (max potential) from 2030 |
|---|---|---|
| Timber – total | 23%<br>Source: estimated based on data in Eunomia (2017) | 75%<br>Source: ThinkStep (2018) Under Construction (p.18) |
| Timber - reused | 5%<br>Source: BRANZ Building end of life module C1 xls | 15%<br>Source: BRANZ Building end of life module C1 xls |
| Timber – recycled | 10%<br>Source: BRANZ Building end of life module C1 xls | 30%<br>Source: BRANZ Building end of life module C1 xls |
| Concrete/rubble - recycled | 20%<br>Source: BRANZ Building end of life module C1 xls | 90%<br>Source: BRANZ Building end of life module C1 xls |
| Ferrous and non-ferrous metals – recycled | 62%<br>Source: estimated based on data in Eunomia (2017) | 89%<br>Source: ThinkStep (2018) Under Construction (p.18) |
| Glass | 32%<br>Source: estimated based on data in Eunomia (2017) | 50%<br>Source: ThinkStep (2018) Under Construction (p.18) |

## Attributing diversion of construction and demolition waste volumes to policy intervention

Option 2c is a high-level policy intervention, and at this stage we are not able to assess the specific outcomes expected from the implementation of these policy interventions. Further, the expected increase in waste levies[43] may also be a contributing factor to increased diversion rates.

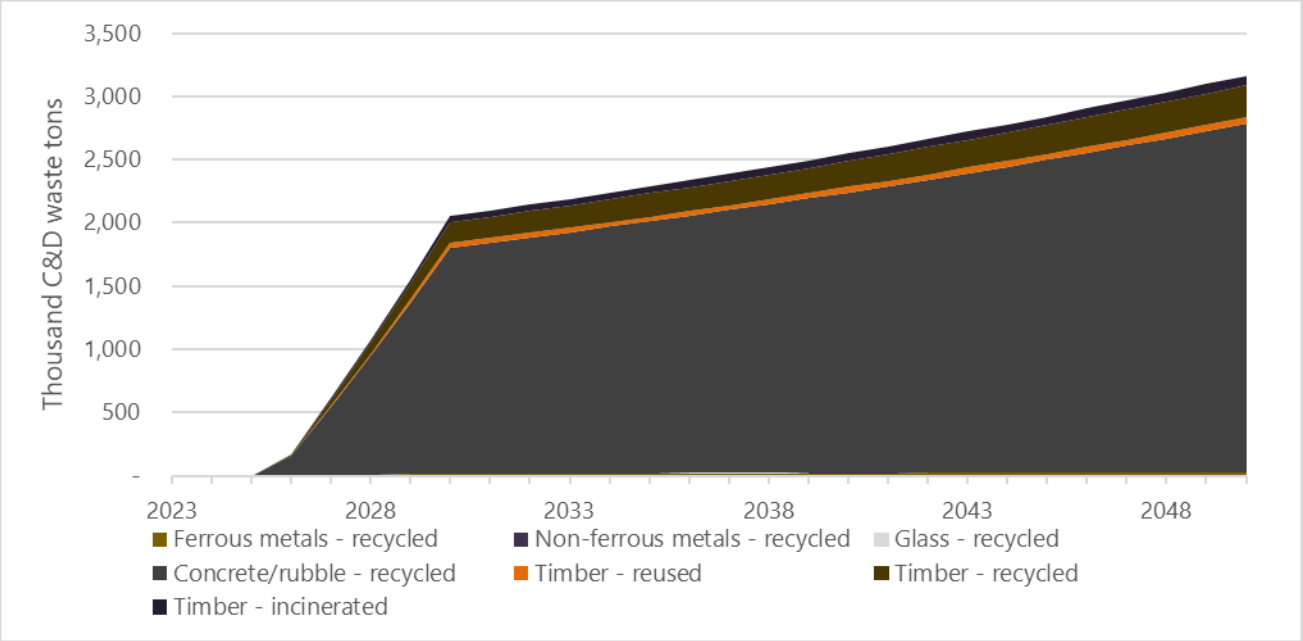
To isolate the impact of the waste levy, we assume a price elasticity of -0.23, which is the mid-point value assumed in NZIER (2021). The volumes that are additionally diverted away from landfills as a result of the increased levies are then subtracted from the maximum additional waste diversion that can be achieved through higher recovery rates as per Table 20.

Different waste diversion objectives set out in individual WMPs will results in different outcomes. Further, we expect the full package to deliver higher diversion rates than Option 2c alone because inclusion of climate change objectives in the purposes and principles is likely to provide a greater signal around the expected behaviour change in the construction sector. However, given the extent is difficult to quantify, we do not present differences between these options.

Hyder (2011) provide case studies of the C&D sector in Australia, noting that the Government's proactive support in South Australia and ACT of recycling and resource recovery contributed to over 75 per cent of all C&D wase material being recycled in those states.[44] We have conservatively assumed that 75 per cent is the highest rate that could be achieved for our analysis. The maximum diversion rates from Table 20 yield an aggregate recycling rate of 85 per cent for the given materials.[45] We have therefore scaled down the assumed diversion (keeping relative weightings of respective materials) to not exceed 75 per cent overall.

[43] https://environment.govt.nz/what-government-is-doing/areas-of-work/waste/waste-disposal-levy/expansion/
[44] P.148 in Hyder (2011) Construction and demolition waste status report
[45] This was estimated using the relative weights of the given material.

Figure 7: Estimations of C&D waste volumes additionally diverted




Source: Sapere analysis.

## Quantified costs assumptions

Table 21: Quantified costs associated with mandatory waste minimisation plans

| Cost category | Cost description | Cost assumption / estimation |
|---|---|---|
| Material recovery cost – recycling | Labour cost of sorting material | **Latest scenario – $26.41/tonne diverted**<br>**Central scenario - $104.21/tonne diverted**<br>**Original scenario - $182/tonne diverted**<br>The latest value is based on table 5.1 from Tonkin + Taylor (2021) report. It is the sum of off-site sorting cost ($25/tonne) and an estimate weighted average of $1.41/tonne for on-site sorting.<br>The assumption in the original scenario is based on table 16 in Rohani et al (2019). The central assumption is an average between the original and latest values. |
| | Cost of collecting – cost of additional skip bins used for transporting deconstruction waste | **Latest scenario - $48.3/tonne diverted**<br>**Central scenario - $36.15/tonne diverted**<br>**Original scenario - $24/tonne diverted**<br>The latest value is based on table 5.1 from Tonkin + Taylor (2021) report. The original is based on Rohani et al (2019) that considers a collection cost of $0 to $1200 per dwelling. These are converted to a tonnage rate based on the ratio of new and altered consents, yielding a range of $24 to $73/tonne for recycling and reuse. The updated value is the average between $24 and $73. The |

| Cost category | Cost description | Cost assumption / estimation |
|---|---|---|
| | | central scenario is the average between the original and latest values. |
| | Cost of reuse – additional expenses related to reuse (e.g. additional processing) | **$33/tonne diverted**<br>Rohani et al (2019), p. 57 |
| Material recovery cost – reuse | Labour cost of sorting material | **Latest scenario – $26.41/tonne diverted**<br>**Central scenario - $177.71/tonne diverted**<br>**Original scenario - $329/tonne diverted**<br>The latest value is based on table 5.1 from Tonkin + Taylor (2021) report. It is the sum of off-site sorting cost ($25/tonne) and an estimate weighted average of $1.41/tonne for on-site sorting.<br>The assumption in the original scenario is based on table 16 in Rohani et al (2019). The figure in part reflects greater effort in deconstruction rather than demolition, which is why it is larger than the recycling figure. The central assumption is an average between the original and latest values. |
| | Cost of collecting – cost of additional skip bins used for transporting deconstruction waste | **Latest scenario - $48.3/tonne diverted**<br>**Central scenario - $$60.65/tonne diverted**<br>**Original scenario - $73/tonne diverted**<br>The latest value is based on table 5.1 from Tonkin + Taylor (2021) report. The original is based on Rohani et al (2019) that considers a collection cost of $0 to $1200 per dwelling. These are converted to a tonnage rate based on the ratio of new and altered consents, yielding a range of $24 to $73/tonne for recycling and reuse. The higher cost for reuse reflects more destinations that the waste is sent to for further processing. The updated value is the average between $24 and $73. The central scenario is the average between the original and latest values. |
| | Cost of reuse – additional expenses related to reuse (e.g. additional processing) | **$33/tonne diverted**<br>Rohani et al (2019), p. 57 |
| | Cost of processing concrete (crushing) | **10/tonne diverted**<br>Table 5.1 in Tonkin + Taylor (2021) |
| Cost of implementing WMP | One-off cost to MBIE to implement regulations and BCAs/MBIE: training costs | **$500,000 in 2024**<br>Based on Sapere's CBA proposed building systems regulations (2021), p. 46 and scaled up to reflect this is at the stage of primary legislation with associated regulations needed as well and an estimate for the need for guidance/training. |
| | Ongoing cost to MBIE | **$395,613 p.a.** |

| Cost category | Cost description | Cost assumption / estimation |
|---|---|---|
| | | 3 FTE + 50% for overheads. Average annual salary for public service employees FY22 - $87,914 |
| | Cost of designing out waste (used in sensitivity analysis) | **$29.63/tonne**<br>Case study 1 in Tran (2017) indicates a cost of $57,375 for a project diverting 2,138 tonnes of C&D waste. This is the adjusted for 2022 dollars using an inflation rate of 2%. |

## Quantified benefit assumptions

Table 22: Quantified benefits associated with mandatory waste minimisation plans

| Benefit category | Benefit description | Benefit assumption / estimation |
|---|---|---|
| Avoided landfill costs | Avoided landfill disposal costs | **$75.27/tonne diverted from landfill**<br>CBAx values for landfill disposal costs are:<br>$129/t - Municipal landfill (class 1)<br>$63/t - construction and demolition fill<br>$43/t - managed fill and controlled fill (class 3 and 4)<br><br>Weighted for volume of applicable classes for C&D from Eunomia 2017.<br><br>Waste levy expansion: $60, $30, $20 from 2024 for each class respectively.[46] |
| | Avoided transport costs to landfill | **$15/tonne diverted**<br>Based on previous Sapere analysis.<br>We assume waste would go from a C&D site directly to landfill or pass through a transfer station and then to landfill. With the WMP, waste would go from site to the RRC or another build site, with a residual going to landfill.<br>Tran (2017) used an average distance to landfill of 60km. Expert opinions on the unit cost of transporting C&D waste between the project sites and landfill range between $30 and $40 per tonne (Rohani et al., 2019).<br>Recent freight analysis puts transport costs at $1.9 per/km with fixed and labour costs added rates range from $3-$6per/km. Using the 60km estimate produces a range of $180-$360 for a Twenty-foot Equivalent Unit (TEU). Assuming 20 tonnes per TEU the cost could be in the $9 to $18 range.<br>We use the lower end of expert opinion $30 per tonne and simply assume costs halved in RRP scenario meaning there is a $15 per tonne saving. |

[46] https://environment.govt.nz/what-government-is-doing/areas-of-work/waste/waste-disposal-levy/expansion/#:~:text=The%20waste%20disposal%20levy%20expansion,tonne%20as%20of%20July%202024.

| Benefit category | Benefit description | Benefit assumption / estimation |
|---|---|---|
| Avoided material costs | Avoided cost of timber | **$455/tonne diverted**<br>Evidence from Community Recycling Centres suggests $1 per metre. To convert from tonnes to cubic metres we use an online calculator for radiata pine that suggests for dry timber there is 0.44 tonnes to a cubic metre. Redstag timber conversion tables for 100 by 50 wood suggest this would convert to around 455 linear metres per tonne. This is an underestimate as it excludes timber of higher value salvage (e.g. native timber retail for around $5-$10 a metre) |
| | Avoided cost of ferrous metal | **$250/tonne diverted**<br>This figure is based on advertised prices paid for roofing iron of $200-300 by scrap merchants. |
| | Avoided cost of non-ferrous metal | **$1000/tonne diverted**<br>Based on NZIER (2021). |
| | Avoided cost of concrete/rubble | **$11.3/tonne diverted**<br>Assumed to be crushed into aggregated.<br>Prices from https://roadmetals.co.nz/wp-content/uploads/2021/06/WaimakQuarry_PriceList_2021.pdf |
| | Avoided cost of glass | **$75/tonne diverted**<br>Based on NZIER (2021). |
| Avoided negative externalities | Avoided cost of embedded emissions – recycled timber | **0.3113tCO2e/tonne diverted**<br>This is the estimate for embedded emissions in recycled and primary material production of wood, as per United Kingdom Government GHG Conversion Factors for Company Reporting. |
| | Avoided cost of embedded emissions – reused timber | **0.31tCO2e/tonne diverted**<br>This is the estimate for embedded emissions in primary material production of wood, as per United Kingdom Government GHG Conversion Factors for Company Reporting.<br><br>Avoided emissions are then multiplied by the New Zealand Treasury's shadow carbon price (real): $96 in 2023, rising to $174 in 2050. |
| | Avoided cost of embedded emissions – incinerated timber | **1.08tCO2e/tonne diverted**<br>This is the estimate for replacing combustion of natural gas with incineration of timber. Assumes that the emissions factor for natural gas is 0.0541 tCO2e/GJ (using the Ministry for the Environment's emissions factors), and the energy content of pine is 20 GJ/tin (based on EECA data).<br><br>Avoided emissions are then multiplied by the New Zealand Treasury's shadow carbon price (real): $96 in 2023, rising to $174 in 2050. |
| | Avoided cost of embedded emissions | **0.13tCO2e/tonne diverted** |

| Benefit category | Benefit description | Benefit assumption / estimation |
|---|---|---|
| | – recycled concrete/rubble | This is the estimate of embedded emissions in primary material production of concrete, as per United Kingdom Government GHG Conversion Factors for Company Reporting.<br><br>Avoided emissions are then multiplied by the New Zealand Treasury's shadow carbon price (real): $96 in 2023, rising to $174 in 2050. |
| | Avoided cost of embedded emissions – metal | **3.86tCO2e/tonne diverted**<br>This is the estimate of embedded emissions in the primary material production of metals, as per United Kingdom Government GHG Conversion Factors for Company Reporting.<br><br>Avoided emissions are then multiplied by the New Zealand Treasury's shadow carbon price (real): $96 in 2023, rising to $174 in 2050. |
| | Avoided cost of embedded emissions – glass | **1.18tCO2e/tonne diverted**<br>Based on BRANZ $CO_2$NSTRUCT values for embodied greenhouse gas and energy for a range of construction material and products.<br><br>Avoided emissions are then multiplied by the New Zealand Treasury's shadow carbon price (real): $96 in 2023, rising to $174 in 2050. |
| Other benefits | Avoided use of natural gas – timber incinerated | **$177.80/tonne**<br>Saving in the cost of natural gas compared to using salvaged timber.<br><br>Natural gas price is $0.032/kWh and $8.89/GJ. The energy content of dry timber (pin) is 20GJ/tonne. Therefore, the money saved from incinerating timber is $177.80/tonne. |
| | Avoided disamenity effects: noise, litter, odour | **$7.41/tonne**<br>Inflating the average of the lower and upper bounds to 2022 dollars from: https://environment.govt.nz/assets/Publications/Files/nzier-waste-levy-extension.pdf |

# About Sapere

Sapere is one of the largest expert consulting firms in Australasia, and a leader in the provision of independent economic, forensic accounting and public policy services. We provide independent expert testimony, strategic advisory services, data analytics and other advice to Australasia's private sector corporate clients, major law firms, government agencies, and regulatory bodies.

'Sapere' comes from Latin (to be wise) and the phrase 'sapere aude' (dare to be wise). The phrase is associated with German philosopher Immanuel Kant, who promoted the use of reason as a tool of thought; an approach that underpins all Sapere's practice groups.

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