

Climate Implications of Policy Assessment: Disclosure Sheet

This disclosure sheet provides the responsible department's best estimate of the greenhouse gas emissions impacts for New Zealand that would arise from the implementation of the policy proposal or option described below. It has been prepared to help inform Cabinet decisions about this proposal. It is broken down by periods that align with New Zealand's future emissions budgets.

Section 1: General information

General information	
Title:	Let's Get Wellington Moving – Transformational Programme: Preferred Option Progress and Mass Rapid Transit Funding Principles
Agency responsible for the Cabinet paper:	Ministry of Transport
Date CIPA finalised:	15/06/2022
Short description of the policy proposal:	<i>This Cabinet paper relates to the progress of Let's Get Wellington Moving mass rapid transit options, as well as mass rapid transit funding considerations.</i>

Section 2: Greenhouse gas emission impacts Note: impacts are calculated relative to emissions under a 'Do Minimum' scenario.

Greenhouse gas emissions in tonnes of carbon dioxide equivalent (CO ₂ -e)									
Land Use Scenario	Scenario / Option	Emissions Type	2022–25	2026–30	2031–35	2036–40	2041–45	2046–50	Cumulative
Core	Option 1 & Option 2	Enabled	0	-5,000	-21,500	-14,500	-25,500	-28,000	-94,500
		Embodied (construction)	0	60,000	60,000	0	0	0	120,000
		Total	0	+ 55,000	+ 38,500	- 14,500	- 25,500	- 28,000	+ 25,500
	Option 4	Enabled	0	-5,000	-17,000	-11,000	-21,500	-24,000	-78,500
		Embodied (construction)	0	41,250	13,750	0	0	0	55,000
		Total	0	+36,250	-3,250	- 11,000	- 21,500	- 24,000	-23,500
Intensified	Option 1 & Option 2	Enabled	0	-5,000	-86,000	-162,500	-138,500	-109,500	-501,500
		Embodied (construction)	0	60,000	60,000	0	0	0	120,000
		Total	0	+ 55,000	- 26,000	- 162,500	- 138,500	- 109,500	- 381,500

Section 3: Additional information

Additional information

Detailed analysis of Option 3 has not been undertaken as transport modelling focused on two programme options as ‘bookends’: Option 1 as the highest cost programme with the largest infrastructure footprint and Option 4 as the lowest cost programme with the smallest infrastructure footprint. Analysis for Option 2 is based on modelling for Option 1 but adjusted to account for differences in capacity and urban intensification effects of bus rapid transit compared to light rail transit.

Option differentiation

The Let’s Get Wellington Moving (LGWM) carbon analysis shows that the degree of urban intensification achieved, followed by the level of mode shift enabled, is the key differentiator between programme options:

- Option 1 is likely to support very high levels of intensification along the southern corridor and provides for direct public transport journeys and increased public transport capacity to the east to support mode shift to public transport and intensification
- Option 2 is assumed to provide less capacity and less urban development than light rail mass rapid transit. However, this option includes bus mass rapid transit both south and east and is likely to support intensification across both these areas
- Options 3 and 4 will have a lower public transport level of service and capacity limits to the east which are likely to constrain the degree of intensification in the east, and hence the ability of these options to deliver substantial mode shift, and subsequent emissions reductions.

While Options 1 and 2 are estimated to have higher embodied carbon than Options 3 and 4, in the long run the level of urban density achieved matters significantly. Under the Core Land Use Scenario, net zero carbon does not occur until beyond 2050, however under the Intensified Land Use Scenario this is shortened to the 2033 – 2036 period. It should be noted that LGWM is a long-term project, with additional carbon emissions savings achieved beyond the 2046-2050 period.

Assumptions

Fleet emissions and travel distances were calculated using pre-existing transport models. The Vehicle Emissions Prediction Model for future fleet emission levels and the Wellington Transport Strategic Model for estimating how far light vehicles travel.

The model assumes that shifts from private car use to public transport is less impactful on carbon emission further in the future, as a larger proportion of the fleet will produce zero emissions.

At the Indicative Business Case stage, there remains significant uncertainty about design considerations that will substantially affect the level of carbon consumed (embodied emissions) and carbon saved (reduced enabled emissions) by LGWM programme options. Regardless of this uncertainty, the programme analysis clearly shows increasing the density of Wellington City is more likely to deliver carbon reductions than enabling urban growth on green fields sites.

Additional information

Embodied Carbon Emissions

As mass rapid transit vehicles are heavy, large amounts of carbon-intensive materials are required for foundations, regardless of mode.

The programme options that include tunnel construction have the largest overall embodied emissions, owing to the quantity of materials involved and the earthworks required.

Embodied carbon estimates are considered indicative at this stage but are broadly consistent with estimates derived for other major construction projects.

Operational Emissions

Operational emissions have not been quantified at this stage. The main operational emissions for bus rapid transit and light rail transit are those associated with generating electricity to run the system. Operational emissions are not expected to distinguish between programme options. Operational emissions will be formally calculated and optimised during the Detailed Business Case.

Other Emissions

There are other carbon emissions savings that have not been quantified in this analysis, but which we know will be supported by the expansion of high-quality mass rapid transit and active mode networks, these are:

- more efficient use and avoided replication of other infrastructure such as three-waters pipes, energy networks, schools, libraries, arts, and cultural facilities
- increased whole-of-life energy efficiency of denser housing compared to standalone green fields housing.

Detailed Business Case Considerations

Opportunities to reduce the carbon emissions created during the construction phase will be a key objective for the Detailed Business Case.

LGWM transport modelling identifies the transport benefits that come from the improved accessibility provided by the LGWM programme. However, due to the inability of the programme to directly influence urban form, these potential benefits have not been quantified or monetised in this analysis. The LGWM programme team is currently working with Programme Partners, Te Tūāpapa Kura Kāinga – Ministry of Housing & Urban Development and Kāinga Ora to identify the role that facilitation of urban development could play in the future. Should the scope of the Detailed Business Case be expanded to include this, further work will seek to quantify these benefits.

Section 4: Summary and Quality assurance

Quality assurance

1. The Climate implications of Policy Assessment (CIPA) team has been consulted and confirms that the CIPA requirements apply to this proposal as one of the objectives of the LGWM Transformational Programme is to reduce carbon emissions. Each of the mass rapid transit options proposed are likely to have a significant impact on mode shift away from private vehicles and support urban intensification which would result in a significant impact on emissions.
2. At this stage in the project design there is a high degree of uncertainty as there are still unspecified design elements that will substantially affect the expected emissions impact of the options. Therefore, any quantified estimates at this stage should be considered indicative only. The estimates available can be used to indicate the likely scale of impact and provide some indication of the potential relative emissions impacts between options.
3. It is expected that each of the options will require large amounts of carbon-intensive materials and therefore have a relatively high level of embodied emissions associated with construction and materials used.
4. In the long term, every mass rapid transit option is expected to result in substantial net emissions reductions relative to a 'Do Minimum' scenario. Option 1 and 2 have been estimated to be able to result in enabled transport emissions reductions of around 0.09 to 0.50 million tonnes CO₂-e by 2050. This range was produced under different land use scenarios, with the modelling indicating that higher levels of urban intensification would result in substantially higher emissions savings. At this stage, option 3 has not been explicitly modelled, and option 4 has not been modelled under the intensified land use scenario because Option 4 was not considered to be able to support this level of intensification. Option 4 has been estimated to result in enabled transport emissions reductions of 0.08 million tonnes CO₂-e by 2050 under the core land use scenario.
5. Overall, the analysis undertaken indicates that the degree of urban intensification achieved, followed by the level of mode shift enabled, is the key differentiator between programme options.
6. The degree to which each option will be able to support and drive greater intensification has not been explicitly modelled, rather, different land use scenarios have been applied where appropriate. There are also some expected emissions reductions associated with urban intensification and high-quality mass rapid transit networks that have not been quantified, such as increased energy efficiency of denser housing and more efficient use of infrastructure.
7. The CIPA team has undertaken a limited review of the emissions estimates and considers the results at this stage to be reasonable for the purpose of providing a high-level indication of the likely emissions impacts of the options. The Ministry of Transport will work with the CIPA team to assess and disclose emissions when final decisions are required following further emissions analysis as the Detailed Business Case is developed.