

MEMO

TO Manager Environmental Policy

FROM Jake Roos

DATE August 2022

Evaluation of the Preferred Regional Greenhouse Gas Reduction Target for the Wellington Region – Technical Memo

1. Introduction

Greater Wellington Regional Council (GWRC) is preparing a new Climate Change chapter as part of a change to the Regional Policy Statement for the Wellington Region (RPS), identifying climate change as a significant resource management issue for the region, and setting strategic priorities and a statutory framework to drive the integrated management of those aspects of natural and physical resources that can be addressed under the Resource Management Act to support the mitigation of, and adaptation to, climate change.

A previous memo outlined the main options for setting a greenhouse gas emission reduction target for the Wellington Region, with an evaluation of the associated pros and cons, and an explanation of the key terms and concepts associated with greenhouse gas reduction methodologies¹.

Subsequently, GWRC selected Option 2 to form the basis of a greenhouse gas emissions reduction objective for the RPS. This is an all-gases target that aligns with what is required to achieve the Paris Agreement, to limit global warming to 1.5°C with no overshoot with a reasonable safety margin.

GWRC has now requested an economic evaluation of this approach.

2. Evaluation of the preferred greenhouse gas reduction target

2.1 Valuing the avoided cost of emissions

Central government has recognised the importance of assessing the climate change impacts of policy proposals when undertaking cost-benefit analysis (CBA) through Treasury's CBAX Tool User Guidance². This provides a guide to assess the costs and benefits of emissions (i.e. policies that avoid emissions) using 'shadow emission values' which are based on estimates of costs of future emission reductions (abatement)

¹ Options for Setting Regional Greenhouse Gas Reduction Targets – Technical Memo, Jake Roos, July 2022

² Treasury (2021), 'CBAX Tool User Guidance Guide for departments and agencies using Treasury's CBAX tool for cost benefit analysis', Appendix 5, refer: [CBAX Tool User Guidance - September 2021 \(treasury.govt.nz\)](https://www.treasury.govt.nz/user-guidance)

to meet New Zealand's domestic emission reduction targets. It represents the traded cost of carbon which Treasury estimates to rise from \$25/tonne in 2019 to as high as \$343/tonne in 2050.

The Treasury CBAX guidance emphasises that the shadow emission values have been developed for use in central government CBAX. While local government may wish to align their shadow emission cost analysis with these values and New Zealand's domestic transition pathway, the Treasury shadow emission values may not represent the specific abatement costs faced by non-central government entities. The applicability of Treasury's shadow emission prices to GWRC's internal carbon values have been considered as outlined in a technical internal memo³. GWRC now uses the central estimate of shadow emission values from the Treasury for estimates of the cost of offsetting as part of its broader Carbon Reduction Policy.

This evaluation provides an indicative, quantitative assessment of the costs and benefits of the climate change targets in Change 1 through two ways. The first is using the Treasury shadow emission values as outlined above. The second is to use the 'global social cost of carbon' (GSCC). The GSCC is intended to represent in dollar values the total damage done to the world by an extra tonne of carbon dioxide being released into the atmosphere and remaining there. It can be thought of as the 'cost of inaction'. GSCC values vary greatly depending on the assumptions made and uncertainties and limitations inherent in modelling future climate damages⁴. GWRC's approach to set a value for GSCC as part of its Carbon Reduction Policy is set out in an internal technical memo⁵.

2.2 Evaluation of preferred target

The target selected by GWRC is to contribute to a 50% reduction in greenhouse gas emissions by 2030 (based on 2019 levels) and achieve net-zero by 2050. This aligns with the Paris Agreement and IPCC target while recognising that local government interventions to mitigate climate change are part of a broader suite of actions required to meet regional, national and international emission reduction targets.

It is possible to compare the emissions pathway described by these targets to a counterfactual scenario and quantify the additional emissions that would be saved as a result. The counterfactual scenario that was chosen is the 'policy reference scenario' developed by the Climate Change Commission for their advice to the Government on setting national emissions budgets. This approach acknowledges the role that local actors have in achieving emissions reductions and helping meet emissions budgets, rather than assuming that emissions budgets will be met with no input or action on their part.

A further assumption made is that the percentage reductions described by the Climate Commission in the policy reference scenario are applied at the aggregate level for long lived gases and biogenic methane in the region, rather than sector by sector. This avoids creating an over-reliance in the region on the expansion of forest cover, as the current policy reference scenario includes a 217% increase in sequestration by forests across the country by 2050 compared to 2019.

³ Memo to Climate Emergency Programme Board, Review of GW's internal cost carbon values, 7 October 2021.

⁴ Refer for example: Journal of Cleaner Production, 2019, 'Estimates of the social cost of carbon: A review based on meta-analysis' refer: <https://doi.org/10.1016%2Fj.jclepro.2018.11.058>

⁵ Memo to Climate Emergency Programme Board, Review of GW's internal cost carbon values, 7 October 2021.

The two pathways for the region – one with targets and the counterfactual are shown below. The calculations that underpin these pathways are provided in the attached spreadsheet.

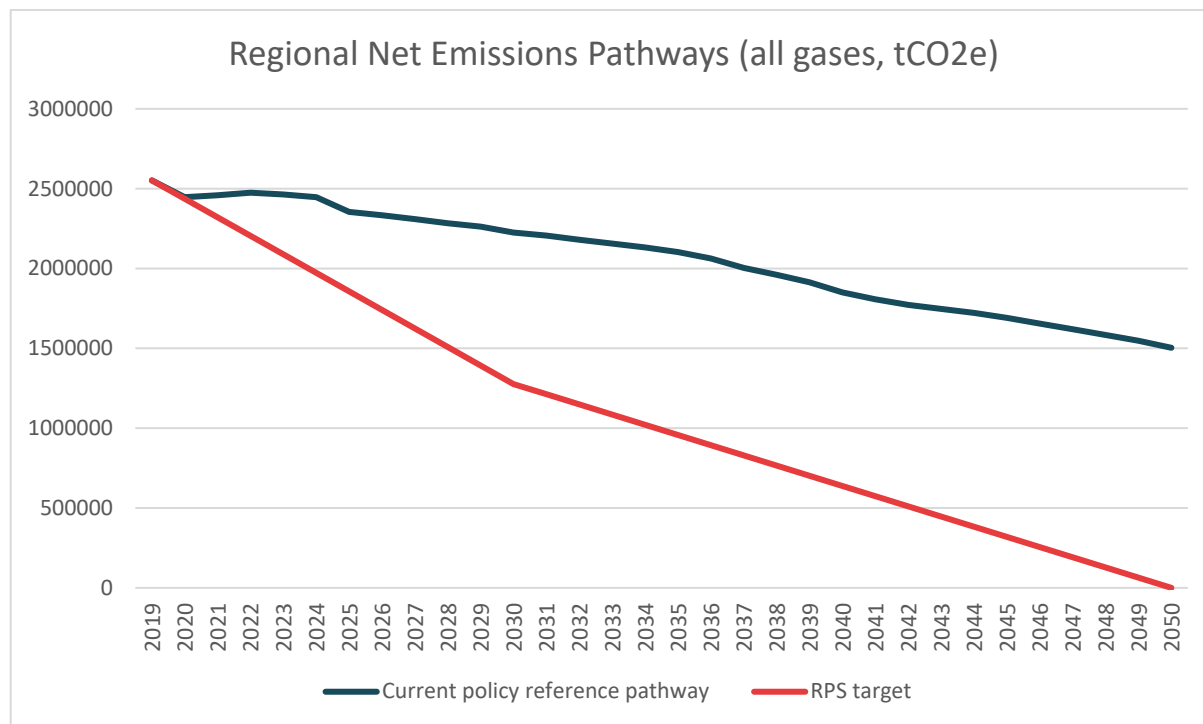


Figure 1 – Regional New Emissions Pathways

The area between the lines is the total greenhouse gas emissions avoided if the RPS targets are met, assuming a linear progression between the targets.

The total cumulative emissions avoided, and the avoided cost of these emissions, evaluated in these two different ways, are set out in Table 1.

The first method uses the future cost of carbon as forecast by the NZ Treasury, with their low, medium and high values. This represents the traded cost of carbon and it rises from \$25/tonne in 2019 to as high as \$343/tonne in 2050. This can be thought of as the cost to achieve the emissions targets exclusively by buying emissions units generated by abatement activity outside the region to offset emissions occurring within the region. Meeting the target through action within the region would avoid this cost, but would incur other costs and benefits.

The second method uses the global social cost of carbon (GSCC) set by the council for evaluating emissions reduction projects. The GSCC represents in a dollar value the total damage done to the world by an extra tonne of carbon dioxide being released into the atmosphere and remaining there. It can be thought of as the cost of inaction. GSCC values vary greatly depending on the assumptions made and uncertainties and limitations inherent in modelling future climate damages. Additional material can be provided to explain how the council decided on using a value of \$350/tonne.

Comparison of 'RPS-targets' pathway to 'Current Policy Reference' pathway		
Year	2030	2050
Cumulative emissions avoided/abated [kTCO ₂ e]	5,634	30,725
Cumulative emissions avoided/abated		
NZ Treasury carbon price projection - Low [\$M]	436	3,935
NZ Treasury carbon price projection – Medium [\$M]	650	5,871
NZ Treasury carbon price projection – High [\$M]	862	7,805
GWRC global social cost of carbon [\$M]	1,972	10,754

Table 1 - Comparison of 'RPS-targets' pathway to 'Current Policy Reference' pathway

The total cumulative emissions avoided/abated under the RPS pathway are 5,634 kTCO₂e by 2030 and 30,725 kTCO₂e by 2050. For these estimates of emissions avoided, it is then possible to estimate the avoided costs of the RPS emission pathway compared to the counterfactual scenario using two methods – Treasury’s shadow emission price estimate and the ‘global social cost of carbon’.

These results indicate that there are significant benefits to the community, in terms of avoided costs from the RPS emission reduction pathway, which range from \$5,871m by 2050 (medium Treasury shadow emission price values) to \$10,754m (GWRC’s GSCC value⁶). While these estimates are subject to a number of uncertainties and broad assumptions, they do indicate that there are significant benefits to the community from the proposed climate change objectives and that these benefits far outweigh the expected abatement costs (some of which are negative cost).

⁶ \$350/CO₂ equivalent tonne

