He Pou a Rangi
Climate Change Commission

Advice on NZ ETS unit limits and price control settings for 2026–2030

Technical annex 2: Price control settings

April 2025

Contents

Introduction

This document is published by He Pou a Rangi Climate Change Commission in support of our Advice on NZ ETS unit limits and price control settings for 2026-2030.

It is a technical annex to that advice, providing further information on the modelling used in our analysis on the price control settings.

This document should be reviewed alongside *Part 4: Te ritenga taura-utu - Price controls* of our advice report published on our website. A separate technical annex is available on our website, which provides further information on the analysis for the unit limit settings.

Purpose and contents

Part 1 of this document sets out further information on modelling undertaken by Concept Consulting using the *Energy and Emissions in New Zealand* (ENZ) model.

This modelling was one element used in the Commission's analysis of whether the current NZ ETS price control settings are in accordance with the third emissions budget and second nationally determined contribution (NDC), which cover the period 2031-35. Specifically, the ENZ modelling generated evidence about the range of emissions prices that may be required if gross emissions reductions are needed to meet these targets.

Concept Consulting used ENZ to analyse the potential range of NZ ETS prices required to meet Aotearoa New Zealand's emissions budgets using gross emissions reductions, subject to uncertainty around baseline emissions, mitigation costs, and the effectiveness of policy. We used this modelling, alongside other information and analysis, to inform our recommended price control settings.

The modelling performed by Concept Consulting is based on the government's modelling supporting the second emissions reduction plan (ERP2).[i] For consistency with the second emissions reduction plan Concept Consulting's modelling uses the same assumptions as those used in the ERP2 modelling, except for one parameter related to electric vehicle (EV) supply constraint, which has been adjusted (see section 0 for further details). Forest planting assumptions were kept static across all scenarios modelled.

In using this modelling, we have not reviewed the assumptions used in the government's ERP2 modelling, nor have we reviewed the version of ENZ that has been used. We have relied upon Concept Consulting and government agencies' review and quality assurance processes, carried out as part of producing the second emissions reduction plan.

Another element of the Commission's analysis considered the effects on emissions prices if further afforestation were to provide a greater contribution to meeting the third emissions budgets and second NDC. Part 2 of this document sets out the information used to inform our desktop estimation of afforestation required to bridge the gap to meet those targets.

[i] It is important to note that there are differences in the Concept Consulting modelling documented here compared to the modelling approach used for ERP2, due to the different purposes of the two different modelling exercises. The government's ERP2 modelling was focused on the sufficiency of the ERP2 policy suite for achieving the second emissions budget. It used, as an input to ENZ, the emissions prices generated by modelling in the Ministry for the Environment's NZ ETS market model, which represent NZU prices that could be expected based on current NZ ETS settings. The modelling described here focuses on what emissions prices might be necessary for meeting the third emissions budget, with the results being shadow emissions prices emerging from the scenarios modelled within ENZ.

Part 1: Modelling potential NZ ETS prices to meet the third emissions budget

Method

Concept Consulting modelled two sets of scenarios using ENZ to address the following categories of uncertainty affecting emissions prices:

- Uncertainty in the emissions baseline and mitigation costs
- Uncertainty in the effectiveness of NZ ETS and non-NZ ETS policy.

The ‘new measures’ emissions projections (the ‘ERP2 path’) published alongside the Government’s second emissions reduction plan are consistent with meeting both the second emissions budget and the 2050 target, but show emissions higher than the third emissions budget. As discussed in our main report, our analysis on the price control settings this year needed to consider whether current settings are consistent with the third emissions budget. Therefore, the modelling undertaken by Concept Consulting uses an adjusted emissions pathway that meets both the second and third emissions budgets.

Concept Consulting followed a common process in both exercises:

1. Set up the scenario with the relevant variables adjusted.
2. Iteratively run the model, adjusting the emissions price path each time, to determine a price path consistent with meeting the second emissions budget (2026-2030) and the third emissions budget (2031-2035) under this scenario.

Emissions pricing in ENZ

An emissions price path is a variable that is input into the ENZ model. **Figure *1*** below illustrates how emissions pricing drives the uptake of some mitigation actions in the model, while for other actions uptake is specified by other scenario assumptions.

Choices around electricity generation, transport, and heating technologies are modelled based on costs, including the input emissions price (i.e., uptake is *endogenous*). These are represented in orange in **Figure *1***. Uptake may also be subject to assumed rate constraints and resource constraints, and other factors related to feasibility. The model seeks to represent diversity in use cases (e.g., in the case of vehicles, to represent variation across how vehicles are used) and other situational factors that lead to a range of cost outcomes for a given technology switch.

For other technologies and behaviour changes, the uptake is specified as an input assumption (i.e., uptake is *exogenous*). This is applied for choices that ENZ does not model, where emissions pricing is unlikely to be a primary driver of uptake, or where abatement costs are highly uncertain. These are represented in green in **Figure *1***.

This analysis uses the input assumptions from the modelling used in the Government’s second emissions reduction plan.

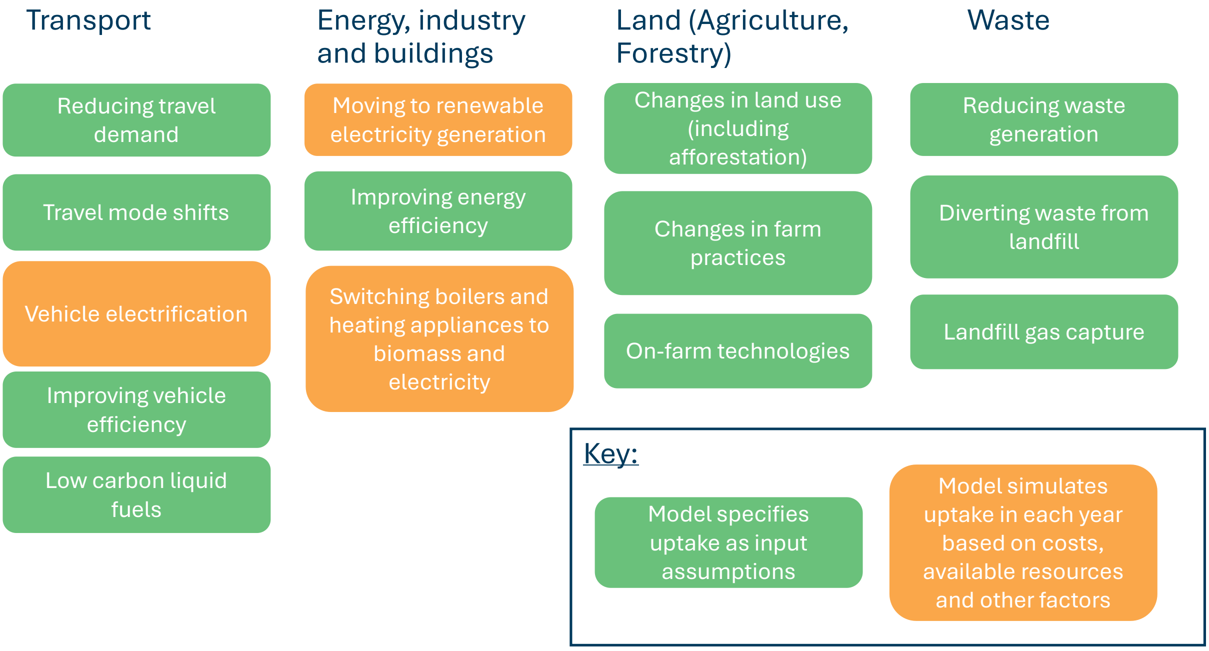
The emissions price within the model should generally be interpreted as a shadow emissions price – a price that reflects the marginal cost of the mitigation outcomes, rather than an explicit price in the NZ ETS.[ii] However, in the context of this analysis, we use the emissions price in the model to inform us of the potential

[ii] Note that this differs from the Government’s ERP2 modelling, which did model an explicit ETS price.

range of emissions prices that may be needed in the NZ ETS for Aotearoa New Zealand to meet emissions budgets.

Caveats around the representation of emissions pricing in ENZ are discussed later in this document.

Figure 1: Key emissions reduction options represented in the ENZ model.



Source: Concept Consulting

ENZ version used

The modelling undertaken in this exercise has been performed by Concept Consulting. A version of the ENZ model was used for the Government's second emissions reduction plan modelling. Following the finalisation of the second emissions reduction plan, Concept Consulting made updates to the ENZ model to reflect updated data, as well as improving methodologies in how calculations were performed in the model. This updated version of ENZ has been used by Concept Consulting for the modelling to inform the Commission's advice. The updates are recorded in the appendix to this document, and the impact of the updates on ENZ results is noted in the following section.

Scenario design and assumptions

Constructing a central scenario

The modelling performed by Concept Consulting is based on the Government's modelling for the second emissions reduction plan. Concept Consulting constructed a central scenario that was based on the Government's "new measures" emissions projection ('the ERP2 path'), with two types of changes.

Firstly, the parameter that sets a constraint on the rate of import for EVs has been lowered (i.e., imports of EVs are less constrained). This assumption represents constraints on EV supply chains and imports – that is, the constraint on the amount of EVs entering the country and therefore available to New Zealanders for purchase. In the Commission's judgement, the assumptions used in the ERP2 modelling overly constrain EV supply. Therefore, we judge that the ERP2 path represents a high EV supply constraint scenario. We developed a low EV supply constraint scenario by using the supply constraint assumption that the Commission used in its demonstration path for emissions budget four (in its December 2024 advice on setting the fourth emissions budget)[iii]. The assumed constraint from the Commission's advice for emissions budget four represents the lower bound, since it assumes that barriers to EV uptake are reduced. The central scenario assumes an EV supply constraint midway between the low and high assumptions.

Secondly, following the finalisation of the ERP2 modelling, Concept Consulting made minor updates to the ENZ model. These updates mean that the same input assumptions produce slightly different results. In the ERP2 path, emissions over the third emissions budget period are 9.2MtCO_2e higher than the budget level. In the updated version of ENZ used in this analysis, this reduces to 7.2MtCO_2e above the budget level.

For a full explanation of the changes, see *Appendix: Log of changes to ENZ from Concept Consulting*, contained in this document.

Emissions price paths

Concept Consulting used a fixed 3% rate of increase (or *discount rate*) across all emissions price paths. Only the starting point for the price from 2024 to 2025 was varied. This reflects a one-off equilibrium adjustment to the different scenario assumptions. The discount rate was applied to reflect the increasing cost of mitigation as low-cost opportunities are taken up. We chose a rate of 3% so that the emissions price does not exceed the likely cost of capital, which could risk encouraging speculative demand.

As the ENZ model 'looks forward' at future emissions prices when determining whether abatement is cost-effective (assuming perfect foresight), using a higher discount rate would risk understating the actual emissions prices required.

Testing policy uncertainty

To explore the effect of policy uncertainty, Concept Consulting modelled scenarios where the key parameter varied was the EV supply constraint. Considering the policy package in the second emissions reduction plan, this is the main factor amenable to policy intervention to which the modelled emissions price is sensitive. This approach evolved from that used in the ENZ modelling undertaken in 2022 to inform the Commission's first advice on the NZ ETS settings, adapted to reflect the current situation. As the second emissions reduction plan sets out intentions to rely more heavily on the NZ ETS, and implement relatively fewer complementary policies, the modelling approach for this advice takes a more limited approach to testing the impact of such policies.

The EV supply constraint represents the maximum allowable EV share of vehicle imports in any particular year and is a combination of short run and long run factors. The short run factor is the base growth in market share (in percentage points) for used and new imports. The long run factor adds an amount of growth allowable, which is calculated as a proportion of the previous year's EV market share. These two factors are summed to give the overall upper limit of EV share of vehicle imports. In the short-term when EV market share is low, the absolute increases from the short-run factor are the main contributor to the allowed growth. As EV market share increases, the proportion of allowed growth from the long-term factor becomes more significant. **Table 1** below shows the assumptions used in the scenarios.

[iii] He Pou a Rangi Climate Change Commission. (2024). *Advice on Aotearoa New Zealand's fourth emissions budget.* https://www.climatecommission.govt.nz/our-work/advice-to-government-topic/preparing-advice-on-emissions-budgets/advice-on-the-fourth-emissions-budget/final-report/

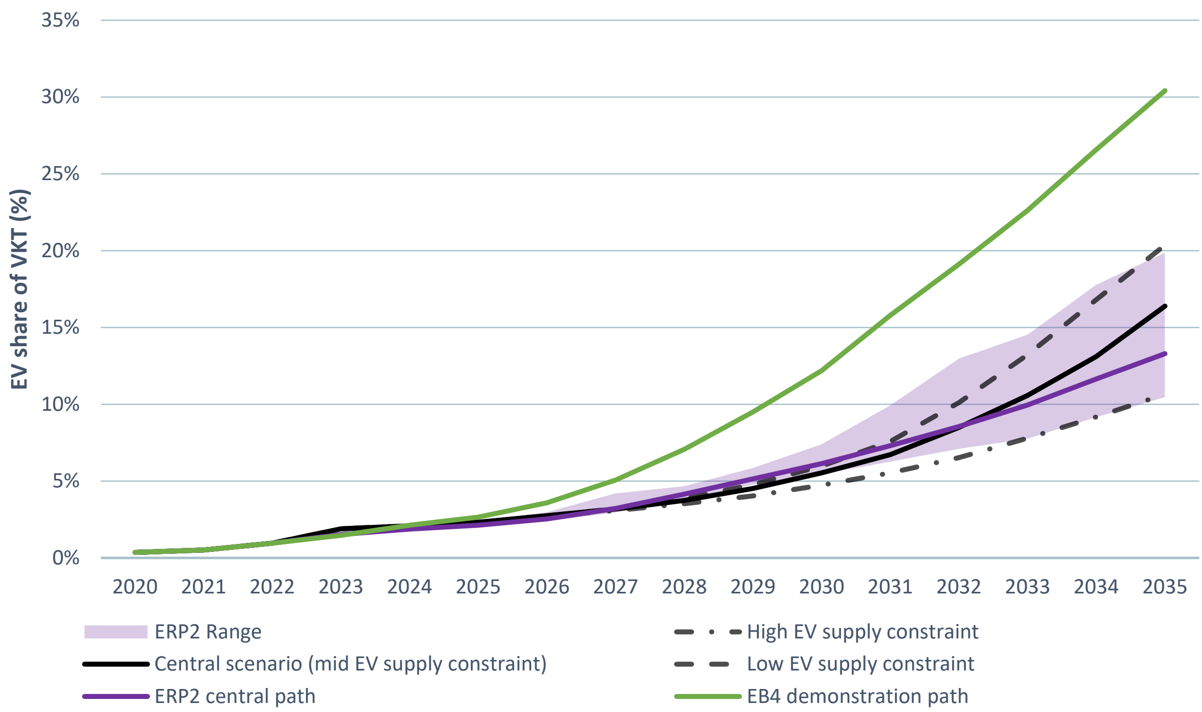
Table 1: Assumptions in the "High/Low EV supply constraint" scenarios compared with the central scenario

Variable	Assumptions by scenario		
	Central scenario	Low EV supply constraint	High EV supply constraint
EV supply constraint factors	Short run: 0.17-2%, Long run: 20%	Short run: 0.17-2%, Long run: 40%	Short run: 0.03-1%, Long run: 15%

Concept Consulting have created two scenarios that increase and decrease the EV supply constraint in relation to the central scenario. The high EV supply constraint uses the same assumption as used in the ERP2 path. The low EV supply constraint uses the assumptions from the Commission's EB4 demonstration path, which was used to support our advice on the level of the fourth emissions budget.

Varying this assumption leads to higher or lower uptake of EVs. This is shown below in **Error! Reference source not found.**, along with the range of EV uptake considered in the ERP2 modelling. It shows that the high, low and central EV supply constraint scenarios all fall within, or close to, the ERP2 modelling range.

Figure 2: EV share (%) of vehicle kilometres travelled (VKT) in the modelled scenarios, with the government's ERP2 modelling and the Commission's EB4 modelling overlaid.



Source: Concept Consulting analysis, Commission analysis, government second emissions reduction plan modelling.

Testing uncertainty in the baseline and mitigation costs

We asked Concept Consulting to test the combined impact of a higher or lower emissions baseline, and higher or lower mitigation costs, compared with the core assumptions used in the central scenario.

Note that, as further discussed in the results section below, we do not regard the scenarios that vary baseline emissions assumptions as plausibly likely to occur. In particular, the high emissions scenario represents outcomes well outside the bounds of the model's useful capabilities.

The baseline growth in emitting activities, such as energy and vehicle use, affects the quantity of abatement required to meet emission budgets. These activities are driven by factors such as population and economic growth. The costs of abatement depend on assumed energy and technology prices and, for some measures, resource availability.

We created a pair of scenarios to test uncertainty around the central scenario. First, we identified a set of key drivers relating to the baseline and mitigation costs (listed as 'Variables' in Table 1 below). Concept Consulting then adjusted their assumed values to make the budgets either easier to achieve ('Low baseline and mitigation costs' scenario) or harder to achieve ('High baseline and mitigation costs' scenario). Some variables were only adjusted in either the High or the Low scenario, in cases where the central scenario already represents a high or low value for that variable. All other assumptions were unchanged from the central scenario. **Table 2** below shows the factors varied and the assumptions used.

Table 2: Assumptions in the "High/Low baseline and mitigation costs" scenarios compared with the central scenario

Variables	Assumptions by scenario[iv]		
	Central scenario	**Low baseline and mitigation costs**	**High baseline and mitigation costs**
Population (average growth rate 2024-2035)	0.8%	0.4%	1.1%
GDP (average real growth rate 2024-2035)	2.1%	1.6%	2.6%
Oil price in 2035 ($2024 per barrel of crude oil, bbl)	65 USD/bbl	100 USD/bbl	40 USD/bbl
Fossil gas price in 2035 (excluding carbon price component, $2024/GJ)	$7	$12	$3.5
New renewable generation costs (annual capital cost reduction)	Hydro 0.07% Geothermal 0.07% Onshore wind 0.27%	Hydro 0.08% Geothermal 0.08% Onshore wind 0.28%	Hydro 0.05% Geothermal 0.05% Onshore wind 0.25%

[iv] Note that some variables are only adjusted in either the High or Low scenario, in cases where the central scenario already represents a High or Low value for that variable.

Variables	Assumptions by scenario[iv]		
	Central scenario	Low baseline and mitigation costs	High baseline and mitigation costs
	Offshore wind 1.07% Utility scale solar 1.00% Residential solar 1.20% Biomass 0.17%	Offshore wind 1.12% Utility scale solar 1.05% Residential solar 1.44% Biomass 0.20%	Offshore wind 1.01% Utility scale solar 0.95% Residential solar 0.96% Biomass 0.13%
EV battery cost reductions (average annual change 2024-2035)	-9.8%	-13.7%	-9.8%
NZ Steel Electric Arc Furnace (abatement and start year)	58% abatement from 2026	58% abatement from 2026	50% abatement from 2028
Methanol production	One train closing in 2028, second closing in 2030	One train closing in 2028, second closing in 2030	One train closing in 2030, second closing in 2040
HFC phasedown	HFCs 34% decrease from 2024 to 2035	HFCs 34% decrease from 2024 to 2035	HFCs 6% decrease from 2024 to 2035

Results

Price paths consistent with meeting emissions budget three

For each of the scenarios, Concept Consulting applied a targeting approach to determine the emissions prices needed in 2035 to meet both the second and third emissions budgets. The figures below show the resulting emissions price paths for each of the scenario sets.

When considering these results it is important to note the following:

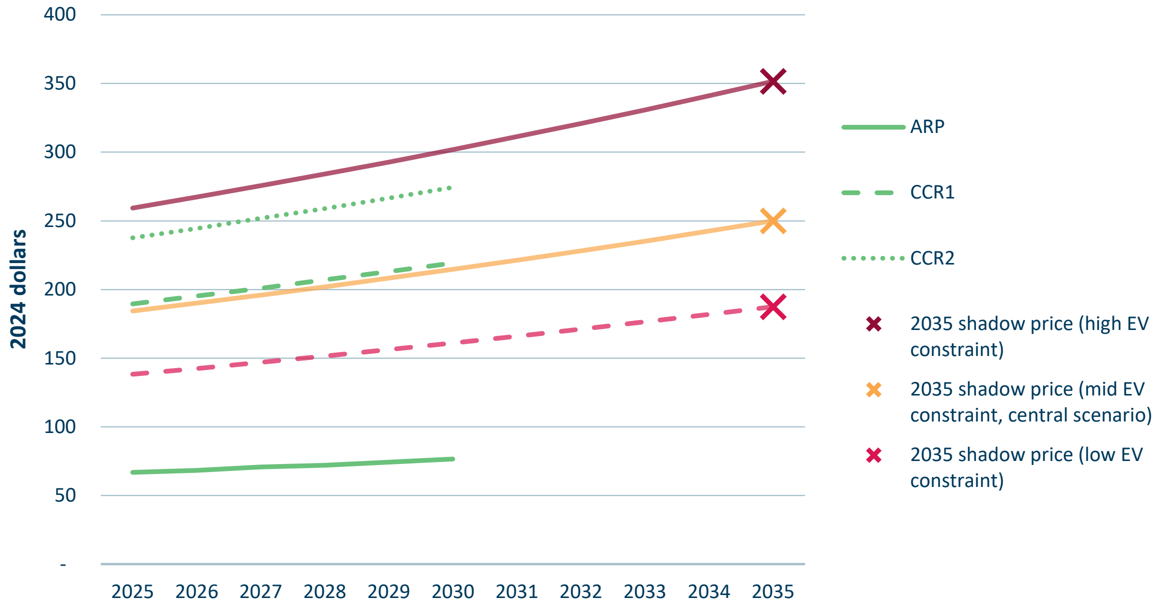
1. These price paths represent shadow emissions prices, and while they can shed light on the New Zealand Unit (NZU) prices required, they are not the result of modelling the NZU market and do not take into account any of the market dynamics or price drivers that may be present in the NZ ETS.
2. We do not regard the scenarios that vary baseline emissions assumptions as plausibly likely to occur. In particular, the high emissions scenario represents outcomes well outside the bounds of the model's useful capabilities. This is further explained in the results discussion below.
3. The same level of afforestation is assumed across all scenarios, in line with the government's ERP2 path.

Results from scenarios testing policy uncertainty

In these scenarios, the results were very sensitive to the constraint on EV supply, as displayed in **Figure 3**. This is because when EV supply is more constrained it limits the ability of individuals and firms to convert to EVs (where it would otherwise be economic), and in turn reduce emissions from the transport sector. This means greater reductions are needed from other sectors.

The results for the scenario with high EV constraint (consistent with ERP2 path assumptions), indicate that emissions prices may have to reach $350 in 2035 to meet the third emissions budget. However, with lower constraint on EV supply, emissions prices of $180-$250 in 2035 may be sufficient to meet the third emissions budget.

Figure 3: ENZ modelled shadow emissions prices needed for gross reductions to meet the third emissions budget, under different levels of constraints on EV uptake (in 2024 prices)



Source: Concept Consulting analysis

Results from scenarios testing uncertainty in baseline and mitigation costs

Concept Consulting also modelled scenarios that varied baseline emissions assumptions. The assumptions varied included the fossil gas price, GDP, population growth, renewable energy build costs, and EV battery costs. These are factors affecting gross emissions that the Government has limited influence over compared to EV uptake, which can be more readily accelerated with policy. Results are displayed in **Figure 4**.

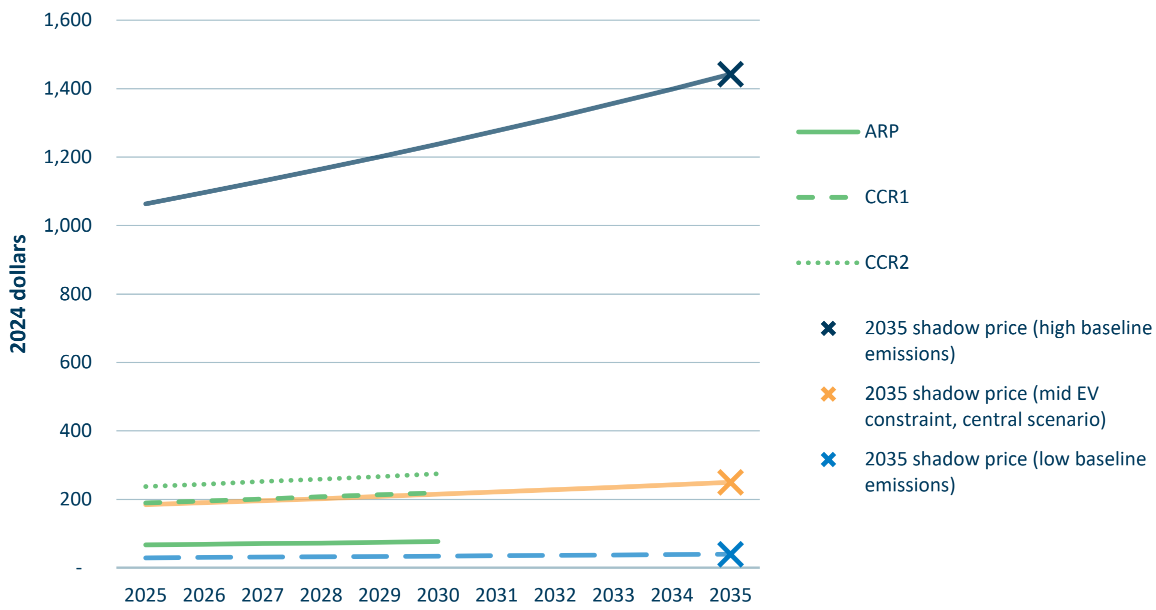
The value of these scenarios is in the insights they provide about external factors that could affect the emissions prices needed to meet the third emissions budget, rather than in the specific shadow emissions price pathways they generate. The iterative process of developing them highlighted which external uncertainties are likely to have the largest impact over the period to 2035 under consideration. The key insights are discussed in the sub-sections below **Figure 4**.

We do not regard these scenarios as plausibly likely to occur, and the shadow emissions prices resulting from them should not be regarded as realistic prices for informing the price control settings. In both scenarios the assumptions are varied all in one direction compared to the ERP2 assumptions used in the central path, i.e. in the high scenario assumptions are all aligned to higher emissions and in the low scenario they all favour lower emissions. It is unlikely that all factors would move in this direction at once, so they do not represent likely real-world outcomes.

In addition, the high emissions scenario resulted in very high emissions prices (over $1000/tonne in 2035), which represents outcomes well outside the bounds of the model's useful capabilities. The model can only reduce emitting activities in the manufacturing, fossil electricity generation, and transport sectors (via fuel switching). Additional reductions likely to occur in other areas in response to these prices are not modelled. These include landfill gas capture, reinjection of geothermal emissions, changes in transport demand, or changes in afforestation rates. Therefore, the high emissions price path generated is not appropriate to use directly to inform the price control settings.

Care should be taken when considering this set of scenarios. Relying on the emissions prices associated with them implies a reliance on external factors developing in certain ways that the Government has limited influence over. For example, using the emissions prices from the low baseline emissions scenario to set the price control settings directly would imply expectations of a prolonged period of low economic growth, low population growth, and high fossil gas and oil prices.

Figure 4: ENZ modelled shadow emissions prices in scenarios testing uncertainty in baseline emissions (in 2024 prices)



Source: Concept Consulting analysis

Fossil gas prices

The results are very sensitive to fossil gas prices. Of the assumptions varied, fossil gas prices have the most impact over the near/medium-term, whereas the others (GDP, population growth, renewable build costs, battery costs) have more impact over the long-term. Given that reducing industrial fossil gas use plays an important role in meeting the third emissions budget, a higher/lower fossil gas price means that a lower/higher emissions price is required to drive much of the industrial decarbonisation needed to meet the third emissions budget.

How the fossil gas price may develop over the coming decade is very uncertain, especially considering material declines in gas production and reserves over the last year – which saw fossil gas shortages, and thus high prices, through winter 2024. Given the sensitivity of the results to fossil gas prices, this is a key uncertainty that could materially affect the emissions prices needed to achieve the third emissions budget.

Methanol production

Assumptions about Methanex's continued operation or phase-out also have a large effect on emissions prices, because it significantly increases the amount of alternative abatement needed. In the high baseline emissions scenario, the assumption that methanol production continues for longer doubles the emissions price needed to meet the third emissions budget compared to the base methanol production assumption.

Model limitations and caveats

Models provide useful insights into the factors that influence decisions that can reduce or increase emissions by different amounts. However, all models have limitations. There are several limitations around how the ENZ model represents emissions pricing that are important to consider when interpreting the results.

ENZ models the areas where we expect emissions pricing to have the biggest impact, but does not fully capture the likely impact on all mitigation actions. In ENZ, emissions prices have no impact on:

- energy and transport demand
- energy efficiency measures
- mitigation in the waste sector
- uptake of liquid biofuels
- assumptions affecting how fast household fuel switching can occur
- afforestation.

The assumption that emissions prices will have limited impact on these areas is reasonable considering emissions prices seen to date, and they reflect areas where the price is a small component of costs or savings, or where other policies are expected to have a greater effect than emissions pricing. However, the assumption is unlikely to hold at significantly higher emissions prices. As emissions prices increase, we would expect to see some growing influence in these areas. Much higher prices could also lead to reductions in industrial output.

Further, some technologies that are not represented in the model, such as use of hydrogen for high temperature process heat, could potentially become cost-effective at the higher prices considered in this modelling.

Conversely, the model assumes perfect foresight of future prices, which may drive faster uptake of the available mitigation options than we would expect in the real world, where prices are uncertain.

Overall, we consider that these limitations mean ENZ is likely to understate the mitigation response to significantly higher emissions prices.

Part 2: Estimating afforestation required to meet the third emissions budget

The modelling exercise undertaken by Concept Consulting using ENZ asked the question: "What carbon price would be needed to drive gross emissions reductions to meet the third emissions budget?". However, in reality, some of the additional abatement needed could be met through higher carbon dioxide removals by forests.

We have performed a high-level calculation to estimate how much further afforestation would be needed to deliver the 7.2Mt CO_2e of net emissions reductions in the third emissions budget period. We know that foresters' planting intentions are generally established 1-2 years in advance, and therefore we have considered additional planting from 2027 onwards.

We based this calculation on the following carbon yield table (for production pine forest), which includes emissions from planting. The yield table was supplied by the Ministry for Primary Industries and aligns with the 2024 Greenhouse Gas Inventory.

Table 3: Production pine forest carbon yield table

Years since planting	0	1	2	3	4	5	6	7	8	9	10
Annual increment (tCO2/ha/yr)	-13.0	0.9	3.1	7.6	16.5	28.6	40.9	43.5	39.8	37.6	34
Cumulative removals (tCO2/ha)	-13.0	-12.1	-9.0	-1.4	15.1	43.7	84.6	128.1	167.9	205.5	239.5

Source: Ministry for Primary Industries

Table 3 Table 3: Production pine forest carbon yield tableshows that it takes four years before the cumulative carbon removals outweigh the initial emissions from planting. Therefore, in order for increased removals to occur during the third emissions budget period (2031-2035), planting must occur no later than 2031.

The Government's second emissions reduction plan emissions projections are based on planting of 35,000 hectares per year, on average, between 2027 and 2031. Based on this yield table, we estimate that without additional gross emissions reductions, about 15,000 hectares of additional planting would be needed each year between 2027 and 2031 in order to meet the third emissions budget through additional afforestation alone. Therefore, a total of 50,000 hectares per year between 2027 and 2031 would be required if there were no additional gross emissions reductions.

Appendix: Log of changes to ENZ from Concept Consulting

Table below includes changes made to the ENZ model between the version used for the second emissions reduction plan and the version used in the Commission's analysis for the 2025 NZ ETS unit limits and price control settings advice. This information was provided by Concept Consulting.

Table 4: ENZ changes log since ERP2 version of ENZ

ENZ module updated	Reason for change	Description of change
Heat, Industry and Power (HIP)	Model improvement	Changed the % end-of-life cost saving for existing gas water heaters from 30% to 10%. This is because an external electric water cylinder can also use the same internal water pipes as an instant gas water heater that is replacing an existing instant gas water heater. Accordingly, the 30% cost saving was giving too much benefit to continuing with gas relative to switching to electric.
Heat, Industry and Power (HIP)	Rationalising	Reformatted food processing demand. Removed top arrays of historical consumption as they didn't lead anywhere and were duplicated by arrays immediately below.
Heat, Industry and Power (HIP)	Data update	Altered historical LPG source array to tidy up historical input data. Will have slightly reduced LPG demand for Food Production
Heat, Industry and Power (HIP)	Data update	Reformatted and updated source of historical coal data. Now more accurate and has marginally reduced food processing consumption.
Heat, Industry and Power (HIP)	Data update	Updated historical input data, plus also incremented last actual year in many cases to 2023.
Heat, Industry and Power (HIP)	Model improvement	Altered renewable long run marginal cost calculation so that if a technology had reached the end of its cost-supply curve (i.e., all the potential had been developed), it would no longer be able to set the price. This is principally only an issue for scenarios where there are extreme constraints on the ability to develop wind and solar - including the extreme scenario of no new wind or solar as part of establishing the benefit of these technologies.
Heat, Industry and Power (HIP)	Model improvement	Improving the selection of renewable generation technologies to build which influences electricity prices. It was under-projecting prices previously.

Land and waste (LnW)	Rationalising	Moved waste scenarios into Ctrl workbook
Heat, Industry and Power (HIP)	Model improvement	Altered the format of the assumptions around the gradient of the renewable cost-supply curve to be explicitly specified in terms of $/MWh/GW
Control workbook (Ctrl)	Model improvement	AchieveCarbonTargets routine can now target emissions outcomes over a range of years, rather than just a single point year target
Heat, Industry and Power (HIP)	Data update	Added new Ministry of business, Innovation and Employment (MBIE) oil statistics
Heat, Industry and Power (HIP)	Rationalising	Moved the data centre and e-fuels new demand scenarios into the Ctrl workbook
Transport (Tpt)	Calibration with agency projections	Changed the projected electrical consumption per 100km to use Ministry of Transport (MoT) data for historicals. Also scaled the "BEV efficiency factors (relative to ICE)" to align projected efficiency
Heat, Industry and Power (HIP)	Model improvement	Altered rate of improvement of building-weighted average intensity for new-build situations. The sumproduct was originally weighting based on the cumulative proportion of new-build houses, but corrected to be weighted on the actual number of new-build houses in each year
Transport (Tpt)	Calibration with agency projections	Changed the heavy trucks fuel efficiency factor from 0.94 to 1 to align with MoT projections
Transport (Tpt)	Model improvement	Corrected the diesel fuel price calculation to use the diesel carbon emissions factor, rather than the petrol one
Heat, Industry and Power (HIP)	New functionality	Added ability to consider aggregate emissions including International transport, following CCC advice on this matter
Heat, Industry and Power (HIP)	Data update	Altered Wood boiler heat source reference in Gas tab to refer to the MBIE historical value, rather than the Energy End Use Database (EEUD) value, because the EEUD value seems out of kilter with the MBIE value which is considered to be the main source of record. Impact is minor.
Heat, Industry and Power (HIP)	Model improvement	Changed the Wood Pulp & Paper section in specific industrials so that the historical value is based on Cogen Oji named range, rather than a Cogen Wood %. Minor impact.

Transport (Tpt)	Improve handling of extreme outcomes	Fixed a #DIV/0 error caused by no ICEs at very high carbon price (i.e., $2000)
Heat, Industry and Power (HIP)	Improve handling of extreme outcomes	Altered formulae in area labelled: Determine resultant renewable build and fossil generation, and consequent time weighted average wholesale price. Now handles cases where 'Remaining renewable flex capacity' is zero, preventing errors.
Transport (Tpt)	Calibration with agency projections	Updated petrol and diesel emissions factors to match those used by MoT.
Heat, Industry and Power (HIP)	Improve handling of extreme outcomes	Corrected functionality so that Waitara Valley does not open if scenario flag says that is not an option.
Land and waste (LnW)	Calibration with agency projections	Revised formula for calculating the combined emissions impact of agricultural mitigation to use only the best technology per emissions source, in line with ERP2 guidance. This change reflects the fact that exogenous uptake estimates were derived from independent modelling for each technology. This is an area for potential further development.
Heat, Industry and Power (HIP)	Model improvement	Smoothed the commercial petrol projection to use the average of past 5 years demand, because volatility in MBIE oil statistics was causing big swings in long-term projected emissions ('For' tab row 3029).
Transport (Tpt)	Improve handling of extreme outcomes	Fixed a #DIV/0 error in Air emissions calculations caused by zero carbon price.
Land and waste (LnW)	Improve handling of extreme outcomes	Changed the formula for % of non-ETS forestry ('Frst' tab row 85) to not cause a #DIV0 error when afforestation is zero.
Transport (Tpt)	Data update	Updated fleet entry/exit counts from the Jan 2025 Fleet Statistics release

He Pou a Rangi
Climate Change Commission

Level 21, 1 Willis Street
Wellington 6011
PO Box 24448
Wellington 6142

www.climatecommission.govt.nz