Likely cost-benefit of removing the Clean Car Discount

A report to Drive Electric

12 December 2023

About Concept Consulting Group Ltd

We have been providing useful, high-quality advice and analysis for more than 20 years. Our roots are in the electricity sector and our practice has grown from there. We have developed deep expertise across the wider energy sector, and in environmental and resource economics. We have also translated our skills to assignments in telecommunications and water infrastructure.
Our directors have all held senior executive roles in the energy sector, and our team has a breadth of policy, regulatory, economic analysis, strategy, modelling, forecasting and reporting expertise. Our clients include large users, suppliers, regulators and governments. Our practical experience and range of skills means we can tackle difficult problems and provide advice you can use.
For more information, please visit www.concept.co.nz.

Disclaimer

Except as expressly provided for in our engagement terms, Concept and its staff shall not, and do not, accept any liability for errors or omissions in this report or for any consequences of reliance on its content, conclusions or any material, correspondence of any form or discussions, arising out of or associated with its preparation.

The analysis and opinions set out in this report reflect Concept's best professional judgement at the time of writing. Concept shall not be liable for, and expressly excludes in advance any liability to update the analysis or information contained in this report after the date of the report, whether or not it has an effect on the findings and conclusions contained in the report.

This report remains subject to any other qualifications or limitations set out in the engagement terms.

No part of this report may be published without prior written approval of Concept.

© Copyright 2023
Concept Consulting Group Limited
All rights reserved

Executive summary

The Clean Car policies are delivering significant economic and environmental benefits to New Zealand

Concept has undertaken modelling of the effects of the two Clean Car policies: The Clean Car Discount (CCD), and Clean Car Standard (CCS)

Our analysis indicates that the increased rates of EV uptake over the next ten years if these policies continue beyond 2023 will deliver an estimated NPV benefit to New Zealand of approximately $2.7bn excluding avoided carbon emissions. This benefit increases to $3.5bn if avoided emissions are valued using the shadow carbon price recommended by the Treasury.

The cumulative avoided emissions from these policies are estimated to be approximately 3.0 MtCO2e out to 2030, and 9.8 MtCO2e out to 2050.

If both policies are discontinued, New Zealand would lose this economic and environmental benefit, all other things being equal.

Impact if CCD removed and CCS continues

If the CCD is discontinued but the CCS continues on current settings, our modelling indicates that vehicle suppliers would fail to meet the CCS (assuming vehicle purchase prices reverted back to without-CCD levels). The penalties for failing to meet the CCS would incentivise suppliers to alter their sales mix to achieve the CCS requirements, giving rise to CCS-credits and CCS-debits. These credits/debits (and the ability to trade credits between suppliers) should increase the price of high emissions vehicles and reduce the price of low-emissions vehicles. If the CCS penalties are high enough, the altered pattern of sales should sufficiently lower the average emissions of imported vehicles to meet the CCS.

If only the CCS continues out to 2027 – the last year to currently have CCS targets specified, we estimate that this will deliver no more than 70% (and probably less) of the combined benefit of the CCS and CCD set out above. Ie. 30%+ (or approximately $900m+) of the combined benefits of the CCD and CCS will be lost if the CCD is discontinued. We state “probably less” as the price signal to consumers from the CCD appears to be stronger than the price signal to suppliers from the penalties in the CCS. However, it was out of scope for this engagement to fully model the effect of CCS penalties on vehicle purchase prices.

Discontinuing the CCD only for utes could be an appropriate policy

It should be noted that the vast majority of benefit from the Clean Car policies to-date has been through incentivising uptake of low-emission LPVs (cars and SUVs). It has had much less effect on the rates of uptake of low-emission LCVs (vans and utes). This is for the simple reason that there have not been many (not any, in some vehicle categories) EV or hybrid models available for LCVs.

As and when the number of low-emission LCV models increases in the future, the Clean Car policies should increasingly become effective at incentivising the uptake of EVs in this category as well. However, there is uncertainty over how quickly global manufacturers will produce EV LCV models – particularly in the ute category. In the meantime, it is arguably the case that the Clean Car policies have unreasonably penalised those vehicle users who require a van or ute for their business.

Until such time as there is an adequate range of low-emission vehicles to choose from, discontinuing the CCD (and also adjusting the CCS) for utes and vans will result in much less economic cost and emissions impact than removing the CCD for LPVs as well.

If the CCD is discontinued only for LCVs at this time, it is recommended that the CCD for all light vehicles be re-introduced once a sufficient proportion of low-emission vehicles are available in the LCV category – ideally splitting implementation of CCD between vans and utes, noting that the proportions of low-emission vehicles could be very different between these sub-classes.

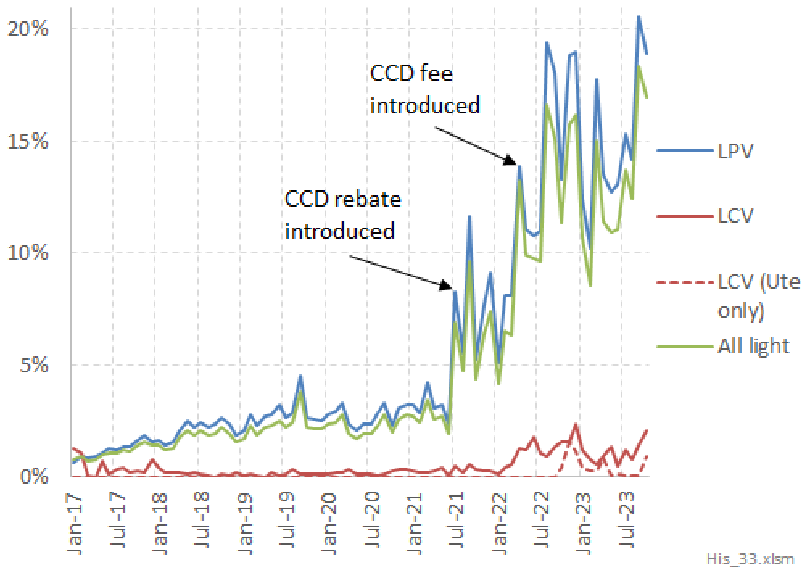
1 Introduction

Electric vehicles (EVs) are reaching the point where for most car uses, they are lower cost than internal combustion engine (ICE) vehicles on a lifetime total cost of ownership (TCO) basis. However, the higher up-front costs of EVs relative to ICE vehicles is frequently cited as a reason consumers purchase EVs at below economically efficient levels.

To overcome this barrier, New Zealand introduced two key policies:

- The Clean Car Discount (CCD), whereby purchasers of low-emission vehicles receive a purchase price rebate, funded by fees on the purchase price of high-emission vehicles. This changes the *relative price* of EVs and ICE vehicles.
- The Clean Car Standard (CCS), which specifies the maximum average emissions efficiency that importers of vehicles into New Zealand must meet across the entire fleet of vehicles they bring into New Zealand. In effect, this is a quantitative restriction on the emissions for imported light vehicles.

Figure 1: Proportion of light vehicles entering NZ that are EVs



'LPV' = Light passenger vehicle (cars and SUVs). 'LCV' = Light commercial vehicle (vans and utes).

The policies have been introduced progressively: The CCD was in two stages: the rebates came into effect on 1 July 2021, with the fees starting 1 April 2022. The first year where vehicle suppliers are subject to the CCS is 2023, with the emissions targets being progressively tightened for each subsequent year out to 2027. No CCS targets are currently specified beyond 2027.

As Figure 1 illustrates, the effect on the proportion of EVs purchased by consumers since the CCD has been introduced has been significant. The change in sales mix following introduction of the policies (especially the CCD) leads us to believe the policies *caused* the change in mix.

However, while the CCD has been popular with many vehicle purchasers (particularly those purchasing EV cars), the CCD has received criticism in some quarters. This has been particularly in relation to its application to utes (with the CCD being branded a 'ute tax'), as well as perceived equity issues – ie, why should people who can afford EVs get a discount.[1]

It has also received criticism that the initial level of fees and discounts were set at levels which resulted in approximately 2.5 times more rebates being given out than were collected in fees. This required central

[1] The equity issue is complex, requiring consideration of whether it is fairer to correct a market failure relating to consumer uptake of new technologies (the nature of which is discussed at the end of this report) via funding through general taxation or a tax on 'dirty' vehicles to fund 'clean' vehicles. Consideration of the merits of the two approaches is outside the scope of this report.

government to fund it to the tune of $343m by June 2023. However, the level of fees and rebates were altered on 1 July 2023 such that in the five months to 30 November 2023, it now appears to be achieving its intended self-funding status, with the level of fees collected almost exactly equalling the level of rebates given out.

In regard to the ute-tax issue, the criticism is because, until relatively recently, there were no fully electric utes available to purchase, and even now the number of available models is tiny in comparison to electric models available in the light passenger vehicle class. The lack of EV utes is the primary reason why EV uptake of utes is so low in Figure 1. Although some international manufacturers are starting to produce EV utes, the number of models is very small compared to cars and SUVs, plus most are not yet available in New Zealand. As such, the lack of EV ute models available in New Zealand is likely to continue for some time.

It is against this background, the incoming government has announced that they plan to remove the CCD and review the levels of the CCS.

This report details Concept's analysis of the likely costs and benefits of such changes at an economy-wide level.

This analysis was undertaken using Concept's whole-economy model, ENZ. ENZ has separate modules for modelling the different sectors of New Zealand's economy (eg, transport, electricity generation, heavy industry, agriculture, forestry, waste, etc), but links them all together to enable internally consistent outcomes that recognise the significant inter-linkages between different parts of the economy.

ENZ is the principal tool used by the Climate Change Commission for developing its carbon budget recommendations. It is also used by other government agencies for evaluating emissions reduction policy options across the economy, including agriculture, forestry, waste, heavy industry, home energy, electricity generation, and transport.

We have analysed the potential effects of altering the Clean Car policies in two stages:

- Chapter 2 analyses the likely effects if the level of fees and rebates in the CCD were removed, *and* vehicle suppliers were no longer subject to the CCS. Ie, a complete removal of the Clean Car policies.
- Chapter 3 analyses the likely effects if the CCD were removed, but the CCS were to continue in its current form.

2 Effect of removing both Clean Car policies

2.1 Impact on vehicle purchase prices

If the CCD is removed, it will become relatively more costly for households and commercial businesses to purchase electric vehicles (EVs) compared to internal combustion engine (ICE) vehicles, all other things being equal.

For example, the effect of the CCD for a consumer purchasing a typical passenger car is to reduce the price for a fully battery electric vehicle (BEV) by around $7,015 and increase the price for a non-hybrid petrol vehicle by approximately $2,000: A $9,000 impact on the relative price of the two vehicles.

The effect is even greater for a consumer considering purchasing a ute, with the biggest (and hence most emissions-intensive) diesel utes facing a purchase price increase of $6,900, compared to the $7,015 rebate for a BEV ute, leading to almost a $14,000 impact on the relative price of the two vehicles.

The CCS does not *directly* alter the relative price of EVs and ICE vehicles but instead sets a limit on the average emission efficiency of vehicles sold. As we discuss in Chapter 3, we think the CCS limits are not currently binding because the CCD has altered the sales mix sufficiently to mean that CCS emission standard is likely to be met. However, if the CCD is removed, our analysis in Chapter 3 indicates the CCS in its current form would likely bind and create subsequent incentives on suppliers to alter the relative price of high and low emission vehicles.

For this reason, our analysis in this chapter of the impact of removing the CCD and CCS focuses on the effect of removing the CCD fees and rebates, and assuming the CCS is also removed such that it would not create incentives on suppliers to alter vehicle prices.

Box 1: Why isn't the CCD delivering more EV utes?

Although the CCD is significantly altering the relative price between ICE and EV utes, Figure 1 on page 4 previously shows this higher price differential hasn't led to similar rates of EV uptake for utes as for LPVs. This is because, as already mentioned, there have not been many (indeed any, in the early period of the CCD) EV ute models available for purchase.

Although some EV ute models are starting to come to the market, the number of models available is still much smaller than for light passenger vehicles. This situation should significantly resolve within five to ten years, as global vehicle manufacturers start to turn their attention to the ute/pick-up truck segment, having initially focussed their limited capital on the much higher volume passenger vehicle segment. However, this situation of relative scarcity of EV ute models available in New Zealand is likely to continue for a while yet.

Lastly, although there is this significant disparity between utes and light passenger vehicles, it should be noted that utes make up a relatively small % of vehicles entering the market: From Jan-17 to Oct-23, the 'Utility' segment comprised 12% of all light vehicles entering New Zealand (across New and Used, segments). As an aside, it is worth noting this 12% market share is very high by international standards – explaining why global manufacturers have focussed their attention on developing EV models for the LPV segments, rather than utes.

2.2 Impact on proportion of EVs

The transport module of ENZ has a consumer vehicle choice function within it, which estimates the proportion of vehicles entering New Zealand in a given year that will be EVs based on the relative cost of ownership – including up-front purchase costs, fuel costs (petrol, diesel, or electricity) including carbon charges, ongoing maintenance costs, and other policy driven factors which may alter the cost of ownership such as the effect of a CCD on purchase costs or exemptions from road user charges (RUCs) in some instances. The model distinguishes between different classes of vehicles (LPV, LCV, trucks (split between medium and heavy), motorcycles, and buses) and between vehicles entering New Zealand as New or Used.

'Backcasting' has been undertaken (applying the function to historical years and comparing outcomes with observed rates of EV versus ICE uptake) to check it is producing realistic results.

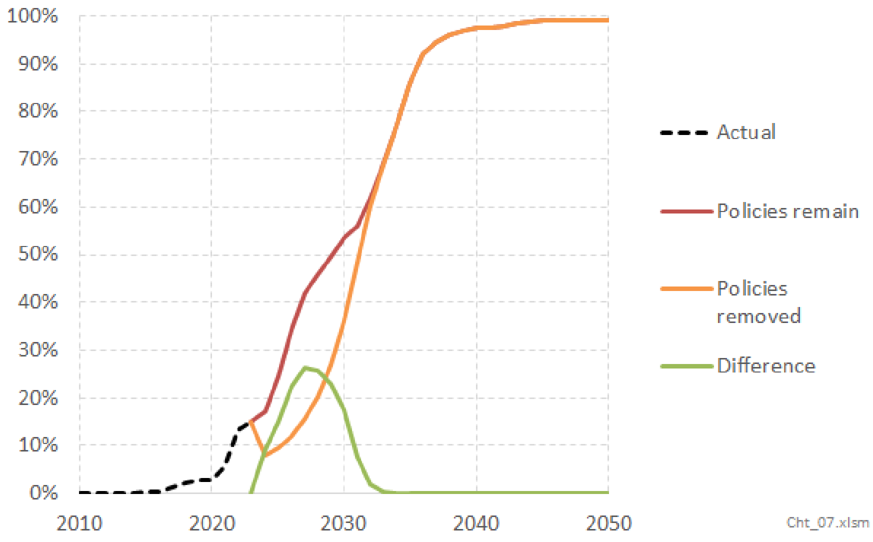
Figure 2 shows Concept's modelling of the altered rates of EV uptake for light passenger vehicles (LPVs) if the fees and rebates of the CCD are removed and the CCS is assumed to also not be in effect (ie, removed).

In brief, if Clean Car policies are removed, we expect the EV % of the sales mix to fall to levels similar to those prevailing just before the Clean Car policies were introduced, and then to gradually rise (reflecting an expectation that EV purchase costs will fall relative to ICE vehicles over time – following international expectations of continued improvements in EV prices and performance).

Conversely, if the Clean Car policies remain in place, we expect the EV % to continue gradually rising from current levels (again reflecting an expectation of falling international EV costs relative to ICE vehicles).

For both cases, the trajectories have a similar shape, and the main difference is in the 'starting points' for the two trajectories in 2024.

Figure 2: Proportions of LPVs entering New Zealand that are EVs



Note: EVs are defined as fully battery electric vehicles (BEVs) plus plug-in hybrid electric vehicles (PHEVs). Hybrid vehicles without plug-in capability are classed as ICE vehicles in this analysis.

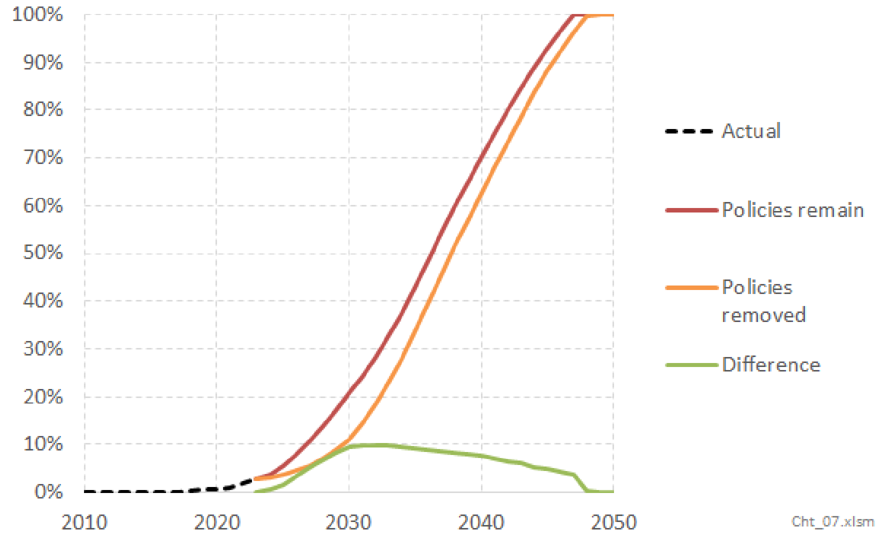
As can be seen, for approximately eight years, the rates of EV uptake are expected to be lower in the scenario where the Clean Car policies are removed than in the scenario where they continue. Eventually, the rates of EV uptake in both scenarios reach the same level, as it is assumed the

Clean Car policies will anyway be removed around the time that EVs reach purchase price parity with ICE vehicles.[2]

However, although the rates of EV uptake differ between the two scenarios for 'only' eight years, the consequences of such altered rates of uptake will continue for a further twenty years, or so. This is because once a new vehicle enters New Zealand, it will remain on New Zealand's roads for approximately twenty years before it is scrapped. The expected longer-term impact of the Clean Car policies' removal is shown in Figure 3 and Figure 4 below, which show EVs' proportion of total vehicles, and proportion of vehicle kilometres travelled (vkt), respectively.

This modelling of proportions of vehicles and vkt takes account of the fact that the average annual vkt of an older vehicle tends to be much less than a younger vehicle. This explains why the shape of the 'Difference' line is slightly different between Figure 3 and Figure 4.

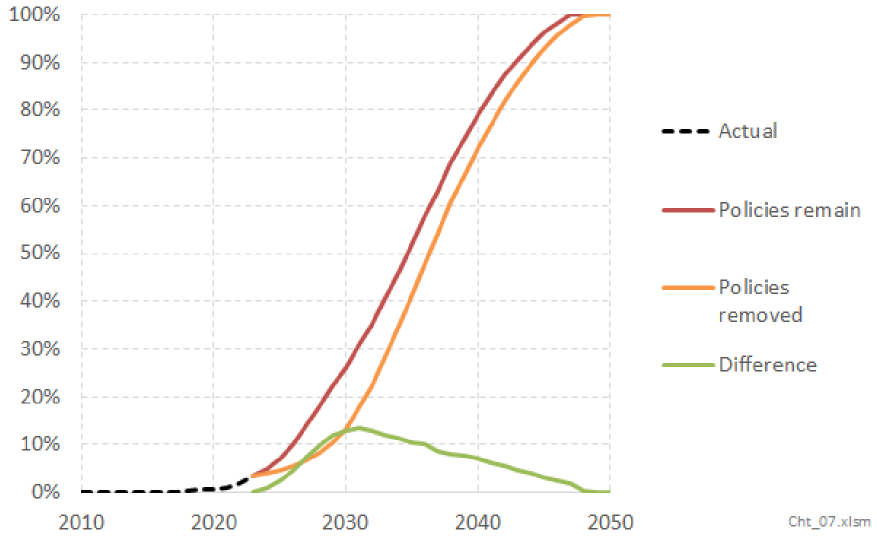
Figure 3: Proportion of LPVs on the roads that are EVs



If the Clean Car policies were to continue, it is projected that EVs would make up 21% of the light passenger vehicle fleet by 2030, whereas if they were removed only 11% of cars and SUVs are projected to be EVs. That equates to approximately 350,000 fewer EVs on the road in 2030.

[2] Purchase price parity refers to when two different vehicles have the same up-front purchase costs. Due to the rapid improvements in battery technology, and consequent significant ongoing reduction in EV purchase prices, many international commentators are assuming purchase price parity between EV and ICE vehicles will be reached in the latter half of this decade. For our analysis, we have assumed purchase price parity will be achieved in the early-to-mid 2030s (four years earlier for LPVs than LCVs).

Figure 4: Proportion of LPV vehicle kilometres travelled that are by EVs



2.3 Impact on emissions

The reduced share of vkt made by EVs translates into increased petrol and diesel consumption, and consequent increased emissions. The estimated impact is shown in Figure 5 which shows altered long-lived gases emissions[3] for the transport sector. Note: This shows all transport emissions, not just those from LPVs. Ie, it includes emissions from heavy trucks, aviation, and shipping.

Figure 5: Long-lived gases emissions from the transport segment

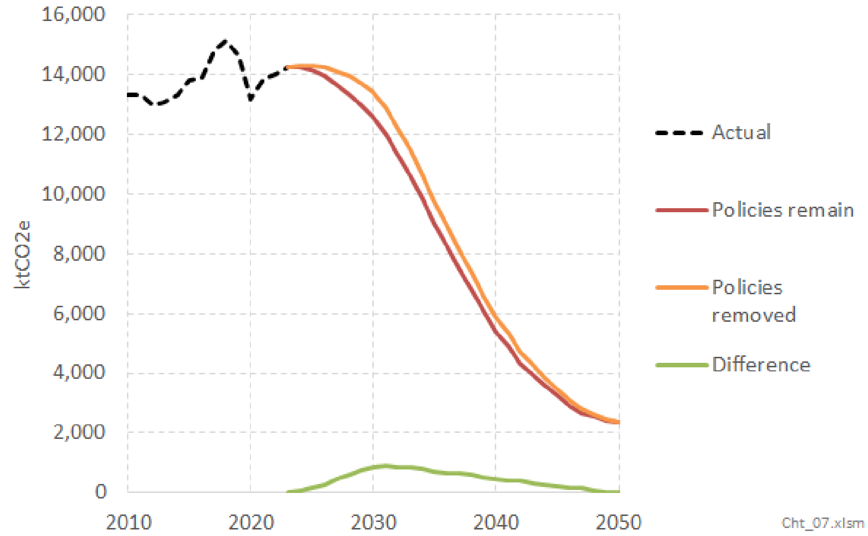
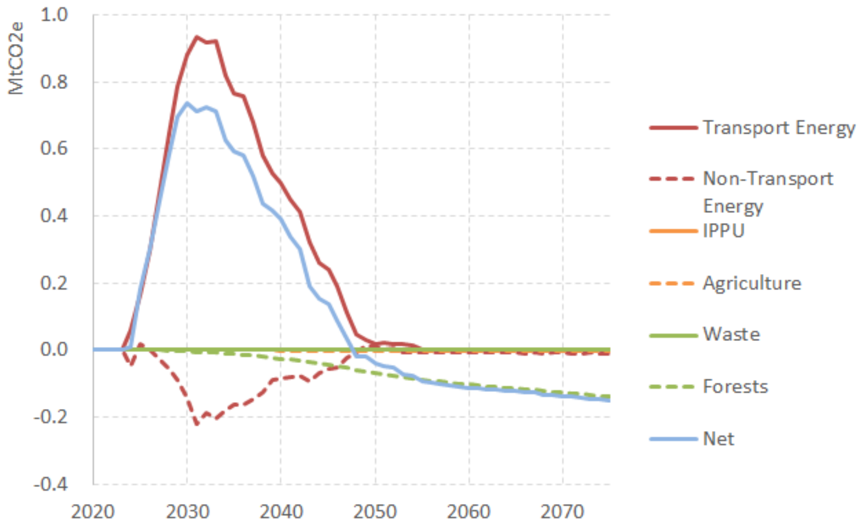


Figure 6 shows the difference in emissions between the two scenarios for different segments of the economy. Thus, the solid red line in Figure 6 is equivalent to the green line in Figure 5, but Figure 6 also shows the

[3] Long-lived gases are classed as all emissions except for biogenic methane. This approach follows New Zealand's split-gas approach to meeting emissions reduction targets. This distinguishes between biogenic methane (methane from agriculture, landfill, and wastewater treatment) and everything else (colloquially known as long-lived gases in this analysis.)

emissions impact on other sectors of the economy, and an overall net effect.

Figure 6: Long-lived gases emissions impact of removing the CCD for different economic sectors



Although removing the Clean Car policies would increase transport emissions, Figure 6 shows it will lead to decreases (relative to what otherwise would have occurred) in two other segments in the economy:

- Power generation emissions (being the principal item represented by Non-Transport Energy) are less if the Clean Car policies are removed. This is because less EVs means less peaky within-day electricity demand than would otherwise be the case, therefore resulting in less requirement to run gas-fired peaking generation to meet such peaks. (Noting that some of the within-day peakiness due to EV demand will be met by hydro flexibility, batteries, and renewable overbuild).
- Because transport emissions are higher with the Clean Car policies removed, it will be harder to achieve New Zealand's 2050 emissions targets, therefore the (endogenously modelled) carbon price in the Clean Car Policies removed scenario will be marginally higher in order to continue to meet the target of net-zero long-lived gases by 2050. This results in more forests being planted (displacing sheep & beef). This highlights one of the key tensions New Zealand's faces with reducing its net emissions: If we don't reduce our gross emissions by as much, we will need to increase the amount of forest planting all other things being equal – almost inevitably at the expense of sheep & beef farming.

While these other segments of the economy show reduced emissions from removing the Clean Car policies, Figure 6 shows that the overall effect of removing the Clean Car policies is a significant increase in New Zealand's cumulative gross emissions:

- 3.0 MtCO2e cumulative increase out to 2030 (the target date for emissions reduction under our Nationally Defined Contribution, 'NDC').
- 9.8 MtCO2e cumulative increase out to 2050.

It should be noted that in both cases, the economy achieves net-zero long-lived gases by 2050 (as that was the specified objective function for the model), but the trajectory for achieving this target results in materially greater cumulative emissions for the modelled future with the Clean Car policies removed.

If (as is almost certainly likely to be the case) New Zealand doesn't meet its NDC emissions reduction target, it will need to purchase offshore mitigation measures. In its recent analysis of the potential economic and fiscal implications of climate change for New Zealand[4], the Treasury

[4] "*Climate Economic and Fiscal Assessment 2023*", New Zealand Treasury, April 2023 https://www.treasury.govt.nz/sites/default/files/2023-04/cefa23.pdf

estimated New Zealand's NDC liabilities using two values for the price of offshore mitigation:

- the carbon price assumed by the IEA for emerging and developing economies: approx. \$41/tCO2e
- the carbon price assumed by the IEA for advanced economies: approx. \$227/tCO2e

Using these two estimates, an extra 3.0 MtCO2e due to removal of the Clean Car policies could cost New Zealand between \$125m and \$680m.

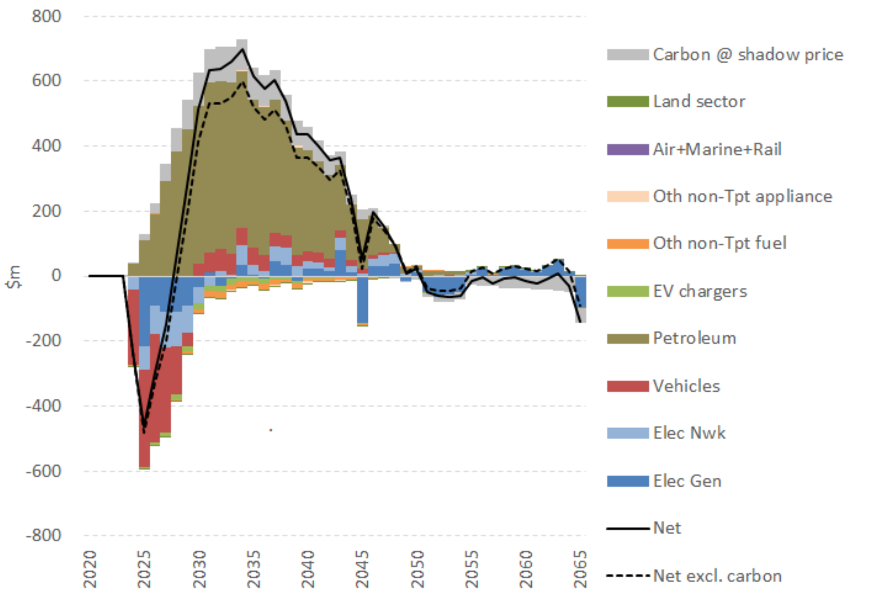
Given that international efforts to reduce emissions are generally progressing at a materially slower rate than required to meet individual countries' NDCs, it is likely that there will be significant international demand for purchasing offshore mitigation credits. This suggests that the price of offshore measures which New Zealand will need to pay to meet its NDC liability is likely to be at the upper end of the Treasury's estimate – and potentially even higher.

2.4 Economic impact

Figure 7 shows the estimated economy-wide costs arising from removal of the Clean Car policies, beyond the potential increase in costs associated with meeting our NDC mentioned in the previous sub-section.

Increases in cost are shown above the line, while decreases in costs are shown below the line.

Figure 7: Altered costs due to removing the Clean Car policies



As can be seen, removal of the Clean Car policies will result in some costs being less in the early years (out to approximately 2032) than if the Clean Car policies continue:

- New Zealand will spend less money on vehicles – noting that until the end of this decade, EVs are likely to continue to have higher capital costs than ICE vehicles.

- The lower electricity demand than would otherwise be the case, will result in reduced need to build electricity generation and electricity network assets in these early years.

There are also some other cost reductions which are longer lasting, although the magnitude of these is relatively second-order:

- Reduced costs of EV chargers
- Reduced non-transport ('tpt') fuel costs (principally the fossil fuel costs of thermal power stations)

However, all the above cost reductions are significantly outweighed by the increase in petroleum costs – the cost to New Zealand of the purchase of petrol and diesel from petroleum companies (ie, ignoring domestic taxes). For reference, this analysis assumed an average world oil price of approximately US$72/bbl for the future years (in real, $2023 terms).

Additionally, some of the reduced electricity generation and network investment costs in the early years are postponed costs. As Figure 3 earlier indicates, the reduced number of EVs due to removal of the Clean Car policies will be a temporary phenomenon – albeit one that lasts until approximately 2050. Ultimately, a similar amount of new generation and electricity network assets will need to be built by 2050 as, in both with- and without- Clean Car policies scenarios, electricity demand from EVs reaches roughly the same level. Accordingly, the reduced electricity supply costs in the early years are counterbalanced by increased electricity supply costs in the later years – albeit, pushing out when costs are incurred delivers an NPV benefit.

Furthermore, the reduced vehicle purchase costs in the early years, are partially counterbalanced by increased vehicle maintenance costs in the later years – noting that:

- the 'Vehicles' cost category covers both vehicle purchase and vehicle maintenance costs; and
- ICE vehicles cost more to maintain than EVs.

In all other respects, the analysis assumes that ICEs and EVs are close substitutes.

Note also that all the above costs and benefits relate to economic costs to New Zealand. The analysis does not consider possible costs to the New Zealand taxpayer. The principal reason for not considering potential taxpayer costs is that the Clean Car policies are not meant to cost the taxpayer anything. Under the CCD, the rebates paid to purchasers of low-emissions vehicles are meant to be entirely funded from the fees paid by purchasers of high-emissions vehicles. As set out earlier on page 4, the initial CCD fee and rebate settings were not achieving fiscal-neutrality, causing a net call on taxpayer revenue of $343m by Jun-23. However, since the adjustments to such settings on 1 July 2023, it appears the revised CCD is self-funding.

On an NPV basis out to 2050, removal of the Clean Car policies is projected to increase non-emissions economic costs to New Zealand by approximately $2.7bn.[5]

If the increased emissions due to removal of the Clean Car policies are included, and the carbon emissions are valued using the shadow price recommended by the New Zealand Treasury[6], the NPV cost to New

[5] Future cashflows are discounted using the Treasury recommended 5% discount rate.
[6] The shadow price of carbon is intended to represent the cost to New Zealand of greenhouse emissions. The price is $165/tCO2e in 2030, rising to $295/tCOe by 2050, and 3% per year increase beyond that – all in real $2023.

Zealand increases to \$3.5bn. (Note, this emissions cost ignores any human health impacts of increased tailpipe emissions from ICE vehicles).

The profile of altered costs and emissions has been used to calculate the effective abatement cost associated with keeping the Clean Car policies. This is minus \$485/tCO2e – ie, not only does it reduce emissions, but it also reduces non-emissions costs.

This outcome of the Clean Car policies having a negative abatement cost reflects the fact that:

- EVs are becoming lower-cost options than ICE vehicles on a whole-of-lifetime basis, even without accounting for emissions costs; but
- Mass-market consumers are not purchasing such vehicles to the extent they 'should' due to several factors including:
  - Many consumers are relatively poor at making the trade-off between higher up-front purchase costs and lower long-term running costs – known as time-inconsistency in behavioural economics.
  - Consumers have a greater tendency to revert to the status quo technology option, rather than the 'New' option, (known as status quo bias in behavioural economics), particularly if:
    - It is relatively complex to evaluate the relative lifetime costs of the two options. This certainly applies to the EV/ICE choice, as it requires familiarity with how to evaluate the running costs of an EV, plus reasonably sophisticated financial analysis skills (discounted cashflow analyses incorporating uncertainty over future cost items such as oil prices, carbon prices, and electricity prices);
    - There is relatively low penetration of the new technology – noting that many consumers are unwilling to adopt a new technology until a significant proportion of their peers have already done so.

3 Impact of removing the CCD but retaining the CCS

Chapter 2 sets out our estimate of the economic cost from removing *both* the CCD and CCS. This chapter shows our estimate of removing *only* the CCD. We have included this estimate because the incoming government has announced a clear intention to repeal the CCD, but its policy relating to the CCS is not clear.

To analyse the effect of removing only the CCD and retaining the CCS, it is necessary to evaluate:

- whether the pattern of EV uptake modelled in chapter 2 would result in outcomes which are inconsistent with the CCS in its current form; and
- if they are inconsistent, to what extent the CCS would alter EV uptake patterns, thereby altering economic impacts and emissions modelled in chapter 2.

3.1 Operation of the CCS

The CCS specifies the maximum average emissions efficiency (measured in gCO2/km) that importers of vehicles into New Zealand must meet across the entire fleet of vehicles they bring into New Zealand. In simple terms, if an importer imports an emissions-intensive vehicle whose emissions are higher than the CCS limit, the importer can still meet the CCS if they also bring a low-emissions vehicle such that the average emissions across the two vehicles is no more than the CCS.

Failure to meet the CCS will result in an importer paying a penalty, with the penalty expressed in $/gCO2/km in excess of the CCS.

Figure 8: Annual CCS targets

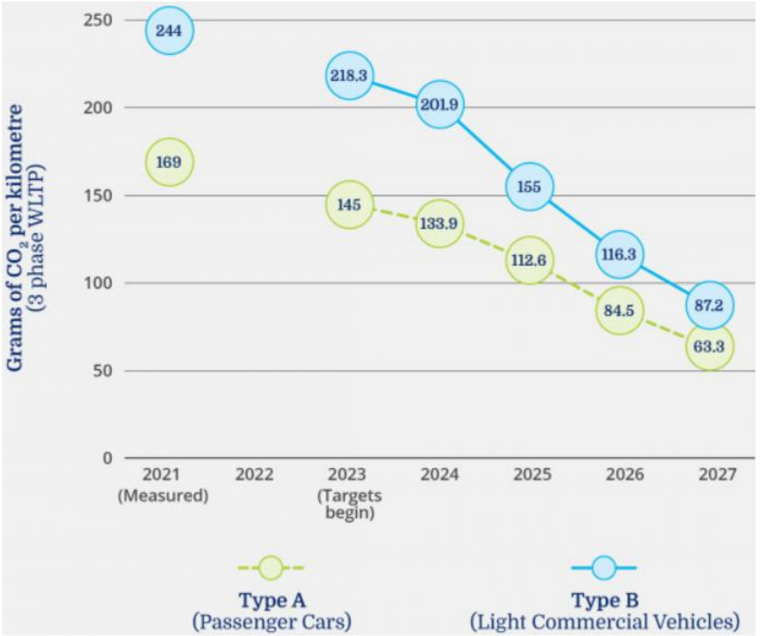


Figure 8 shows the current CCS targets.

Although the target is specified as annual values that an importer must achieve, differentiated by LPVs and LCVs, the CCS offers considerable flexibility as to how the target can be met:

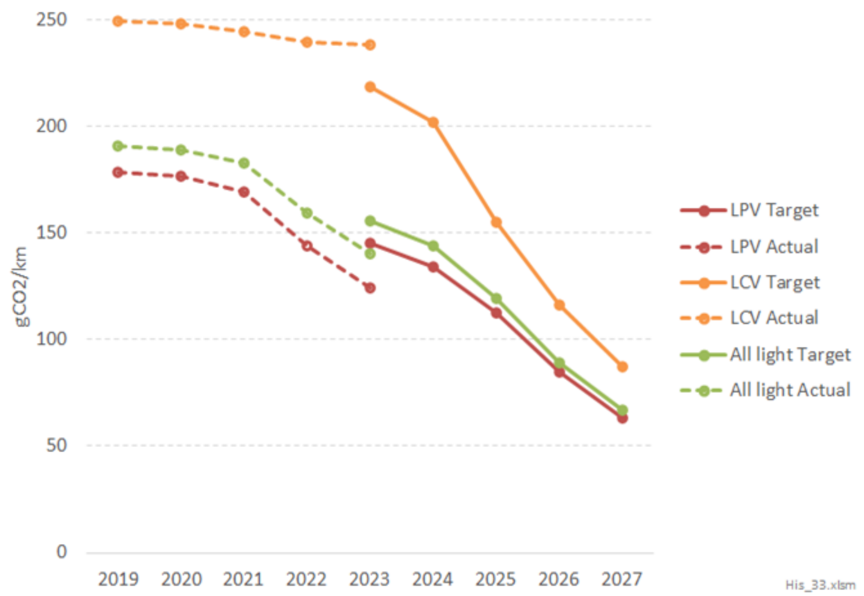
- The extent of any CCS liability is based on the weighted average across the LPVs and LCVs that an importer brings into the country. For example, failing to meet the target across the LCVs an importer brings into the country can be counter-balanced by over-achievement across its LPV portfolio.
- The CCS allows for transferring of CCS liabilities *between* importers. Thus, an importer with predominantly low or zero-emission vehicles (eg, Tesla) will significantly out-perform the CCS target and not face any charges. The CCS mechanism allows this low-emissions importer to transfer some of its over-achievement to a high-emissions importer (presumably in return for payment if the low/zero-emission 'credits' are scarce) as a means of the high-emissions importer meeting its CCS target.
- The CCS allows for a degree of banking and borrowing of CCS over- and under-achievement. For example, an importer that over-achieves relative to the CCS in one year, can 'bank' the credits to be

used to offset potential under-achievement in subsequent years, within some constraints.

3.2 Performance relative to the CCS to-date

Figure 9 shows the average annual emissions intensity of vehicles entering the light fleet, both the historical actual values and the target values specified in the CCS. It splits out the values for LPVs and LCVs, and calculates a vehicle number-weighted average for 'All light' vehicles.[7]

Figure 9: Average emissions intensity of vehicles entering the light fleet



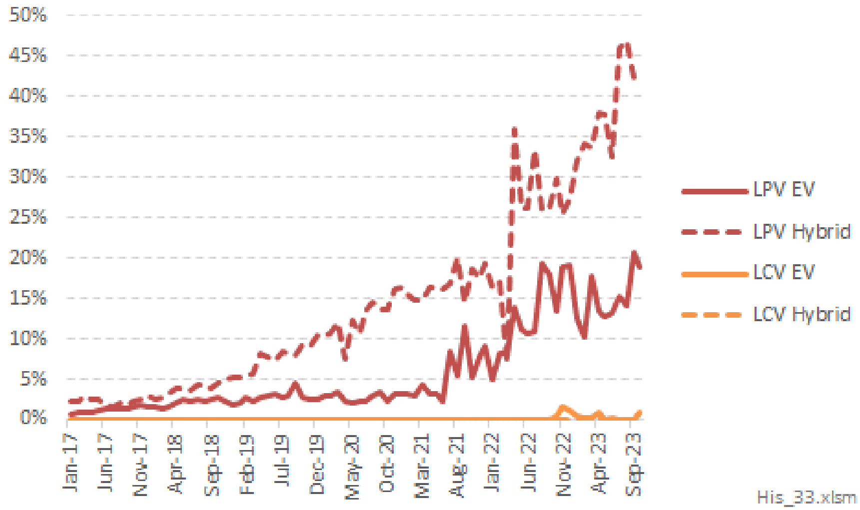
Source: Concept analysis of MoT data

As can be seen, in 2023, LPVs significantly over-performed relative to the CCS target, whereas LCVs fell materially short of the target. On a vehicle number-weighted average basis across all light vehicles, the emissions intensity of vehicle sales over-performed relative to the CCS target.

[7] The 'All light' value is much closer to the LPV value, because LPVs account for approximately 85% of light vehicles entering New Zealand. The 'All light' target values for 2024 onwards assume this proportion remains constant for these future years.

As Figure 10 illustrates, this over-performance relative to the CCS target for LPVs is due to a combination of EV uptake plus ICE vehicles (ie, without plug-in electric charging) increasingly being hybrids. However, neither vehicle type has yet made an impact on LCV sales.

Figure 10: Proportion of vehicles entering NZ that are EV or hybrid

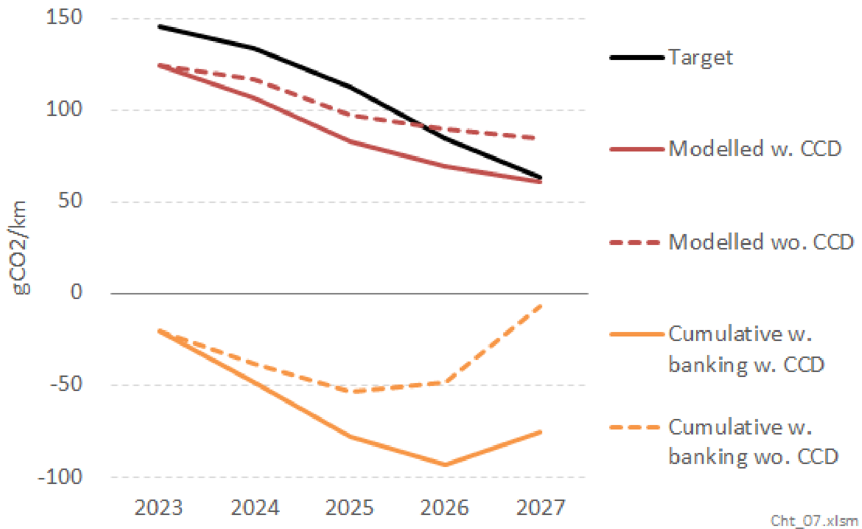


Source: Concept analysis of MoT data

3.3 Modelled outcomes relative to the CCS

The red lines in Figure 11 below show our modelled outcomes for LPVs for the scenario where the fees and rebates from the CCD continue ('w. CCD') and the scenario where they are removed ('wo. CCD').

Figure 11: Modelled emissions of LPVs entering NZ relative to CCS target



The orange lines show the cumulative extent to which the modelled outcomes out-perform the CCS target or fail to meet the target. Out-performance ('surpassing') is shown as a negative value, with under-performance ('failure') shown as a positive value.

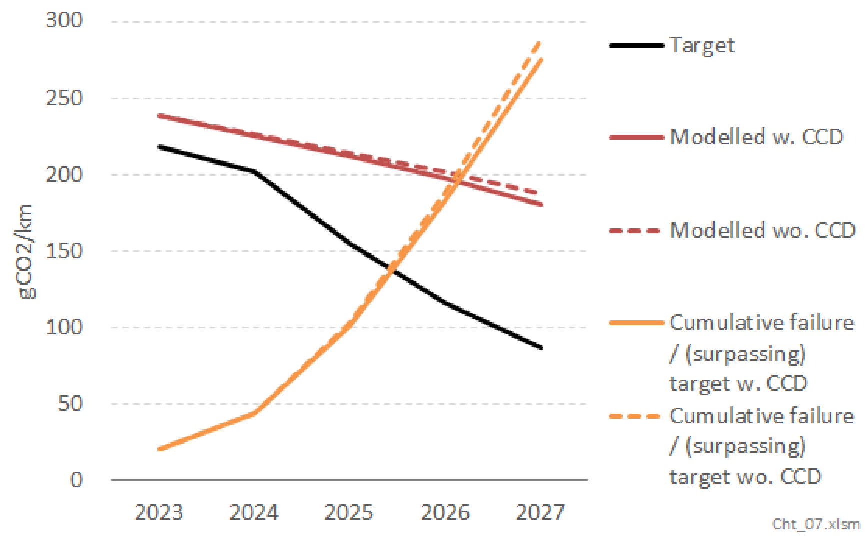
The reason that the cumulative value is calculated is because of the ability for importers to bank and borrow in the CCS scheme. Thus, under-performance in an early year can be offset by over-performance in a later year, and vice versa. The cumulative calculation in the graph uses the banking rules in the CCS, which allow under-performance in a given year to be offset by banked credits from over-performance up to three years previously.

Comparing the red lines with the black, target line, shows that with the CCD continuing, the emissions intensity of LPVs entering New Zealand is better than the CCS target in all five years. However, if the CCD is removed, the modelled emissions intensity of LPVs entering New Zealand would rise above the CCS target for the later two years of the five-year period. However, on a cumulative basis, even this without-CCD scenario over-performs the CCS over the five-year period – ie, banking allows the over-performance in the first three years to more than offset the under-performance in the last two years.

As such, if the CCS were only applied to LPVs independently of LCVs, we consider it likely that the CCS would not have an effect on LPV EV uptake outcomes, even without the CCD.

However, achievement of the CCS is assessed based on the combined outcomes of LPVs and LCVs. Accordingly, it is important to understand whether LCV sales are likely to achieve the CCS. As Figure 12 below shows, the modelled outcomes for LCVs is a completely different story to that for LPVs.

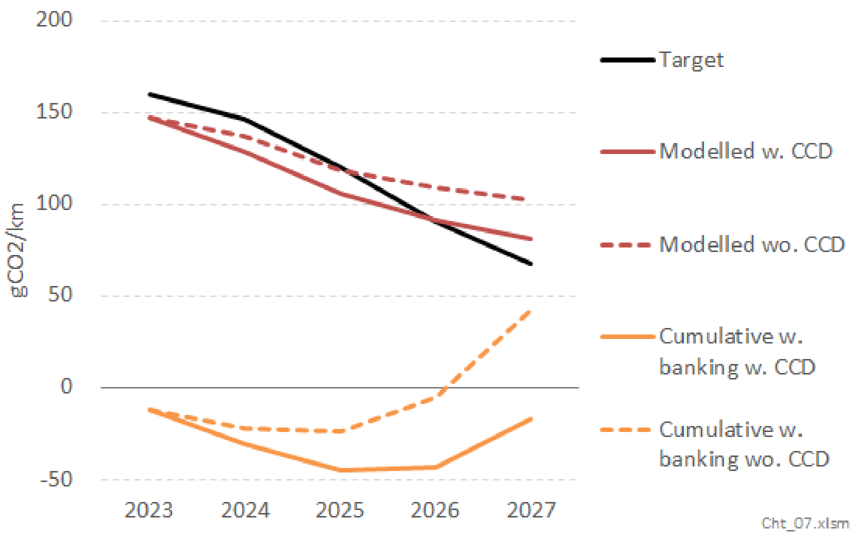
Figure 12: Modelled emissions of LCVs entering NZ relative to CCS target



Our modelling of LCV outcomes has LCVs continuing to fail to meet the CCS target over the entire five-year period of the CCS for both the 'with' and 'without' CCD scenarios.

Figure 13 shows the modelled outcomes averaged across LPVs and LCVs – ie, 'All Light' vehicles. This is the basis on which the CCS rules apply.

Figure 13: Modelled emissions of all Light vehicles entering NZ relative to CCS target



This modelling indicates that if the CCD continues, the light fleet will meet the CCS on a cumulative basis over the entire five-year period – ie, banking of over-performance in the first three years will offset under-performance in the last year. In this future, our modelling indicates the CCS would not be expected to have any incremental effect beyond the CCD.

However, if the CCD is discontinued and car purchase prices reverted to their without fees or rebate levels, we project that the Light fleet would fail to meet the CCS target over the five-year period. Given that the penalties for failure to meet the CCS are intended to incentivise importers to alter outcomes so they do meet the CCS,[8] we consider it likely that the CCS would 'bite' in a future where the CCD were discontinued.

Our expectation is that, if the penalties for failing to meet the CCS are sufficiently high, importers would increase the price of high-emissions vehicles and likely lower the price of low-emissions vehicles until consumer purchases are altered to the point where the cumulative effect across the Light fleet is such that the CCS target will be met.

This is expected to come about via trading for the CCS credits/debits. For example, importers of low/zero emission vehicles with surplus credits would be able to sell them to importers whose sale mix doesn't achieve the CCS requirement. This trade in credits/debits is ultimately expected to affect the prices paid by consumers.

Assuming they are able to perfectly achieve such outcomes, the CCS penalties are sufficiently high, and if the CCS was only in force for the five years that are currently specified, they would alter the balance of low- and high-emission vehicle uptake such that the cumulative over-/under-performance relative to the CCS of All Light vehicles reaches zero by 2027. Ie, the dotted orange line in Figure 13 would hit zero in 2027.

This resulting effect would correspond to approximately 70% of the benefit of increased EV uptake calculated in Chapter 2.

In other words, if the CCD were removed *and the CCS penalties were sufficiently high*, we expect the current CCS would force importers to alter the prices of light vehicles in such a way that would increase EV uptake by about 70% the amount that the CCD alone is projected to do – leading to approximately 100,000 fewer EVs on the road by 2030.

[8] The charges incurred by suppliers for failing to meet the Standard would reduce the margin they earned on such vehicle sales. This should incentivise suppliers to increase the sales price of high-emissions vehicles to reduce any loss of margin. Conversely, suppliers of low-emissions vehicles will earn increased margins on such sales as they result in credits that are of value to suppliers of high-emissions vehicles to offset any charges. If there is sufficient competition for the sale of vehicles, the value of these charges / credits for high- / low-emissions vehicles should largely flow through to higher / lower sales prices for such vehicles.

It was beyond the scope of this engagement to model the effect of only relying on the CCS penalties. That said, a quick review of the penalties (being \$36/gCO2 for New vehicles and \$18/gCO2 for Used vehicles) indicates they don't give as strong a financial incentive on suppliers to alter the relative prices of high and low emissions vehicles as the current settings of the CCD.

For example, under the CCD, the change in relative prices of a New petrol vehicle with 7 l/100km fuel efficiency versus a New fully battery-powered EV is \$8,485.

Conversely, the effect of the penalties on suppliers for failing to meet the CCS is estimated to alter the relative value of such high and low-emissions vehicles by \$5,960.

Given that the effective price signal to suppliers under the CCS is not as strong as the price signal to consumers under the CCD, it is likely that the rates of EV uptake in a future where only the CCS continues will deliver outcomes which result in less than 70% of the benefit of continuing with both policies. Ie, the incremental economic and emission loss due to removal of the CCD will be greater.

Furthermore, if the government reviews the CCS settings and subsequently alters them, the incremental benefit of continuing the CCD will also be altered: Higher if the CCS settings are weakened, and lower if the CCS settings are strengthened. Modelling of any potential future change in the CCS settings was also out of scope for this engagement.