Submission on Clean Car Standard and Clean Car Discount

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Overall comments

- New Zealand needs to take action as soon as practicably possible to reduce CO_2 emissions from its transport sector, and in particular those from its light vehicle fleet, which make up nearly 70% of these emissions.
- I support the intent and general approach of both these proposed policies, which should help to increase the supply and reduce the cost of low-emissions vehicles, especially EVs, entering the NZ light vehicle fleet. I also support policies such as these which will encourage consumers to move to smaller vehicles with lower CO_2 emissions.
- This is New Zealand's first major policy step to start moving New Zealand to a low-emissions light vehicle fleet. As such, it needs to be a success, the specified targets to be achieved and for New Zealanders to accept the need to make these changes. Much as I might wish otherwise, I am afraid that what is currently proposed is just too big a change occurring too quickly for the large number of New Zealanders who will be effected – particularly given the level of technical maturity of EVs.

Consumer acceptance

The biggest risk I see to the success of these proposed policies is that consumers are unwilling or unable to make the transition to low emission vehicles, particularly EVs, at the rate envisioned in the Clean Car Standard.

The changes will affect a large proportion of New Zealanders - an estimated 3 out of 7 households will replace their vehicle in the 6 years to 2025[1].

The proposed reductions in CO_2 emissions are both large and fast. Similar types of policies have proved effective at driving down emissions in other countries, but what is proposed here, dropping from 180 to 105 g/km over 5 years, is both further and faster than achieved overseas. For instance, the Social Impact assessment document suggests that only 1.7% of new vehicles entering the fleet in 2017 would meet the 2025 105 g/km standard, with none of the current top 10 selling vehicles complying.

We also need to recognise that NZ differs from other countries, both in terms of it's lower population density, smaller cities and the nature of its economy. This may well make the transition to low-emissions vehicles more challenging than in other jurisdictions.

Consumers switching to EVs are currently held back by:

Technical barriers: The physical barriers currently holding back consumers from switching to EVs are well understood, and primarily relate to the lower energy storage density of current state-of-the-art EV batteries vs petrol, giving EVs a range shorter than a car powered by petrol and requiring more frequent recharging. Other interlinked technical barriers include inadequate charging infrastructure, long recharging times and a loss of range as the battery ages. Yes, these barriers should reduce with time, but they are currently substantial barriers to EV uptake, and require purchasers to make significant behavioural changes. I note that many folks, myself included, make vehicle purchase decisions based on their extreme uses for their vehicle (e.g. towing a boat) rather than its typical use (e.g. commuting, school run). This will make such technical barriers, be they real or imagined, much more important than average/most common uses for the vehicle would indicate – particularly for one-car households. PHEVs do address a number of these barriers, but are they really a long-term solution?

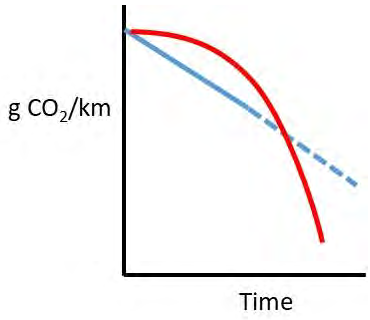
Higher purchase prices for low emissions vehicles: This issue is well discussed and the clean car rebate goes some way – but far from all the way - to addressing the very significant purchase price differential between EVs and fossil-fuelled vehicles.

Significant behavioural changes are needed: To a consumer switching from a conventional ICE to a hybrid vehicle, is essentially seamless and does not require significant behavioural changes. On the other hand, transitioning to an EV currently requires significant sacrifices and changes in the way they currently do things. These sacrifices and changes offer little, if any, short-term

[1] 42%. Source: Social impact assessment document.

payback to the individual consumer - beyond the feeling that they are doing their bit. Are car owners ready to "buy into" the changes they personally need to make to their current way of doing things and higher costs to transition the country to a low-emissions economy (a long-term benefit to society)? Certainly government has a leadership role to play, and the power to impose changes on society for the long-term good of New Zealand, but there is only so much pain folks will tolerate and how quickly behaviours/values will change.

Much as I might wish otherwise, I am afraid that currently-proposed target within the Clean Car Standard will be a case of "too much too fast" for many New Zealanders, particularly given the current technical barriers to EVs and higher purchase prices for low emissions vehicles. I suggest that for this reason it would be preferable, rather than reducing the emissions linearly from 180 to 105 g/km to do this more slowly in the early years, but then ramp up the reduction in later years. This would give more time for New Zealanders to accept the importance of reducing emissions and then making the required changes/sacrifices – and would align much more closely with typical uptake curves for new technologies.



Technical risk

Implicit in the success of the Clean Car Standard is that technical advances in EV batteries will occur, overcoming or substantially mitigating the current barriers to the uptake of EVs. Such advances could include batteries with a higher energy densities (thus increasing vehicle range/ability to carry large loads), substantially lower costs[2], faster recharge times or longer battery lifetimes.

However, history tells us that predicting which technical developments will occur is difficult, and predicting the rate at which technical developments occur is even more challenging.

This reliance on future technical advances to overcome current barriers to EVs adds significant "technical risk" to the rate and extent of EV uptake - and achieving the goals of the Clean Car Standard. For example, consumers may want to wait until technical barriers are overcome or purchase prices drop before committing to an EV, or investors may to hold off from building EV charging infrastructure until they see large numbers of EVs entering the fleet.

This technical risk applies not only to how quickly EV battery technologies evolve, but also how quickly other competing low-carbon vehicle propulsion technologies evolve. If, for example, inductive charging developments occur which allow electric cars to [simply and cost-effectively] charge as they drive along the road, or hydrogen technologies advance rapidly, then there is a risk that by betting on a battery EV fleet the country is locked into what turns out to be a sub-optimal solution.[3]

Biofuels

The most cost-effective solution to decarbonising the light vehicle fleet in New Zealand could well be a mixed model, where EVs make up the bulk of the future light vehicle fleet, but that a liquid biofuel such as renewable diesel[4] is introduced for use in those difficult-to-electrify applications, *e.g.* in remote parts of the country, or for light vehicles where the high energy density of liquid fuels is required.

Advantages of such a mixed decarbonisation model, particularly in the short and medium term, include:

[2] Costs are already expected to drop due to economies of scale and continuous improvement, but new types of batteries could lead deliver substantial additional cost reductions.
[3] I agree that at the moment battery EVs look a good option for decarbonising New Zealand's light vehicle fleet - and there is a huge global effort in this space (reducing technical risk) – but substantial technical risks still remain.
[4] Renewable diesel (hydrotreated vegetable oil) can be blended with fossil diesel in all proportions and can be used in existing diesel engines and existing fuel distribution infrastructure. Global production in 2017 was 5.5 billion litres.

- Reduced technical risk, and therefore increased consumer acceptance, by providing a low-carbon option for currently difficult-to-electrify applications
- Lower up-front capital costs, particularly for recharging infrastructure and transmission line upgrades in remoter locations – but also for car purchasers. The significantly lower price of electricity *vs* biofuels should provide a strong incentive for consumers to use EVs wherever practicable.
- Fitting well with using biofuels to decarbonise heavy duty vehicles and aviation
- Providing a route to further lowering emissions from PHEVs.

I believe that such mixed decarbonisation options need to be given more detailed consideration. High-speed internet deployment in NZ is an example of such a mixed model, being delivered to most households by fibre, while wireless technologies are used for remote rural locations.

However, while the proposed Clean Car Standard does not specifically exclude using liquid or gaseous biofuels, a vehicle emission target specified in g CO_2/km measured using vehicle test cycle with fossil fuel strongly favours EVs (or hydrogen) over the use of liquid or gaseous biofuels.

Future emissions targets
Longer-term targets of some form are definitely needed within the Clean Car Standard to provide the longer-term certainty needed by investors and car purchasers. The economic lifetimes of the substantial investments in EV recharging infrastructure and upgraded power distribution lines are long, and the money involved large, so investors need long-term policy certainty before make the required investments. In the biofuels space, there are many examples, including in Europe and the US, where biofuel producers have been burnt by changes in Government policy.

I support the general approach suggested around a process for setting future emissions targets, including the need for these to be revisable as and when the need arises.

I would however advocate that the post-2025 targets be expressed in terms of a reduction in CO_2 emissions achieved in-use – rather than via vehicle test cycle emissions. Expressing the targets in this way would focus directly on the desired outcome, rather than how it is to be delivered. This would reduce medium- to long-term technical risk by allowing the market to work out the best and most cost-effective way to deliver the required outcome (including biofuels), as well as to adapt/respond to technical developments as and when they occur. I appreciate that this is likely to be more difficult to measure, and would need to be somehow tied back to the 2025 target, but getting locked into a sub-optimal technology, or having to change direction at a later date, would come at a huge future cost.

Other points
One likely impact of the Clean Car Standard would be to increase the proportion of diesel-powered vehicles in the light vehicle fleet, with the resultant increase in particulate emissions. Tight particulate emissions standards will be needed alongside the Clean Car Standard to ensure that air quality is not adversely affected.

I found it rather difficult to get my head around what effect the Clean Car Standard would have on vehicle supply and found the following example quite useful. If an importer wished to import 100 4WD utes, and only imported one other vehicle type, then to meet the 2025 standard they would, for example need to balance this by importing 75 EVs, or 447 hybrids, or 92 PHEVs[5]. Assuming I have got the maths correct, this is significantly less of a change than I had first envisioned!

About the submitter:
Dr Ian Suckling is now retired, but until January 2019 was a Research Leader at Scion, New Zealand's forestry-focussed Crown Research Institute, with responsibility for the Institute's research on both liquid and solid biofuels. He also represented New Zealand in IEA Bioenergy's Task 39, "Commercialising liquid biofuels", giving him a good understanding and international perspective on the role of policy and technical developments in biofuel deployment.

[5] Vehicle assumptions: diesel-powered Ford Ranger; Nissan Leaf; Toyota Prius; and Mitsubishi Outlander.