

20 August 2019

Ministry of Transport
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Closing date for submissions: 20th August 2019

We would like to appear before any hearings related to this discussion document or development of associated policy.

Submission: Response to the discussion paper on a Clean Car Standard and Clean Car Discount

Background

- Thank you for the opportunity to comment on the discussion document relating to "Moving the light vehicle fleet to low-emissions: discussion paper on a Clean Car Standard and Clean Car Discount".
- Gifford Consulting is an applied research company with over 30 years experience in the climate change, renewable energy, transport fuel, environmental issues and developing a bioeconomy in New Zealand.
- This submission primarily relates to the following proposals and your request for our views on the proposed policy changes.
 - Specific questions covered include:
 - Is the Clean Car Standard appropriate for New Zealand? If not, why?
 - Is an average emission target of 105 grams CO₂ per kilometre by 2025 and appropriate target for New Zealand? If not why not?

Submission

- Gifford Consulting agrees with the need to reduce greenhouse gas emissions from the transport sector as it is a major contributor of CO₂ emissions arising from the combustion of fossil fuel derivatives. Furthermore, we agree that CO₂ needs to be a major focus for the government as it is a long term gas that stays in the atmosphere.
- We agree that given that transport greenhouse gas emissions contribute 20% of New Zealand's Greenhouse Gas Emissions that road transport needs to be a focus for the Government. This focus is particularly urgent given that road transport emissions are on the rise and have increased by 90% over the period 1990 - 2017.
- We agree that there is an urgent need to address emissions from the light vehicle fleet as these are a significant contribution to NZ's total emissions.

- The discussion document indicates that fuel efficiency is an important factor to consider as part of the strategies to use to reduce CO2 emissions from the light vehicle fleet. This we agree with as if less fuel is used to travel the same distance then there is a reduction in the amount of greenhouse gas emissions produced.
- The discussion document indicates that one measure to assess fuel efficiency is grams of CO2 per kilometre. We would like to point out that not all CO2 is the same and we would suggest that this should be modified to specifically focus only on CO2 derived from fossil fuels. Where CO2 is derived from living plants and animals then this can be regarded as part of the short-term natural carbon cycle and the carbon can be regarded as not contributing to greenhouse emissions (i.e. are effectively carbon dioxide neutral and not contributing to global warming). The current discussion document fails to recognise that there is carbon dioxide sourced from renewable based carbon and that this should be treated differently compared to fossil fuel carbon. One of the most important contributors to greenhouse gas emissions is the removal of fossil based fuels from the ground and burning these carbon sources. Targeting CO2 sourced from these fuels should be the focus of these policy measures. Biofuels should not be included in the context of these proposed measures. We recommend that you remove the word biofuels from the "insert box" on page 7. This is particularly important as the main reason for these proposals is to reduce greenhouse gas emissions.
- We agree that there is logic to the argument to improve the fuel efficiency of the light vehicle fleet and measures should be taken to achieve this. However, we are of the view that the proposed "Clean Car Standard" is an overly complicated approach to achieve greenhouse gas emission reductions and reductions for other air contaminants.
- Gifford Consulting is of the view that the government should focus on the nationwide introduction of liquid biofuels - such fuels can provide greenhouse gas emission reductions not only for the light vehicle fleet but also for heavy vehicles and aviation.
- Biofuels can be used in variety of ways either as blended fuels or completely substitute for fossil fuels. Depending on the level of substitution then this will directly commensurate to a similar level of greenhouse gas emission reduction. This being the case - then the introduction of biofuels has the potential to substantially reduce the level of transport related greenhouse gas emissions over a much shorter time frame.
- Biofuels can largely use the existing fuel distribution network, so the overall costs of using biofuels will be substantially less than converting the car fleet and installing new infrastructure.
- We support the introduction of EVs - though we question the overall efficiency of replacing the existing vehicle fleet with EVs as this is encouraging more "consumption" and probably with this will come increased use of fossil fuels - if not in NZ then in the country of origin for the manufacturing of component parts for these vehicles. Our understanding of the well to cradle life cycle of EVs and Internal Combustion Engine Vehicles (ICEVs) show the following (Arthur D. Little, 2016)¹:
 - The electricity costs associated with operating a BEV over a kilometre is significantly lower than the gasoline cost required to operate a comparable ICEV.
 - BEVs cost less to maintain owing to the relative simplicity of the battery-electric motor system compared to the frequent maintenance required for the operation of ICEVs.
 - Automotive battery technology has evolved rapidly and costs of production have reduced to around \$ US 1126 per kilowatt hour to just \$ US 300. Furthermore, that there is an opportunity for further cost savings over time.

¹ Arthur D. Little, 2019. Battery Electric Vehicles vs Internal Combustion Engine Vehicles: A United States Based Comprehensive Assessment.

- Produce a local reduction in greenhouse gas emissions.
- The total cost of ownership for BEVs is significantly greater than for ICEV as the BEVs are substantially more expensive to manufacture, primarily due to the cost of automotive batteries, higher insurance and financing costs, costs of additional charging infrastructure at home and often the need for alternative transportation (i.e. the costs of having access to second vehicles for either long range trips or to destinations where charging facilities are not available).
- The supply of materials for automotive batteries is largely sourced from poorly regulated and heavily polluting mines in the Congo and China.
- BEVs contribute to a more diffuse set of environmental impact spread across the globe.
- BEVs have a higher human toxicity potential.
- Although there is apparent short-term local greenhouse gas emission benefits of moving the light vehicle fleet to EVs there are a range of consequential environmental and cost impacts that also need to be taken into account. The economic analysis provided in the discussion document is superficial and does not consider the full total cost of ownership and taking into account the cost of capital over time (i.e. using an analysis based on present value).
- EECA undertook a life cycle analysis of EVs and ICEV in 215. The climate change results are provided below.

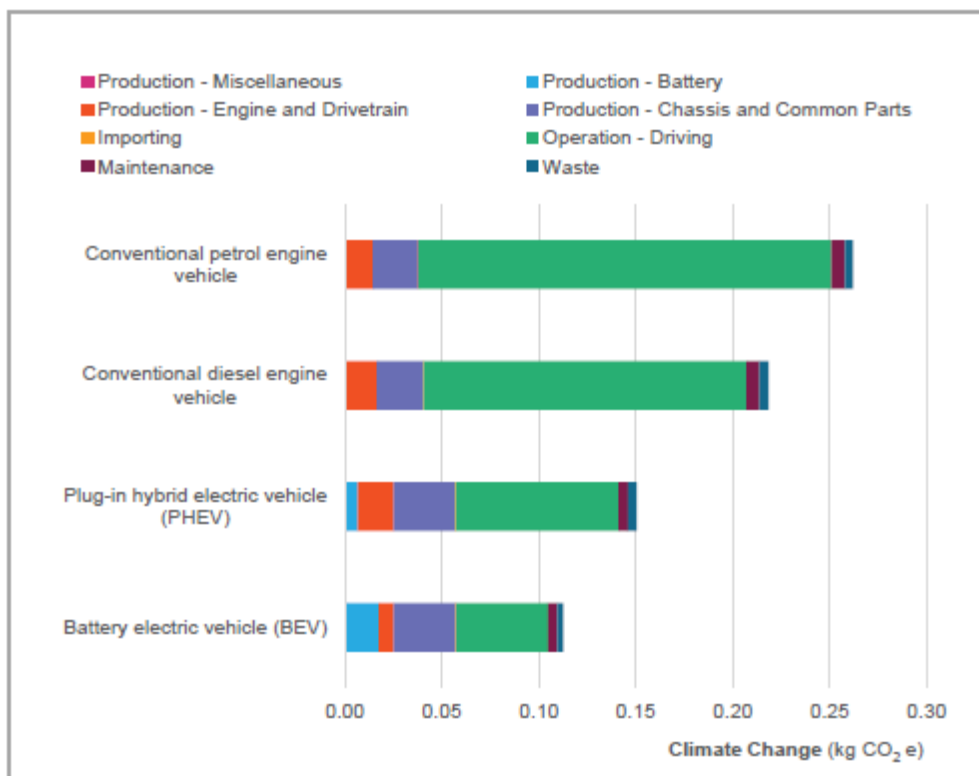


Figure 10 Climate change impact

From EECA, 2015².

The operation component of driving the vehicle is the largest contributor for CO₂ emissions (indicated by the green section of each bar graph above). Interestingly, this analysis shows that if the fuel to run the car is changed from fossil fuels to biofuels (i.e. using renewable carbon - which is

² EECA, 2015. Life Cycle Assessment of Electric Vehicles, Final Report. 2015.

regarded as climate change neutral) then the overall climate change contribution for conventional ICEVs would be less than that for BEVs.

Proposed Alternative Approaches

Gifford Consulting proposes that an alternative approach to focusing on the proposed Clean Car Standard based on an emissions target of 105 g CO₂ per kilometre should include the following.

- The alternative approach is based on the following best knowledge:
 - Emissions of CO₂ from the use of fossil fuels are a stock resource (i.e. it continues to accumulate in the atmosphere as more fossil fuel carbon is consumed). Whereas, CO₂ derived from sustainably produced biofuels are a flow resource and are part of the short term natural carbon cycle involving plants, atmosphere, soils, and water exchanges (i.e. the CO₂ emitted from the combustion of biofuels is reabsorbed in growing plant material and not contributing to the stock of CO₂ in the atmosphere).
 - The two main factors that will drive significant atmospheric reductions in GHG emissions are:
 - The global decarbonisation of energy systems (i.e. reduction of the use of fossil fuels for all forms of energy (electricity, transport, heat, etc).
 - Recognising that decarbonisation of the global economy is not possible – as all human development relies on the continued use of carbon. **The change required here is to substitute renewable carbon (i.e. utilising all the carbon that is flowing through the short term-natural carbon cycle more efficiently) for fossil fuel derived carbon (i.e. leave fossil fuels in the ground for now).**
 - Afforestation (either plantation or native forests) makes a significant contribution to GHG emissions though the net effect of this is ultimately constrained by how we continue to use fossil fuels and requirements of land for the production of food and other renewable materials over the long term to meet the needs of the increasing human population.
- Given the above conditions – then the Government should:
 - Encourage the development of bioeconomy where products are produced in a fully integrated manner for:
 - Food (highest priority)
 - Fibre
 - Animal feed
 - Fertilisers
 - Chemicals
 - Energy (lowest priority)

Ideally, this range of products can be produced from single or multiple crops and pastoral farming (i.e. it implies a significant increase in the efficient use of all primary production resources).

- Such systems should be considered at the national level and take into account the land use capability characteristics and other attributes of natural capital;

- Encourage the development of a NZ bioeconomy where plant and animal based products are providing food and all the other carbon-based products required for continued economic development;
 - Promote the bioeconomy through the development of an integrated Bioeconomy Strategy which links agriculture, forestry, waste sector, bio-processing and chemical industries as is the case increasingly in other countries;
 - Encourage a higher level of collaboration between the land based sectors and bio-processing sectors through the development of a national Bioeconomy Council which is mandated to get sectors working together and integrating their operations;
 - Implement renewable liquid biofuel mandated targets;
 - Implement mandates for replacing fossil fuel derived carbon in the economy with renewable carbon (i.e. that derived directly from plant and animal systems);
 - Support R&D to developing the bioeconomy, but most importantly the technologies required to initiate and maintain reliable bio-feedstock supply chains. This should be part of the response of the agri-business sector to climate change mitigation.
 - Encourage investment into new technologies for converting bio-based feedstocks into applications that reduce the need for fossil fuels.
- Gifford Consulting is aware of technology that can convert municipal waste materials into liquid biofuels that can directly replace fossil fuel derived products. Such technology could reduce greenhouse gas emissions by the light and heavy vehicle fleet by 15% within 2-3 years.

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