

24 June 2021

Ministry of Transport

Submission on:
Hīkina te Kohupara

Summary

- The ‘Avoid, Shift, Improve’ framework, and scenario-based Themes derived from it, are inappropriate for the task of developing “a 10-15 year time horizon action plan for how Aotearoa will reduce its transport emissions”.
- Instead, the Ministry should re-focus on the “*Government Policy Statement on Land Transport 2021/22-2030/31*” and “*Strategic priority 4: Transforming to a low carbon transport system that supports emissions reductions aligned with national commitments, while improving safety and inclusive access*”, and use mainstream techniques for managing under uncertainty to develop the required action plan.
- This should:
 - Identify what is well understood and develop evidence-based policies to address these.
 - Where there is uncertainty undertake research to better understand the uncertainty and reduce it (e.g. enhance the adaptability of the system, increase options).
 - Any policy interventions need to be material in impact; facilitate adaption under uncertainty (e.g. fuel neutrality); and welfare enhancing compared with business-as-usual, taking account of the ongoing impact of the ETS.
 - The underpinning Principles should be amended to explicitly reflect these desired characteristics.
- The above implies the development of a clean transport, applied, directed research programme for New Zealand.

Introduction

This submission addresses the key issues that NERI¹ considers arise for energy research from the Hīkina te Kohupara (HtK). Around 50% of our energy use is driven by transport, effectively 100% fossil fuels and imported. Transport demand and the fuels used shape the future of our energy sector.

We have some general issues that we also raised in respect of the Climate Change Commission's (CCC) draft report and now responded to in its final report. These are usefully discussed in relationship to the Principles (*Consultation question 1*).

Comments on the balance of the *Consultation questions* follow from that.

General issues and *Consultation question 1*

Uncertainty and how to manage with it.

Management under risk and uncertainty with its emphasis on the value of setting up adaptive dynamics and increasing options in transport planning is well understood².

HtK addresses this issue better than the draft CCC report did³, e.g. *Principle 3* raises “*the need to be strategic about which options [emphasis added] we pursue to reduce emissions ...*”, and, in the case when consequences are understood draws the appropriate inference, “*prioritising initiatives that will have the largest impact on avoiding ..*”. It further reinforces the importance of options, *Principle 4* “*This helps to manage risk by avoiding relying too heavily on one solution to meet our targets ...*”, and adaption *Principle 6* “*We will need to keep adapting to reduce emissions along our future path*”.

But it is silent on using options analysis systematically and actively investing in improving adaptive dynamics in our transport system when the future is uncertain.

Central to this is identifying the “known unknowns” and investing in understanding them better with a view to reducing them, exploiting them, and “designing-in” our ability to adapt to them.

¹ The National Energy Research Institute (NERI) is a Charitable Trust incorporated in New Zealand. Its primary purpose is to enhance New Zealand's sustainability and to benefit the New Zealand community by stimulating, promoting, co-ordinating and supporting high-quality energy research and education within New Zealand. Its research members are Auckland University of Technology, GNS Science, Scion, University of Canterbury and the University of Otago, and its industry association members are the Bioenergy Association, BusinessNZ Energy Council, the Carbon and Energy Professionals New Zealand, the New Zealand Wind Energy Association, the Road Transport Forum and Tourism Industry Aotearoa.

² Ministry of Transport (2016) *Adaptive Investment Management Using a real options approach in transport planning* Wellington, Retrieved from <https://www.transport.govt.nz/assets/Uploads/Paper/MOT-Real-Options.pdf>

³ The evidence base for the final CCC Report is primarily found in its draft report hence we will still refer to the latter.

Acting prematurely in the face of uncertainty can be costly. Simply delaying an action until things clarify can be the most welfare enhancing option. In many cases applied directed research into the uncertainties and options will cost-effectively identify both where action should be held off, or, where there are opportunities, to accelerate the beneficial changes.

Thus, applied directed research plays a much more central role for the Government than implied by *Principle 7's* “accelerating the uptake and diffusion of new transport technologies and services”.

Applied directed research is an integral part of an adaptive approach to uncertainty. This is point is now reflected in the final CCC report, and HtK needs to be similarly amended.

ETS

In this submission we assume the Government has established a budget for emissions reductions, and there is a reasonably efficient ETS in place covering Transport. Thus, there is a neutral economically efficient and adaptive process in place driving towards the Government’s emissions targets.

In this context further action by the Government must be justified by it lowering the incremental costs (economic, social, cultural, environmental⁴) over the process driven by the ETS. Examples might be to remediate adverse social impacts from higher transport costs prices.

The draft CCC report was very weak in this regard when it came to Transport. It has now strengthened this in its final report.

The context and implications of the ETS are of sufficient significance that it should explicitly feature in *Principle 6* reflecting the CCC’s amendments.

Materiality

One implication of the ETS process, coupled with the general uncertainty of the outcomes from policy actions, is that targeting small reductions in the costs of emissions over and above the what the ETS should deliver is unlikely to produce gains outside the margin of error.

Thus, as *Principles 1 and 3* note, effort addressing areas of relatively high emissions will have much higher expected returns than, say, areas producing <10% of the current Transport emissions unless there are other considerations⁵. Effort is better focused on the former.

⁴ In what follows when we use the terms “costs” and “benefits” they should be read as being measured on an appropriate balance of all these dimensions.

⁵ E.g., in electricity generation where there is the need for significant growth driven by Transport demand will make its potential use of fossil fuel material.

However, there is a risk that small emissions benefits are rationalised by potential co-benefits e.g. *Principle 5* “... opportunities to reduce air and noise pollution, improve physical health and mental wellbeing, and make our towns and cities more liveable.” These need to be justified in terms of their co-benefits, rather than just rely on their association with low emissions⁶. The relationship between land use and emissions is an example – if low emissions fuels are adopted the emissions’ impact of land use changes/urban form are likely to become marginal⁷. These observations are confirmed by HtK’s modelling that shows “*Land use and Public Transport*” only contributing 0.1-0.6% reduction in 2050 emission.

This general problem of assessing benefits on multiple dimensions (economic, social, cultural, environmental) and with multiple impacts outside transport is an important role for applied directed research in support of policy analysis.

The limitations of scenario modelling

HtK deterministically model four scenarios for future transport emissions, that it terms “pathways”. It places many caveats on their use but in the end *Principle 6* says: “We need to forge a path to zero transport emissions by 2050, ...” even if recognising “... that there is not one way to get there.”

Ultimately *Consultation question 13* forces a choice “... which pathway do you think Aotearoa should follow to reduce transport emissions?”

This can be justified for the limited task of setting budgets, testing achievability, and building a consensus around goals. However, using modelling based on scenario projections based on “weight given to ‘avoid’, ‘shift’ and ‘improve’ initiatives” (p. 106) to help make decisions about today’s optimum response is quite inappropriate.

These policy packages have been arbitrarily constructed “based on the ‘Avoid, Shift, Improve’ framework”, drawing from a limited set of policies. Approaches that have been ruled out of scope or not considered may well be precisely the ones we wish to explore when thinking about how we could do better.

Further, endorsing any such scenario is a trap when thinking about interventions. A deterministic scenario can quickly be used to justify prescriptive interventions in the name of achieving an arbitrary pathway, when a proper assessment, considering the full range of assumptions and the cumulative uncertainties, could reach quite a different conclusion.

⁶ The OECD report “*Decarbonising urban mobility with land use and transport policies: the case of Auckland, New Zealand*” referenced in HtK suggests that *Widespread Densification* by relaxing regulations is likely to be welfare enhancing without any contribution from environmental impacts (i.e. CO₂-e reductions) and those will be marginal (6.1.1.) in light of the CCC’s recommended aggressive EV policies.

⁷ See two recent reports by the Productivity Commission have addressed this in the NZ context, *Better urban planning* (2017) and *Low emissions economy* (2018), coming to an alternative view to the draft CCC Report Section 4b.2. Relevant too is Finding 16.3 in the draft CCC report i.e. the diminishing returns from urban form when the vehicle fleet is becoming low emissions, and the high cost and low progress of this particular intervention.

The draft CCC report fell into this trap several times, and this extended to it recommending prescriptive interventions simply based on its desire to have the future fit with its crudely projected preferred pathway.

Consultation question 2

Do you support the principles in Hīkina te Kohupara? Are there any other considerations that should be reflected in the principles?

Recommendations:

That the Principles be amended as follows:

Principle 3. We need to take a strategic approach to reducing transport emissions

We will be managing under significant uncertainty and Some interventions may take a long time to play out, ~~and requiring~~ ongoing dedicated action over decades. We need to take a strategic approach that increases our adaptability, increasing and capitalises capitalizing on our short-term opportunities, ~~and~~ putting in motion changes that deliver a large impact in the medium and long term at lowest cost. We also need to be strategic about which options we develop and pursue to reduce emissions - prioritising initiatives that will have the largest impact on avoiding and reducing emissions, while delivering value for society (including co-benefits).

Principle 4. Co-ordinated action is required across the transport system to avoid and reduce emissions

We need to develop and pursue multiple, co-ordinated actions to reduce and avoid emissions – both within the transport sector, and in other sectors (such as ~~land-use planning~~ energy) that have a strong influence on transport emissions. This helps to manage risk by increasing our options in responding to an uncertain future and avoiding relying too heavily on one solution to meet our targets (for example, a solution that requires technological improvements or significant behaviour change). While Government will play a leading role in making the shift, it needs to work closely with iwi, communities, businesses, and councils to reduce transport emissions.

Principle 5. To ensure a Just Transition we need to manage the impacts and maximise the opportunities brought about by changes to the transport system

Everyone in Aotearoa will experience changes from the transition to a zero emissions transport system. However, some people may be more impacted – for example, people who already experience social/economic disadvantages could be disproportionately affected if transport costs increase. At the same time, policies to reduce emissions can deliver multiple benefits. For example, there are many opportunities to reduce air and noise pollution, improve physical health and mental wellbeing, and make our towns and cities more liveable, although actions still need to be justified on the balance of total costs and benefits.

The Government also needs to carefully consider both the costs and benefits of policies and changes on different communities, iwi/Māori and regions to ensure a Just Transition and deliver maximum value for New Zealanders.

Principle 6. We need to ~~forge a path to~~ maintain our target of zero transport emissions by 2050, while recognising ~~that there is not one the best~~ way to get there ~~will evolve through the journey~~

~~There are many~~We cannot today predict the pathways that Aotearoa ~~could~~will take to achieve a zero carbon transport system by 2050, within the overall context of the ETS. ~~But s~~Substantial and sustained actions will be required to decarbonise our transport system. Actions taken within the next five years will significantly shape this future pathway, and determine how close we get to, or stray from a zero carbon target. We base our advice on evidence as much as possible. However, we also need to recognise that we will never have all the evidence we need about the future, and that future modelling is often based on experience. We will need to keep adapting to reduce emissions along our future path and an important priority for our investment today will be to increase the evidence base and our options and adaptability to these uncertainties into the future-

Principle 7. R&D, Innovation and technologies will ~~play an important role~~ will be integral in reducing emissions, but people are the key to our future

R&D and innovation will be essential to address uncertainty, quantify costs and benefits, understand stresses, and offer solutions that facilitate change. The areas of uncertainty, stresses and the need for investment in options and public policy responses in New Zealand are predictable and will regularly warrant public investment In addition ~~M~~any existing technologies and techniques are already available to avoid and reduce emissions. Innovative approaches and business models, as well as new technologies, will keep changing the way that people and products travel. While the Government does not usually 'pick winners', it can play a powerful role in accelerating the uptake and diffusion of new transport technologies and services. However, ultimately, responses to policy settings, technological change and uptake depends on people – so we need to put people at the centre of our policy development.

Consultation question 2

Is the government's role in reducing transport emissions clear? Are there other levers the government could use to reduce transport emissions

The key lever that is missing is the Government's role as the major funder of RS&I in New Zealand, particularly in this case applied directed R&D to facilitate change.

We have summarised the high-level arguments for this in our comments so far, and further context for enhancing this role across the energy sector is set out in our Post Election Briefing 2020 (Recommendation1)⁸.

The CCC has picked this up in its final report's recommendations on Innovation.

Consultation question 3

What more should Government do to encourage and support transport innovation that supports emissions reductions?

⁸ Available off <https://www.neri.org.nz/submissions-and-papers-by-neri>

The key issue is to broaden the scope of innovation away from the current narrow focus on technologies. As discussed above and summarised in the recommended changes to Principle 7, R&D and innovation also covers addressing uncertainty, quantifying costs and benefits, understanding stresses, and offering solutions that facilitate change. Perhaps the most important aspect is investment in building an adaptive sector, i.e. one that facilitates innovation.

Refer again to the final CCC report on this issue.

General comment on Consultation questions 4 - 12

Underpinning these questions is the Avoid-Shift-Improve (“A-S-I”) Framework⁹. This is designed with a goal of sustainable urban transport in mind. Its use is questionable for HtK’s particular purpose: lower GHG emissions are just one of the externalities it seeks to address; its focus is European urban; some of its implicit assumptions (e.g. mobility is to be avoided) are unlikely to be seen as welfare enhancing for New Zealand, etc. The strong focus on urban form, mode shifting, and mobility reduction become suboptimal when imported into HtK.

This leads HtK to an analytic approach (the “Themes”) that are focused on means, rather than the output required – GHGs reductions and the best policy package to address that at a particular point in time.

In practice this issue is much better dealt within the “*Government Policy Statement on Land Transport 2021/22-2030/31*”¹⁰ where “*Strategic priority 4: Transforming to a low carbon transport system that supports emissions reductions aligned with national commitments, while improving safety and inclusive access*”.

This outcome is precisely aligned with that of HfK. The primary proposed indicator is “*Tonnes of greenhouse gases emitted per year from land transport*”. Co-benefits are considered but do not dominate.

HfK should therefore be placed in the context of being the MoT’s strategy to address *Strategic priority 4* in the Government Policy Statement.

A simpler and more obvious analytic approach would then be appropriate. Direct GHG emissions are caused by vehicles that use fossil fuels (t CO₂-e/km) times the amount of travel they do (v-kms p.a.). The primary target is reducing the number of vehicles that use fossil fuels, focusing on those that do the most travel, and are lowest cost to address. A breakdown by vehicle type, function and type of trips will aid analysis.

The Themes than could become things like “reduce the GHGs from low duty cycle road transport”.

Note that on this analysis once a vehicle ceases to emit GHGs (or it becomes negligible) it no longer is of interest. This targeting simplifies any strategy. In practice

⁹ “*Sustainable Urban Transport: Avoid-Shift-Improve*” Referenced in HtK.

¹⁰ Accessed from <https://www.transport.govt.nz/assets/Uploads/Paper/GPS2021.pdf>

much of the balance of HfK does adopt a two-pronged approach of cleaning up fossil fuel vehicles and reducing the trips travelled for the remainder. However, this done without the benefit of considering materiality, net welfare impacts, and uncertainties.

To address this we would expect a mainstream marginal abatement cost analysis¹¹ where costs are assessed in the broad sense indicated at the beginning of this submission. This should cover evolution over time and estimates of the uncertainties.

Doing this, particularly focusing on options that help reduce abatement costs and areas of greatest significance, will change the policy mix and priorities for intervention from that contained in HfK.

Recommendations:

That:

- HfK be positioned as the MoT's strategy to address Strategic priority 4 in the "Government Policy Statement on Land Transport 2021/22-2030/31", and
- The A-S-I Framework not be used, as being inappropriate to this purpose, and instead,
- Use more mainstream analysis to first identify the options within each subsector to address GHGs¹², and then use marginal abatement cost analysis to identify materiality, cost and welfare effects, and level of uncertainty, and
- Based on that develop priorities for policy intervention and priorities for further analysis to best address uncertainties.

An alternative view of priorities

Until this analysis has been undertaken it is difficult to comment on the detail of the *Consultative questions 4-12*, except at a high level, but we can indicate where we expect priorities for action to lie. Almost as important as the priorities will be the areas that are low priority, particularly remembering that the ETS will be impacting regardless.

As noted earlier we should expect two types of priorities both addressing areas of significant potential impact over and above the ETS: (a) where the issues are clear cut and options are well understood; and (b) where there is sufficient uncertainty that we need better information or take steps to increase the options we face.

¹¹ E.g. a dated but relevant detailed European example can be found in Roland Berger (2016) "Integrated Fuels and Vehicles Roadmap to 2030 and beyond". Accessed from https://www.rolandberger.com/publications/publication_pdf/roland_berger_integrated_fuels_and_vehicles_roadmap_to_2030_v2_20160428.pdf and a more recent but less detailed contribution from New Zealand: Ministry for the Environment (2020). "Marginal abatement cost curves analysis for New Zealand: Potential greenhouse gas mitigation options and their costs." Wellington: Ministry for the Environment. Accessed from

https://environment.govt.nz/assets/Publications/Files/marginal-abatement-cost-curves-analysis_0.pdf

¹² An initial attempt for high duty cycle transport is contained in NERI (2019) "Working paper: NZ Clean High Duty Cycle Transport: Research Challenges" Accessed from <https://www.neri.org.nz/submissions-and-papers-by-neri>

EV uptake - clear cut example

As of today, the evidence strongly points to electrification of the low duty cycle fleet as being welfare enhancing in the New Zealand context and this is starting to occur under current ETS/policy settings. The supply of renewable electricity does not appear to be a constraint, although network infrastructure including charging could emerge as an issue.

However, there are currently clear barriers to EV uptake coming from the available supply of new vehicles; their higher upfront price compared with ICEs; and the significant lack of new-to-New Zealand second-hand vehicles to compete against ICEs.

The Government has recently announced a policy package to address EV uptake and some further elements of a policy package to address this are included in HtK. The weakness of these initiatives is that they are not systematically evaluated as a package that can materially outperform the ETS.

Consequently, the HtK proposes policies of marginal value such as urban form; the Government's policy package risk unintended consequences (EV price inflation, "the Utes" issue); and directly relevant potentially valuable policies do not appear to be considered.

For example, two potentially low-cost more neutral ways to address the barriers to uptake could be to facilitate:

- the annualization of some of the higher upfront cost of EVs;
- reducing barriers to Transport as a Service. This can significantly improve the use of scarce EV capital stock in the short-term at a time when it is in short supply.

Building on the second point, the impact of ICT on the transport sector is underrepresented in HtK (e.g. potential of AR/VR – a New Zealand strength in other domains).

A more systematic evaluation of the policy options is indicated even if the evidence for EVs in this market is strong.

Fuels for high duty cycle transport – example of uncertainty and options

The longer-term least-cost fuel/engine options for high duty-cycle road transport are uncertain. In terms of opportunity for GHG reduction this is a major target, but one where the best approach as of today is unclear.

There are three broad contenders FCEVs, BEVs, and bio-based fuels primarily running in existing or modified ICEs. The performance of BEVs define the boundary

with lower duty cycle vehicles and their reach. This will be steadily increasing with better batteries and charging.

Otherwise, none of these engine/fuel combinations are competitive with fossil fuels as of today, except at the margin (e.g., biofuel blends). Instead, we have multiple options and issues that we need to better understand.

Rather than making significant risky investments right now in any of these, HtK should be developing an investment programme into better understanding key options and issue focusing on a comparative standpoint, how they might develop in the New Zealand context, and looking for low cost options to reduce risk and facilitate early entry markets.

Consultation question 13

Given the four potential pathways identified in Hīkina te Kohupara, each of which require many levers and policies to be achieved, which pathway to you think Aotearoa should follow to reduce transport emissions?

As should be clear from this submission, the way HtK uses pathways is not particularly relevant to the intent of HtK or Strategic priority 4 in the Government Policy Statement on Land Transport, and it is potentially negative in its impact because it assumes knowledge of the future that is highly uncertain.

Recommendation:

That following on from the earlier recommendations, the pathways approach be put aside and a more mainstream approach of using options analysis and marginal abatement costs as the basis for developing future policies and investments, building on the ETS.

Consultation question 14

Do you have any views on the policies that we propose should be considered for the first emissions budget?

The policies at present are an unsystematic collection of possible initiatives. A high-level assessment of their value would be to apply two tests derived from Principle 3 as amended:

- calculate the percentage contribution to emissions reduction in 2050 over and above the base case of just the ETS, and if less than around 10% (a reasonable estimate of materiality given the uncertainties) put the policy aside;
- calculate the marginal value of the policy by multiplying reductions in 2050 by a notional CO₂-e price in that year. Among other things this will give ceiling on the amount p.a. it is worth spending on this policy to make these gains.

Based on this assessment a programme of work could be developed, including the research required to address the uncertainties.

Conclusion

Thank you for the opportunity to submit on this issue. While we have advocated for an alternative approach it raises important issues the New Zealand's applied research community would be keen to help address.

If you want any further information, please do not hesitate to contact us.

A handwritten signature in black ink, appearing to read 'Simon', with a stylized flourish at the end.

Simon Arnold
Chief Executive