

## Submission by the NZ Centre for Sustainable Cities to the New Zealand Productivity Commission on the draft 'Low-emissions economy' report (April 2018)

8 June 2018

Thank you for the opportunity to submit on this report. As you rightly point out, pursuing a low-emissions economy is of vital importance to New Zealand and the world. As a nation that prides itself on innovation and 'punching above its weight' on the international stage, and given our fortuitous renewable electricity provision and educated, prosperous population, we should be leading the way in decarbonising our economy and setting an example for many countries around the world.

We support decisive action to transition New Zealand to a low-emission economy by 2050, and consider that, although this could entail significant cost, the costs are likely to be far greater if New Zealand and other countries do not commit to, and take steps to achieve, this goal.

Our key recommendations to the Commission are:

1. Recognition in discussion and modelling of the influence of changes in the built environment and urban form in generating transport trips.
2. More realistic modelling scenarios of increases in cycling, walking and PT based on evidence and experience internationally of what is achievable.
3. Valuation of co-benefits, including productivity and health gains and savings to the health system of realistic increases in active transport (including the overall reductions in injury that would be seen with this).
4. Better acknowledgement and exploration of the wider sustainability issues, and limits on carbon emission reductions, associated with EVs.
5. An equity analysis of the proposed changes. As it stands, proposed measures such as feebates and fuel taxes would increase inequity. The tax and benefit system, and other policies, would need to be adjusted to complement these measures. More creative thinking is needed to avoid undesirable distributional impacts.
6. A more powerful critique of the status quo transport system and the policies, including land use policies, that entrench this position. Replacing internal combustion engine vehicles with electric vehicles will not address many of the issues that have arisen as a result of shaping cities around cars in the last 70 years. This is an opportunity to think carefully about the cities we want to live in and how we can use policy to shape the transport system to support that.

"The Public Health Association of New Zealand (PHANZ) endorses this submission as an informative, well-researched and thoughtful contribution to the Productivity Commission's consultation.

The PHANZ's membership is open to a wide range of professional groups from public, private and non-government occupations committed to our shared vision for equity in health and provides a collective voice for the public health sector on issues of the day.

We believe the New Zealand Centre for Sustainable Cities' work on this submission articulates the evidence, values and perspective widely shared across the public health sector."

We have chosen to focus this submission on Chapter 11 (Transport) and to a lesser extent on Chapter 15 (The built environment), as these are areas of particular concern for us. These chapters present

some interesting options for the future of the New Zealand transport system and urban land use and provide good discussion of a number of important matters that have lacked attention in recent years. It is refreshing to see some new thinking on the New Zealand transport sector and urban form. However, there are a number of issues we feel need to be addressed:

The broader picture

- The focus of this report is to explore ways to reduce carbon while maintaining a strong and growing economy. We would strongly argue that there is sound justification for considering small reductions in GDP in favour of large carbon emissions reductions and refocus 'productivity' on wellbeing rather than GDP.<sup>1</sup> This would align well with an international shift away from using crude economic activity measures, like GDP, and instead developing more holistic measures of wellbeing and quality of life, such as the OECD Wellbeing Framework and the Treasury's Living Standards Framework.<sup>2,3</sup>
- The Transport chapter and the Built Environment chapter, taken together, seem to miss a key opportunity to think about the types of cities we want and the way we want to live, rather than trying to maintain as close to the status quo as possible. Part of Chapter 15 on the Built Environment, for example, is dedicated to interrogating the relationship between compactness of cities and lower car use. We have already questioned the Productivity Commission's perspective on this issue,<sup>4</sup> but simply note here that urban density is only one of several characteristics of urban form that present opportunities for reshaping cities over several decades to be more supportive of active travel and public transport, and less carbon intensive. In the period to 2050, we have such an opportunity. It would in our view be foolish of New Zealand to overlook such an opportunity on the basis of an emphasis on the (limited) carbon savings offered by electric cars. We would also point to the observation of the 'New Climate Economy' paper on urban form and transport produced by LSE Cities, that 'where urban form and transport infrastructure is too biased towards sprawling, automobile-dependent patterns of development, it can in turn lead to a change-inhibiting cultural and political equilibrium'.<sup>5</sup> Conventional perspectives in New Zealand appear to suffer from this syndrome.
- While many of the issues discussed in this submission are not directly related to the low-carbon economy, decisions about our transport network cannot be made in silos, especially ones that do not consider the real impacts on human life that transport has, so any recommendation on the future of transport must take these into account.
- It is vital that in pursuing a low-emissions economy we do not cause further harm or miss important opportunities to improve the wellbeing of both New Zealanders and those in other countries (despite the constraints of the terms of reference for this inquiry). A lack of systems thinking and inadequate attention to externalities, interactions, feedback loops and thresholds have resulted in the current climate issues we are facing.<sup>6</sup> We do not need to continue down this path while trying to address carbon emissions.

Urban form and transport demand management

- The report does not explicitly acknowledge that the transport network is a system and, as such, is part of and interacts with other systems. There is little mention of the synergies between transport and the built environment and ability of urban form and design to reduce the length of trips and need to travel by car.<sup>7</sup> This should be given more attention and included in modelling.
- The report also has a technological emphasis on electric vehicles and no acknowledgement that too many cars making too many trips lead to too many carbon emissions. Reducing the demand for private motorised transport has co-benefits discussed below.



- The huge resource costs of replacing the entire light vehicle fleet with EVs could be substantially reduced by a focus on minimising motorized vehicle travel through transport and land use policies that avoid trips, reduce total distance travelled by private car, incentivise higher vehicle occupancy, and encourage active and public transport to reduce car trips.<sup>8-12</sup>

#### Mode shift, externalities and co-benefits

- The transport scenarios modelled in the report seem to be unnecessarily conservative. There seems to be a lack of ambition on shifting trips from vehicles to other modes, which severely underestimates the very large potential for mode shift (especially to public transport, including longer distance train travel) to reduce transport carbon emissions. The modelled 30% increase in public transport and cycling is a shift from 3% to 4% and 1% to 1.3% total mode share of public transport and cycling, respectively. Areas around the world that have put in a concerted effort to increase public and active transport have seen much larger mode shifts than this and the same could be achieved in New Zealand.<sup>13,14</sup>
- The fundamental external benefit of reducing emissions is underestimated in parts of the report, such as in Figure 11.16 which assumes a value of NZ\$40 per tonne. Increasing evidence suggests that the social cost of carbon, the relevant concept, is likely to be dramatically higher. In particular, we place more weight on recent estimates such as that by van den Bergh and Botzen estimating the value at around US\$125/tonne or about NZ\$170/tonne,<sup>15</sup> or at the minimum, levels of the order of NZ\$100-150 per tonne.<sup>16</sup>
- While co-benefits of a shift to active and public transport are mentioned, in terms of increased physical activity and reduced air pollution and congestion, more should be made of these potentially substantial benefits to society and the economy. Figure 11.16 presents estimated external costs of land transport in NZ, but does not include any costs associated with transport-related physical inactivity. Research has shown that these costs far outweigh other externalities, including the cost of deaths and injury, and should be explicitly included in this report.<sup>17-22</sup> A recent paper incorporating co-benefits of mode switching to active travel in New Zealand indicates that benefit/cost ratios of measures to encourage active travel are of the order of 10:1.<sup>23</sup> Consideration of co-benefits would ideally include not only the direct health benefits of increased physical activity, but also gains in productivity and reduced time off work, which appear to be unvalued in the current draft report.
- There is also no discussion of other externalities associated with a car-dominated transport system, including the vast amount of public land required for parking and movement of private vehicles. Providing this space in cities contributes to urban sprawl, increases the cost of transport for everyone and pushes up house prices.<sup>7,24,25</sup>
- There is no mention of the costs of deaths and injuries caused by vehicle travel. Figure 11.16 displays death and injury as the biggest external cost of the land transport system in NZ in 2016. However, reducing this cost by encouraging safer transport options (e.g. public and active transport and less road freight) and reducing total distance travelled by motorised vehicles is not mentioned.
- Biofuels are presented as a viable option for reducing emissions, especially those from heavy vehicles. However, the production and use of biofuels have a range of issues associated with them, including the use of land that could otherwise be used for food production and air pollution (particulates) produced when burning these fuels.<sup>26</sup>

#### Electric vehicles

- A number of advantages of electric vehicles are discussed in the report, but there is a key benefit that was not mentioned. There are clear synergies between a transport system with electric and plug-in hybrid vehicles and an electricity system based on renewable energy and



smart grid technology, with electric vehicles providing distributed storage and helping to solve peak load and variable generation issues.<sup>27</sup>

- The report also does not mention the full environmental costs of a shift to electric vehicles. Although lifetime carbon emissions of EVs may be less than internal combustion engine vehicles, a ballpark estimate is that carbon emission reductions are well short of 100%: a life cycle analysis for EECA estimated a 60% reduction, which implies that 40% of carbon emissions remain unmitigated.<sup>28</sup>
- The construction and disposal of EVs and EV batteries have other major environmental impacts that are not mentioned. While many of these impacts will be borne by other countries, New Zealand has an obligation to consider the full environmental impact of its policy and market decisions.<sup>29,30</sup> We can also not rely on other countries to continue to accept our waste and should take this into consideration when designing our future transport system.

## Freight

- In terms of freight transport, the report seems to downplay the future role of electric heavy vehicles, which have seen significant technological advancements in recent years.<sup>31,32</sup>
- The report also seems overly dismissive of using rail for freight. There are substantial co-disbenefits of using high capacity trucks to move freight, ranging from large increases in road maintenance costs and asset investments (such as bridges), to significant increases in risk of fatal crashes for other road users and the costs of urban congestion on freight reliability and urban economies.<sup>33</sup>

## Policy

- The report points out that government policy has led to the current car dominance and high emissions, but overall there seems to be a focus on relying on market forces and price to drive the shift to a lower emissions transport system. The report lacks discussion on the role of policy to undo the dominance of the private motor vehicle and to encourage more sustainable and efficient forms of transport (public and active transport) and urban form.
- The report suggests that the ETS, with a higher emissions price, would help to encourage more fuel efficient and electric vehicles. However, there is no evidence that an ETS on fuel is effective at reducing fuel use, at least at the very modest levels seen to date. There is evidence that a carbon tax, explicitly presented to the user, does result in reduced fuel use. By making it clear to the user that they are paying a tax for the carbon emissions they are producing, the imperative to reduce fuel use becomes more salient and people will take action (if only motivated to reduce the amount of tax they pay). This has proven to be effective in reducing fuel use in British Columbia, Canada, where this policy has been employed in a revenue-neutral way to make it acceptable to the public.<sup>34</sup> While ideally the price on carbon in New Zealand would be higher (in better alignment with the social cost of carbon noted above), we did not see any evidence in the Commission's report that the level of ETS price likely to significantly affect fuel use would be politically palatable in New Zealand.
- Many of the ways to achieve lower transport carbon emissions discussed in the report come with potentially very large problems of impacts on the less well-off in society. While this is mentioned, and Chapter 9 covers distributional policies, we feel that the potential negative impact on inequalities has not been given sufficient consideration and has not been sufficiently highlighted in the Transport chapter. While policies such as feebates may be effective, it is important to note that they are regressive and place further burden on those in society who cannot afford to buy low-emissions vehicles. It can be very difficult to ensure these distributional effects are adequately and effectively addressed when using mechanisms

such as changes in other benefits or tax reductions. It would be essential to ensure that complementary policies ensure no adverse effects of new transport measures on inequalities.

We would be happy to discuss any of the content of the submission with the Commission. Please feel free to contact Ed Randal: [Edward.randal@otago.ac.nz](mailto:Edward.randal@otago.ac.nz)

#### About NZ CSC

The New Zealand Centre for Sustainable Cities is an inter-disciplinary national network dedicated to providing the research base for innovative solutions to the economic, social, environmental and cultural challenges facing our urban centres. We undertake a range of research, published as journal articles, policy papers working papers, and blogs, as well as making submissions from time to time to central government and councils on a range of issues relevant to cities, from climate change policy to compact development. See <http://sustainablecities.org.nz/>

#### Contributors to this submission

- Ed Randal, Department of Public Health, University of Otago Wellington (lead author)
- Dr Caroline Shaw, Department of Public Health, University of Otago Wellington
- Associate Professor Ralph Chapman, School of Geography, Environment and Earth Sciences, Victoria University of Wellington
- Associate Professor Michael Keall, Department of Public Health, University of Otago Wellington
- Professor Philippa Howden-Chapman, Department of Public Health, University of Otago Wellington
- Dr Marie Russell, Department of Public Health, University of Otago Wellington
- Dr Anja Mizdrak, Department of Public Health, University of Otago Wellington
- Dr Julie Bennett, Department of Public Health, University of Otago Wellington
- Libby Grant, Department of Public Health, University of Otago Wellington

#### References

1. van den Bergh JCM. The GDP paradox. *Journal of Economic Psychology* 2009; **30**(2): 117-35.
2. OECD. Better Life Initiative: Measuring Well-Being and Progress. 2018. <http://www.oecd.org/statistics/better-life-initiative.htm> (accessed 07/06/2018).
3. Treasury T. Our living standards framework. 2018. <https://treasury.govt.nz/information-and-services/nz-economy/living-standards/our-living-standards-framework> (accessed 07/06/2018).
4. Chapman R, Dodge N. Urban intensification and policies to reduce GHG emissions: an analysis of the Productivity Commission's argument: Submission to the New Zealand Productivity Commission on the 'Better Urban Planning Draft Report'. Wellington: NZ Centre for Sustainable Cities and Victoria University of Wellington, 2016. <http://sustainablecities.org.nz/wp-content/uploads/Chapman-Dodge-3Oct16-submission-to-PC-on-urban-form-and-emissions.pdf>.
5. Rode P, Floater G, Thomopoulos N, et al. Accessibility in Cities: Transport and Urban Form. NCE Cities Paper 03. LSE Cities: London School of Economics and Political Science, 2014. <https://files.lsecities.net/files/2014/11/LSE-Cities-2014-Transport-and-Urban-Form-NCE-Cities-Paper-03.pdf>.
6. Ostrom E. A General Framework for Analyzing Sustainability of Social-Ecological Systems. *Science* 2009; **325**(5939): 419-22.
7. Chapman R, Howden-Chapman P, Capon A. Understanding the systemic nature of cities to improve health and climate change mitigation. *Environment International* 2016; **94**: 380-7.

8. Ewing R, Cervero R. Travel and the Built Environment. *Journal of the American Planning Association* 2010; **76**(3): 265-94.
9. Ewing R, Meakins G, Hamidi S, Nelson AC. Relationship between urban sprawl and physical activity, obesity, and morbidity – Update and refinement. *Health & Place* 2014; **26**: 118-26.
10. Ewing R, Nelson AC, Bartholomew K, Emmi P, Appleyard B. Response to special report 298 Driving and the built environment: The effects of compact development on motorized travel, energy use, and CO2 emissions. *Journal of Urbanism* 2011; **4**(1): 1-5.
11. Frank L, Giles-Corti B, Ewing R. The influence of the built environment on transport and health. *Journal of Transport & Health* 2016; **3**(4): 423-5.
12. Stevenson M, Thompson J, de Sá TH, et al. Land use, transport, and population health: estimating the health benefits of compact cities. *The Lancet* 2016; **388**(10062): 2925-35.
13. Vancouver City Council. Transportation 2040. Plan as adopted by Vancouver City Council on October 31, 2012. Vancouver: Vancouver City Council, 2012.
14. McElhanney Consulting Services Ltd. 2016 Vancouver Panel Survey. Vancouver: McElhanney Consulting Services Ltd, 2017. <http://vancouver.ca/files/cov/transportation-panel-survey-2016-final-report.pdf>.
15. van den Bergh JCJM, Botzen WJW. Monetary valuation of the social cost of CO2 emissions: A critical survey. *Ecological Economics* 2015; **114**: 33-46.
16. Moore FC, Diaz DB. Temperature impacts on economic growth warrant stringent mitigation policy. *Nature Climate Change* 2015; **5**: 127.
17. Woodcock J, Givoni M, Morgan A. Health Impact Modelling of Active Travel Visions for England and Wales Using an Integrated Transport and Health Impact Modelling Tool (ITHIM). *PLoS ONE* 2013; **8**(1): e51462.
18. Götschi T, Tainio M, Maizlish N, Schwanen T, Goodman A, Woodcock J. Contrasts in active transport behaviour across four countries: How do they translate into public health benefits? *Preventive Medicine* 2015; **74**: 42-8.
19. Shaw C, Randal E, Keall M, Woodward A. Health consequences of transport patterns in New Zealand's largest cities. *The New Zealand medical Journal* 2018; **131**(1472): 64-72.
20. Maizlish N, Linesch NJ, Woodcock J. Health and greenhouse gas mitigation benefits of ambitious expansion of cycling, walking, and transit in California. *Journal of Transport & Health* 2017; **6**(Supplement C): 490-500.
21. Woodcock J, Tainio M, Cheshire J, O'Brien O, Goodman A. Health effects of the London bicycle sharing system: health impact modelling study. *BMJ : British Medical Journal* 2014; **348**.
22. Celis-Morales CA, Lyall DM, Welsh P, et al. Association between active commuting and incident cardiovascular disease, cancer, and mortality: prospective cohort study. *BMJ* 2017; **357**.
23. Chapman R, Keall M, Howden-Chapman P, et al. A Cost Benefit Analysis of an Active Travel Intervention with Health and Carbon Emission Reduction Benefits. *International Journal of Environmental Research and Public Health* 2018; **15**(5): 962.
24. Woodcock J, Aldred R. Cars, corporations, and commodities: Consequences for the social determinants of health. *Emerging Themes in Epidemiology* 2008; **5**.
25. Shoup D. *The High Cost of Free Parking: Updated Edition*: Routledge; 2017.
26. Hill J, Nelson E, Tilman D, Polasky S, Tiffany D. Environmental, economic, and energetic costs and benefits of biodiesel and ethanol biofuels. *Proceedings of the National Academy of Sciences* 2006; **103**(30): 11206-10.
27. Mwasilu F, Justo JJ, Kim E-K, Do TD, Jung J-W. Electric vehicles and smart grid interaction: A review on vehicle to grid and renewable energy sources integration. *Renewable and Sustainable Energy Reviews* 2014; **34**: 501-16.
28. EECA. Life Cycle Assessment of Electric Vehicles: The environmental impact of electric vehicles, a New Zealand Perspective. Wellington: EECA, 2015.

29. Hawkins TR, Singh B, Majeau-Bettez G, Strømman AH. Comparative Environmental Life Cycle Assessment of Conventional and Electric Vehicles. *Journal of Industrial Ecology* 2013; **17**(1): 53-64.
30. Hawkins TR, Gausen OM, Strømman AH. Environmental impacts of hybrid and electric vehicles—a review. *The International Journal of Life Cycle Assessment* 2012; **17**(8): 997-1014.
31. Taefi TT, Kreutzfeldt J, Held T, Fink A. Strategies to increase the profitability of electric vehicles in urban freight transport. *Green Energy and Technology*; 2015. p. 367-88.
32. Taefi TT, Kreutzfeldt J, Held T, Fink A. Supporting the adoption of electric vehicles in urban road freight transport – A multi-criteria analysis of policy measures in Germany. *Transportation Research Part A: Policy and Practice* 2016; **91**: 61-79.
33. Forkenbrock DJ. Comparison of external costs of rail and truck freight transportation. *Transportation Research Part A: Policy and Practice* 2001; **35**(4): 321-37.
34. Rivers N, Schaufele B. Salience of carbon taxes in the gasoline market. *J Environ Econ Manag* 2015; **74**: 23-36.