

## Submission on the *Interim Hydrogen Roadmap*

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| Name                            |  |
| Organisation<br>(if applicable) |  |
| Contact details                 |  |

### Release of information

Please let us know if you would like any part of your submission to be kept confidential.

I would like to be contacted before the release or use of my submission in the summary of submissions that will be published by MBIE after the consultation.

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## Responses to questions

### Section 1: Hydrogen is emerging as an important part of the future global energy system

#### Are there other issues we should be considering in our assessment of the strategic landscape for hydrogen in New Zealand?

The key one you have failed to address is that hydrogen is a greenhouse gas itself, in the upper atmosphere it inhibits the breakdown of methane, resulting in the presence for longer periods of much greater amounts of methane. The core of reversing climate impact is to reduce greenhouse gases and having a reliance on hydrogen to achieve this is therefore a flawed strategy.

Further, as methane is such a small, light compound its increased use will result in much greater production of it and loss through leakage of it into the atmosphere.

1 It is more correct to view hydrogen as part of the problem we face in climate change rather than part of a solution (with some exceptions where hydrogen is and is likely to continue to be practicable).

Transportation of hydrogen has not been adequately addressed in your paper, existing gas infrastructure is not designed or suitable for hydrogen (leakage is a key issue) and transportation by road, particularly if liquefied, is an enormous danger and would also involve vastly greater tanker movements than is currently needed for diesel.

The inefficiency of hydrogen as compared with electricity, particularly for heating and transportation (including heavy transportation), fails to be addressed in the paper, and these matters in themselves suggest the strategy will fail as economically the physics will simply make hydrogen uncompetitive (particularly where overseas countries remove their generous hydrogen subsidies).

### Section 2: The role for hydrogen in New Zealand's energy transition

#### Do you agree with our assessment of the most viable use cases of hydrogen in New Zealand's energy transition?

The suggestion that hydrogen has real potential in transportation does not take account of its inherent inefficiencies as compared with EV transportation.

2 The fundamental problem is that hydrogen vehicles require at least three times the amount of electricity input to cover the same distance as an EV.

EV battery technology is on a steady improvement phase and these improvements can be expected to continue or accelerate. In contrast the physical constraints on enhancing electrolysers and fuel cells for hydrogen are constrained by simple physics.

The often misrepresented range of travel also should be more robustly addressed in the paper, recognising that EV options now surpass hydrogen.

Hydrogen transportation (including heavy vehicles) require three times the energy input of EVs for the same distance and are more expensive to construct and maintain.  
The infrastructure required and adverse effects of leakage are also major issues.

**Do you support some of these uses more than others?**

3 Some of the existing and traditional uses of grey hydrogen, converted to operate on green hydrogen, make some sense, such as chemical use and steel making.

4 **What other factors should we be considering when assessing the right roles for hydrogen in New Zealand's energy transition?**

The enormous, expensive and often highly dangerous infrastructure requirements have been inadequately identified and assessed.

5 **Do you agree with this assessment of the potential for hydrogen supply and demand in New Zealand?**

No, as outlined, the paper does not take account of the inherent constraints arising from physics as to the potential of hydrogen in the economy as compared with the use of electricity. It is simply wasting taxpayer funds to push on with investments in hydrogen when that money used on electricity options now available would have an immediate impact.

6 **Do you agree with the key factors we have set out that are likely to determine how hydrogen deployment could play out?**

Your paper does not identify key factors. There are various actions described but none of these address the issues identified in this submission.

7 **What do you think needs to happen to address these factors?**

Explain how hydrogen can achieve outcomes better than electricity from an environmental, commercial and engineering perspective, and why the hydrogen greenhouse gas impact (particularly on methane) will be addressed.

8 **Do you have any evidence to help us build a clearer picture?**

Where your paper is most flawed is its failure to make comparisons to the benefits of electricity compared to hydrogen, in terms of energy required to achieve the same outcome, its production, the ability for storage, physics limitations, the greenhouse gas effect, and the cost.

9 **Do you agree with our findings on the potential for hydrogen to contribute to New Zealand's emissions reduction, energy security and resilience and economic outcomes?**

I consider hydrogen is more of a problem than a solution, starting fundamentally from the fact that it will worsen the greenhouse gas impact given its effect on reducing the break down of the potent methane in the atmosphere.

10

**Do you have any insights we should consider on what is needed to make hydrogen commercially viable?**

A robust assessment of the cost of producing green hydrogen is needed.

11

**Is there any further evidence you think we should be considering?**

The level of expenditure on hydrogen needs to be linked to the benefits of expenditure on enhancing electricity usage, such as improving the national grid.

### Section 3: Government position and actions

**Do you agree with our policy objectives?**

12

The policy objectives are fundamentally flawed, by for example, not recognising hydrogen as a greenhouse gas due to impact on breaking down methane. It will create a bigger problem than we are currently facing.

**Do you agree with our positioning on hydrogen's renewable electricity impacts and export sector?**

13

The electricity is needed in NZ for greater electrification of our country and its inefficient use for manufacturing hydrogen for export (to countries where the purchase of it is dependent on government subsidies) is a wasteful and flawed strategy.

**Do you agree with the proposed actions and considerations we have made under each focus area?**

14

In comparison to electricity, I do not support the proposed actions.

**Is there any evidence we should be considering to better target actions in the final Hydrogen Roadmap?**

15

As compared with electricity, hydrogen is more expensive and has worse performance commercially and environmentally.

### General comments

The failure to address fundamental issues in the paper around the greenhouse gas effect of hydrogen (particularly in respect of the breakdown of methane), the inefficiency as compared with electricity in respect of manufacture, energy efficiency, infrastructure, storage, commercial viability,

sutability for heavy freight haulage and other matters, is a disappointment and raises questions as to the robustness and quality of the paper.