

[REDACTED]

From: no-reply@mbie.govt.nz
Sent: Sunday, 8 September 2019 11:48 p.m.
To: [REDACTED]; [REDACTED] Hydrogen
Subject: Hydrogen green paper - submission

Submission on Hydrogen green paper received:

Introduction

Name

Earl Bardsley

Email

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Business name or organisation (if applicable):

University of Waikato

Position title (if applicable):

Associate Professor (Faculty of Science & Engineering)

Is this an individual submission or on behalf of a group or organisation?

Individual

Please give the name of the group or organisation this submission is on behalf of.

What is the role of Government in developing hydrogen for storage and distribution?

What are the challenges for using hydrogen for storage and distribution?

What are the opportunities for using hydrogen for storage and distribution?

What is the role of Government in developing the complementary role of electricity and hydrogen?

What are the challenges for achieving this complementary role of electricity and hydrogen?

The use of stored green hydrogen to buffer seasonal and dry-year demand is unrealistic. This is because there would be so much energy loss in the sequence going from green electricity to green hydrogen, to large-scale hydrogen storage, and then back to green electricity. The hydrogen inefficiencies are a consequence of basic physical and chemical realities that will not be solved by future research. Alternatively, pumped hydro with significant storage in Central Otago offers system efficiencies in excess of 100% if coupled with conjunctive management of Lakes Tekapo, Pukaki, and Hawea. This scheme would provide buffer against South Island dry winters with only local requirements for grid upgrades. In addition, the Electrification Report (ICCC, 2019) noted that pumped hydro (with storage) offered the most cost-effective option to achieve 100% renewable electricity. This was in comparison with hydrogen storage and other options. The ICCC Report recommended that further investigation of pumped storage be conducted as a priority. Pumped storage for 100% renewable electricity would, however, carry the considerable additional cost of a major grid upgrade.

ICCC (2019). Accelerated electrification. Evidence, analysis and recommendations. Report of the Interim Climate Change Committee.

What are the opportunities for this complementary role of electricity and hydrogen?

What is the role of Government in supporting hydrogen use for the transport sector?

The government should pass regulations against use of green hydrogen as a fuel for light vehicles. This is because it is wasteful of New Zealand renewable energy resources to have to have to support

the inefficiencies of green hydrogen creation and conversion back to green electricity as created from fuel cells. Much less renewable generating capacity would need to be constructed if the electricity is used directly to charge EV batteries.

What are the challenges when using hydrogen for mobility and transport?

What are the opportunities for using hydrogen for mobility and transport?

What is the role of Government in encouraging the use of hydrogen for industrial processes including process heat supply?

Green hydrogen should be discouraged by Government for industrial use whenever the process could be achieved equally well by green electricity. This is because it is wasteful of New Zealand renewable energy resources to have to have to support the inefficiencies of green hydrogen creation and conversion back to green electricity.

What are the challenges for using hydrogen in industrial processes?

What are the opportunities for the use of hydrogen in industrial processes?

What is the role of Government in encouraging hydrogen uptake for decarbonisation of our natural gas uses?

What are the challenges for hydrogen to decarbonise the applications using natural gas?

What are the opportunities for hydrogen to decarbonise our gas demand?

What is the role of Government in producing hydrogen in sufficient volume for export?

What are the challenges for hydrogen if produced for export?

There is no certainty that we could produce green hydrogen at lower cost than competing brown hydrogen in a global hydrogen market, should such a market ever happen. If we wish to contribute toward global decarbonisation from our gas sales, it would be more logical to seek to discover and develop major offshore gas fields, selling the gas to China for power generation there in place of coal.

In addition, we welcome your feedback about the opportunities of hydrogen to Māori and how this will support their aspirations for social and economic development.

What are the opportunities for hydrogen if produced for export?

If you wish to, you can attach a document to this submission.

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