[redacted]

From: no-reply@mbie.govt.nz
Sent: Friday, 25 October 2019 4:16 p.m.
To: [redacted]; Hydrogen
Subject: Hydrogen green paper - submission
Attachments: Online-submission-form-uploadsHydrogen-green-paperPorts-of-Auckland-Submission-NZ-Hydrogen-Vision_25Oct2019.pdf

Submission on Hydrogen green paper recevied:

Introduction

Name

Rosie Mercer

Email

[redacted]

Business name or organisation (if applicable):

Ports of Auckland

Position title (if applicable):

General Manager Sustainability

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

Behalf of group or organisation

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

Ports of Auckland Ltd

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

Refer attachment "Ports of Auckland Submission - NZ Hydrogen Vision_25Oct2019.pdf"

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

Refer attachment "Ports of Auckland Submission - NZ Hydrogen Vision_25Oct2019.pdf"

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

Refer attachment "Ports of Auckland Submission - NZ Hydrogen Vision_25Oct2019.pdf"

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

Refer attachment "Ports of Auckland Submission - NZ Hydrogen Vision_25Oct2019.pdf"

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

Refer attachment "Ports of Auckland Submission - NZ Hydrogen Vision_25Oct2019.pdf"

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

Refer attachment "Ports of Auckland Submission - NZ Hydrogen Vision_25Oct2019.pdf"

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

Refer attachment "Ports of Auckland Submission - NZ Hydrogen Vision_25Oct2019.pdf"

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

Refer attachment "Ports of Auckland Submission - NZ Hydrogen Vision_25Oct2019.pdf"

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

Refer attachment "Ports of Auckland Submission - NZ Hydrogen Vision_25Oct2019.pdf"

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

Refer attachment "Ports of Auckland Submission - NZ Hydrogen Vision_25Oct2019.pdf"

What are the challenges for using hydrogen in industrial processes?

Refer attachment "Ports of Auckland Submission - NZ Hydrogen Vision_25Oct2019.pdf"

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

Refer attachment "Ports of Auckland Submission - NZ Hydrogen Vision_25Oct2019.pdf"

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

Refer attachment "Ports of Auckland Submission - NZ Hydrogen Vision_25Oct2019.pdf"

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

Refer attachment "Ports of Auckland Submission - NZ Hydrogen Vision_25Oct2019.pdf"

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

Refer attachment "Ports of Auckland Submission - NZ Hydrogen Vision_25Oct2019.pdf"

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

Refer attachment "Ports of Auckland Submission - NZ Hydrogen Vision_25Oct2019.pdf"

What are the challenges for hydrogen if produced for export?

Refer attachment "Ports of Auckland Submission - NZ Hydrogen Vision_25Oct2019.pdf"

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.

Refer attachment "Ports of Auckland Submission - NZ Hydrogen Vision_25Oct2019.pdf"

What are the opportunities for hydrogen if produced for export?

Refer attachment "Ports of Auckland Submission - NZ Hydrogen Vision_25Oct2019.pdf"

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

Ports-of-Auckland-Submission-NZ-Hydrogen-Vision_25Oct2019.pdf - Download File

Use and release of information

We intend to upload submissions to our website at www.mbie.govt.nz. Can we include your submission on the website?

Yes

Can we include your name?

Yes

Can we include your email address?

No

Can we include your business name or organisation?

Yes

Can we include your position title?

Yes

Can we include the group or organisation your submission represents (if submitting on behalf of a group or organisation)?

Yes

If there are any other parts to your submission that you do not want public on the website please note them below:
OIA warning
If there is information in your submission that you wish to remain confidential, please note them below:

Submission on the Ministry of Business, Innovation & Employment's Green Paper "A Vision for Hydrogen in New Zealand" by Ports of Auckland Limited

INTRODUCTION

1. This is a submission by Ports of Auckland Limited (**POAL**) on the Green Paper "A Vision for Hydrogen in New Zealand" (**Green Paper**) prepared by the Ministry of Business, Innovation & Employment and published in September 2019.

2. POAL has committed to reducing its greenhouse gas emissions with a goal of becoming a zero emissions port by 2040. POAL's vision is to become a leading sustainable port at a global level, woven into the fabric of Auckland and driving the city and New Zealand's sustainable growth to improve the environment for future generations.

3. As noted in the Green Paper, POAL (together with the support of KiwiRail, Auckland Transport and Auckland Council) has committed to undertaking a hydrogen demonstration project at the Ports of Auckland (**HDP**). The HDP will produce hydrogen using electrolysis for use in hydrogen fuel cell electric vehicles (**FCEVs**), including light vehicles and a bus.[1] The initial scope of the HDP will be a single site at the Port of Auckland and a small number of vehicles. However, the HDP is designed to allow for scaling-up in the future and has potential application to other sites in New Zealand.

4. The HDP will assist POAL in achieving its emissions and sustainability goals and to demonstrate leadership in sustainable energy development in New Zealand. It will provide an opportunity for POAL test the equipment, transmission processes and supply lines in New Zealand and to contribute to the development of standards, policy development and regulation of green hydrogen as a fuel.

5. As the owner of the HDP, POAL wishes to contribute to the development of the Government's strategy towards achieving a low emission economy and the role of hydrogen as an important part of that strategy. Although the Green Paper covers a broad range of issues in relation to hydrogen in New Zealand, in this submission, POAL will focus on those that are most relevant to the HDP.

SUBMISSION

6. POAL generally supports the vision for hydrogen in New Zealand as expressed in the Green Paper. However, the paper highlights some areas where further work and consideration is required.

    (a) POAL agrees that hydrogen contributes a very real opportunity, and within reaching distance, to assist New Zealand in establishing a strong, low emissions economy. Demonstration projects, like that being undertaken by POAL, have a vital role in informing the development of a strategy for hydrogen and further regulatory development.

[1] For more information about the Hydrogen Demonstration Project see http://www.poal.co.nz/media/ports-of-auckland-to build-auckland%E2%80%99s-first-hydrogen-production-and-refuelling-facility

(b) The current regulatory regime does not adequately enable hydrogen projects; the high cost and risk associated with the initial stages of projects like HDP are not adequately supported.

(c) The government has a key role in developing policies, providing funding and facilitating regulatory change for demonstration projects and subsequently in developing a long-term strategy for the future of hydrogen in New Zealand.

(d) POAL supports an approach that identifies incentives that may be required, roadblocks to be removed and how new technologies can be supported to come on stream.

7. In particular, POAL supports the following points from the Green Paper:

(a) Green hydrogen is a tool that will help reduce global emissions.

(b) New Zealand's ambitions for a clean, green, carbon neutral economy by 2050 require hydrogen and electricity to be deployed in tandem, deploying the most effective application to each circumstance, to maximise opportunity and positive energy outcomes.

(c) Establishing a strong role for hydrogen in the economy creates potential for a broad range of benefits for New Zealand.

(d) Costs and benefits of hydrogen are only fully appreciated when the whole energy system is analysed.[2] Further lifecycle analysis and cost benefit assessment are needed to better inform decision makers.[3]

(e) There are significant challenges that need to be addressed for hydrogen to succeed in New Zealand.

(f) Demonstration projects have a vital role in providing information for the development of policy and strategies in relation to hydrogen and renewable energy.

8. POAL considers that the approach described in the Green Paper should be improved by addressing the following:

(a) Prioritising funding and regulatory support for demonstration projects, and recognise that funding is required across New Zealand (in particular Auckland as a major freight and transport economy) to support the low emission objectives across the whole New Zealand economy.

(b) Recognising that funding and regulatory requirements will change over time as projects move from the demonstration stage to commercial production.

(c) Recognising the anticipated role of New Zealand's developing hydrogen industry within the international context in developing a hydrogen strategy.

9. These points are discussed below.

Green hydrogen is a tool that will help reduce global emissions

10. Green hydrogen fuel is sustainably produced using water and renewable electricity. It can be used in fuel cells or internal combustion engines and when combined with oxygen emits no waste products or emissions. As noted in the Green Paper, there are a number

---

2 *A Vision for Hydrogen in New Zealand* (MBIE and Arup, Green Paper, September 2019) at 22. See the modelled hydrogen costs for various applications in New Zealand at Figure 7.

3 At 22.

of areas of application, including transport and mobility applications such as for freight, materials handling, return to base fleet transport, shared mobility and public transport.[4]

11. POAL agrees with the thrust of the Green Paper that green hydrogen is an important tool that will help reduce global emissions, and help New Zealand achieve a strong, low emissions economy.

12. As noted in the Green Paper, New Zealand has an abundance of renewable energy, and potential for renewable energy developments, that could be used to produce hydrogen as a next generation fuel in a sustainable way.[5]

POAL supports the Green Paper's view that hydrogen and electricity technologies are complementary and should be deployed in tandem

13. POAL supports the view that New Zealand's ambitions for a clean, green, carbon neutral economy by 2050 require hydrogen and electricity to be deployed in tandem, deploying the most effective application to each circumstance, to maximise opportunity and positive energy outcomes.[6]

    (a) POAL agrees that there is value in embracing the complementary characteristics of hydrogen and electricity as a way of meeting the challenge of reaching a resilient 100% renewable energy system.[7]

    (b) Hydrogen has a much higher storage capacity compared to battery technologies (small scale) or pumped hydro and compressed-air energy storage.

    (c) Hydrogen is well-suited to some applications for which electrification is a challenge such as long distance heavy-duty road transport, and where long refuelling times are impractical.[8] On the other hand, electricity is a more suitable option for light duty vehicles. As noted in the Green Paper, hydrogen's suitability for heavy-duty transport applications indicates that action should be taken now to encourage deployment of hydrogen infrastructure throughout New Zealand at key locations such as freight hubs and ports.[9]

    (d) Due to its high energy storage capacity, hydrogen can support the resilience of the New Zealand energy system and provide for remote area power solutions.

Establishing a strong role for hydrogen in the economy creates potential for a broad range of benefits for New Zealand

14. In addition to supporting New Zealand's de-carbonisation and renewable energy goals, the development of hydrogen as a fuel in New Zealand offers a range of additional benefits:

    (a) The testing and application of hydrogen fuel technology through demonstration projects, such as the HDP, provides valuable information and opportunities to

---

4 For further information about the potential areas of application of hydrogen in New Zealand, see page 11.

5 For discussion of how green hydrogen could become a major differentiator for New Zealand's energy, transport and industrial sectors, see page 6.

6 At 46.

7 For a breakdown of the distribution of energy supply in New Zealand in 2018 and use of fossil fuels by sector, see page 32.

8 At 20.

9 At 52.

assist with the development of regulatory structures and policies, supply chains and infrastructure and industry expertise, to support additional uses of hydrogen.

(b) The development of new technology provides an opportunity to create new jobs and economic activity, which is important given the government's strategic move away from the oil and gas industry and the economic effects associated with that move.

(c) New Zealand is well-placed to leverage its renewable energy potential to create green hydrogen exports in the future.[10] POAL supports the Green Paper's view that further studies should be undertaken to assess the extent to which hydrogen export has a role in New Zealand's future by providing a way to utilise our renewable advantages to provide a new source of earnings.[11] New Zealand's proximity to potential hydrogen importing countries such as Japan and South Korea may provide opportunities to develop a new commodity export of green hydrogen.[12]

(d) New Zealand signed a Memorandum of Cooperation with Japan in 2018 which signalled its interest in working in partnership with Japan to collaborate in the development of hydrogen for the benefit of both countries.[13] Partnerships with other countries that are investing in hydrogen research, development and demonstration projects, and in some cases, national strategies, like Japan, provides an opportunity to strengthen international relationships.

(a) Developing alternative hydrogen technology will enhance New Zealand's security of electricity supply.

Costs and benefits of hydrogen are only fully appreciated when the whole energy system is analysed

15. Further lifecycle analysis and cost benefit assessment of green hydrogen technology is needed to better inform decisions.

(a) The cost of producing hydrogen from renewable electricity is currently high when compared with hydrogen from other sources and other fuels. The costs associated with green hydrogen include the expense of establishing production (such as the purchase of electrolysers and construction of plant) and the associated price of production in the early stages of production where there is limited demand.

(b) Production costs for green hydrogen depend on several factors such as electricity costs and taxes, grid fees and the capacity utilisation rates of electrolysers.[14] In the medium term, if production costs fall and carbon prices rise, then hydrogen will become more cost-competitive with natural gas and liquid fuels.[15]

(c) Successful transformation to a future involving green hydrogen will require innovative systems-wide thinking to appreciate the whole-of-life costs, benefits and opportunities.[16] Government involvement in supporting hydrogen in early

---

10 For further discussion of why New Zealand is well-placed to develop hydrogen as a form of renewable energy, see page 27.

11 At 27.

12 At 27.

13 See page 6 for discussion of how green hydrogen could become a major differentiator for New Zealand's energy, transport and industrial sectors.

14 For further information about the production costs of hydrogen, see page 25.

15 At 25.

16 For discussion of the challenges for New Zealand to achieve a net zero economy, see page 33.

stages (through funding and regulatory support) will assist the development of this systems-wide thinking and will encourage adoption at later stages and scaling up through policies that account for the cost of the whole energy system.

There are significant challenges that need to be addressed for hydrogen to succeed in New Zealand

16. POAL agrees that for successful use and development of green hydrogen in New Zealand, there are significant challenges to be managed including: [17]

    (a) overcoming economic and policy uncertainty;

    (b) attracting demand from a broad range of end users while technology matures and because costs are high;

    (c) addressing investment and infrastructure needs;

    (d) settling policy that stimulates demand;

    (e) establishing standards and regulations; and

    (f) analysing lifecycle costs; and

    (g) changing public perceptions around use and safety.

17. In addition, POAL considers that:

    (a) The current regulatory structure around the use of gases as fuels is a barrier for demonstration projects and the future development of the hydrogen industry in New Zealand, and that this must be addressed with urgency.

    (b) New applications for hydrogen stand at the riskiest point of the deployment curve and require significant investment. Investment risk mitigation should be a priority consideration for the Government. 18 The most effective investment risk mitigation to deliver the hydrogen vision is the provision of Government incentives and grants. This will ensure that this important technology is deployed and that New Zealand is able to be regionally competitive in the development of the hydrogen industry. It might also include other financial tools such as loans and risk guarantee.

18. Given the interrelatedness of many of these challenges and the potential position of hydrogen within the energy industry, a holistic approach is needed to policy developments. For example, when setting policy, challenges at all stages of the supply chain should be considered (for example, compatibility with international hydrogen users and technology and accessibility of support) as well as the need to encourage uptake and adoption of new technology and to support supply and demand.

19. Given the significant role of policy to help overcome these challenges, the Government will have a key role in addressing these issues through the development and adoption of appropriate policies and standards.

20. POAL agrees that there is opportunity for industry to collaborate with the Government on these issues and in developing a policy approach.[19] It encourages the Government to

---

17 For information on the next steps in developing New Zealand's renewable energy strategy, see pages 76-79.

18 International Energy Agency "The Future of Hydrogen: Seizing Today's Opportunities" (14 June 2019) at 176. Investment and risk mitigation is one of the five key policy categories that the International Energy Agency has identified as requiring attention in order for hydrogen products to develop.

19 *A Vision for Hydrogen in New Zealand*, at 76.

engage with the energy sector, particularly those with current hydrogen projects, such as POAL.

Demonstration projects have a vital role in providing information for the development of both the technology and the specific policy and strategies for hydrogen generation

21. Hydrogen demonstration projects have a vital role in providing information for:

    (a) The development of the technology;

    (b) Decision-making about appropriate standards to be adopted;

    (c) The development of appropriate regulation, policies and strategies for the industry to support and encourage its growth; and

    (d) Informing the public and decision-makers about the role of hydrogen in decarbonising New Zealand's energy system.

22. The Green Paper states that "New Zealand is acknowledged as one of the best places in the world for innovation, trials and demonstrations with minimal regulatory impediments. Working in partnership with international stakeholders to encourage the use and production of hydrogen will be critical in achieving our goals."[20]

23. POAL agrees with the Green Paper that it is important to build on existing demonstration projects and to undertake further demonstration projects and trials as soon as possible.[21] POAL would like to consider New Zealand to be one of the best places in the world for innovation, trials and demonstrations with minimal regulatory impediments, although its experience with HDP to date does not bear that out. Demonstration projects need support from central and local government to ensure they are successful through both funding and flexible regulatory solutions.

Additional funding and regulatory support for demonstration projects should be prioritised

24. POAL acknowledges the investment and supports the government's ambition for an energy transition in Taranaki. It is however also important to recognise the connectivity of the freight system through Auckland and other major centres. The development of refuelling infrastructure in the main centres is essential to embedding hydrogen within New Zealand's economy. Accordingly, funding is required across New Zealand (including Auckland) to support the low emission objectives across the whole economy.

25. The success and value of projects like the HDP are dependent on adequate funding support. As described in the Green Paper, initial costs and risks for such projects are high and extra support is needed to encourage private sector investment in this area. Increased government support of demonstration projects will allow New Zealand to best take advantage of current opportunities. Significant investment is occurring in Australia at both the Commonwealth and State level. A good example is the dedicated hydrogen fund in Western Australia which is encouraging innovation. New Zealand needs the same.

---

[20] At 27.

[21] For further discussion about how public policy can play a supportive role in the initial stages of developing and deploying hydrogen in New Zealand, see page 57.

26. The significance of demonstration and pilot projects for the development of hydrogen in New Zealand is addressed in the Green Paper. As noted above, projects of this type are a source of vital information needed for further decision-making about appropriate standards to be adopted, regulatory change required and policy development. However, the Green Paper also acknowledges that regulatory change in relation to hydrogen is required.

27. The current regulatory regime does not support the use of hydrogen as a fuel, even at the demonstration project stage and is, at best, unclear. To allow demonstration projects to be undertaken and to gather the information needed for government decision-making and larger scale regulatory change, it is vital that regulatory changes are made in the short-term to encourage and support demonstration projects such as HDP to proceed. This needs to be a priority.

It needs to be recognised that funding and regulatory requirements will change over time as projects move from the demonstration stage to commercial production

28. The hydrogen fuel industry in New Zealand is in its infancy. While it is essential to develop policies and regulations for a developing and mature industry in New Zealand, specialised and targeted support is also needed for the development stage. POAL suggests that in developing the Renewable Energy Strategy and the role of hydrogen, recognition and support must be given to two stages:

    (a) Initially and immediately there must be support in the early stages of the development of the industry where there is a focus on gathering information. This should involve funding, regulatory changes to allow and support demonstration projects, centralised sharing of information and increased international engagement with the hydrogen industry.

    (b) As a second stage, there must also be mechanisms which enable demonstrate projects to scale up and branch out so that commercial production is able to be realised. These mechanisms need to contemplate and anticipate the evolution of a growing hydrogen fuel industry. To limit regulatory changes to demonstration projects could stifle commercial investment that could result in a broader hydrogen fuel industry.

29. The enablement of both stages will:

    (a) Support and encourage a deeper establishment of a hydrogen market in New Zealand's energy sector, one which has longevity, commerciality and future markets;

    (b) Lead to potential development of green hydrogen as an export commodity.

The role of New Zealand's hydrogen industry within the international context should be considered in developing a hydrogen strategy

30. New Zealand's hydrogen vision must be considered within the international context in developing a vision for the development of a hydrogen industry.

31. The focus of New Zealand's industry is likely to be unique to our local context. However, it is likely to also support the hydrogen industries of other local jurisdictions (such as by providing green hydrogen for shipping at New Zealand ports) and be part of a regional hydrogen supply chain (together with, for example in the case of shipping, Australia).

32. Given the potential for supply or export of green hydrogen, it is important to secure compatibility between regulation of and components used for hydrogen in New Zealand with those of countries that are potential receivers of green hydrogen as well as countries

(including Australia) that may be complementary suppliers in the region. For this reason, it is important that New Zealand actively works with other countries that share these interests and participates in creating a global market for green hydrogen.

33. It may be that some applications of hydrogen are less appropriate for New Zealand given its small population and the natural resources available. So, when undertaking international engagement in creating a compatible and viable international market that New Zealand can participate in, it is important to identify and focus on the areas where the technology can provide the best opportunities and value based on New Zealand's unique circumstances.