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Sent: Friday, 4 October 2019 3:41 p.m.
To: [redacted] Hydrogen
Subject: Hydrogen green paper - submission

Submission on Hydrogen green paper recevied:

Introduction
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Position title (if applicable):

Hydrogen futures

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?

The Government will be key in setting up hydrogen storage and distribution in the early stages if current energy companies are laggards in creating the infrastructure. It will be beneficial if the storage and distribution starts as crown-owned to level the playing field of access to hydrogen for innovation and usage.
With the issues facing the fossil fuel industry around limited and expensive access, it would be against their interests to make access easy for people looking for alternatives to fossil fuels.
If the Government provides infrastructure and oversight, then at least initially, innovation can be given the best chance.

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

The main challenges would be around the very different requirements for storage and distribution compared to fossil fuels. It is likely that the costs of the infrastructure will be higher, either with high pressure gas, or the extreme cold of liquid hydrogen. Hydrogen is extremely volatile, so a rupture or explosion would be catastrophic. The fact it is so light, a rupture would very quickly see it disappear rapidly.

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

The opportunities are that generation of liquid hydrogen could be done regionally and therefore distribution networks could be smaller. If a hydrogen production plant is setup near the coast sea water could be taken from the coast and used to fuel localities rather than requiring large, expensive, and potentially polluting transport networks.
If the key transports i.e. rail and shipping can have easy access to hydrogen, then it makes the use case of hydrogen fueled trains and ships more economical.

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

At the moment NZ's electricity network is only 80% renewable energy, even with the large projects to increase renewable infrastructure, the ever increasing demand for electricity for transport or

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hydrogen generation is going to push it even further.
A role that Government could take would be to incentivise a citizen-network of energy generation. That is, if the "sell to the grid" price resembled that which commercial generators were paid, it would be far more economically viable for all households to generate electricity.
An example I use is with my employer, and DHB at the top of the south island. A location that is well known for very high sunshine hours, perfect for solar power generation. However, solar panels are not economical with the very low cost of power and coal we pay currently.

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

As above, the main grid comes under massive load at the shoulders of the day, this is when fossil fuel generators must be switched on to meet demand. This would go against the point of utilising hydrogen if we undo the benefit by burning fossil fuel in order to generate it.
If de-centralised hydrogen generation is utilised, i.e. at various locations throughout the country, electricity demand will be variable and may put a load on areas that haven't been designed to cope with that sort of plant.

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

De-centralised power generation would be the best way to build a resilient energy network, paying a fair price to citizen-generators will increase the energy available to hydrogen generators. Especially in locations where networks were not designed for a high load from a hydrogen plant, the network of citizen-generators would ease the load.

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

Setting clear goals and time frames for a move to electricity and hydrogen for the transport sector will encourage innovation and development. At the moment, there is no real economic incentive to make electric or hydrogen vehicles, they are aimed at the small number of early adopters.

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

Access and cost. The network for storage and distribution will be a large piece of work and at a large cost. Consumers will have to meet some of the cost, but over a long time period, otherwise there is no incentive to use hydrogen over fossil fuels.

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

If the Government encourages innovations in air, sea, and rail transport, there would be a huge benefit to global emissions.
There is a huge network of ships globally transporting people and cargo around the world. These ships burn what is close to crude oil, though they may be efficient at it, the emissions are terrible for the environment. If these ships were to utilise hydrogen, they not only would be clean, but they have a ready supply of fuel they are floating on (with the need for a generation system). There is potential to develop a ship that is near to a circular system of energy production by using hydrogen, wind, and solar.

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

The Governments role is to phase it in once the distribution and storage network is available and used for transport. Encouraging it too soon would keep people burning carbon due to the ease of access and cost. However, if there is easier access to hydrogen and it is cheap to use - and has a good ROI for the capital costs of setup - then it would make economic sense.

What are the challenges for using hydrogen in industrial processes?

Cost comparison to burning carbon. The cost of coal, wood biomass, and natural gas is cheap because the lack of carbon tax on them. If the price of those products is increased to reflect the carbon they release, then hydrogen would be a more viable option.

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

It is easy to think that the hydrogen would be used out of the goodness of industrial hearts, but in reality it comes down to cost. If the hydrogen infrastructure is set up, then increasing the costs of carbon fuels provides an alternative - and that is, hydrogen.

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?

The role of Government is in being realistic about the benefits of exporting hydrogen. Unless the transport network is low or zero emission, then we would be going against all of the good work to export it.
Ideally, hydrogen would be generated locally, so exporting the IP would be better.

What are the challenges for hydrogen if produced for export?

A zero emission transport network, and exporting sufficiently large volumes, likely in liquid form which is more efficient but energy intensive.

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.

Unlock the potential of Māori communities to generate their own power and hydrogen to sell back to the main energy grid.

What are the opportunities for hydrogen if produced for export?

New Zealand could become a net exporter of clean and renewable energy. The diversification away from polluting primary industry would also help NZ reach its zero emission goal.

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