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From: no-reply@mbie.govt.nz
Sent: Tuesday, 8 October 2019 10:51 a.m.
To: [redacted]; Hydrogen
Subject: Hydrogen green paper - submission

Submission on Hydrogen green paper recevied:

Introduction
Name

Bryan Leyland

Email

bryan.leyland@gmail.com

Business name or organisation (if applicable):

Bryan Leyland Consulting EngineerAre

Position title (if applicable):

MD

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?

Hydrogen technology is a long way from commercial development. There are many difficult problems that need to be solved and demonstrate commercial viability.

The government should keep watching brief on overseas developments and only make a move when the problems are solved and commercial viability is demonstrated.

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

Storing and transmitting hydrogen is extremely difficult. It can leak through steel, it causes hydrogen embrittlement in pipelines if the concentration is above 20% and it can leak through plastic gas pipes.

It seems that research is going on to find out if hydrogen can be stored in underground salt caverns: https://medium.com/@cH2ange/louis-londe-technical-director-at-geostock-hydrogen-caverns-are-a-proven-inexpensive-and-346dde79c460
I am not sure that New Zealand had any suitable geology (Salt domes). I am told that it does not.

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

At the moment, none.

There is no proven technology available – let alone at a commercial price.

As the report of the interim climate change committee showed, New Zealand is now in a situation where it has just enough electricity generation to meet normal demand and not enough to cover a dry year. If there is to be a major expansion in electric cars, huge problems with the RMA, and the intermittent supply of wind and solar power will arise.

There is no spare energy available for converting water to hydrogen. If there was, the conversion plant would have a very low capacity factor because the surplus energy would be available only when the wind was blowing hard. It's capacity factor could be as low as 20% this makes hydrogen conversion even more expensive and probably increases the losses.

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

I do not see that they are complementary. Hydrogen is simply a way of transmitting energy from one place to another – which powerlines do better and cheaper. Hydrogen may, one day, be able to be stored – which hydro pumped storage does better and cheaper. There are several opportunities for hydro pumped storage in New Zealand. I have investigated some of them.

All that hydrogen does is increase energy losses and imposes huge extra costs in new infrastructure.

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

It is not a complimentary role. As I have pointed out, electricity is better than hydrogen for transport and storage. As the technology stands at the moment, there is no case for hydrogen.

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

None.

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

Do nothing until the technology is firmly established and commercially viable overseas.

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

Technology, cost of production and problems with storage.

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

With the present state of technology, none.

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

With the present state of technology, none.

What are the challenges for using hydrogen in industrial processes?

What advantage does it have over natural gas? The Interim Climate Change Committee report showed that, in the foreseeable future, we cannot have a reliable and economic supply without a supply of gas or coal. According to the International energy agency the world will be burning roughly the same amount of fossil fuels in 2050 as it is today. https://energypost.eu/an-independent-global-energy-forecast-to-2050-to-compare-with-the-ieas-weo-2018/
Why should New Zealand seriously damage its economy when it will make no difference to the world's climate?

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

It does have some uses in specialised processes such as oil refining. There is no reason to assume that New Zealand industries suffering from steadily increasing power prices will be happy to spend even more money on hydrogen instead. They are more likely to shut down.

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

The technology as yet to be perfected and then it has to demonstrate commercial viability. When this happens, the market should, anyway, provide the incentives needed.

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

Apart from the high cost of making hydrogen using electricity there would be a need to replace our gas transmission network if the hydrogen concentration is to be above 20% – as it would need to be. There was also the problem of storing the hydrogen as it is generated intermittently when it is available from intermittent renewable energy sources.

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

Apart from the high cost of making hydrogen using electricity there would be a need to replace our gas transmission network if the hydrogen concentration is to be above 20% – as it would need to be. There is also the problem of storing the hydrogen as it is generated from intermittent renewable energy sources.

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

Export cannot be even considered at this stage. You do have to learn to walk before you run. The technology is not available, the electricity is not available and hydrogen tankers do not exist.

What are the challenges for hydrogen if produced for export?

Tankers have not yet been developed.
Japan is proposing to develop tankers that will ship hydrogen made from Australian brown coal to Japan. If the object is reducing emissions of carbon dioxide, you can't get much crazier than that!
https://www.rivieramm.com/news-content-hub/kawasaki-ship-designs-support-japans-hydrogen-society-plans-29850

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.

No comment.

What are the opportunities for hydrogen if produced for export?

Japan is probably the only country that would be interested. There is no way that it would use expensive electricity generated hydrogen when much lower cost hydrogen is available at a much larger volume from lignite coals in Australia.

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