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Submission on Hydrogen green paper received:

Introduction

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

Behalf of group or organisation

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Koru Consultants

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

To guide, encourage and improve the development and application of hydrogen. Funding supply should be open to the public society rather than a small range of institutions. More cooperation between other countries rather than Japan only should be encouraged so that New Zealand has better access to the quick movement and new technologies that can emerge in other countries. The government should also raise more awareness of the new opportunities to the public.

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

The current major methods to storage hydrogen share the same disadvantages like the low efficiency, complexity of the technology, and the need of sophisticated equipment. When it turns to hydrogen distribution, for pipeline transportation the biggest challenge is the initial cost, especially the labour cost in New Zealand is very high. For other choices like liquid hydrogen transportation, the biggest challenge may be the reliable material and equipment.

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

To development the related technology to make hydrogen storage and distribution easier, cheaper, safer and more progressive.

The transmission of hydrogen blended into the existing natural gas pipe system has shown great potential in China. Closer look can be addressed as it means low cost of construction.

What is the role of Government in developing the complementary role of electricity

and hydrogen?

From the perspective of nature resources and environment protection, more and more country pay high attention to the complementary role of electricity and hydrogen. Relevant laws and regulations have been put into effect to guide and encourage the development of this field.

Electricity Authority could be involved.

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

The biggest challenge is the high cost of transportation and transmission which makes to move the hydrogen in distance is difficult. More emphasis can be put on the local storage as a supplementary or storage of the electricity, i.e., as battery rather than fuel. Secondly, how to obtain enough quality hydrogen with reasonable cost is also important.

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

We are delighted to participate in this technology evolvement and aid to solve the production, storage, transportation, and utilize of hydrogen.

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

The government can consider policies to guide and encourage the development of using hydrogen in transportation, for example, subsidy for fuel cell on-road and off-road vehicles and fill-up stations.

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

As we all know, if we want to make full use of the hydrogen, then fuel cell system technology is the best solution. For a fuel cell system, it will match some auxiliary component to speed up its reaction and improve its efficiency and so on. What's more, since there is limited space on automobile, so the biggest challenge is whether the fuel cell system integrator can find the best component which is small, low power dissipation, low price and strong performance for its system. The underdevelopment fuel cell industry is the bottleneck to the practical use of fuel cell. Then the next challenge may be the national strategic deployment level, such as build more hydrogen refuelling station, improve laws and regulation related to hydrogen production, transportation, safety, usage and so on.

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

For a FCEV, it boosts such merits, short refuelling time, less weight, long range (as long as it can carry enough hydrogen), zero emission besides water, maybe in the future low cost.

The first places to adapt such vehicles can possibility start from yard forklifts, golf carts, short distance trucks, etc.

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

Issue policies to guide and encourage the development of this field.

What are the challenges for using hydrogen in industrial processes?

Security of energy supply, competitive price, advancement of related technology.

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

Cutting the price of hydrogen through technology improvement, such as development new materials enabled to storage more hydrogen, development of low-cost, efficient methods to purification hydrogen etc.

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

The government encourages in-depth research on the technology, advocates the study of a wider range of solutions, and encourages the development of relevant enterprises, so that the reactant before decarburization and the decarburization of derivatives can form a closed loop supply chain and reduce the generation of industrial waste.

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

In the process of decarbonization, it is necessary to pay attention to the pH change of water solution in the regeneration tower at all times. It is necessary to filter the organics degradation products and metal corrosives produced by decarbonization regularly to avoid the danger caused by the rise of pressure difference in the tower caused by the system absorption difference. In addition, the consumption of corrosion inhibitor used in the decarbonization process is also very large, and the production cost is relatively high.

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

Converting the whole gas transmission system to hydrogen will lead to deep decarbonization of heat supply, transportation and power, with minimum interference to customers and zero emission.

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

On the one hand, the government encourages enterprises to engage in the development of hydrogen related industries, on the other hand, it needs to conduct strict control and supervision on the safety standards of hydrogen, formulate strict regulations on the import and export of hydrogen, and promote the export trade of hydrogen under the condition of ensuring safety. In addition, the export of hydrogen also depends on the transportation system. The government needs to vigorously develop the new energy transportation industry, so that the hydrogen energy manufacturing industry has advantages in the development and production and foreign trade.

What are the challenges for hydrogen if produced for export?

The density of hydrogen gas is small, the relative molecule is small, and the volume of hydrogen gas is larger than that of liquid and solid, but the compression into liquid increases the explosiveness. In addition, there is a certain safety risk in the process of changing the form of hydrogen, and the compression degree is often not enough, and the compression cost is high, and the enough strength of the storage device is also required.

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

The introduction of hydrogen into Maori's life through pipeline transportation can effectively solve the problem of energy supply and increase the local employment rate to a certain extent. In addition, with the development of new energy vehicles, the introduction of hydrogen can facilitate local transportation. After solving the traffic problem, it can increase the connection between the local and the outside world and promote the economic development. It will also become a signature of New Zealand if the Maori can take advantage of using hydrogen which is a merge of the tradition culture into modern technology with their involvement in training, research and application.

What are the opportunities for hydrogen if produced for export?

The hydrogen industry is witnessing unprecedented political and commercial momentum. Policies around the world are being implemented rapidly, and the number of hydrogen

projects is increasing rapidly. New Zealand has the best wind resource in the world, but wind by nature is very unstable and difficult to store. If the energy can be harvested and converted to hydrogen products which can be shipped and exported to other countries such as pacific island countries, it will tighten the strength between the links to the people and culture and their economy growth.

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