[redacted]

From: no-reply@mbie.govt.nz
Sent: Friday, 25 October 2019 2:01 p.m.
To: [redacted]
Subject: Hydrogen green paper - submission
Attachments: Online-submission-form-uploadsHydrogen-green-paperTodd-Corporation-Submission-on-H2-Strategy-25Oct19.pdf

Submission on Hydrogen green paper recevied:

Introduction
Name

[redacted]

Email

[redacted]

Business name or organisation (if applicable):

Todd Corporation

Position title (if applicable):

[redacted]

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.

Todd Corporation

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?
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?
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?
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?
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.

[redacted]

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

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Yes

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OIA warning
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Submitted online

To: Resource Markets Policy - Building, Resources and Markets
Ministry of Business, Innovation & Employment

From: The Todd Corporation Ltd

Date: 25 October 2019

Submission on "A vision for hydrogen in New Zealand: Green paper"

The Todd Corporation Limited (Todd) welcomes the opportunity to provide this submission on the Hydrogen Green Paper.

1 About The Todd Corporation

a) Todd is one of New Zealand's largest companies. The family owned company has grown over more than a century to employ a team of over 1000 people, with investments in energy, minerals, property, healthcare and technology.

b) Through Todd Energy, Todd produces around 33% of New Zealand's natural gas and is:

   i 100% permit holder and operator of the Kapuni, McKee and Mangahewa onshore natural gas fields;

   ii a non-operator joint venture partner in the Pohokura offshore natural gas field; and

   iii permit holder of four petroleum exploration permits in both onshore and offshore Taranaki.

c) Natural gas is a very important energy source for New Zealand. It is used by industry, supplying 38% of the energy used for process heat[1], and as a feedstock in the production of methanol and urea. Nova Energy (a Todd subsidiary) alone supplies about 110,000 residential, commercial and industrial customers with natural gas and/or electricity.

d) Through Nova Energy, Todd generates electricity at its 100 MW fast-start natural gas fired peaker plant at McKee in Taranaki and at two cogeneration plants at Whareroa and Edgecumbe. Another 100 MW fast-start natural gas fired peaker plant is being built at Junction Road, New Plymouth, and consents are in place to build 360 MW of capacity in the Waikato.

e) Nova has recently acquired Sunergise NZ, an experienced supplier of commercial and industrial scale rooftop solar power, and is actively developing consents for a North Island wind farm. Todd has also obtained consents for a tidal power generation site in the Kaipara Harbour, to be developed as technology matures and becomes economically viable.

f) As New Zealand's electricity use increases, secure, affordable and reliable energy will be required to meet both daily demand and seasonal peaks within a highly renewable electricity generation system. Todd believes that natural gas powered electricity generation has a crucial role in enabling renewables, both now and in a lower emissions economy.

g) As an integrated energy company, Todd is participating actively in the discussion on New Zealand's transition to a low emissions economy. Todd Energy's CEO is Chair of the Taranaki 2050 Lead Group, established by a partnership between MBIE and Venture Taranaki, which published the Taranaki 2050 Transition Roadmap. Todd continues to be involved in this important programme of work. Energy is one of the 12 workstreams in

[1] https://www.mbie.govt.nz/assets/8c89799b73/process-heat-current-state-fact-sheet.pdf

the Roadmap and included in the energy transition plan is natural gas, hydrogen, wind, solar, wave and tidal energy.

2 Submission overview

a) Internationally, most hydrogen is produced from natural gas[2] and the Green Paper acknowledges that hydrogen from fossil fuels and industrial processes has a role in the development / investigation of any future hydrogen industry. If a hydrogen industry is to be established at any scale in New Zealand, it will benefit from existing skills and experience within the energy sector and Todd, as a major natural gas producer and supplier into the natural gas network, will contribute to the future discussions.

b) Todd considers that both existing and new technologies, including hydrogen, have potential to play a role in reducing emissions and the role of the Government is to encourage the widest possible range of innovation and enable fast uptake by:

   i supporting a fit for purpose and enabling regulatory environment; and

   ii providing appropriate R&D support to businesses and universities.

c) Todd supports an enabling regulatory and policy framework that allows the market to test and develop hydrogen uses and other options as and where it best fits. The Government can enable hydrogen projects by developing or clarifying regulations and requirements for the production, transportation and use of hydrogen, ensuring that consistent national standards are adopted. The Government should not, however, be favouring one form of technology over another.

d) Todd considers that emissions pricing should be the main price signal to drive investment and innovation in low emissions technologies. An emissions trading scheme is designed to reduce emissions in a cost-effective, market driven manner, reducing the risk that market distortions (such as arise from subsidies) lock in technology or infrastructure that prevents adoption of better and alternative technologies in the future.

e) For hydrogen to be a viable energy source, it must be economic and efficient/easy to use. The Green Paper and the January 2019 Concept Report acknowledge that the current cost of hydrogen is very high. While costs are likely to reduce in the future, in most cases hydrogen is unlikely to become cost-competitive with direct use of electricity, which does not require new handling and infrastructure and is more efficient (given the significant conversion losses incurred at each step from electricity to hydrogen and back to electricity).

f) Todd considers that the Government should concentrate on securely increasing electricity supply to meet increasing demand from electrification and reduce New Zealand's emissions, rather than promoting polices that would potentially jeopardise this transition, such as those targeting export of hydrogen.

g) Todd agrees that there may be opportunities for hydrogen use in niche applications where there may not be an obvious alternative low-carbon solution, such as transport depots, on-site freight loading operations or energy supply for off-grid locations, or in high emission industries. Those applications would potentially enable the development of hydrogen expertise, build public confidence and, if costs reduce sufficiently, be a springboard to future hydrogen projects.

[2] As per the Green Paper terminology: brown hydrogen is produced from fossil fuels; blue hydrogen is produced from fossil fuels with carbon capture and storage; green hydrogen is produced from renewably generated electricity (so has no direct carbon dioxide emissions).

3 Challenges and opportunities for hydrogen (by sector)

3.1 Storage and distribution

a) The Concept Report notes that, while hydrogen production technology is well understood, "full hydrogen-based energy chains are another story"[3]. There are significant challenges for storage and distribution of hydrogen in New Zealand - the limited gas pipeline infrastructure, lack of large-scale storage facilities, low population density and distance between potential users and producers of hydrogen.

b) Those challenges mean that it makes most sense to concentrate on evaluating on-site hydrogen generation, for example for heavy vehicle refuelling or process uses. Distributed systems, where hydrogen is produced locally, may become more economically viable as the cost of electrolysers and storage decreases.

c) The Green Paper notes that "line pack storage in pressurised pipelines or underground storage is most appropriate for domestic applications"[4]. Enabling regulations for underground storage would likely be required in the event this becomes economic. For comments on distribution via the natural gas pipeline network, see section 3.5.

3.2 Electricity and hydrogen for resilience

a) The Concept Report considered the cost of producing hydrogen for a variety of uses and found that even small-scale opportunistic hydrogen production (at low electricity prices) is not economic if it requires storage facilities to be built[5]. This is due to the challenges of storage and distribution of hydrogen in New Zealand.

b) The Interim Climate Change Committee has recommended that the Government prioritise accelerated electrification of transport and process heat over pursuing a target of 100% renewable electricity.

c) Electricity demand in New Zealand will increase, with the proportion of renewable energy also expected to increase in the longer-term, but flexible, on-demand peaking generation – to meet both daily and seasonal peaks (particularly in a dry year when hydro lakes are below capacity) will be crucial to ensure a secure electricity supply.

d) Natural gas power plants are the ideal enabler for renewables, providing power when hydroelectricity lakes are low and when wind and solar are in short supply. The Green Paper (page 44) states "natural gas peaker plants have relatively low efficiency and therefore impact electricity pricing and drive up carbon emissions". Todd does not agree with that statement. All peaking power, no matter the source, is more expensive than the equivalent baseload supply – due to the capital cost of building power plant that is idle for much of the time.

e) The ICCC estimated that the cost of overbuilding renewable generation to meet a 100% renewable energy target would be in the order of $1,200 per tonne of carbon dioxide emissions avoided[6]. Further, the ICCC noted that "in the years to 2035, no single solution stands out as a clear candidate to replace the relatively low-cost, flexible and low emissions service that natural gas can provide to the electricity system". Todd considers that natural gas-powered electricity generation will continue to be essential to meet peaks within a highly renewable electricity generation system.

3.3 Transport

a) As set out in the Green Paper, Todd considers that the use of hydrogen for transport purposes will be most suited for heavy and industrial vehicles – based at freight

[3] Concept Report 1 – Summary, January 2019, p 5.
[4] Green Paper page 40
[5] Concept Report 1 – Summary, January 2019, p 7.
[6] ICCC, Accelerated Electrification, 30 April 2019.

hubs/depots or moving between distribution centres, where refuelling infrastructure is installed.

b) Given New Zealand's geography and population density, Todd does not consider it economic to invest in development of a sufficiently dense national re-fuelling network that would be required for hydrogen-fuelled light vehicles.

3.4 Industrial processes

a) In respect of intermediate process heat, the Concept report concluded that "hydrogen is not projected to be competitive relative to other low-carbon options: direct electricity and biomass. There is no carbon price that will alter this evaluation"[7].

b) Todd notes that the replacement of coal with use of natural gas (in the North Island) for process heat will bring an immediate reduction in emissions.

c) Todd agrees that there may be opportunities for hydrogen production to decarbonise emissions-intensive processes, such as for ammonia/urea and steel production. Practically, however, this will be challenging in New Zealand as the geographical spread of those industries means there are limited options for companies to work together to maximise resource utilisation and reduce costs.

3.5 Decarbonisation of natural gas

a) There are a number of ways to decarbonise natural gas, including by increasing the use of biogas (methane produced from landfills), use of carbon capture and storage (CCS), or the addition of hydrogen (produced from either green or blue sources). CCS technology is becoming well established internationally and the blue hydrogen pathway is being used in the medium term to encourage uptake and begin piloting key hydrogen projects. Todd agrees that blending of hydrogen into the natural gas transmission network will reduce the carbon intensity of gas while retaining use of the existing grid.

3.6 Export

a) The Green Paper sets out the challenges associated with generating sufficient hydrogen for export (associated economic, cultural, environmental and social costs of the overbuild of renewable energy sources that will be required), as well as the "significant costs and risks" of establishing international supply chains, logistics and infrastructure (page 73).

b) The Concept report[8] estimates that green hydrogen could be exported to Japan at a cost of around $44 per gigajoule; by comparison, the cost of liquefied natural gas is in the order of $14/GJ.

c) The export of gas from New Zealand was investigated some years ago but it was not competitive with other countries who were closer to the potential markets (such as Japan and South Korea). Similarly, exports of New Zealand green hydrogen would compete with LNG (which could be converted to hydrogen once in country) and with cheaper brown or blue hydrogen sources, generated in locations closer to markets, with no certainty that green hydrogen would fetch a premium on (potential) future hydrogen markets.

d) The challenge ahead - to electrify New Zealand's economy and increase renewable energy supplies - is significant. Todd recommends that the Government concentrate on achieving this goal. Export should remain a secondary goal to be considered once the electrification goal has been achieved.

[7] Concept Report 1 – Summary, January 2019, p 12.

[8] Concept Report 1 – Summary, January 2019, p 16