CLIMATE TASMANIA

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Climate Tasmania

Response to the draft Tasmanian Renewable Hydrogen Action Plan

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Summary

Climate Tasmania welcomes the opportunity to comment on the draft Tasmanian Renewable Hydrogen Action Plan ("draft Plan").

The draft Plan sets a highly ambitious goal that by 2022:

- Tasmania has commenced production of renewable hydrogen.
- Locally produced renewable hydrogen is being used in Tasmania.

The draft Plan provides only very general information on the economics and environmental benefits of this plan and we are pleased that the state government has undertaken to release a final strategy "in early 2020".

The areas which we believe need to be more thoroughly researched and resolved in the final strategy include:

- the processes to ensure transparency on how contributions from the taxpayer towards development of privately owned hydrogen infrastructure can be assessed against the costs and benefits to the economy and the environment
- any risks arising from the fact that predicted demand may not eventuate or that the technology does not prove cost effective in the longer term
- the risk that the currently lower price of producing hydrogen from fossil fuel sources may lock-in the sites for future hydrogen infrastructure development
- the local Tasmanian uses of hydrogen likely to be most viable
- assessment of the economic, social and environmental benefits of developing hydrogen electrolysis in Tasmania compared with other routes to capitalising on Tasmania's competitive advantage in generation of reliable renewable electricity.

Climate Tasmania would welcome the opportunity to be involved further in the development of the final strategy.

About Climate Tasmania

Climate Tasmania is a group of concerned professionals who have a diverse range of expertise, spanning scientific, legal, economic, health, social and policy aspects of climate change.

Our aim is "To provide timely, independent and authoritative advice to Tasmanian business, government and community leaders on climate change and appropriate policy responses."

In pursuit of this aim we:

- Inform and engage the Tasmanian community on climate issues.
- Identify and promote model policies and actions for Tasmania.
- Influence and engage decision makers on climate trends and policy options.
- Monitor and report on Tasmania's progress in addressing climate change.

Details of the members of the Climate Tasmania board and expert advisers are available at www.climatetasmania.org/members/

Clarification of business model

The draft Plan is not explicit about how hydrogen economy infrastructure in Tasmania would be funded and operated. We assume this government would pursue a model of private ownership of new infrastructure. In addition to supportive policy and the development of a suitable regulatory framework draft Plan suggests (p.35) several ways in which (presumably private) developments could be financially supported by the government, namely;

- contributions from a “Tasmanian Renewable Hydrogen Fund”
- concessional electricity pricing
- discounted loans
- payroll tax relief.

As with any private development, but especially those which are supported by the Tasmania taxpayer, it is important that any proposed developments are subjected to full environmental and social assessment. An independent feasibility study should look at the full picture of the project costs, including lifecycle and decommissioning and cleanup, as well as potential adverse health impacts on local communities.

If it is proposed that the Tasmanian taxpayer (or GBEs such as TasNetworks or Hydro Tasmania) underwrite developments through concessional pricing or assumption of risk, these costs need to be fully publicly disclosed so that Tasmanians can assess whether the social, environmental and economic benefits are commensurate with the costs.

The ‘community awareness’ activities proposed in the draft Plan (p.36) will only be meaningful if they are based on full disclosure of impacts, costs and risks.

Challenges in developing a Tasmanian Hydrogen Strategy

Clarification of objectives

While the draft Plan frames the opportunities from the hydrogen economy as resulting from countries looking to “cleaner, renewable forms of energy in order to decarbonise their economies” it does not argue that the hydrogen economy is part of the solution to Tasmania decarbonising the local economy. Rather it focuses on the anticipated benefits “through job creation and economic growth, particularly in regional areas”. (p.2)

In fact increased industrialisation through both increased electricity production and development of industrial processes for local use of hydrogen will marginally increase Tasmania’s emission even if the electricity is generated from renewable sources.

An argument might be made that the development of hydrogen economy infrastructure in Tasmania will lead to reduced carbon emissions on the mainland or in other countries.

This distinction should be made clear in the proposed final strategy. To the extent that government investment is proposed on the basis of reduced carbon emissions, the costs and benefits of this should be made explicit.

Climate Tasmania does not believe that the development of hydrogen economy infrastructure in Tasmania is the most effective method for reducing Tasmania’s greenhouse gas emissions.

Uncertainty of demand

While the existing use of fossil fuel based hydrogen as feedstock for fertiliser production is a well-established industry there is considerably less certainty about the scale of new demand sources.

The estimates of demand on p.8 of the draft Plan are described as “conservative” but they reference the ACIL Allen report which has been critiqued by the Australia Institute as overstating the potential export demand by a factor of up to eleven (TAI 2019).

Technical challenges in developing an export industry

Liquefaction and marine transport of hydrogen at scale is an untested technology. Liquefaction of hydrogen requires that it is cooled to -253 °C, which is very substantially colder than the −162 °C used in LNG transport.

There are currently no bulk liquid hydrogen ships in the world and the first, currently under construction in Japan, is expected to be complete by late 2020. The ship will have storage capacity of about 1250 cubic metres, less than 1 per cent of the size of liquefied natural gas carriers (Murtaugh 2019).

Given the technical challenges and the cumulative energy losses in electrolysis, liquefaction, and re-gasification of hydrogen, it is by no means certain that long distance transport of liquid hydrogen will prove a viable technology. Some argue that long distance HVDC transmission of electricity is a more viable technology (see for example Williams 2019).

Competition between hydrogen from renewable and fossil fuel sources

Although it is difficult to find exact prices, it is generally acknowledged that producing hydrogen by electrolysis is currently more expensive than fossil fuel based techniques based on brown coal or natural gas. There are optimistic predictions of how much the cost of renewable hydrogen could fall (e.g. see Mathis 2019). However given the current price difference there is a concern that accelerated development of hydrogen infrastructure will focus on fossil fuel based sites which could lock in future developments (Kaitsu 2019, p.31). It is notable that the currently most advance hydrogen infrastructure site in Australia is the Hydrogen Energy Supply Chain (HESC) project in Victoria based on gasification of brown coal.

Identification of the most viable local use of renewable hydrogen

The draft Plan proposes that by 2022 "Locally produced renewable hydrogen is being used in Tasmania".

The draft Plan (p.9) suggests a number of potential domestic applications of hydrogen. With current technology each of these has significant cost and viability challenges. The final strategy should assess what domestic uses of hydrogen are likely to be cost effective and implementable given the objective of having domestic consumption from a pilot plant by 2022.

Remote power generation

Tasmania has a number of successful existing remote area power supplies combining wind and solar generation with battery storage with diesel backup. Using hydrogen as an alternative storage mechanism or as replacement backup fuel might be viable but is a less proven technology and would need to be shown to have significant cost advantages over existing proven technologies.

Industrial applications

Possibilities mentioned include 'green ammonia' and 'green methanol', possibly with further processing to fertiliser production. The final strategy would need to demonstrate the business case for these new industrial processes being viable in Tasmania. Availability of renewable hydrogen as feedstock would be only one factor in creation of a viable business case.

Transport fuel

Climate science has clearly and unequivocally demonstrated that the primary driver of global heating is the burning of fossil fuels — coal, oil and gas. Therefore, phasing out the use of coal, oil and gas is an essential part of moving to zero carbon emissions.

Hydrogen may have two important roles to play in the transition away from the use of petrol and diesel in transport. Petrol is mainly used in the light vehicle fleet, and this is where the use of battery electric vehicles is growing. While fuel cell light vehicles are available commercially, there is not the same range of available models as there is with battery electric vehicles, and hydrogen's role as a replacement fuel for petrol is likely to be limited.

Battery electric vehicles have made smaller inroads in the heavy vehicle market, and in the non-road market, such as tractors and earthmoving equipment. This segment mainly uses diesel fuel, and here hydrogen has two potential roles:

1. There has been some development of hydrogen fuel cell heavy road transport vehicles. The widespread use of such vehicles in Tasmania would require the development of a network of hydrogen refuelling stations, which requires the resolution of the technical challenges discussed above. Given the small size of the market, it is not clear that it would be viable for Tasmania to develop infrastructure for the distribution and supply of both electric and hydrogen vehicles.

2. So called “renewable diesel” is being manufactured outside Australia by the hydrogenation of vegetable oils (ARENA 2019a, p.14). A renewable diesel plant in Tasmania would bring together a vegetable oil processing plant, a hydrogen production facility and a hydrogenation plant which would then combine the two inputs to make renewable diesel. The vegetable oil could be locally grown canola oil, and waste vegetable oils can also be processed to make renewable diesel.

Renewable diesel can conform with the standard diesel fuel quality specification, and thus can be blended with fossil diesel or used unblended in standard diesel engines that do not require modification. Renewable diesel can be transported, stored and dispensed in existing diesel fuel infrastructure.

The development of a renewable diesel industry in Tasmania requires the production of renewable hydrogen, and would have two benefits:

1. Manufacturing “drop in” diesel in Tasmania would provide an important fuel security benefit; and
2. The availability of a non-fossil diesel fuel capable of being used in the existing fleet of vehicles and diesel powered equipment means that the transition away from fossil diesel would allow the existing fleet to still be usable, thus avoiding the stranding of those assets.

Blending with natural gas

This is probably the most immediately practical local use of hydrogen. However it is unlikely that renewable hydrogen would cost less than existing natural gas.

Tasmanian gas use from fossil fuel sources needs to be dramatically reduced as part of a plan to reach net zero carbon emissions. The focus of government policy should be on reducing gas usage. Increased renewable electricity generation will allow the closure or moth-balling of the Tamar Valley Power Station (TVPS) or keeping it operational only as an emergency reserve.

As part of a plan to reach net zero carbon emissions, Tasmania should be investigating what policies and technology alternatives could be promoted to reduce other commercial and industrial uses of gas. The possibility of a small proportion of natural gas use being replaced with renewable hydrogen should not divert attention from the need to reduce gas consumption overall.

It is possible that for the small proportion of gas use for which substitutes are not viable might in the long term be met with a combination of biogas and renewable hydrogen delivered via the existing gas distribution network.

Opportunity costs for Tasmania

The draft Plan accurately identifies Tasmania’s key strengths in the production of renewable electricity.

However it does not follow that the production of hydrogen by electrolysis is the best use of this capacity. In assessing the business case for a hydrogen industry, the benefits need to be compared with alternative uses of this energy.

If Marinus Link is commissioned there will be significant capacity to export additional electricity to the mainland. Even without Marinus Link there is potential for expansion of renewable electricity generation to provide economic and environmental benefits to Tasmania through reducing imports of electricity from the mainland, increasing electricity exports on the existing Basslink interconnector, and reducing the use of gas-fired generation at TVPS.

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