**Introduction**

The National Hydrogen Strategy determined that a certificate of origin (or certification) scheme was a priority. There has been little obvious action from Government in this space, and AHC members have identified the lack of a scheme poses significant risk to their investment decisions and the progress of the hydrogen industry in Australia.

Therefore, both individual members and the AHC need to advocate strongly into Government a united position on minimal viable product of a scheme to enable business decisions to continue.

**Purpose**

The purpose of this paper is to support the AHC to agree on a ‘industry’ position to take to the Stakeholder Workshop on certification being hosted by the Hydrogen Strategy Team (Department of Industry, Science, Energy and Resources) on 27 August.

**Discussion**

There are four factors that require consideration to progress a hydrogen Certificate of Origin scheme:

1. Timing

The National Hydrogen Strategy talks to achieving a mature hydrogen export industry by 2050. The Australian Hydrogen Council’s Export Roadmap identifies that in order to achieve this goal, industry will need to start making final investment decisions on commercial scale projects in early 2021. Industry is not likely to take investment decisions without some certainty around at least classes of hydrogen.

* What are the minimum needs from your company/industry to take FID in 2021?

Refer to attachment 1 for a high-level time frame on certification in relation to the Export Roadmap.

1. Scope

The scope of the scheme significantly impacts timing: the more comprehensive the scheme, the longer it will take to finalise. However, there is opportunity to ensure the scheme is designed so hydrogen products (e.g. ammonia or blended gas) can be accommodated in future.

Conversely, there is opportunity to include some classes of hydrogen into the scope of existing schemes. For example, the Renewable Electricity Scheme and /or Green Power could be considered for water derived hydrogen.

* Which schemes could be expanded to include hydrogen?
* How can we use scope to de-risk timing?

One way to de-risk timing is to not include certification of biomethane, green gas or blended gas now. The hydrogen input into blended gas is considered, but not the final gas blend product.

The scope also needs to consider certificate boundaries. Certificate boundaries should be considered in conjunction with definitions and their subsequent accounting methodologies. It is proposed that certification covers from Scope 1 to Scope 3.

* Should a minimal viable product of a scheme include Scope 3?

1. Definitions

Defining classes of hydrogen is key to meeting customer needs. Japan has already indicated it wants clarity on hydrogen created using renewable electricity compared to other production methods. Defining hydrogen classes does not make one ‘better’ than another, it simply enables informed decision making from consumers.

It is proposed that rather than relying solely on emission factors to define all hydrogen classes, a combined method should be adopted. Product ‘ingredient’ should form the foundation of classification:

1. Water derived
2. Methane derived
3. Coal derived

Each of these categories could then be tiered based on:

*Water derived:*

* Sustainability of water input for production
* Level of renewable electricity used for production – tiers could be percentage or REC balanced or emission factor related
* Scope 3 – emission factor related

*Coal/methane derived:*

* Emissions factor
* Offset methodology (e.g. are science-based targets in place?)
* Scope 3 – emission factor related

To make this option feasible, a limited combination of inputs is required.

An example of how this could be considered is outlined below:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Sustainable water** | **Renewable electricity** | **Scope 3 -emissions** | **Tier** |
| **Water derived** | 100% | Net grid positive through REC | Zero emissions | 1 |
| 85% | Net grid positive through REC | Zero emissions | 2 |
| 100% | Net grid positive through REC | <xx tonnes/kg H2 | 3 |

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Total emissions (1-3)** | **Offsets used** | **Tier** |
| **Coal/methane derived** | <xx tonnes/kg H2 | No | 1 |
| <xx tonnes/kg H3 | Yes | 2 |

These are examples only and are intended to generate discussion amongst the AHC Export Working group. The coal/methane derived without offsets assumes carbon capture and storage or similar direct abatement method.

If colours are perceived as an important marketing tool, the two categories could be split as green (water derived) and blue (coal/methane derived). It should also be noted that using the terminology ‘water derived’ is not without risk. It draws attention to the use of water in hydrogen production. At the same time limiting a scheme to technology (e.g. electrolysis) inadvertently excludes technological advancement, unless the scheme has suitable flexibility. A minimal viable product scheme/definition can safely replace ‘water’ with ‘electrolysis’ as this point in time.

Despite the challenges faced in Australia around water scarcity, it is not expected that definitions absent of water considerations would be tolerated by consumers or regulators. Lessons or frameworks/certification related to water sustainability in the food and beverage industry should be considered.

The risk with determining definitions in the absence of establishing a compliance framework or accounting methodology (for emissions in particular) is that a definition may be decided, and it is then determined there is no easy way to demonstrate compliance. The time pressure on industry to make investment decisions means industry is taking on significant risk around their ability to adhere to a scheme. Ideally compliance framework/accounting methodology would be developed in parallel with any definitions.

* How do you see the AHC progressing in defining classes of hydrogen?
* How can AHC leverage off membership (particularly consultants) to progress a water sustainability position?
* How can the compliance framework/accounting methodology factor be de-risked?

It should be noted that information from the National Hydrogen Taskforce indicates the Government have been working to a carbon emission factor methodology to define hydrogen classes. However, there is no formal information being released on this approach.

1. Process and structure (certification framework)

This factor has already been touched on in scope and definitions. However, the certification framework needs further consideration. The Export Roadmap identifies that determining governance (who will administer the scheme) is a critical step in progressing scheme development. There have been no clear signals from Government on which administering authority will have accountability for this scheme and AHC will likely have to explicitly state where it thinks this governance role sits. There are some suggestions amongst commentators that the Clean Energy Regulator could take this on.

There is potential to consider certifying different forms of hydrogen into different existing schemes (i.e. not just assume a single scheme for all hydrogen). Further analysis of which existing schemes could accommodate which hydrogen classes is required. AHC should consider undertaking this analysis to inform their preference to Government.

* Do you think the AHC should explicitly state preferred administering authority? If yes, which authority?
* Should the AHC asses the ability of existing schemes to incorporate hydrogen?

|  | **2020** | **2021** | **2022** | **2023-2024** | **2025** | **2030** | **2035** | **2040** | **2050** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Immediate next steps 🡪** | | | **Early scale-up 🡪** | | **Diversification 🡪** | | **Maturing industry 🡪** | **Industry mature** |
| Key Outcomes | Accelerated deployment of strategic funding for commercial scale blue and green H2 export projects (~10ktpa+ scale of H2 production per project, ~100MW electrolyser scale for green H2 project).  Commercial scale H2 projects incorporated into broader infrastructure programs intended to stimulate economic recovery.  Strategic priorities developed for the next 3-5 years based on where the demand is now i.e. export markets in Japan and Korea (see LNG industry experience).  Australian H2 technology and knowledge is monetised and built into relationships with offtakers.  Certification scheme minimum viable product in place | | | Commercial scale projects (10ktpa+) reach FID in 2023/2024 and construction commences.  1-10ktpa scale projects (10-100MW scale green H2 projects) ready to export to Asia in 2025.  Cost to produce H2 reducing as a result of learnings from feasibility studies and commercial scale projects | | Increased efficiencies gained from commercial scale experience  Growing volumes of H2 exported to Japan and Korea. New export markets emerge.  H2 from export used fro diversifying domestic market as end-use applications. | | Export industry in Australia growing and approaching maturity.  100ktpa+ scale projects increase in number. | **Export** industry mature and at scale, like the LNG industry today.  Australia a global leader in **H2** production. |
| Hydrogen Production Scale-Up Milestones | **Late-2020**: feasibility studies completed for first 1-10ktpa+scale green H2 electrolyser projects.  Feasibility studies for first small to mid-scale blue H2 projects. | **Mid-2021**: FID taken on first 10ktpa+ scale electrolyser projects.  FID taken on first small to mid-scale blue H2 projects. | **2022:** Feasibility studies begin for first 100ktpa+ scale projects. This includes the first large scale blue H2 projects as well as ~1GW scale electrolyser projects. | **2023/2024:** FID on first 100ktpa+ projects.  FID on first large-scale blue H2 projects and 1 GW scale electrolyser projects | **2025**: First small to midscale 10ktpa+ projects online and exporting to Asia. | **2030:** First 100ktpa+ projects online and exporting to Asia. | **2035:** Expansion of smaller-scale and large-scale facilities to meet increasing demand for hydrogen in Asia. Australia established as trusted H2 export partner. | **2040:** H2 export industry in Australia growing and approaching maturity. 100ktpa+ projects the norm. | **2050: E**xport industry mature and at scale, similar to the maturity of the LNG industry. |
| Funding Milestones | **Mid-2020**: ARENA H2 funding allocated to kick-start feasibility studies and pre-FEED studies.  ARENA provided further funds to mid-2022 | **Early 2021**: ARENA 2.0 (or alternative) legislation passed to fund renewable investment after mid-2022, with **A$>2bn in H2 investment** **allocated**. | **Mid-2022**: ARENA 2.0 (or alternative) funds available. | | | | | | |
| Certificate of origin | **Late-2020:**  Governance structure for scheme administration finalised | **Feb 2021**: Definitions of hydrogen classes finalised so FID can be made | **Mid-2022:** Accounting methodology/ compliance framework for hydrogen classifications finalised | **End-2024:** Export Certification Scheme operational to support first cargo in 2025 |  |  |  |  |  |

Using SMR + CCS/offsets