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The Treasury
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Response to the Hydrogen Production Tax Incentive Consultation Paper

GHD welcomes the opportunity to respond to the Federal Government's Hydrogen Production Tax Incentive (HPTI) Consultation Paper and commends the Federal Government for pledging significant support for the emerging Australian hydrogen industry. We welcome the opportunity to provide constructive input to policy development.

GHD is a global professional services company that leads through engineering, environment, and architectural expertise and advisory, as well as delivery phase services. Our forward-looking, innovative approaches connect and sustain communities around the world. We have extensive experience in the Australian energy sector and are committed to leading Australia's energy transition, including significant work supporting both technology and project developers in the hydrogen and hydrogen derivative sectors.

We have chosen to respond to key consultation questions where we have the necessary experience:

Q4: What key factors would need to be accounted for in a definition of Final Investment Decision (FID) for the purposes of the HPTI?

Q5: How long do you expect it will take for projects to reach first production following FID?

The proposed timeline of the HPTI may prove challenging for participants to leverage the full 10 years of the inventive. A project starting today may require 24 months of engineering work prior to achieving Final Investment Decision (FID). Added to that, electrolyser lead times are long, currently sitting around 18 – 24 months, and may become longer as demand increases, particularly if manufacturing capacity does not increase as currently projected. Other equipment such as hydrogen storage units and compressors could also have long lead times. Therefore, additional time should be allowed for shipping, site construction and commissioning.

Q7: Please provide any feedback on the proposed emissions intensity threshold of 0.6 kg of carbon dioxide equivalent up to the production gate.

GHD draws reference to several low carbon hydrogen emissions intensity benchmarks globally, detailed in Table 1. The electricity emissions intensity required to produce hydrogen in an electrolyser facility to meet each emissions threshold is detailed in the final column[1].

Table 1 - Hydrogen emissions standards.

Scheme	Label	Emissions threshold (kg CO_2e/kg H_2)	Indicative required electricity emissions intensity (g CO_2e/kWh)
China Hydrogen Alliance	Renewable hydrogen	4.9	81.7
	Clean hydrogen	4.9	81.7
CertifHy	Green hydrogen	4.4	73.3
	Low-carbon hydrogen	4.4	73.3

[1] Using an electrolysis energy demand of 60 kWh/kg.

Scheme	Label	Emissions threshold (kg CO_2e/kg H_2)	Indicative required electricity emissions intensity (g CO_2e/kWh)
UK Low Carbon Hydrogen Standard	Low-carbon hydrogen	2.4	40.0
UK Renewable Transport Fuel Obligation	–	3.9	65.0
TUV SUD CMS 70 (threshold depends on technology, use, and other factors)	Green hydrogen (non-transport)	1.1 – 2.7	18.3 – 45.0
	Green hydrogen (transport)	1.1 – 2.3	18.3 – 38.3
Green Hydrogen Standard	Green hydrogen	≤ 1	≤ 16.7
US Clean Hydrogen Production Standard	Clean hydrogen	4	66.7
US IRA (45V)	US$3/kg	< 0.45	< 7.5
	US$1/kg	0.45 - 1.5	25.0
	US$0.75/kg	1.5 - 2.5	41.7
	US$0.60/kg	2.5 – 4.0	66.7
Safeguard Mechanism (Schedule 99)	Hydrogen	9.01	150.2
Proposed HPTI	**Green hydrogen**	**0.6**	**10.0**

The US IRA (45V, US$3/kg) is the only benchmark that nominates an emissions threshold lower than the proposed HPTI figure. An emissions threshold that is overly restrictive could limit proponents ability to maximise a facilities' capacity factor and therefore negatively impact the levelized cost of hydrogen, restricting the competitiveness and therefore the development, of Australia's hydrogen industry. GHD therefore recommends Treasury consider the proposed emissions intensity threshold within the context of the following:

- Current and forecast Australian electricity grid emissions intensities (NEM, WEM, NTEM).
- Impact on development of renewable energy resources and grid firming technologies in Australian electricity grids.
- Global criteria for clean hydrogen production.

Ideally, Australia would find an emissions intensity sweet spot that achieves a genuine and meaningful lifecycle GHG reduction of the end use of the hydrogen product but allows proponents to find an economic blend of Power Purchase Agreements (PPA), behind the meter generation and grid power at average grid emissions intensity. Power is the largest cost contributor to the levelized cost of hydrogen for most projects and failure to competitively position Australian proponents relative to their global competitors could drive investment to more favourable global locations. An ambitiously low emissions limit relative to global competitors could have that effect.

The mechanism could also incorporate a requirement to meet a reducing target over time and following improvements in grid emissions intensity. The mechanism could also adopt the strategy used in the IRA of a sliding scale to reward proponents that do target lower intensities.

Q9: Please provide feedback on the proposed minimum capacity requirement (equivalent to 10 MW electrolyser)?

Q10: For renewable production processes other than electrolysis, is using the minimum capacity requirement of "equivalent to a 10MW electrolyser" appropriate? Is another definition of capacity required to deal with other production pathways?

The proposed minimum capacity is considered reasonable. However there are potential issues with using a metric referenced as "equivalent to a 10MW electrolyser" as the definition is inherently ambiguous. Definition of capacity through megawatts introduces variability in terms of system design, efficiency, operating conditions and boundary conditions (e.g. are auxiliary loads included in the 10 MW?). For non-electrolyser facilities, these variable factors introduce uncertainty around what conversion factor to use to determine their equivalent minimum capacity requirement.

This ambiguity could be resolved by expressing minimum capacity in terms of mass of hydrogen, i.e. tonnes per year or other suitable production measure. Using a standard electrolyser efficiency of 60 MWh/t, the 10 MW minimum threshold could be considered equivalent to 167 kg/h production capacity. GHD highlights that both definitions are around system capacity, rather than minimum production. Systems with similar capacity can have very different annual productions, based on their operation regime (systems without renewable firming capability may only operate 20-30% of the day, compared to systems with access to firmed power that may run 80% of the day).

In addition to the responses provided above, we would like to take the opportunity to highlight the value we see in the Australian Government considering other measures to promote and support the broad range of low carbon energy vectors. For example, the HPTI provides an incentive linked to hydrogen production. As part of broader support to deliver Australia's net zero future, an alternative or parallel incentive could be provided for the production of low carbon fuels in general (potentially as a $/GJ incentive for low carbon intensity energy). This approach would also promote and support other low carbon energy conversion vectors including hydrogen and other renewable fuel opportunities, provided maximum carbon intensity thresholds are met.

We would welcome the chance to discuss any of our responses and please don't hesitate to contact us if you would like to explore in more detail.

Regards

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