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Energy Policy WA

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Thank you for the opportunity to provide feedback on the idea of stimulating demand for clean hydrogen through an electricity target for the South West Interconnected System (SWIS). We would like to commend the WA Government for exploring ways to stimulate demand for clean hydrogen. It is clear hydrogen will play a major role in the future energy mix and as an export that can over time replace fossil fuels. For this to happen we need to establish domestic demand to build supply chains and bring costs down. Your efforts will be very valuable in that regard.

ITP Thermal has extensive experience in this area and would be keen to assist the WA government further if there were an opportunity. Previously we helped the ACT government look at these issues and our report from that is in the public domain at [Green Gas Trading](#). More recently we assisted the Federal government (DISER) with an investigation of the future of chemical feedstocks in a world where green hydrogen plays an ever increasing role.

Your specific support for hydrogen in power generation is in fact one example of the introduction of dispatchable renewable electricity generation. This is an area that will be critical as we move to decarbonise electricity and as increasing amounts of variable PV and wind generation enter our systems. The ITP Thermal report, [Comparison of Dispatchable Renewable Options](#) provides a useful overview of the various dispatchable options, including the use of stored hydrogen.

ITP Thermal is also a shareholder in www.ardentunderground.com a company that is targeting commercialisation of novel large scale underground hydrogen storage. Such storage we believe will increasingly be essential as larger amounts of renewable hydrogen are employed in a de-carbonising world.

ITP Thermal supports an economy wide, renewable gas target for the whole State and ideally the whole nation. Applying the target to more than the SWIS will further stimulate renewable and clean hydrogen demand, innovation and business models that provide value to multiple parties. If you would like to discuss any aspect of the attached feedback, I can be contacted on (02) 6257 3511.

Yours sincerely

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Renewable Hydrogen Target

Submission from ITP Thermal Pty Ltd

This template has been developed to enable stakeholders to provide feedback on the questions posed in the Renewable Hydrogen Target consultation paper. Energy Policy WA encourage stakeholders to use this template. If you wish to provide additional feedback outside the template, wherever possible please reference the relevant question/section to which your feedback relates.

Renewable Hydrogen Target for electricity generation		
1	What are some examples of an objective or objectives that could be used to assess the benefits, costs and impacts of a Renewable Hydrogen Target for electricity generation?	Building a supply chain for hydrogen production and demonstration that learning curve cost reductions result from increasing demand for hydrogen over time. Reducing the carbon-intensity of SWIS electricity is a priority. Moving towards a mix of generating technologies able to meet demand at all times with zero emissions.
2	How might other uses of renewable hydrogen be accommodated under a Renewable Hydrogen Target certificate scheme? How might Government otherwise support and/or encourage other use cases for hydrogen?	A more economic design for a RHT may be to apply the liability to all fossil gas consumers in the State and allowing domestic gas reserve requirements to be offset, increasing gas exports that can access high international prices. There may be administrative reasons to have a minimum annual threshold for liability. If a threshold is required, it should be as low as feasible, around 20 TJ pa may be appropriate.
Considering hydrogen		
3	What role do you believe renewable hydrogen can play in the decarbonisation of electricity generation ? To what extent will a Renewable Hydrogen Target for electricity generation in the SWIS assist in achieving the decarbonisation objectives of the State Government?	Renewable electrolysis hydrogen electricity generation when coupled with hydrogen storage is one of the future options for the share of dispatchable renewable electricity that will be essential in a fully decarbonised electricity system. If large scale underground storage is employed, hydrogen is one of the few routes to feasible seasonal storage. It will contribute to overall goals both in proportion to the amount of fossil energy that is displaced, but also by building the comfort and confidence needed to pursue complete zero emissions results into the future.
4	What role can the infrastructure associated with the production of renewable hydrogen (i.e. renewable electricity generation facilities, electrolysers, transport and storage infrastructure) play in the broader SWIS ?	A renewable hydrogen generator using gas turbines will play a similar role in the SWIS as a fossil gas generator. Many claim that electrolysis units can be operated as a variable load so offering demand side grid services. If existing gas turbines are converted to hydrogen combustion, this has the potential to save on stranded assets.
Technical feasibility		
5	To the extent you are able please reflect on some of the technical issues, challenges and considerations in the utilisation of hydrogen in the generation of electricity. To what extent can these technical issues and challenges be overcome ? How should this impact on the consideration of a RHT for electricity generation in Western Australia?	There are almost no technical challenges, as technologies have existed for decades to make, store and use hydrogen. The challenges are all economic, as WA natural gas is low cost and there is no cost associated with the greenhouse gas emissions from burning gas in WA. The economic challenges will be overcome by making SWIS electricity more expensive. Whether residential electricity consumers or Synergy (taxpayers) pay this increased cost is a decision for those deciding to increase electricity costs.
Certificate schemes for Renewable Hydrogen Target for electricity generation in the SWIS		

6	Do you believe a renewable hydrogen electricity generation certificate-based scheme represents an efficient and effective means to deliver a Renewable Hydrogen Target for electricity generation in the SWIS? Please explain your answer.	In the first instance it may be administratively, more cost-effective for the Minister for Energy to direct Synergy to purchase 20,000 tonnes of renewable hydrogen per year by 2030, with specified interim annual quantities. However a certificate scheme has the advantage that it can be either now or in the future, be applied to other generators and other fossil fuel using sectors. It also serves as an example to other jurisdictions.
7	What are some other approaches which could be considered alongside a renewable hydrogen electricity generation certificate scheme that would provide a framework to deliver on the objectives or outcomes sought?	Grey hydrogen is already used by many industries in WA. Requiring these industries to use clean hydrogen is a more cost-effective approach to stimulating demand. If this was allowed to offset domestic gas reservation requirements, it would increase gas available for export that benefits from high international prices.
Liable entities		
8	Is the proposed approach of certification, deemed liability and certificate transfer an efficient and effective way to deliver on the intent of the Renewable Hydrogen Target for electricity generation? Are there alternative approaches which could better deliver on the objectives?	See answer to question 6, Minister directs Synergy to purchase renewable hydrogen.
Exemptions		
9	What are the benefits, costs and impacts of an exemptions regime for a Renewable Hydrogen Target for electricity generation?	Many industries are likely to seek exemptions. Granting these exemptions will mean that the price for residential electricity may need to increase more. The measure is more effective and equitable the broader the sectors targeted.
Non-renewable hydrogen		
Renewable fuels		
10	Should the Renewable Hydrogen Target for electricity generation consider alternative renewable fuels as eligible for the creation of Renewable Hydrogen Electricity Generation Certificate? Why or why not?	Yes, broadening the target to a "Renewable Gas Target" to include for example biomethane and biogas as eligible renewable energy. Will help to accelerate overall progress and decarbonisation at least cost. Broadening the eligible gases could allow a bigger overall target to be met at the same overall cost. It is not clear why these more cost-effective, gas fuel sources are excluded from the RHT and the WA Government's approach to decarbonisation. Hydrogen produced from sustainably sourced biomass could also be classified as renewable hydrogen.
Setting a target		
11	Please consider the benefits, costs and implications of a 1%, 5% and 10% Renewable Hydrogen Target for electricity generation in the SWIS on your business or industry, and provide commentary on how you would expect	Due to the administrative complexity and high costs, a 5% target by 2030 should probably be the minimum considered. Preferably for an economy-wide or or broad range of sectors or gas consumption target, rather than just electricity generation in the SWIS.

	to react from a commercial and investment perspective to each target level.	
12	At a whole-of-economy and / or sectoral level, what do you consider to be some of the benefits, costs and implications of a 1% target, a 5% target, and a 10% target?	Due to industry's need for certainty, the target could be specified in MWh or GJ per year, in the year before the obligation arises. A better approach may be to design the target based on annual fuel inputs. The higher the target and the broader the sectors targeted accelerates progress down the cost-curve. However, the initial years are very high costs, so it is a political decision on how to balance the high short-term costs with the long-term benefits.

Target terms

13	Is the suggested approach of a medium term aggregate target, with annual entity targets , an efficient and effective means to achieve the objectives of the Renewable Hydrogen Target for electricity generation in the SWIS? Why or why not?	The RET operates on annual targets, a similar mechanism would work for the RHT.
14	To what extent should banking and borrowing of liabilities be permitted under the scheme? What are the benefits and costs of a borrowing mechanism as described in the paragraph above?	The RET has allowances for banking and shortfalls, a similar mechanism would work for the RHT.

Scheme commencement and ramp up

15	How soon do you believe a Renewable Hydrogen Target for electricity generation in the SWIS could be feasibly delivered from a technical perspective (i.e. if cost was not a consideration)? Please reflect on your own organisation and/or sector when providing your answer.	ATCO's Clean Energy Innovation Park (CEIP) may have started construction in 2022, if a Government Trading Enterprise had been directed to sign an off-take agreement in 2021. ATCO's CEIP is forecast to produce 1,267 tonnes pa, so if the year 1 target is of this scale, then the forecast construction schedule of the CEIP gives an indication of the lead time required for any mandatory obligations.
16	Similar to the above, how soon do you believe a Renewable Hydrogen Target for electricity generation in the SWIS could be feasibly delivered from a commercial or economic perspective (i.e. if cost was a consideration)? Please reflect on your own organisation and/or sector when providing your answer.	The price of RHCs and the required penalty will need to be high to feasibly deliver the measure. If the penalty is set high enough, the measure will be met, subject to approvals, staff, skills and supply chain constraints.
17	Over what period of time do you believe is an appropriate ramp up period for the Renewable Hydrogen Target for electricity generation in the SWIS? In providing your answer reflect on the actions your organisation and / or sector would need to take to participate in the scheme.	The RET was originally for a period of 20 years. The complexity of implementing a RHT indicates that a similar timeframe may be appropriate.

Hydrogen cost outlook

18	In the short (<5 years), medium (5-15 years) and long (15+ years) term, where do you expect the cost of production of renewable hydrogen to move from the estimated levels of today? What do you expect to be the drivers of this change?	The cost of hydrogen production will fall as per standard technology learning curve models as production increases. The rate of cost-reduction will mainly depend on global uptake rates. An additional important consideration is the cost of storing and transporting hydrogen as well as the operation and maintenance of hydrogen electricity generation units.
Hydrogen demand and electrolyser capacity		
19	To what extent do you believe the above scenarios are reasonable and achievable ? Please explain your answer with reference to your previous answers regarding the objectives of the scheme.	Any target is achievable if the penalty is high enough, subject to approvals, staff, skills and other supply chain constraints. Opinions on what increase in the cost of electricity is reasonable is likely to vary across the many income-brackets of residential electricity consumers in the SWIS.
20	How would you expect the levels of hydrogen demand for electricity generation in the SWIS to be met at various points in the supply chain? Would you expect a single generator would emerge and provide all certificates?	This depends on the scale of the target and timeframes. Synergy may also have opportunities to cost-shift and is likely to be able to wear financial losses better than pure commercial operators, so is likely to become the default generator of RHCs.
21	Would you expect one very large renewable hydrogen producer , a number of very small renewable hydrogen producers, or some other combination, to emerge in the State as a result of the scheme? Alternatively, would a domestic-focused producer have sufficient scale to operate in a domestic market only?	This depends on the scale of the target and timeframes. As a first-mover in renewable hydrogen production, ATCO will have an advantage and may seek to maintain a monopoly position on supply. The Hazer Group's demonstration plant is expected to produce around 100 tonnes pa of hydrogen from biogas, so depending on the definition of renewable hydrogen, it may not be able to compete with ATCO on supplying the RHT market. A domestic-focussed renewable hydrogen producer can install sufficient scale to meet whatever the target is as their costs are likely to be met due to the required, high penalty for non-compliance. Costs will be lower for high-volume producers. However, the RHT does not directly stimulate any exports of renewable hydrogen which has significant cost as well as port and other infrastructure challenges.