10 November 2022

Energy Policy WA
Level 1
66 St Georges Terrace
Perth WA 6000

Lodged email: energymarkets@dmirs.wa.gov.au

Dear Energy Policy WA,

RE: Renewable Hydrogen Target for electricity generation in the South West Interconnected System

Shell Energy Australia Pty Ltd (Shell Energy) welcomes the opportunity to respond to Energy Policy WA's (EPWA's) Renewable Hydrogen Target (RHT) for electricity generation in the South West Interconnected System (SWIS) Consultation Paper (the Consultation Paper), released on 13 October 2022. The Consultation Paper has been developed by EPWA in response to the WA Government's request to investigate a Renewable Hydrogen Target for electricity generation in the SWIS.

About Shell and Shell Energy in Australia

Shell has been providing energy to Australians for over 120 years. In Queensland, we are the operator of the onshore QGC coal seam gas project and Joint Venture (JV) partner in the Arrow project. In Western Australia, we operate the Prelude Floating LNG facility and are also part of JV projects including North-West Shelf and Gorgon.

Shell Energy is Shell's global renewables and energy solutions business which has a long history of helping its customers to decarbonize and reduce their environmental footprint. In Australia, Shell Energy is the second largest electricity provider to commercial and industrial businesses[1] and delivers energy solutions and innovation across a portfolio of electricity, gas, environmental products and energy productivity for commercial and industrial customers. In addition, Shell Energy's residential energy retailing business, Powershop, serves more than 185,000 households and small business customers in Australia.

As the second largest electricity provider to commercial and industrial businesses in Australia[1], Shell Energy offers integrated solutions and market-leading[2] customer satisfaction, built on industry expertise and personalised relationships. The company's generation assets include 662 megawatts of gas-fired peaking power stations in Western Australia and Queensland, supporting the transition to renewables, and the 120 megawatt Gangarri solar energy development in Queensland.

Shell Energy has recently acquired a 50% share of Kondinin Energy Pty Ltd (Kondinin) which will be our first West Australian renewables development pending Financial Investment Decision anticipated in late 2023. The centrepiece of the Kondinin project is the Kondinin Wind Farm, a wind development which would generate approximately 230MWs, across two stages, into the SWIS. Kondinin also holds approvals to develop a 80MWs solar farm and ~60MWs BESS which comprise stages three and four of the Kondinin project.

Shell Energy Australia Pty Ltd and its subsidiaries trade as Shell Energy, while Powershop Australia Pty Ltd trades as Powershop. Further information about Shell Energy and our operations can be found on our website here.

[1] By load, based on Shell Energy analysis of publicly available data.

[2] Utility Market Intelligence (UMI) survey of large commercial and industrial electricity customers of major electricity retailers, including ERM Power (now known as Shell Energy) by independent research company NTF Group in 2011-2021.

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General Comments

Shell Energy believes clean hydrogen[3] – together with electrification – has a significant role to play in Australia's future energy system. It is the most promising solution to decarbonise hard-to-abate sectors where electrification is challenging due to technical reasons (i.e. freight, steel making, refining).

Future hydrogen supplies will come from a mix of sources, including electrolysis, pyrolysis, steam methane reforming with carbon capture and storage, and autothermal reforming with carbon capture and storage. Production of green hydrogen is Shell's ultimate goal. However, we believe both blue and green hydrogen production will likely be required to achieve ambitions of net-zero emissions.

Shell Energy considers that policy support should include:

- Defining widely accepted industry technical standards for green and blue hydrogen, including a methodology for calculating carbon dioxide emissions.
- Providing grants (funding) to support demonstration projects and associated infrastructure to reach scale, thereby assisting viability of investments.
- Promoting demand for renewable hydrogen by increasing mandates in hard-to-decarbonise sectors such as heavy industry, industrial heating and heavy-duty transport.

Hydrogen has significant potential to enable the transition to a clean and low-emissions energy system. Shell Energy sees material markets for clean hydrogen as a feedstock into chemical processes, a fuel for heavy industry as a medium-term replacement of gas, fuel oil and metallurgical coal, and also for clean energy export to energy short markets. Shell Energy is exploring solutions to provide clean hydrogen to homes and business, for transport, as well as refineries and factories. Ensuring that there is sufficient demand in place will be critical to the success of demonstration projects for clean hydrogen in industry, power and transport.

In Australia, the challenge is timing. For clean hydrogen to succeed, it will take synchronised development of both supply and demand as well as the supporting infrastructure, such as hydrogen pipelines for transportation, storage technologies and production facilities. This will require coordination among public and private organisations at a local, national and international level.

Shell Energy understands that through limited stakeholder consultation in May 2022, EPWA was tasked to investigate a RHT in WA. Key themes were decarbonisation of industry, infrastructure (development and timing), government policy and best use of hydrogen. We understand that feedback from this consultation will be used to inform the development of a cost benefits analysis based on what will be the preferred options.

We look forward to contributing to this important consultation and encourage EPWA to continue to provide sufficient time for stakeholder engagement. Feedback and responses to consultation questions for each of the 21 design concepts has been provided below under the associated subheadings.

Consultation questions

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?**

   Assuming this question is specific to the SWIS, one objective that could be used to assess the benefits, costs and impacts of a RHT for electricity generation is the growth of a renewable hydrogen industry in WA, measured by long term monitoring against targets and should be subject to review. While we see that stimulation of a renewable hydrogen industry is the first objective outlined in the Consultation Paper, we see the importance of clear and measurable targets to effectively track how this objective is being met.

   The Consultation Paper suggests that the introduction of a RHT in the SWIS could create a source of demand for renewable hydrogen produced in WA, and could act as a catalyst for broader industry

[3] Hydrogen can be produced from various renewable and non-renewable sources and technology pathways. Shell's definition of clean hydrogen includes: electrolysis using renewable or low-carbon energy input (usually referred to as green hydrogen when 100% renewables are used); 100% renewable gas reforming; gas reforming with CCS, whereby natural gas or refinery gas is converted to hydrogen via a reaction which involves either steam (steam reforming), oxygen (partial oxidation) or both in sequence (autothermal reforming) and during which the CO2 is captured (usually referred to as blue hydrogen); and pyrolysis, whereby natural gas or renewable gas is heated to high temperatures to generate hydrogen, with a solid carbon by-product. There is currently no universally agreed definition of green, clean or low-carbon hydrogen.

development. We would encourage EPWA to undertake detailed modelling and work with stakeholders to develop clear criteria and targets to measure against this objective.

We suggest that if this were to be implemented in WA, EPWA commit to undertaking a regular review against the agreed objectives to determine the value of a RHT.

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?**

   Other uses of renewable hydrogen include energy storage to firm variable renewable energy or as a distributed energy resource (off-grid system or back up power). Shell Energy envisage storage of renewable hydrogen, potentially used for grid stabilisation services, or transported for use as a fuel in certain power generation processes. Shell Energy believes renewable hydrogen as a storage option will have a role for managing intermittency, ensuring seasonality and a constant supply.

   Shell Energy suggests that a certificate scheme could incentivise wider adoption of the RHT through the appropriate benefits as mentioned above.

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?**

   Decarbonisation objectives of the State Government include[4]:

   - To provide robust and credible emissions reduction pathways for Western Australia with tangible actions for reducing emissions consistent with the government's target of net zero emissions by 2050.
   - To recognise the importance of significant action this decade to reduce emissions, transition emissions-intensive industries and protect Western Australia's economy from carbon transition risks.

   The challenge presented in WA is that the hydrogen industry is currently in a development phase, lending to a costly and cumbersome exercise for demand stimulation. In reality, the infancy of this industry in both WA and Australia makes it difficult to determine how successful a RHT for electricity generation in the SWIS will be in achieving the decarbonisation objectives of the State Government. Again, this would need to be assessed over an extended period of time, perhaps when renewable fuel sources are more cost effective and there has been broader implementation of similar State and Federal Government policies.

   Large-scale production of hydrogen from renewables is Shell's ultimate goal, but to achieve scale in the timeframe required for hydrogen to make a difference as a net-zero lever, all forms of decarbonised hydrogen are needed. As demand for hydrogen and electricity increases simultaneously, there is unlikely to be enough renewable electricity to sustain both deep electrification and mass hydrogen adoption in the short to medium term.[5]

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?**

   With declining costs for Solar PV and wind generation, building electrolysers at locations with appropriate renewable resource conditions could become a low-cost supply option for hydrogen, even after taking into account the transmission and distribution costs of transporting hydrogen from (often remote) renewables locations to end-users. Shell Energy would encourage EPWA to use existing policies such as the Whole of System Plan (WOSP) to incorporate the potential for renewable hydrogen to be produced in the SWIS.

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 Renewable Hydrogen Target for electricity generation in Western Australia?**

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[4] Shaping Western Australia's low-carbon future, Developing the sectoral emissions reduction strategies to transition the economy to net zero, Department of Water and Environmental Regulation, December 2021.
[5] Shell Global Hydrogen Policy Positions..

Consideration needs to be given to the volume of renewable hydrogen to be blended, alongside the RHT percentage required to achieve the listed objectives. Shell Energy encourages EPWA to undertake modelling that will strike a balance between the technical capability of open cycle gas turbines blending hydrogen, inclusive of long-term safety and cost implications of blending renewable hydrogen into gas infrastructure. This could lead to requiring additional facility maintenance and upgrades to facilities to accommodate renewable hydrogen.

In addition, the existing generation capacity and electricity infrastructure will need to be considered in the modelling of the RHT percentage as this could have significant implications on meeting the listed objectives.

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.**

   - Design needs to align with the objectives of the proposed RHT
   - Must be in alignment with other relative schemes so as to ensure standards are consistent

   The Consultation Paper proposes a certificate scheme facilitating the creation of a market for renewable hydrogen-based electricity in a transparent and accountable manner, through a centralised authority.

   Shell Energy is supportive of the creation of a renewable hydrogen certificate scheme to allow for the trading of certificates to encourage and support development of a hydrogen industry. While this seems to be a sensible approach to meet the objective of the development of a hydrogen industry in WA in an efficient manner in the short term, a low cost and efficient certificate scheme needs deep and liquid certificate market. The value of the certificates as a tradeable commodity must be transparent and sufficient competition to support objectives with a fluid forward market and low transactional costs. Shell Energy requests stakeholder consultation to ensure the design is compatible with efficiency objectives (low compliance costs, low fees, adequate price discovery etc) but also to have a design that would enable liable parties to efficiently manage forward procurement etc.

   With regard to a Guarantee of Origin Scheme, EPWA advised that development of a certificate scheme is being considered or that a scheme may be leveraged off an existing scheme. Shell Energy notes that if this is in reference to the Federal Guarantee of Origin Scheme, this is still under development and is unlikely to be legislated until at least 2024. We seek clarification on how the timing of this Federal scheme aligns with the timeframe of the proposed RHT and encourage timing to be considered as a priority to allow for consistency across frameworks and 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?**

   Shell Energy sees material markets for clean hydrogen as a feedstock into chemical processes, a fuel for heavy industry as a medium-term replacement of gas, fuel oil and metallurgical coal, and also for clean energy export to energy short markets.

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?**

   If the intent of the RHT is to stimulate a renewable hydrogen industry, then the creation of a certificate scheme would likely assist in delivering this outcome. Shell Energy is supportive of a certificate scheme however, the design features will be crucial in measuring the effectiveness and efficiency of the scheme. To ensure the development of an efficient market, we request EPWA prepare a detailed design of the scheme for stakeholder consultation.

   The Consultation Paper refers to the definition of a liable entity as per the Renewable Energy Target (RET) and describes a liable entity considered to be any purchaser of electricity from an electricity grid or directly from the point of generation. This includes all wholesale electricity providers, plus large users who purchase electricity directly from generators. Shell Energy requests EPWA ensures definitions are consistent across jurisdictions where possible and requests this to be included in further stakeholder consultation.

   In addition, the point at which liability applies is important and we request EPWA clarify this in further consultation.

Exemptions

9. **What are the benefits, costs and impacts of an exemptions regime for a Renewable Hydrogen Target for electricity generation?**

   No feedback provided.

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?**

    If introduction of alternative renewable fuels is being considered for a certificate scheme, we encourage consideration of a technology neutral approach. This would scale up technologies and bring down costs to allow hydrogen to become widely used, providing more of an opportunity to stimulate a hydrogen industry in the first instance, with renewable hydrogen to follow as a result. As technology for hydrogen decreases in cost, renewable hydrogen would become more cost effective to produce.

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 to react from a commercial and investment perspective to each target level.**

    Shell Energy welcomes substantial consultation on a cost benefits analysis for each percentage target proposed in the Consultation Paper and encourage EPWA to consider the order of the objectives in the Consultation Paper and benchmark the percentage options against the objectives.

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?**

	Benefits	Costs	Implications
1% Target	• Least long-term implications to facility maintenance and upgrades • Least expensive with regard to facility maintenance	• Same costs to start up as higher percentage targets	• May not meet objectives as portion is too low/insignificant • Will likely increase this target anyway
5% Target	• Most balanced option	• Same costs to start up as higher percentage targets	• Will not meet objectives as effectively • It is more likely that existing generation assets and electricity infrastructure could support the introduction of this percentage
10% Target	• Achieve objectives in shortest timeframe	• Higher cost to maintain facilities • Highest start up cost	• Likely to meet objectives however, at an increased risk to safety/technical aspects • Stretch for planned generation fleet to meet this target

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?**

    Agree, medium term appears to balance certainty of demand and capacity of upstream to respond. This would also effectively reduce administrative burden for liable entities in managing the surrender of certificates.

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?**

    Supportive of this approach as it allows management of certificates on a multiple year basis in line with business planning and maintenance cycles. It's likely to reduce risks associated with over-procurement of certificates and allows liable entities to manage their exposures more efficiently.

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.**

    As outlined earlier in this paper, ensuring that there is sufficient demand in place will be critical to the success of a RHT in the SWIS. More broadly, in Australia the challenge is timing and for renewable hydrogen to succeed, it will take synchronised development of both supply and demand as well as the supporting infrastructure, such as hydrogen pipelines for transportation, storage technologies and production facilities. This will require coordination among public and private organisations at a local, national and international level.

    Additionally, Shell Energy believes that rushing implementation of such a complex mechanism is not a sensible approach and we request EPWA consider the time it takes to set up an accreditation regime, certificate registry and allowing reasonable time for customer communication, and ensuring that systems and contracts can support compliance. As such, we request EPWA develop a detailed design of the proposed scheme for stakeholder consultation.

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.**

    Please see above.

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.**

    Shell Energy notes that objective 2 of the proposed RHT scheme is to decarbonise the electricity grid. Timeframes for decarbonisation of the electricity grid would need to be determined for this objective to be achieved and therefore, the timing would impact ramp up periods for this scheme to be underway. This is a significant undertaking and given the infancy of the hydrogen industry in Australia, it is expected that this would be a lengthy process.

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?**

    In the short to early medium term, the cost of renewable hydrogen (between US$4/kg to US$5.50/kg)[6] is likely to remain cost prohibitive relative to blue hydrogen, unless supported by Government incentives or potentially favourable lending terms.

    Shell Energy recognises that to drive this change there will need to be a supportive regulatory framework and financial support from Government will be critical to bring decarbonised technologies to scale, reduce costs and enable commercial deployment.[7]

[6] https://www.mckinsey.com/capabilities/sustainability/our-insights/five-charts-on-hydrogens-role-in-a-net-zero-future
[7] Shell Global Hydrogen Policy Positions.

Hydrogen demand and electrolyser capacity

19. **To what extent to 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.**

    As mentioned in the previous response, the achievement of the above scenarios will be dependent on a broad spectrum of factors. However, one of the key impediments would be funding and a well-considered transition plan. It is understood, globally, Europe and America's Government have recently announced significant funding programs to expediate a renewable transition; these incentives naturally pull resources and capabilities away from less well funded regions.

    Even if technologically advancement is available in achieving the targets, being able to bring resources and capabilities to implement infrastructures would be a challenge given the competitiveness of funding availabilities.

    Consideration should be given to how a transition plan might work in WA. It is imperative to note a key objective of the RHT scheme is to facilitate emission reductions, and therefore existing abatement programs or available carbon capture storage infrastructure, should be included to ensure the successful implementation of the RHT scheme.

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?**

    Northern and southern coastal corridors appear best suited to transition to hydrogen production, due to access to fuel, water, land, pipelines and electricity infrastructure.

    The DBNGP provides a solution for hydrogen transportation if technical challenges can be addressed.

    Electricity generation with hydrogen is unlikely to be centralised in a single facility, with gas turbines throughout the SWIS investigating technical feasibility of hydrogen.

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?**

    It is more likely to be concentrated in a small number of large producers, given the current cost barriers and requirement to develop a demand base. We encourage this point to be considered in the cost benefit analysis that is being undertaken following this consultation.

Conclusion

Shell Energy have a strong interest in the development of Hydrogen projects both in Australia and around the world. We recognise that renewable hydrogen can play a significant role in decarbonisation across hard to abate industries.

It is important that any mechanism for supporting the sector is carefully designed to avoid unintended consequences.

Shell Energy thanks EPWA for its consultation efforts so far and we look forward to further engagement during all stages of this consultation. We encourage EPWA to continue stakeholder engagement early in the process to allow for sufficient time to comment, ensuring opportunity for effective feedback to be provided.

We welcome the opportunity to discuss our submission further. Please contact Tessa Liddelow at tessa.liddelow@shellenergy.com.au for any queries regarding this submission.

Yours sincerely

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