



ASX Announcement | 11 January 2023
Hexagon Energy Materials Limited (ASX: HXG)

Hexagon Completes WAH₂ Scoping Study

Highlights:

- Scoping study completed in December 2022 on time and on budget.
- Study confirms WAH₂ project concept, identifies opportunities to reduce unit costs, and provides appropriate focus for Preliminary Feasibility Study (PFS).
- PFS on track for completion Q2 2023.
- Targeting FEED entry Q4 2023 and FID Q4 2024, subject to results of PFS.

WAH₂ Project Scoping Study Results:

The Hexagon team completed the anticipated WAH₂ low-carbon hydrogen project scoping study on time and on budget prior to year-end. The study considered the different elements required to deliver such a project and supported progression to a Preliminary Feasibility Study. Specific areas of analysis included:

- Hydrogen production methodology;
- Energy carrier solution;
- Site location and availability of land;
- Project scaling and phasing of production;
- Gas supply;
- Carbon capture and storage;
- Production technology alternatives; and
- Identification of enhancements to minimise capital and operating costs.

While, due to the proprietary nature of the finding of the study, the complete report will not be made public a summary of key findings is provided below.

Chairman Charles Whitfield commented: *"The Scoping Study has built a firm foundation upon which to move the WAH₂ project forward. Key questions around availability of input gas and CO₂ sequestration capacity from already planned providers have been addressed, clearing a major hurdle to the viability of the project. The outcomes of the scoping study provide the confidence for the Company to now move ahead with the Preliminary Feasibility Study which is due for completion in Q2 of this year. In parallel with this, key commercial discussions with input and service providers, the WA Government, potential off-takers and strategic partners will all be progressed. I'd like to thank the hydrogen team including Stephen Hall and Andrew Kirk for their diligence in completing this stage in the project development."*

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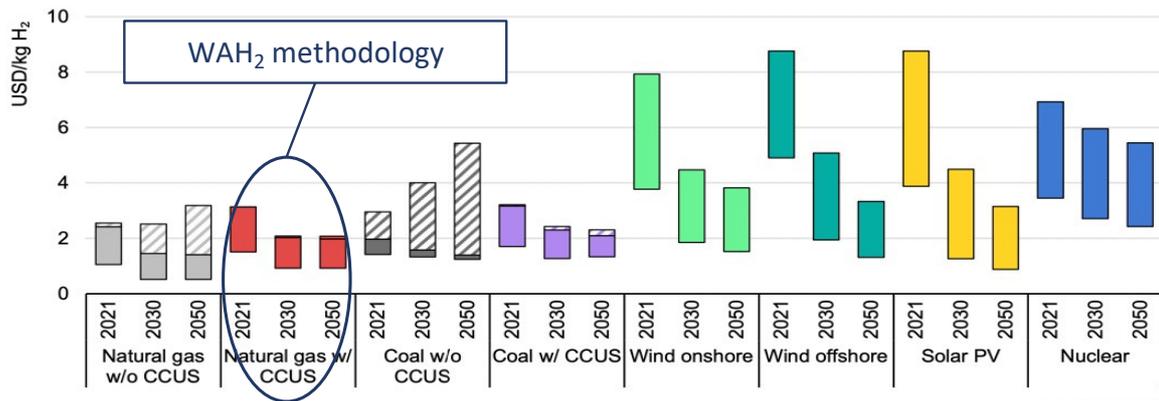
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Hydrogen production methodology

Competitive, low-carbon, low-risk hydrogen is to be delivered by using proven technology to reform natural gas feedstock, carbon capture and storage (CCS) in depleted gas reservoirs and harnessing northern Western Australia's renewable energy potential.

Figure 1. Comparative cost of hydrogen across different methodologies
(in 2021 and in Net Zero Emissions scenario in 2030 and 2050)

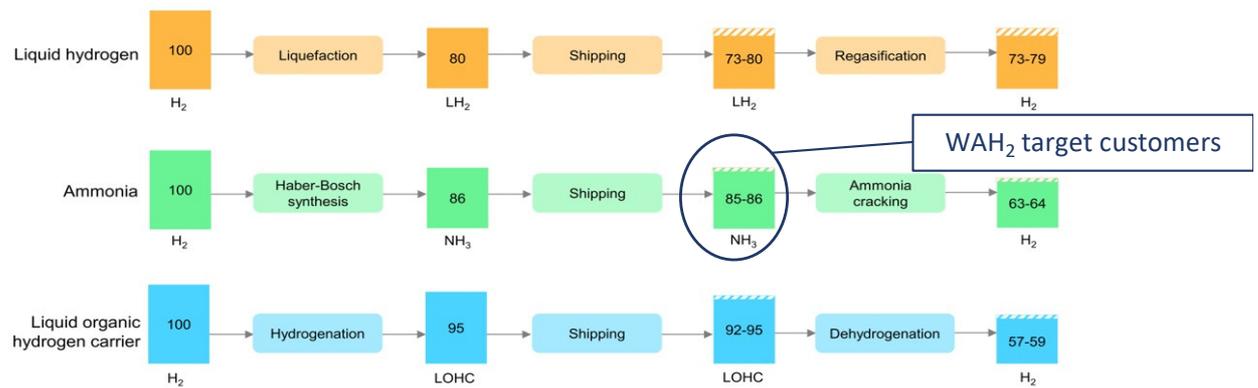


Source: IEA Global Hydrogen Review 2022¹

Energy carrier

The produced hydrogen will be converted to low-carbon ammonia as the most appropriate energy carrier. This offers reduced processing and transportation costs and greater energy-efficiency than the alternatives of liquid hydrogen or liquid organic hydrogen carriers - and aligns with customers' need for ammonia.

Figure 2. Energy available along the conversion and value chain in hydrogen equivalent terms
(in 2030)



Source: IEA Global Hydrogen Review 2022²

Site location

Hexagon has identified its preferred site for WAH₂ and has applied to the WA Government for a long-term lease over the site.



The site is in an existing Strategic Industrial Area in northern Western Australia. It is proximal to services, with established export routes and an existing infrastructure corridor. It is well-placed to access key Asian markets such as Japan and South Korea and to provide domestic supply to Australia.

Project scaling and phasing of production

Development of the WAH₂ project will be phased to manage risks and align with market development. Indicatively, Phase 1 will produce ~250 kT of ammonia per annum, increasing to ~800 kT per annum in Phase 2.

Gas Supply

WAH₂'s feed-gas requirement could be met by the market.

There are several potential suppliers with access to existing distribution infrastructure and Phase 1 of the project would consume only ~2% of Western Australian's forecast daily gas supply (Base Case, WA GSOO 2022).

Carbon capture and storage

Several credible CO₂ sequestration alternatives are being developed proximal to WAH₂.

Greenhouse gas assessment permits have been awarded to joint ventures operated by Santos (G-9-AP) and Woodside (G-10-AP), and the Australian Gas Infrastructure Group is investigating the potential to use its wholly owned Tubridgi asset for CO₂ sequestration.

Production technology

The choice of specific hydrogen production technology drives tangible differences in plant costs, power requirements and CO₂ emissions. Steam methane reforming, autothermal reforming and gas heated reforming are all under consideration.

Project enhancement opportunities

Opportunities have been identified to reduce unit costs and leverage economies of scale. These include:

- Optimal technology choice and sizing of Phase 1 of the WAH₂ project;
- Potential access to multi-user infrastructure including utilities import, product export and CO₂ transmission; and
- An optimised power solution.



Next steps:

The focus of the Hexagon team has now turned to completing the WAH₂ PFS in Q2 2023 and, in parallel:

- Progressing commercial discussions regarding gas supply, utilities, CO₂ sequestration and ammonia offtake; and
- Securing an Option to Lease from the WA Government over Hexagon's preferred project site.

¹ Notes to Figure 1

Ranges of production cost estimates reflect regional variations in costs and renewable resource conditions. The dashed areas reflect CO₂ price impact, based on CO₂ prices ranging from USD 15/tonne to USD 140/tonne CO₂ between regions in 2030 and USD 55/tonne CO₂ to USD 250/tonne CO₂ in 2050. Sources: Based on data from McKinsey & Company and the Hydrogen Council; IRENA (2020); IEA GHG (2014); IEA GHG (2017); E4 Tech (2015); Kawasaki Heavy Industries; Element Energy (2018).

² Notes to Figure 2

LH2 = liquefied hydrogen; NH₃ = ammonia; LOHC = liquid organic hydrogen carrier. Numbers show the remaining energy content of hydrogen along the supply chain relative to a starting value of 100, assuming that all energy needs of the steps would be covered by the hydrogen or hydrogen-derived fuel. The Haber-Bosch synthesis process includes energy consumption in the air separation unit. Boil-off losses from shipping are based on a distance of 8 000 km. For LH2, dashed areas represent energy being recovered by using the boil-off gases as shipping fuel, corresponding to the upper range numbers. For NH₃ and LOHC, the dashed area represents the energy requirements for one-way shipping, which are included in the lower range numbers.

Ends

ABOUT HEXAGON ENERGY MATERIALS LIMITED

Hexagon Energy Materials Limited (ASX: HXG) is an Australian company focused on future energy project development and energy materials exploration and project development.

Hexagon 100% owns the McIntosh Nickel-Copper-PGE and Graphite project in Western Australia (WA) and the Halls Creek Gold and Base metals project in WA. On 14 February 2022 Hexagon announced a binding Graphite Mineral Rights Earn-in agreement (up to 80%) had been entered into with Critical Green Minerals Pty Ltd, with McIntosh graphite expected to become part of an ASX Initial Public Offering during 2023. In the USA, Hexagon has an 80 per cent controlling interest of the Ceylon Graphite project located in Alabama, over which South Star Battery Materials Corp. (TSXV: STS) on 7 December 2021 signed an Option to develop and earn-in up to 75% interest.

Hexagon also is developing a business to deliver decarbonised Hydrogen (blue Ammonia) into export and domestic markets at scale, with Hexagon's WA Hydrogen (WAH₂) project currently being pursued.

Hexagon's plan is to use renewable energy in clean Hydrogen production to the greatest extent possible in its projects, transitioning from blue to green Hydrogen production on a commercial basis, over time. Supporting this strategy in January 2022 Hexagon signed a Memorandum of Understanding with renewable energy company FRV Services Australia Pty Ltd (FRV Australia) (51% owned by Fotowatio Renewable

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Ventures S.L. and 49% owned by OMERS Infrastructure part of OMERS Canadian defined benefit pension plan fund). FRV has almost 800MWdc of Australian PV assets built or under construction in Australia.

Hexagon’s overarching goal for 2023 is to secure and leverage technical and commercial alliances by commodity across its project portfolio whilst maintaining a core focus on Northern Australian Future Energy Materials and Future Energy project developments, in-house. The graphics below summarises Hexagon’s Strategy and the locations of Hexagon’s projects.

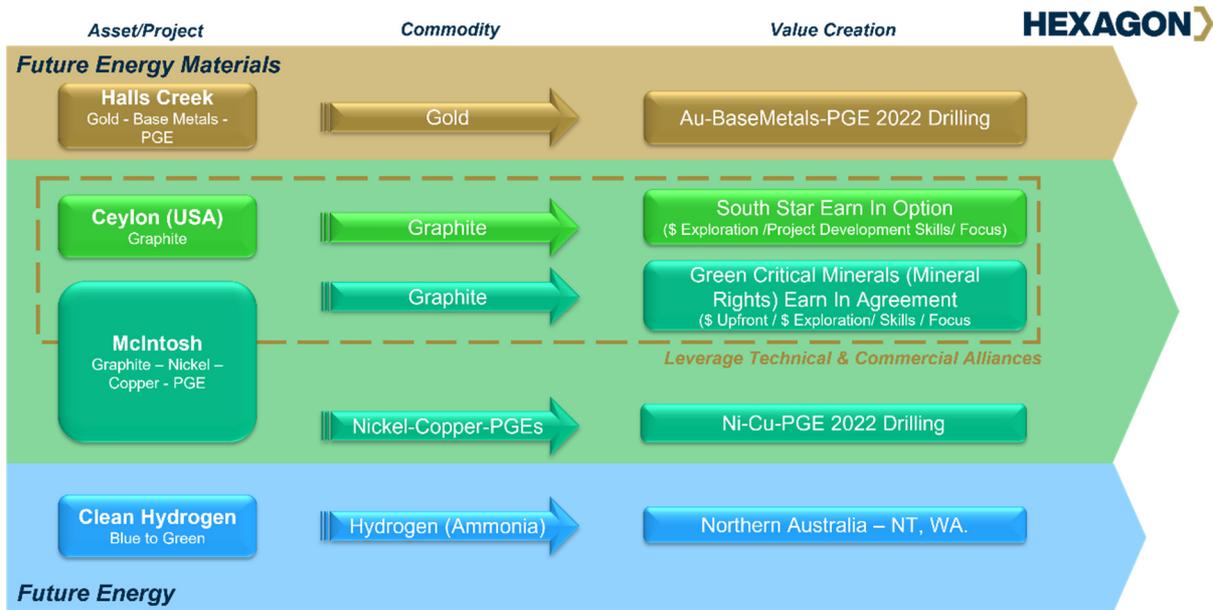


Figure 1: Hexagon’s Strategy 2023.

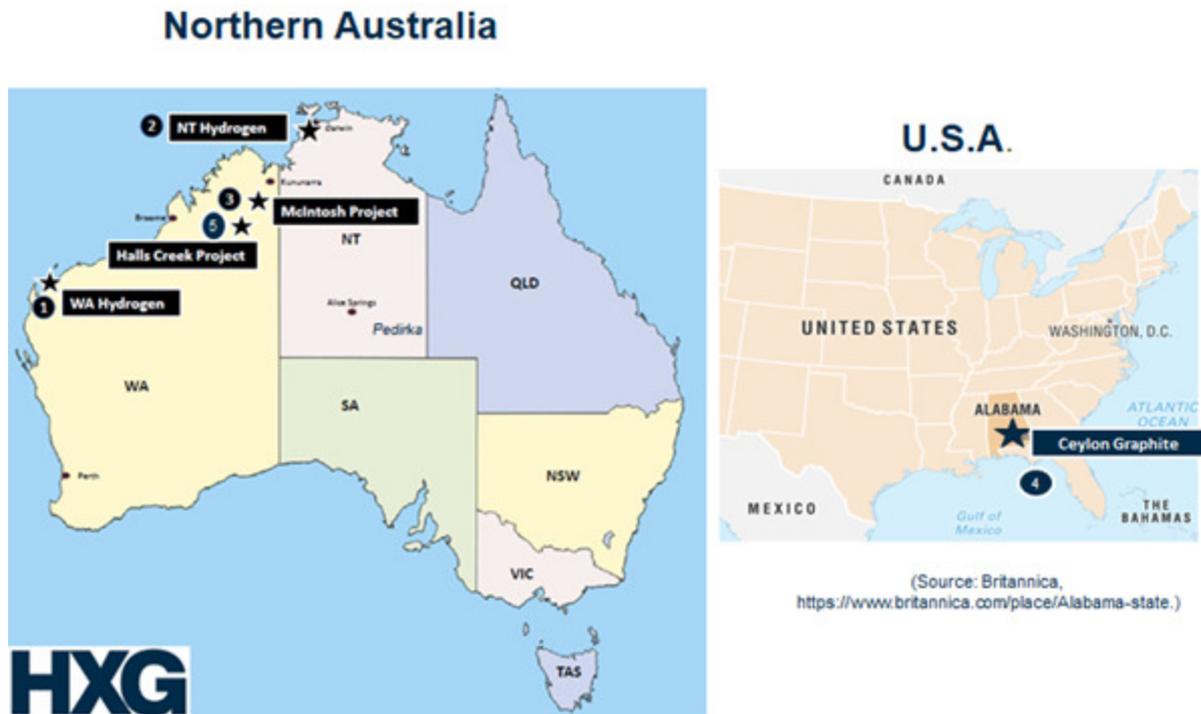


Figure 2: Hexagon project locations.



Authorisation

This announcement has been authorised by the Board of Directors.

To learn more please visit: www.hxgenenergymaterials.com.au

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