Commercial Demonstration Plant produces Hydrogen and Graphene Powder

- **Turquoise Group (TG)confirms it has successfully produced graphene powder and hydrogen as part of testing of its commercial demonstration plant located in Brisbane, Queensland.**
- **As reported in Pure Hydrogen's March 2024 quarterly report the commercial plant's construction and implementation has been completed. The testing stage has commenced with excellent results so far.**
- **Further testing will be conducted, with the aim of expanding production output and optimising the consistency of hydrogen and graphene powder production.**
- **Pure Hydrogen holds a strategic 40% stake in the Turquoise Group, with exclusive long-term purchase rights for hydrogen produced by Turquoise Group in Australia at attractive market rates**

Sydney, 21 May 2024: Australian clean energy company Pure Hydrogen Corporation Limited (ASX: PH2 or 'Pure Hydrogen') is pleased to announce that Turquoise Group has reported that it has successfully produced both hydrogen and graphene powder from its commercial demonstration plant (CDP) located in Brisbane, Queensland.

The results come from testing that was conducted at Turquoise Group's commercial demonstration plant located in Brisbane suburb of Darra, Queensland using natural gas (methane) as feedstock. The preliminary testing of solid carbon production at the CDP has confirmed the plant's capacity to produce graphene powder, a key development milestone for the Turquoise Group process, and demonstrates its potential as a sustainable technology capable of producing bulk-quantities – up to 100's of kilograms per day from one unit – of high-quality graphene powder. Significantly, this milestone also paves the way for a technology capable of producing low-cost zero-emission hydrogen, as the expected revenue from graphene sales ensures the commercial threshold for the system is easily reached.

Bringing bulk quantities of high-quality graphene to the market has the potential to make a significant impact across multiple industries as part of the clean energy transition. Manufacturing industries where the technology can be applied include batteries, electrical equipment, as a potential future evolution for silicon chips and as an enhancing additive in existing manufacturing processes [1].

Graphene-enhanced materials and composites are light, strong, and have 'smart' properties linked to graphene's impressive electrical and temperature conductivity. As an example, studies show that by adding a mere 0.03% weight of graphene increases the strength of the concrete by +25%, while also improving other characteristics of the end-product [2].

With the anticipated adoption of graphene as an enhancing additive across multiple sectors, Turquoise Group's technology will also provide a sustainable and responsible alternative for the commercialisation of methane gas.

The successful initial testing follows the delivery of state-of-the-art methane pyrolysis technology at the commercial demonstration plant in late-2023 (*refer ASX Announcement 5 December 2023*).Turquoise Group's commercial demonstration plant has subsequently been commissioned and refined to target continuous high quality graphene production through a methane plasma pyrolysis process.

The technology solution is highly energy efficient, using a water-free process without direct CO or CO2 emissions. The process splits methane gas (CH4) into solid graphene powder(C) and hydrogen gas (H2) components.

The continuous production of bulk volumes of high-quality graphene (solid carbon powder) was identified as a key value driver for the pathway to commercialisation for future Turquoise Group hydrogen production.

Pure Hydrogen holds a strategic 40% stake in Turquoise Group which is non-dilutable for a 3.5 year term, in line with the expected commercialisation phase for the technology (*refer ASX Announcement 29 June 2023*).

Images: The plasma torch used in Turquoise Group's process (L), and graphene powder generated through the trial demonstration (R).

Image: Left the Turquoise Group's CDP in Brisbane

Once a successful demonstration is achieved, Turquoise Group plans to build commercial modules that can be installed anywhere methane gas is available. Turquoise Hydrogen is manufactured by decomposing methane into its two elemental components, hydrogen gas and solid carbon. The manufacturing process consumes five times less electricity than an equivalent capacity green hydrogen electrolysis process, consumes no water and produces no direct CO or CO2 emissions. When operated with renewable electricity and bio-methane, the process can also become carbon negative.

In connection with its investment, Pure Hydrogen also holds the exclusive rights to acquire hydrogen produced by Turquoise Group within Australia for 20 years at prices based on a sliding scale linked to the value of the carbon offtake products

Pure Hydrogen's Managing, Mr Scott Brown said: "*This is a significant and encouraging result, which marks an important step forward for the development of this unique technology that has the capacity to revolutionise the energy market. While still at an early stage in the process, we are encouraged by these initial results which show the technology has the capacity to convert methane gas to hydrogen and graphene powder, with significant addressable-market applications.*

The results are a step closer in the commercialisation of this promising technology which will enhance Turquoise Group's prospects and importantly for Pure, provide a fantastic low cost and plentiful hydrogen supply option while being emissions free. We look forward to further testing to confirm the technology resulting from the research and development into a commercial one."

Turquoise Group CEO, Samuel Taubert added *"The successful conversion of methane feedstock into hydrogen and high-quality graphene powder is a key milestone in the development of our commercial demonstration plant, and puts Turquoise Group on track to achieve our stated objectives with respect to achieving product-market fit commercial applications for this unique technology. The on-site team is now moving forward to the next testing phase of the development, led by the conversion and manufacture of graphene powder at scale through this process. We look forward to providing more updates in the second half of the year with respect to our production and sales pipeline as product development progresses."*

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This announcement has been authorised by the Managing Director of Pure Hydrogen Mr Scott Brown.
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About Pure Hydrogen Corporation Limited

Pure Hydrogen is a clean energy-focused company seeking to become the leader in the development of Hydrogen and Energy Projects through the use of cutting-edge technology processes. It plans to supply hydrogen fuel to both Australian customers and regional Asia Pacific markets, through the production of Green, Emerald, and Turquoise Hydrogen. Concurrently, the Company is developing natural gas projects directly in Australia and Botswana and through a strategic investment it holds in a Botswana- focused energy company listed on the Australian Securities Exchange.

Strategically, Pure Hydrogen will also prioritise incubation for early-stage companies or projects within the clean energy sector, with the aim of realising profits from those investments. For further details visit www.purehydrogen.com.au

References

1. Graphene vs. Silicon: Exploring the Future of Materials and Technology (scienceshot.com)
2. Graphene: the building block for sustainable cities - Graphene (manchester.ac.uk)