

# Western Sydney Green Gas Project – Managing the Complexities of Hydrogen Production and Injection into an Operating Network.

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Jemena, supported through co-funding from the Australian Renewable Energy Agency (ARENA), is delivering the Western Sydney Green Gas Project. The project involves demonstrating Power-to-Gas (P2G) technology by converting renewable electricity into hydrogen gas, storing it and injecting it into Jemena's secondary gas distribution network over a five year period. The project is located at the existing Jemena high pressure gas facility in Horsley Park, in Western Sydney.

The P2G trial will be one of the most comprehensive in Australia and will produce 100 Nm<sup>3</sup>/h of hydrogen gas from a 500 kW Proton Exchange Membrane (PEM) electrolyser. "Green" hydrogen produced from renewable electricity will be stored in a 340 meter purpose built DN500 buffer storage line prior to:

- controlled injection into the existing natural gas distribution network at up to 2% by volume;
- utilisation by a fuel cell package and/or hydrogen microturbine to generate power for export to the grid;
- use in research and development opportunities including trialing compositions of natural gas and hydrogen blends; and
- future onsite compression and refilling of transportable hydrogen cylinders for off-site use of green hydrogen.

In addition to the above use cases, Jemena has been working with electrical network operators and suppliers to maximise sector coupling opportunities through accessible interfaces, allowing the network operators the ability to control the electrolyser in certain scenarios for grid firming applications.

Throughout the FEED, procurement of Long Lead Items (LLI), construction and commissioning, numerous risks and challenges were successfully managed. The key emerging challenges specific to this project included:

- the fallout from a global pandemic and subsequent identification of the fragility of supply chains, particularly on novel technology;
- complex legislative and regulatory hurdles relating to the production and injection of hydrogen into the gas network;
- compliance with applicable standards and assessing new standards; and
- commissioning and integration of novel technology / asset into an operating natural gas business group.

The above challenges were overcome through significant collaboration between key stakeholders and delivery partners to ensure the successful delivery of the project.

As the project progresses through construction and subsequent commissioning by mid-2021, the project delivery learnings and test results undertaken as part of this project will be presented through the case study. It is hoped the successful delivery of the project will be pivotal in launching the growth of hydrogen production, storage, network injection and increasing sector coupling opportunities around Australia.