



Building a hydrogen pathway

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About Stanwell



Stanwell is a Queensland Government owned energy company.



We are a major provider of electricity to Queensland, the National Electricity Market and our large commercial and industrial customers.



We own and operate Stanwell Power Station, west of Rockhampton, and the Tarong power stations and Meandu Mine near Kingaroy.



Stanwell has a pipeline of renewable energy, battery storage and renewable hydrogen projects which will play a key role in Queensland's low carbon future.



Three decorative circles in the top left corner: a dashed orange circle, a solid orange circle, and a solid grey circle.

Our hydrogen journey

Feasibility study: 10 MW H₂ electrolysis demonstration plant

July 2019 – October 2020

- ▶ 10 MW hydrogen demonstration plant at Stanwell Power Station

Study received funding from ARENA as part of ARENA's Advancing Renewables Program

Concept study: hydrogen at scale in Central Queensland

July 2020 – October 2020

- ▶ investigation into the potential for developing a large-scale renewable hydrogen industry in Central Queensland

Study received funding from ARENA as part of ARENA's Advancing Renewables Program

Joint planning study with Iwatani Corporation: CQ-H₂ project

November 2020 – August 2021

- ▶ planning for a proposed large-scale renewable hydrogen export facility in Gladstone

Joint feasibility study with Consortium: CQ-H₂ project

September 2021 – ongoing

- ▶ Detailed feasibility study into the development of a large-scale renewable hydrogen project in Gladstone

Study has received confirmation of funding from ARENA and METI





Hydrogen industry participation



Pathway to net zero carbon emissions



Central Queensland as a renewable hydrogen hub



High quality jobs



Local manufacturing opportunities

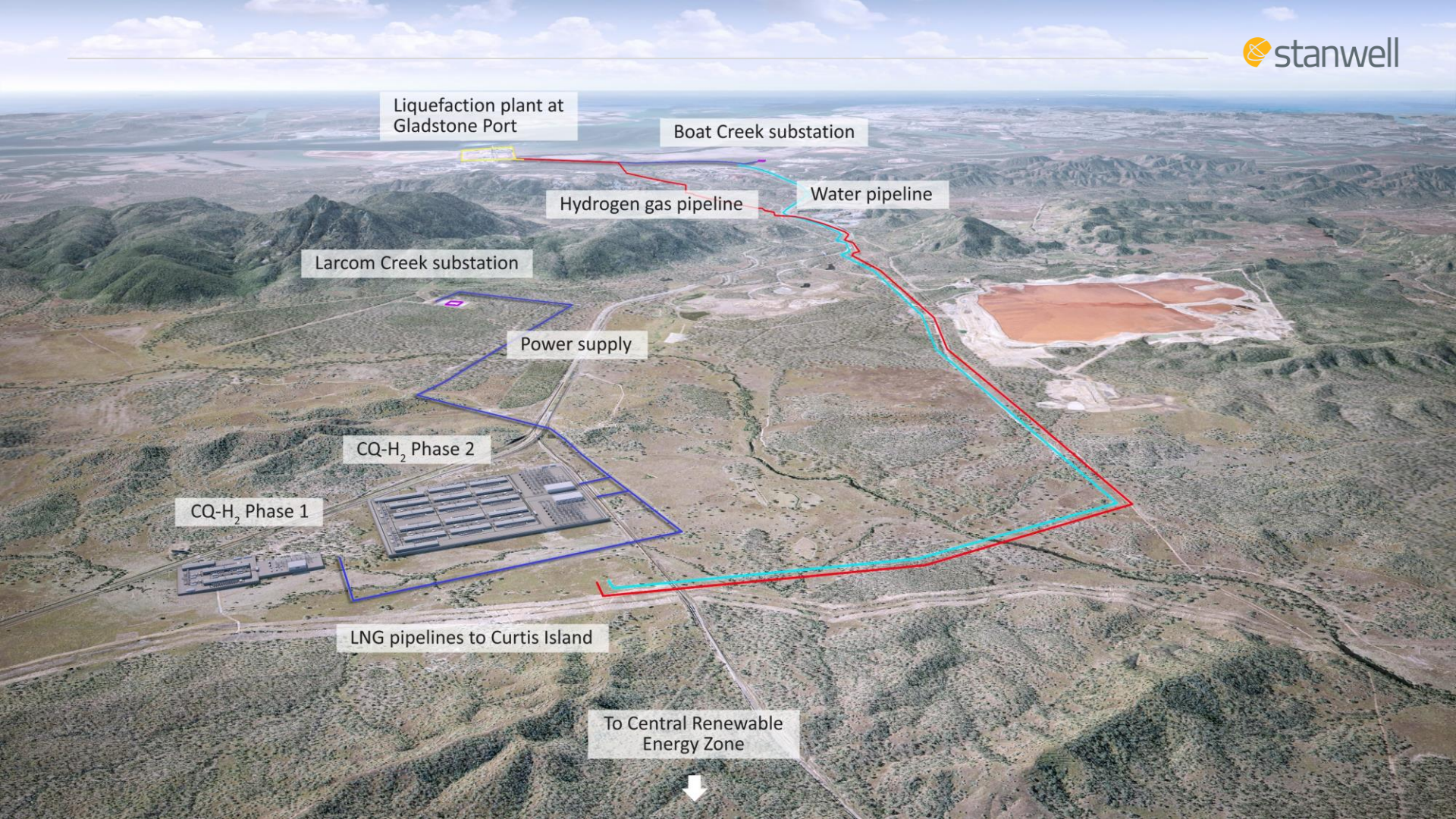


Integrated supply chain between CQ and Japan



Target hydrogen pricing set by off-takers





Liquefaction plant at
Gladstone Port

Boat Creek substation

Hydrogen gas pipeline

Water pipeline

Larcom Creek substation

Power supply

CQ-H₂ Phase 2

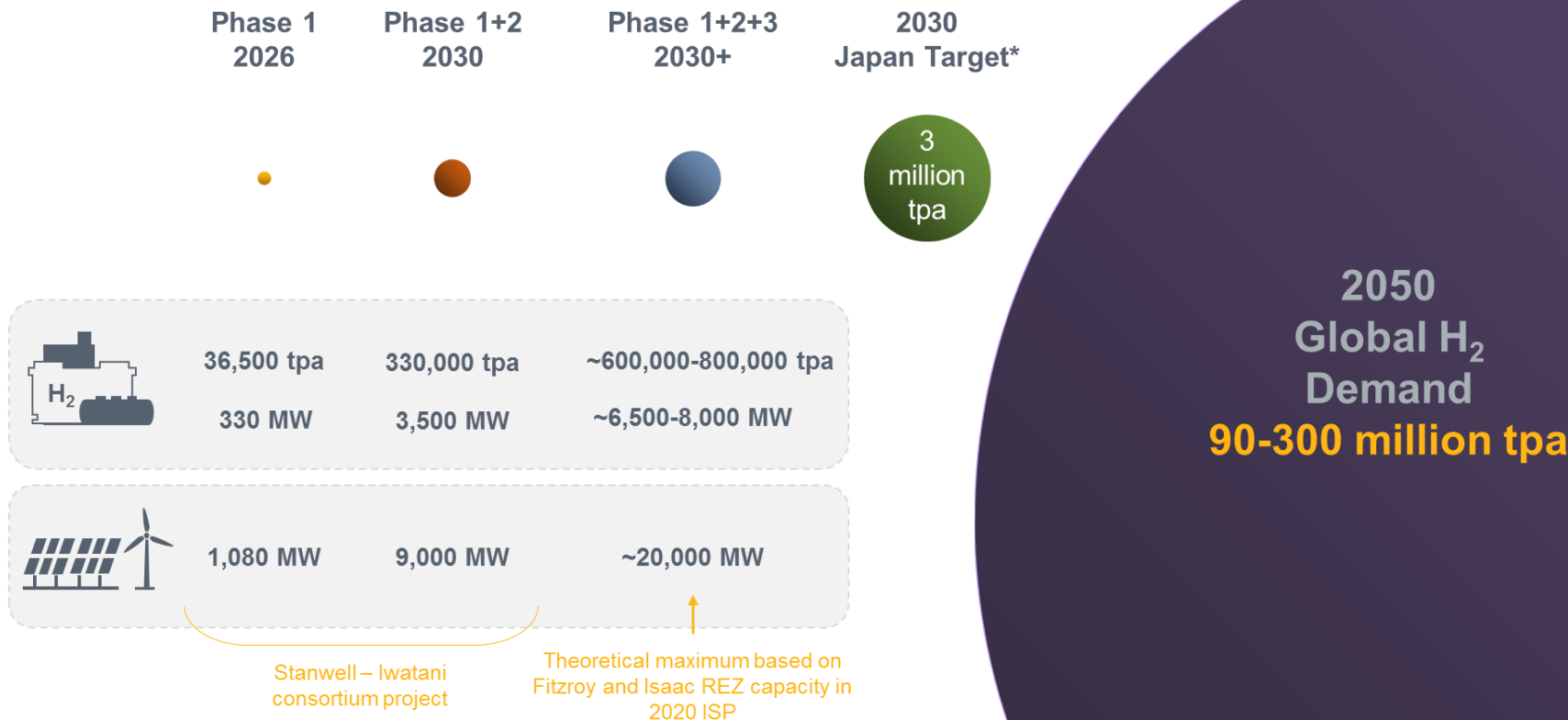
CQ-H₂ Phase 1

LNG pipelines to Curtis Island

To Central Renewable
Energy Zone



Scale of the CQ-H₂ opportunity in context



*Japanese 2030 target for green hydrogen and ammonia

Consortium: strategic partnerships across the supply chain

The consortium members have a unique mix of competitive advantages to harness the commercial and strategic potential of this opportunity. An MOU was executed between the parties in mid September 2021.



Hydrogen supply chain partners



Investor and O&M provider, energy manager

- Energy company owned by Queensland Government
- Energy generator, retailer and trader with growing renewable energy portfolio



OEM (liquefaction and shipping)

- Japanese technology company
- HySTRA/HESC member
- OEM for liquefaction and shipping
- Japan Green Innovation Fund



Investor and O&M provider (upstream)

- Energy infrastructure business focusing on gas transmission
- Growing renewable energy and hydrogen business



Offtaker, investor

- Japanese power utility
- Leading offtaker in the Kansai region



Investor, O&M provider (liquefaction) and distribution/offtaker in Japan

- Industrial gas company
- Japan's largest H₂ supplier with 70% market share
- HySTRA/HESC member
- Secretariat of Kobe-Kansai hydrogen utilisation council

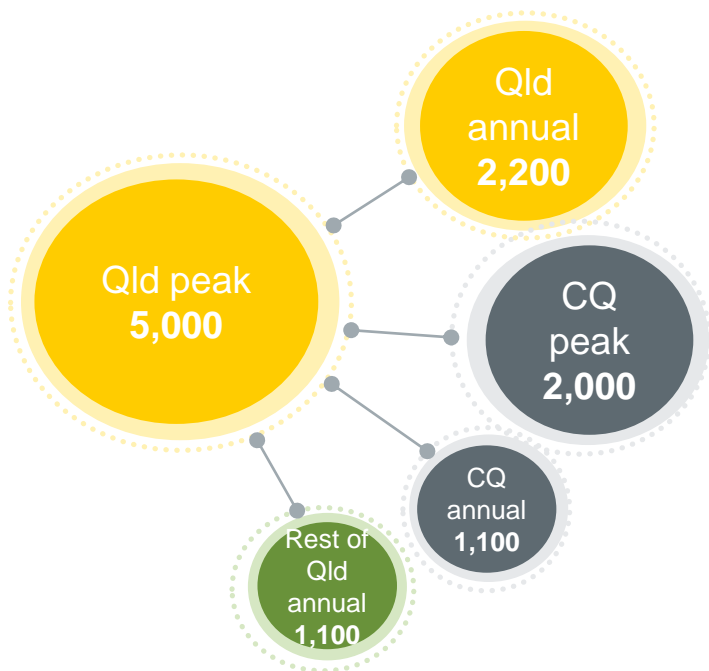


Offtaker, investor

- Japanese trading company
- HySTRA/HESC member
- Secretariat of Kobe-Kansai hydrogen utilisation council

The hydrogen opportunity

Employment impacts, FTEs



Total economic impacts

\$7.9b

Additional Central
Queensland GRP

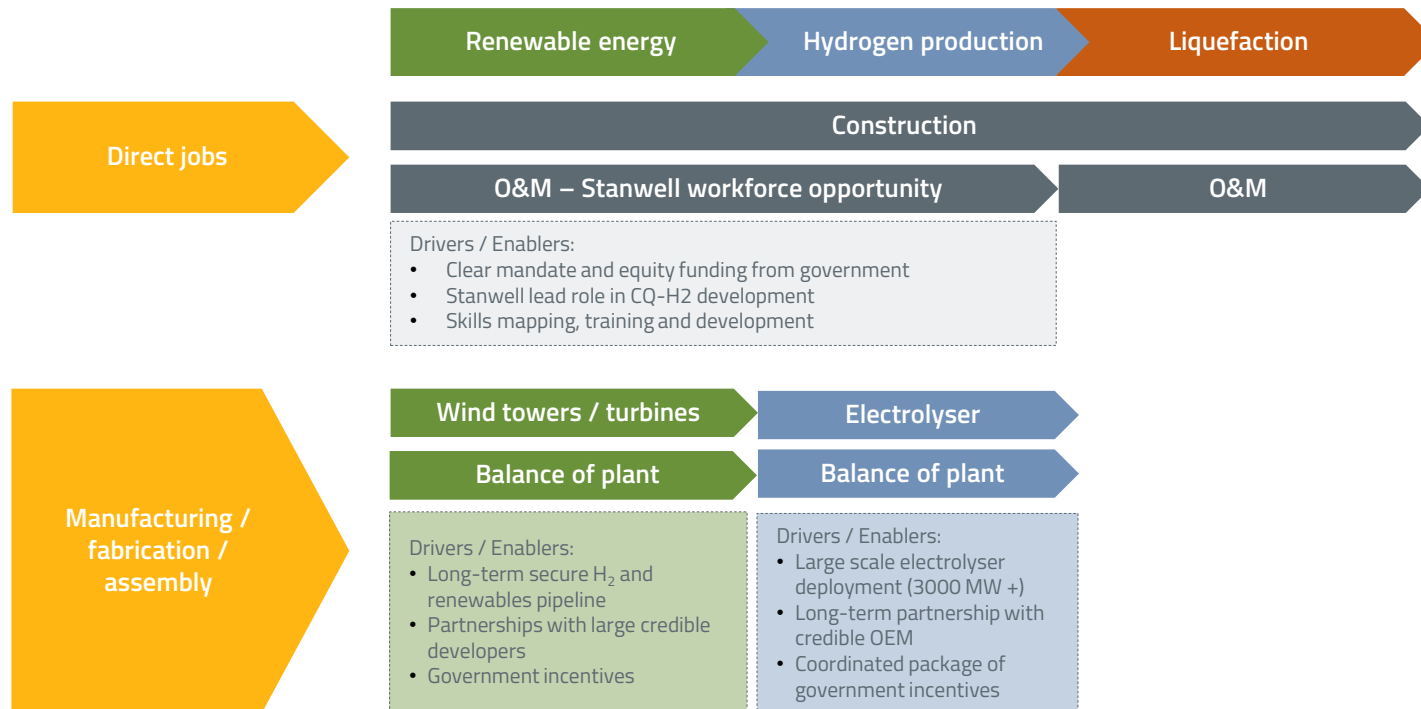
\$4.2b

Total value of
hydrogen exports

\$10b

Additional
Queensland GSP

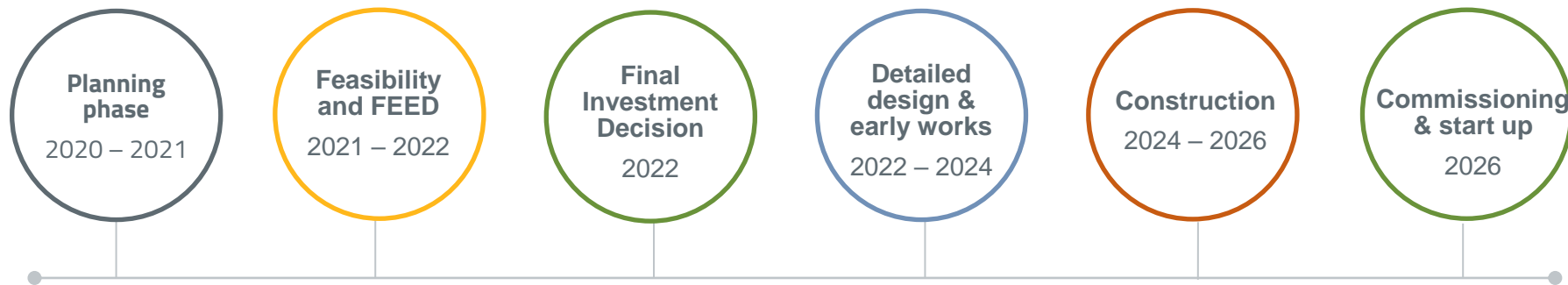
Large-scale, long-term pipeline will drive the CQ jobs and manufacturing opportunity



Feasibility study objectives

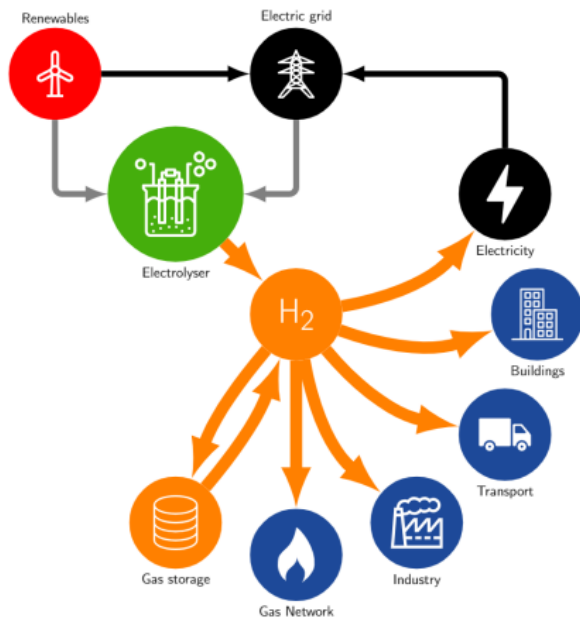
- Assess and optimise the commercial, technical and strategic viability of the Central Queensland Hydrogen Project.
- Identify a preferred Reference Project including scale, location, design, technology selection, cost estimates
- Secure offtake agreements for the hydrogen output of the project, to become binding at the FEED stage
- Complete project development steps to provide sufficient certainty to enter the FEED stage, including securing energy, land, water, port and other infrastructure
- Prepare a feasibility study report to support a decision on whether to proceed to the FEED stage.

Project timeline





Why hydrogen?



Source: Bristowe & Smallbone 2021

Hydrogen can help tackle various critical energy challenges.

- ▶ Hard-to-decarbonise sectors e.g. shipping, aviation
- ▶ Economies with limited renewable energy e.g. Japan, Korea

Hydrogen is versatile.

- ▶ Multiple applications

Hydrogen can enable renewables to provide an even greater contribution.

- ▶ Electrolysers are a flexible energy load, matching variable renewable energy
- ▶ Hydrogen can provide long-term energy storage in high renewable energy system

Adapted from IEA 2020

Why now?

Drivers of renewed interest in hydrogen



Stronger push to limit carbon emissions and reduce global warming

2.0°C

Paris agreement below 2.0°C target for global temperature rise within this century



Falling costs of renewable energies and hydrogen technologies

90%

Decrease in global average solar PV price since 2010

Indicators of hydrogen's growing momentum



Strategic push in national roadmaps

30+

MEDC countries have released hydrogen roadmaps to date



Industry alliances driving for an integrated transition solution

123

Members of the Hydrogen Council today, up from 13 members in 2017

70+

Countries that have announced net-zero emissions as a target by 2050

 Marsh

55x

Projected growth in electrolysis capacity by 2025 vs. 2015

10m

2030 target deployment of FCEVs announced at the Energy Ministerial in Japan

16

China provinces and cities that have launched their own five-year plans that specifically feature hydrogen clusters

Source: Marsh 2021

Why Stanwell?

Participation in hydrogen addresses all our strategic themes

Hydrogen will create jobs and potential for new expertise for our people in the hydrogen supply chain.

Work smart and build capability

TOGETHER WE CREATE ENERGY SOLUTIONS

Create future energy solutions

Hydrogen will create new energy load in Central Queensland and revenue diversification opportunities.

Create local jobs/economic development and support Qld Hydrogen Strategy.

Benefit community and our shareholders

Affordable emissions reduction

Renewable hydrogen can reduce our portfolio emissions intensity and integrate renewables.