H2RESTORE PROJECT FACT SHEET

KEY POINTS

RETIRING COAL-FIRE PLANTS
5GW of coal generation will close by 2030 and a further 14GW may become uneconomic by 2030

MISMATCH OF SUPPLY & DEMAND
This means the winter peak demand period will not match the summer peak of renewable energy generation, creating the need for energy storage

STORING ENERGY UNDERGROUND
H2RESTORE will use abundant renewable generation during the
summer & store it underground as hydrogen for use during winter

SUPPLYING THE NEM
The hydrogen will then be converted back into electricity to supply the National Electricity Market

REDUCING OVERBUILD
This helps to curtail the overbuild of renewables & lessen the burden on regional communities

Storing & shifting energy seasonally via underground hydrogen storage

ABOUT THE PROJECT

Lochard Energy is developing the H2RESTORE Project, which aims to store energy underground in the form of hydrogen and shift it from times of abundant renewable generation, to times of low supply and high demand and help enable a smoother energy transition away from coal.

The Australian energy market is transitioning to a low carbon and renewable energy future. As more renewables enter the grid and coal-fired power plants retire, balancing supply and demand is increasingly complex. Solving the "intermittency" problem is key to enabling the continued uptake of renewable energy resources.

Shifting energy from times of high supply and low demand to times of low supply and high demand is critical to enabling the sufficient buildout of renewable energy whilst retaining high reliability.

Just as grid-scale batteries can shift energy within a day, underground hydrogen storage has the potential to shift energy within a year. For example, from a sunny and windy mild day in Spring to a cold, still Winter's night. This seasonal shift in energy could help avoid overbuilding of renewables and thereby lessen the burden of the energy transition on regional and rural communities.

HELPING TO FIRM THE NATIONAL ELECTRICITY NETWORK

H2RESTORE is being designed to generate hydrogen by electrolysis using excess energy from the National Electricity Market and storing it in Lochard's depleted underground gas storage reservoirs located in Southwest Victoria.

The National Electricity Market comprises energy generated from different sources, including solar, wind and electricity generated from coal-fired plants. A higher proportion of renewable energy within the National Electricity Market implies that the hydrogen stored by H2RESTORE is likely to be greener and more environmentally friendly.

The hydrogen can be converted back into electricity to supply the National Electricity Market when demand is high and supply is low.

A STAGED APPROACH

The H2RESTORE Project is envisaged to be developed in 4 stages: an 18-month feasibility study to determine the viability of storing hydrogen in Lochard's depleted gas reservoirs followed by a demonstration pilot; Stage 1 Commercial Facility Development intended to seasonally shift renewable energy and provide firming services to the National Electricity Market; and Stage 2 Commercial Power-to-X to convert power from hydrogen to make cleaner fuels.

FEASABILITY STUDY

Lochard will undertake an 18-month feasibility study which will involve studies to investigate the viability of storing hydrogen in depleted underground gas reservoirs and conduct engineering and early environmental studies.

The feasibility study will help progress the project to the next stage, which is the development of a small-scale pilot demonstration facility required ahead of potentially developing the project into a commercial scale operation by the early 2030s.

The feasibility study will investigate subsurface properties, concept design for the pilot facility, understand recycled water supply concept design, techno-economics, power connection studies, identify potential development partners, undertake extensive community engagement, regulatory engagement, environmental and cultural heritage due diligence.

The feasibility study will commence in early 2024 with objectives to:

1. confirm technical feasibility of the Waarre sandstone underground storage reservoirs for hydrogen storage,

2. develop a project concept design for the pilot facility, and

3. progress planning, design and technoeconomics for a potential commercial underground hydrogen storage facility.

During this time, Lochard will seek to gain further understanding of subsurface conditions and regulatory pathways, and undertake an extensive program of community and stakeholder engagement.

PILOT FACILITY

A key objective of the feasibility study is to progress a smaller-scale pilot facility, which is considered necessary prior to the development of a large-scale commercial development.

The purpose of the 2-5MW pilot facility is to demonstrate Lochard Energy's capability to generate and store hydrogen, and then convert this back into electricity.

Lochard Energy is aiming to have the H2RESTORE pilot facility ready for operation between 2026 and 2027.

HOW WOULD H2RESTORE WORK?

Abundant energy from the National Electricity Market, increasingly from renewable wind and solar sources, is used to power electrolysers that split water, from a sustainable source, into hydrogen and oxygen. This process is known as electrolysis.

The hydrogen would then be captured and stored in underground depleted gas reservoirs under a layer of clay and the oxygen released elsewhere.

An open cycle turbine would then be used to convert the hydrogen back into electricity, so it can feed into Victoria's electricity grid via existing transmission lines.

PROJECT BENEFITS

By providing a secure energy supply, the Project could help equip the electricity grid to handle seasonal shifts in energy generation from renewable energy sources and thereby help enable a smoother transition away from fossil fuels.

Using existing unutilised gas reservoirs to store hydrogen at a large-scale, would result in less new infrastructure when compared to other alternatives for large-scale storage such as ammonia or refrigeration.

The Project could help to minimise the overbuild of renewable energy generation infrastructure in regional and rural areas, thereby lessening the burden of prolonged project development on those communities.

The Project could support local jobs, with an estimated 76 jobs per year needed for pilot facility to construction of the commercial facility. The Stage 1 Commercial development is estimated to result in 2800 jobs during construction.

This project could help to facilitate the development of the Victorian hydrogen economy.

SUPPORTING THE ENERGY TRANSITION

Lochard supports the Victorian and Federal Net Zero targets and accordingly we are pursuing other project developments including our ER1 project to help provide energy reliability and our H2REFUEL initiative to help decarbonise heavy vehicle transport using renewable hydrogen.

Lochard believes the H2RESTORE Project can play an important role in supporting Victoria's energy transition, by providing back-up power supply to the grid, enhancing network stability, resilience, and energy reliability for Victorians.

Southwest Victoria is the ideal location for this project given its proximity to existing renewable energy generation sources, sustainable water sources, power infrastructure, existing gas pipelines, and underground storage reservoirs.

Lochard Energy is committed to working closely with communities and key stakeholders throughout the feasibility and planning life cycle, to help shape the Project's development.

Lochard is, and will continue to, explore options associated with other renewable hydrogen projects, other forms of renewable gas (like bio-methane), and carbon reduction initiatives.

ABOUT LOCHARD ENERGY

The proposed H2RESTORE Project is being developed by Lochard Energy.

Lochard Energy are trusted infrastructure specialists that develop, own and operate energy infrastructure, which help facilitate a smoother and more rapid transition toward a lower carbon emitting economy.

We are committed to operational excellence, an outstanding safety culture and being a dependable member of the communities in which we operate.

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