

CASE STUDY

KENNARDS HIRE HYDROGEN GENERATOR DELIVERS

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HYDROGEN GENERATOR DELIVERS FOR JOHN HOLLAND ON SYDNEY WATER PROJECT

A hydrogen generator could soon become standard equipment on construction sites across Australia after a successful trial of the technology on a key infrastructure project for Sydney Water.

The 100kVA GEH2 hydrogen generator from Kennards Hire exceeded expectations during the month-long trial, meeting fluctuating demand for power and proving to be a safe, practical and zero emissions replacement for diesel.

THE CHALLENGES OF GREENER POWER

John Holland is delivering construction works for Sydney Water's new Upper South Creek Advanced Water Recycling Centre (AWRC), which will provide wastewater services to fast-growing western Sydney.



The John Holland team approached Kennards Hire for a green energy solution to power the construction site for 12 hours a day, six days a week.

Kennards Hire paired its 100kVA hydrogen generator with a 90kVA Battery Energy Storage System (BESS) unit for an on-site trial in August-September 2023.

THE RESULTS OF THE TRIAL

The 100kVA hydrogen generator has a built-in battery of 44kW, supported by a hydrogen power fuel cell to charge it. This combination provides 88kW of power at peak loads.

The solution resulted in several benefits:

- 100% reduction in diesel use for the site.
- Zero carbon emissions when the generator was running.
- On-site hydrogen use reduced by up to 50% a day with the addition of the BESS.
- The trial saved 12.2 tonnes of CO2 over the 28 days. The utilisation of the hydrogen generator in place of a traditional diesel-powered generator for a working year would eliminate 146 tonnes of CO2. That is equivalent to taking 50 cars off Australian roads every year.
- Air pollution reduction. The hydrogen generator doesn't emit CO2, HC, NOx or other fine particles, only water and filtered air, reducing pollution from noxious fumes. The project team was

able to capture and re-use the water on site as dust suppression.

- Noise pollution reduction. The hydrogen generator is significantly quieter than a diesel generator.
- Unlike a diesel generator, the hydrogen generator can handle very low loads without glazing and clogging.

Important lessons were learned too.

The Kennards Hire team carried out a series of tests during the trial, first running the hydrogen generator alone to gauge the impact and fuel usage against site demands on a normal day's operation.

As a result, the team added a 45kVA BESS to support the load on site, running the unit off the battery and calling on the hydrogen generator to charge the battery when depleted.

In the second week of the trial, the load dramatically increased as work ramped up on site. The 45kVA BESS was cycle charging too frequently due to the unexpected increase in demand.

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Paul Nicholson, Operations Product Specialist for the Power and Renewable Energies division at Kennards Hire, recalculated the load and switched to a bigger 90kVA 128kW BESS, meeting demand and solving the problem.

Hydrogen bottles also have to be replaced manually. The process was streamlined during the trial from daily replacement to weekly with the use of additional equipment.

“It was a challenging experience,” Paul says. “We all tackled it head-on to iron out the inevitable hiccups of first use. The unit proved itself adaptable and practical. It can be used individually or boosted by a battery storage system. And the more we use it, the better it will perform.

“We really appreciate John Holland and Sydney Water entrusting us to provide the power solution. Now we look forward to making it bigger and better.”

WHY IS THE TRIAL SO SIGNIFICANT?

As John Holland’s Sustainability Manager Mark Trethewy explains, Kennards Hire was the only company offering a hydrogen generator “ready to go”.

“Kennards Hire was incredibly helpful. They figured out what our loads were, and how hydrogen could best work on our site. We know they are leaders in use of sustainable equipment, and they worked through all our concerns to a successful conclusion.”

According to Belinda Dechnik, John Holland’s Environmental and Sustainability Advisor for Upper South Creek, plenty of questions were asked – and answered – during the trial.

“It established proof of concept,” she says. “Subsequent trials can deal with improving efficiency and reducing cost. This one proved the hydrogen generator works on site as a safe, practical and low emission solution.”



L to R: Jason Julius, Deputy Project Director John Holland; Steve Tolley, General Manager Infrastructure NSW/ACT/QLD John Holland, Gill Fowler Environment & Sustainability Manager Major Projects Sydney Water; Mark Trethewy, Sustainability Manager Upper South Creek John Holland, Paul Nicholson, Operations Product Specialist Power and Renewable Energies Kennards Hire.

Gill Fowler, Environment and Sustainability Manager at Sydney Water, is keen to explore the hydrogen generator’s potential in future projects.

“Such new technology always presents challenges,” she says. “We’re still analysing the data to see what’s possible. We’re happy the trial powered our site for 28 days, and the project team worked so collaboratively to make it happen.

“With more and more companies looking for renewable, low emissions technology, we’ll continue to see change and advances in this space.”

THE POWER OF HYDROGEN IN AUSTRALIAN INDUSTRY

Hydrogen generators offer benefits in multiple sectors, including construction, telecommunications, mining and utilities.

Air quality is vastly improved, with no smelly, harmful or polluting emissions. Much quieter than diesel, there is less noise impact on

homes around the site. While green hydrogen is not yet readily available, use of grey hydrogen still results in zero carbon emissions when the unit is running.

Mark and Belinda are now fielding a steady stream of enquiries about the hydrogen generator for potential projects along the entire east coast, as well as in Victoria and South Australia.

If you’d like to know more about green power solutions for large-scale infrastructure projects, contact your closest Kennards Hire power specialist.



‘Paired with Battery Energy Storage System (BESS) units, it can handle greatly fluctuating demands.’

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