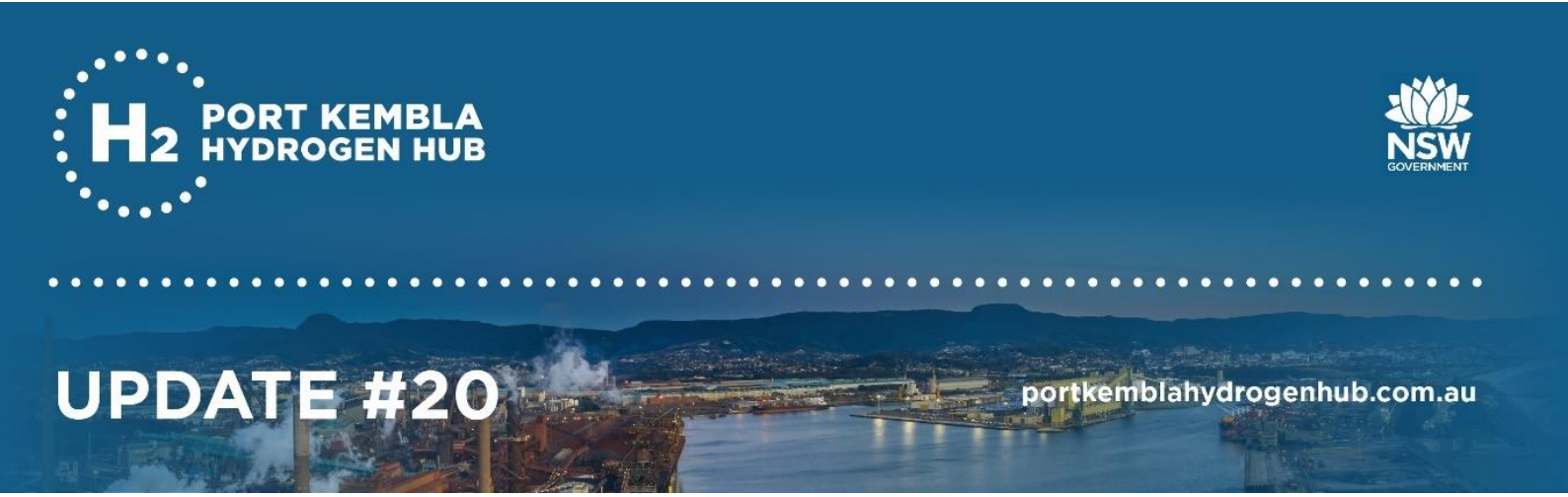

30 June 2023

Busier times at Port Kembla continue.

This Port Kembla Hydrogen Hub Update contains information on the following key projects and initiatives:

- H2 Future Mobility Day #4 – 8 June 2023
- Coregas Port Kembla Hydrogen Refuelling Station equipment arrives
- World's cleanest garbage truck to start trials in Illawarra this year
- Illawarra's place in the clean energy transformation cemented at Canberra Expo
- Tallawarra B should run on local hydrogen: EnergyAustralia MD

H2 Future Mobility Day #4 - 8 June 2023

With the Coregas Hydrogen Refuelling Station (HRS) commissioning getting closer, the focus of this 8 June 2023 event was on HRS technology and hydrogen powered heavy vehicles. Nathan Pearce-Boltec from BOC gave an overview of the BOC/Linde HRS technology that will be deployed as part of their Port Kembla hydrogen production and mobility project that was covered in Update #19. Up to an additional four HRS will be built in the region by the end of 2025to support the large fleet of FCEV buses and trucks.

The first hydrogen powered vehicle to use the Coregas HRS will be the Remondis Refuse Truck that was unveiled at the Brisbane Truck Show in May. Chris Wade from Remondis gave an overview of the Hyzon Refuse Truck they will be trialling including the associated training and systems they are undertaking at their Unanderra facility. Ben Kiddle for HDrive presented on their Taurus FCEV Prime Mover that was also launched at the Brisbane Truck Show in May. This vehicle will join the PepsiCo fleet in Brisbane and be showcased at Port Kembla at some future date as part of a NSW launch.

H2 Future Mobility Day #4 Program
- 8 June 2023

11.00am	Welcome	Nigel McKinnon Dept of Regional NSW
11.05am	Refuelling Infrastructure	Nathan Pearce-Boltec BOC
11.15am	FCEV TS Prime Mover	Ben Kiddle HDrive
11.25am	Hydrogen-Diesel Hybrid Conversion	Stuart Pratt Wasco
11.35pm	FCEV Refuse Truck Trial	Chris Wade Remondis
11.45pm	H2ICE – UNSW Engine Lab Technology	Shawn Kook UNSW
11.55pm	Q & A	

Stuart Pratt from Wasco presented on the Hydra Energy conversion technology the company is bringing to the Australian market. They are converting a Freightliner prime mover into a hydrogen diesel hybrid using Hydra Energy technology that has been developed and tested in Canada.

Shawn Kook has also developed proprietary hydrogen diesel conversion technology in the University of NSW's engine laboratory that has generated considerable international interest from diesel engine OEMs such as MAN.

Coregas Port Kembla Hydrogen Refuelling Station equipment arrives

Equipment for the Coregas Hydrogen Refuelling Station (HRS) to be constructed at the company's Port Kembla industrial gas facility has arrived on site. The equipment is from UK based technology provider Haskel. The refuelling station is scheduled to be commissioned in July and will have daily capacity to supply 400kg of hydrogen to heavy vehicles.

The facility will be the first HRS in Australia for commercial and heavy vehicles with a similar refuelling time to diesel vehicles. It will operate at the commercial vehicle standard pressure of 350 bar as shown in the image below. The only piece of the equipment that will be visible at the HRS will be the dispenser unit. The rest of the equipment will be installed close to the existing hydrogen plant.

World's cleanest garbage truck to start trials in Illawarra this year

Date: 2 May 2023

https://www.illawarramercury.com.au/story/8181523/worlds-cleanest-garbage-truck-to-start-trials-in-illawarra-this-year/

Remondis Australia CEO Bjorn Becker and Hyzon's John Edgley

The Illawarra will be the site for waste company Remondis testing its first zero-emissions garbage truck powered by hydrogen. The company, which is contracted by the city councils in Wollongong and Shellharbour to collect garbage, announced in Melbourne on Wednesday that it would be trialling its first hydrogen truck.

Developed by Hyzon Motors in Australia and made available to Remondis, the truck's fuel cell electric engine relies on hydrogen funnelled from specially made tanks, which combines with air to generate electricity that powers the truck.

The Fuel Cell Electric Vehicle (FCEV) technology only results in water vapour emissions. The waste company called this a "watershed moment". Remondis South Coast regional manager Chris Wade said the goal was to have the zero-emission truck match the capabilities of same-sized diesel-powered trucks.

"Efficiency is critical when it comes to waste collection, so we'll be paying close attention to how the truck performs compared to our diesel trucks," Mr Wade said. Mr Wade added that refuelling will be conducted at the Coregas facility at Port Kembla and is expected to take about 20 minutes.

Remondis said it would be the first time such a truck had been used under commercial conditions in Australia. Hyzon said its heavy-duty garbage truck had been designed against the industry benchmark of a 200km range and 1500 bin lifts per working day.

Illawarra's place in the clean energy transformation cemented at Canberra Expo

https://www.uow.edu.au/media/2023/illawarras-place-in-the-clean-energy-transformation-cemented-at-canberra-expo-.php

Date: 23 March 2023

Clean and renewable energy research and innovation was on display at the first Illawarra Clean Energy Expo, hosted by the University of Wollongong in partnership with Alison Byrnes MP, Member for Cunningham and held at Parliament House Canberra on Monday 20 March 2023.

The Illawarra Clean Energy Expo, which was attended by more than 300 people, showcased the capabilities of organisations active in the Illawarra region that are leading the way towards clean energy transformation. The expo featured exhibits and demonstrations from companies and organizations involved in renewable energy, energy efficiency, and sustainable technologies.

The event was designed to raise awareness of the incredible breadth and depth of expertise, talent, and innovation and that the Illawarra has to offer in clean energy among state, federal and international representatives, as well as provide a networking opportunity for leaders in the field.

Minister for Climate Change and Energy, the Hon Chris Bowen MP said, “The Illawarra is right up there at the cutting edge of these innovations. This will be an important part of Australia's comparative advantage in this massive transformation, the biggest economic change we have experienced since the industrial revolution.”

Ty Christopher Director of UOW’s Energy Futures Network said that the Expo was a huge success.

“Feedback at the event and afterwards was overwhelmingly positive. The Expo put the Illawarra on the map and placed us front of mind with the decision makers of our nation, highlighting the innovation and training in clean energy happening now at UOW.

“Many of these business in partnership with UOW are providing high-calibre, sustainable employment and training for the clean energy revolution. Seeing our UOW colleagues and local industry operating as a cohesive team was hugely inspiring!

“We are now all looking forward to working together to make the Illawarra a clean energy powerhouse for the country,” Mr Christopher said.

UOW exhibitors at the Expo included:

- **Australian Research Council Future Energies Hub**
- **Australian National Centre for Ocean Resources and Security** (ANCORS)
- **Australian Centre for Culture, Environment, Society and Space** (ACCESS)
- **Sustainable Buildings Research Centre** (SBRC)
- **Australian Power Quality Research Centre** (APQRC)
- **iAccelerate**

- **Australian Institute for Innovative Materials** (AIIM)

Industry exhibitors from the region included BlueScope Steel, Squadron Energy, Hysata, Green Gravity, Oceanex, BOC Gases, Sicona Battery Technologies, Gridsight AI, NSW Ports, i3Net, Business Illawarra, Recharge Illawarra, Rewiring Australia, Ecojoule Energy, Wise Energy and Invest Wollongong.

Tallawarra B should run on local hydrogen: EnergyAustralia MD

https://www.illawarramercury.com.au/story/8174908/energyaustralia-md-wants-illawarra-hydrogen-for-tallawarra-turbines/

Date: 27 April 2023

Mark Collette, managing director of Energy Australia, says he would like to see the Tallawarra power station run on locally produced hydrogen by 2025. Picture by Sylvia Liber

The first hydrogen to power the Tallawarra B turbine should be made in the Illawarra, EnergyAustralia MD Mark Collette has said. Six months from completion, the company behind the dual natural gas-hydrogen peaking power plant is hopeful that by 2025 it can run on locally made green hydrogen.

It's an ambitious schedule, but after the curve balls that have been through Tallawarra B's way during the past year of construction, you think they might just pull it off. Sitting on the shores of Lake Illawarra, the Tallawarra B power plant hopes to be the flagship project of the future of electricity, after its predecessor on the same site first brought reliable electricity to the Illawarra. In 1954, the original Tallawarra coal-fired power station opened. By 1961, the power station was providing 320mW of power to the Illawarra after decades of intermittent supply, characterised by blackouts and electricity delivered at times by running tugboats off Port Kembla

harbour. The construction of Tallawarra was essential for the industrialisation of the Illawarra, and the wider post-war industrialisation of Australia.

Tallawarra B will run on a blend of natural gas and hydrogen. Picture by Sylvia Liber

Seven decades on, the Tallawarra B project signals the next phase of power and industry in the Illawarra, and Australia. Sitting alongside the gas-powered Tallawarra A, the power station will initially run on natural gas and operate as a peaking power plant, delivering electrons to the grid during periods of peak demand when renewable capacity is limited.
Its scheduled opening in October could not come soon enough, with the closure this week of Liddel Power station in the Hunter. This takes about 1000mW out of the NSW grid. Tallawarra B will deliver 316mW to help fill the gap.

The design of Tallawarra B is a world first. The power station is the first in the world to run a particular dual gas-hydrogen turbine produced by GE and one of the first in the world to run on both fuels. But while there is a sense of quiet, focused energy on site near Yallah this week, getting to this point involved some white knuckle moments.

After construction began in February 2022, the Illawarra experienced the wettest year on record. Construction projects throughout the region were delayed, leading in some cases to builders collapsing, and at Tallawarra, the site didn't so much as flood, pits turned into swimming pools. "The ground still feels wet out there," Mr Collette said. "It has meant doing the work that can be done in the wet and saving the work that can only be done in the dry."

Health, safety, security and environment lead Glen Cowling overlooks construction as it heads towards the final stages.

After work got back up and running later in the year, one of the major contractors delivering the project went into administration. On December 5, the South African owners of Western Australia contractor Clough, which was also delivering major infrastructure projects such as Snowy Hydro and Inland Rail, announced the company was going into voluntary administration.

Increasing pressure in the tight construction market forced the business to the wall, but Mr Collette said with NSW's energy future depending on Tallawarra B to keep the lights on during the 2023-24 summer, delays were not an option. "We took a decision upfront that we were going to do everything we could to preserve the progress of the project."
EnergyAustralia stepped in to fund the contractors who were on site to continue working, so no days were lost. Mr Collette was tight lipped on what the extra cost was but said that delays would have cost more.

"The main thing we're focused on is delivering to the schedule," he said. "The project overall has faced additional costs and risks. "Projects like this, if you get big disruptions, they become very big and costly and very difficult to recover from."

Around 300 workers are on site, including 190 local contractors, six months from completion. Picture by Sylvia Liber

Italian firm WeBuild eventually bought the stricken Clough, enabling work to continue on the company's Australian projects and in late April, with the turbine installed and construction continuing on the superstructure, roughly 300 workers are on site, including 190 from the Illawarra. While workforce shortages have affected other Illawarra industries, Mr Collette said outside of specialist skilled workers that had to be brought in from elsewhere, being a leader meant local companies were looking to contribute to the project where they can.

"A lot of contractors want to work on the energy transition, and so they were quite keen to come to work on Tallawarra, particularly knowing that we were seeking to put hydrogen in more quickly than just about anyone else in the country," he said. "They're really excited about the project, the state, national and regional significance."

It's a project that doesn't just hold significant for the Illawarra. Mr Collette said EnergyAustralia's Hong Kong owners CLP Holdings were watching Tallawarra as an indicator of how other generators around the world can run on hydrogen. But while the turbine may be installed and ready to run, actually sourcing the hydrogen is the next challenge.

"There's a lot of presentations around hydrogen, there's not a lot of committed projects yet they've got to final investment decision, much less construction. We're in construction."
With 2025 the start date to feed in green hydrogen to the gas powered generator, Mr Collette said he was hopeful just as the previous Tallawarra power stations were run on local coal, the next power station would run on local hydrogen.

"We'd like to put hydrogen into the mix from 2025, in order to do that, we'd like to buy renewable hydrogen," he said. "I hope we can get locally produced green hydrogen, [but] that's yet to be determined."

The Coregas hydrogen plant in Port Kembla. Picture by Adam McLean

The Illawarra already produces hydrogen from non-renewable sources at the BOC plant in Cringila, and the Coregas plant in Port Kembla will soon begin powering vehicles with hydrogen. But although there are plans to scale up, both sites are in their infancy in terms of producing green hydrogen on the scale eventually required for Tallawarra.

"The supply chain to produce hydrogen is still not there yet," Mr Collette said.
On top of the logistics of actually producing the hydrogen, the electricity grid will not only need to increase the amount of renewables to offset the closure of coal-fired power stations, but provide the massive amounts of energy to run electrolysers to separate oxygen and hydrogen from water.

"The speed of the energy transition in Australia has not matched the ambition," Mr Collette said. "At the moment we are around 30 per cent renewable electricity, the goal articulated by the federal government is 82 per cent by 2030, that's just to meet domestic supply.
"If you add on a big chunk of hydrogen, in addition to that, that 50 per cent gap is an enormous number of projects when the supply chain for wind turbines are getting longer, and the need to connect more transmission needs to happen in a way that it hasn't [so far]. The delivery timeframes appear to be blowing out.

"If Australia is producing renewable electricity, do we first use that for domestic consumption or for hydrogen? If we can over-perform as a country and put in more renewables, and increase the pace, then we can do both, but that's the challenge ahead of us." So far, while the NSW government has committed funding to support BOC's hydrogen plans at Cringila, the Illawarra has been overlooked for funding

under the federal government's Hydrogen Hubs scheme. This is despite the Illawarra already having a nascent hydrogen industry, and major demand for the gas not only from Tallawarra, but BlueScope's plans for green steel in the future, which would likely require green hydrogen to replace coking coal.

While Mr Collette said it was up to the federal government to answer why the Illawarra wasn't included in its hydrogen hub scheme, he said the parts of the puzzle were present in the Illawarra. "Our activities are all about creating a demand that helps suppliers come into the system."

Outside of Tallawarra, Mr Collette said there was a role for major utilities in coordinating the uptake of rooftop solar and domestic-scale batteries to support the functioning of the grid. With local initiatives such as Electrify 2515 and Hi Neighbour seeking to add more renewable electricity into the local grid, and support the electrification of households, the distribution of electricity production and storage from major power plants to rooftops and garages requires a new approach to coordination.

"Australia is not the only country dealing with this," Mr Collette points out. "Texas has quite a lot of home batteries, and the grid operator there now struggles to forecast demand as accurately because they can never predict what the batteries are going to do."

Without peeking 'behind the meter' Mr Collette outlines that government regulators, such as the Australian Energy Market Operator have a role in working with major retailers such as EnergyAustralia, to provide flexibility in generation capacity.

This tower is the only steel grid transmission tower that will be preserved, as a family of ospreys have made their nest at the top. Picture by Sylvia Liber

As part of the environmental approvals for the Tallawarra B works, the hill below Mount Brown Reserve will be rewilded, with plantings of eucalypt along the ridge

line. Numerous middens were found in wooded areas around the power station, attesting to the long-term use of the site by Aboriginal people in pre-colonial times. These sites will be preserved while the steel skeleton transmission towers that connected the former coal-powered power station will be replaced with lower-profile concrete poles. But, one transmission tower will remain. For the past 15 years a family of ospreys have made a home in the tower on the eastern side of the site. Until they find another home, the tower will remain, providing a link back to when electricity was first generated on the shore of Lake Illawarra and beyond, to what comes next.

FURTHER INFORMATION

For further information about the Port Kembla Hydrogen Hub, please visit the webpage or contact:

Nigel McKinnon
Deputy Director, Illawarra-Shoalhaven
Regional Development Branch | Department of Regional NSW
M 0418 259 055 | **E** nigel.mckinnon@regional.nsw.gov.au
Level 1, Block F, 84 Crown St, Wollongong NSW 2500
nsw.gov.au/regionalnsw

The Department of Regional New South Wales acknowledges that it stands on Country which always was Aboriginal land. We acknowledge the Traditional Custodians of the land and waters, and we show our respect for Elders past, present and emerging. We are committed to providing places in which Aboriginal people are included socially, culturally and economically through thoughtful and collaborative approaches to our work.