



# PORT KEMBLA HYDROGEN HUB

## INVESTMENT PROSPECTUS

December 2022



[www.portkemblahydrogenhub.com.au](http://www.portkemblahydrogenhub.com.au)

# Hydrogen Hub Vision

Port Kembla - Australia's first **5GW+ green hydrogen hub** to service domestic and export markets by 2030

Meeting since February 2020, the **Port Kembla Hydrogen Hub group** facilitated by **Department of Regional NSW** is seeing the **Vision** of creating Australia's first **5GW+ green hydrogen hub** realised with over **\$600m** in supportive **major energy projects** to be completed by the end of 2023.

The initial focus is on servicing **domestic markets** in **heavy vehicle mobility, power generation, gas network injection** and **industry** scaling into **exports** as **international demand** builds and firms up by 2030.



Strategic Plan



[www.portkemblahydrogenhub.com.au](http://www.portkemblahydrogenhub.com.au)

# PORT KEMBLA HYDROGEN HUB

Future Mobility Day #2  
10 June 2021



## Mission

To achieve the bold **Vision** of creating Australia's first **5GW+ green hydrogen hub**, the following **key strategies** are being implemented.

**Mission:** Build a **world class hydrogen hub ecosystem** that maximises opportunities through the facilitation of:

**#1 Major energy projects** that create new renewable energy infrastructure to enable investment in 5GW+ scale green hydrogen production capacity

**#2 Technology demonstration projects** that can leverage infrastructure, build scale, skills and link industry with research

**#3 Community education program** that builds public trust and confidence in green hydrogen and social licence to operate”



# Australia's first hydrogen-powered trucks to be delivered to Coregas by Hyzon Motors



JULY 15, 2021



## PRESS RELEASE

# GE Technology to Power Australia's First Dual-Fuel Gas and Hydrogen Power Plant

June 16, 2021

## Major Energy Projects

By the end of 2023, **\$600m+** of supportive **major energy projects** will transform the **Port Kembla Hydrogen Hub** ecosystem. These projects include:

- **\$2m Coregas - Hydrogen Refuelling Station** will enable Australia's first zero emissions **heavy road transport trial**
- **\$250m Squadron Energy - Port Kembla Energy Terminal** will deliver Australia's first **gas importation facility**
- **\$70m Jemena - Port Kembla Lateral Pipeline Duplication** + upgrades to the **Eastern Gas Pipeline** will deliver increased **gas network capacity**
- **\$300m EnergyAustralia - Tallawarra B** project will deliver Australia's first **dual fuel capable power station**



# Strategic Location

Port Kembla is a major industrial sea port on the east coast of Australia. It is **strategically** located just over an hour by road south of **Sydney** and its **International Airport**. Port Kembla is part of **Wollongong**, a **modern vibrant city** with a population over **200,000 people**.

Port Kembla has a **30+ year** demonstrated track record in **hydrogen production** and nearly a century of **heavy industry** expertise. Low carbon **hydrogen** made from **natural gas, recycled water** and **renewable energy** at Port Kembla is already used for **transport mobility** and industry around Australia.

Port Kembla has **5GW+ (1,500 tonnes/day)** of potential **green hydrogen production capacity** based on available surplus **recycled water** feedstock.



## EXPORT MARKETS



JAPAN - 18 DAYS

KOREA - 22 DAYS



AUSTRALIA'S  
NATIONAL  
**HYDROGEN**  
STRATEGY



## Port Kembla Hydrogen Hub

Australia's **national hydrogen roadmap** was released in November 2019. A **key element** of the [National Hydrogen Strategy](#) are **port based industrial hubs** that can build scale and capacity by **leveraging existing infrastructure** to service initially domestic markets, scaling into **exports** by 2030 as **international demand** builds and firms up.

**Port Kembla** is listed as a hydrogen hub in the **National Hydrogen Strategy**. The **Department of Regional NSW** is facilitating the development of the [Port Kembla Hydrogen Hub](#) in **collaboration** with key stakeholders across **industry, government and research organisations**.

# Strategic Alignment

The **Vision** and **Key Strategies** of the **Port Kembla Hydrogen Hub** are consistent with the principles of the **National Hydrogen Strategy** and **NSW Government** policy initiatives including the **NSW Hydrogen Strategy** released in September 2021.

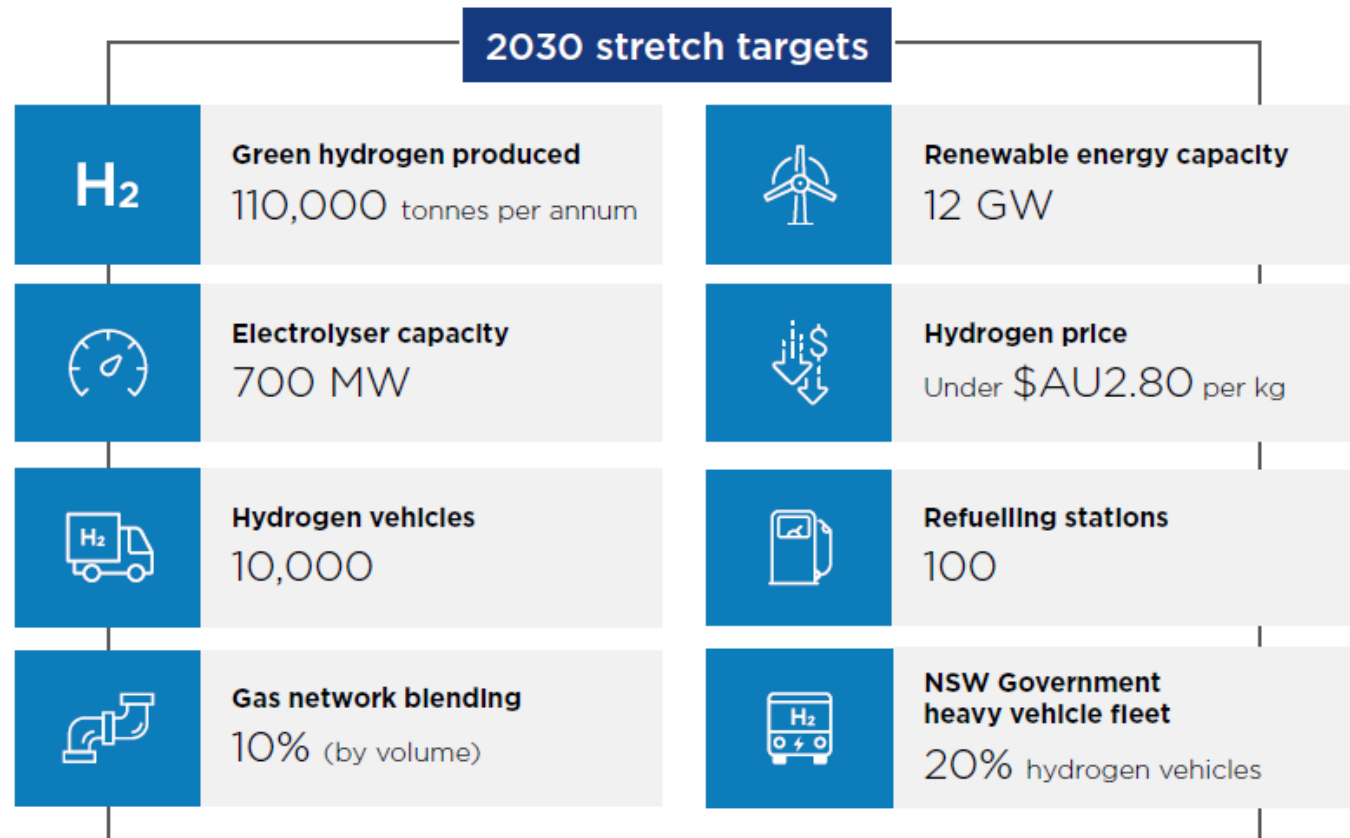
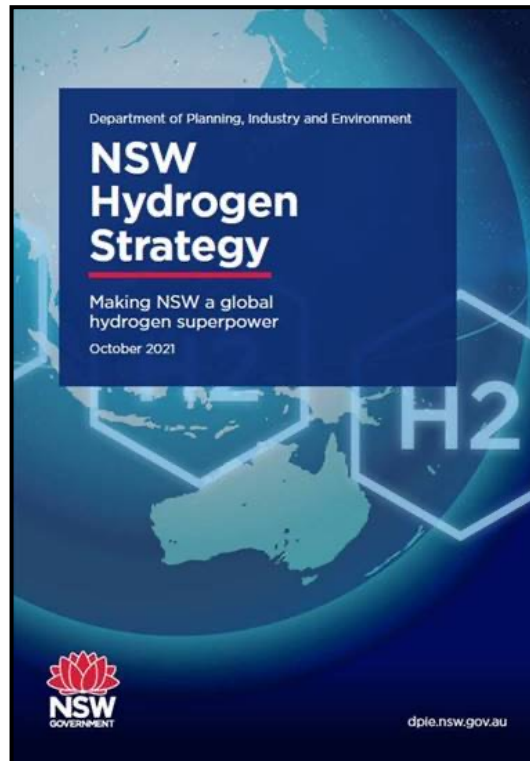


## NSW Hydrogen Strategy



# NSW - global hydrogen superpower

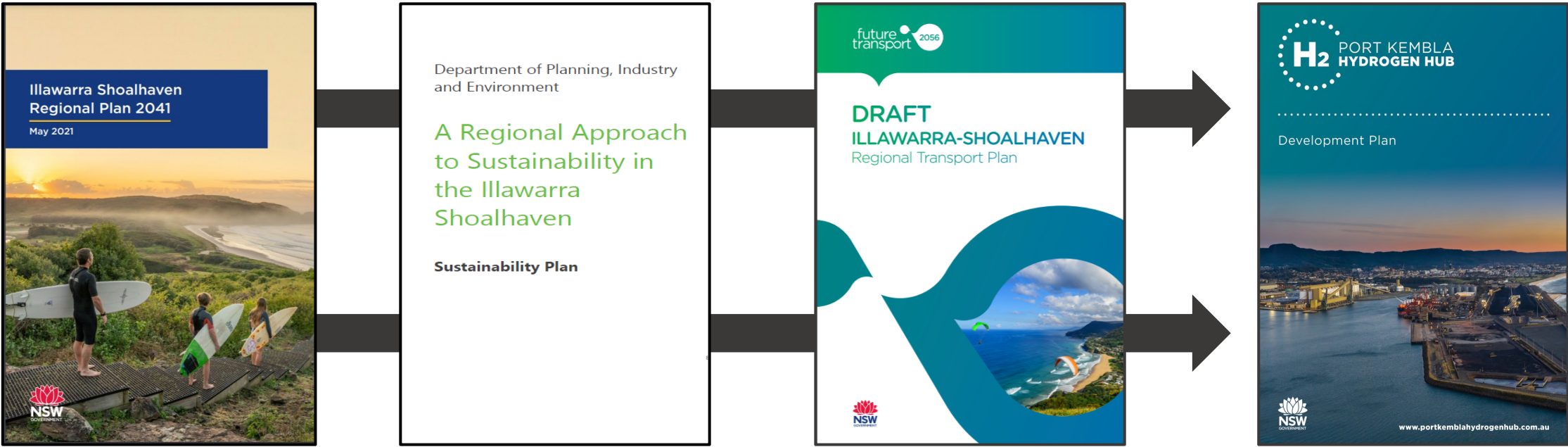
The \$3 billion [NSW Hydrogen Strategy](#) builds on the principles of the **National Hydrogen Strategy** and related **NSW Government** policy initiatives and sets out a range of **stretch targets** for 2030 including **green hydrogen** production, **electrolyser** capacity and hydrogen **price** under **\$AUD2.80/kg**.



# Regional Strategies

The **Port Kembla Hydrogen Hub Vision and Key Strategies** as articulated in this **Strategic Plan** also align with **Illawarra Shoalhaven Regional Plan, Sustainability Plan and Regional Transport Plan**.

These plans cite the potential role of **green hydrogen** in the region's **decarbonisation** journey and transition to a **zero emissions** future.



# Hydrogen Hub Ecosystem

Port Kembla has a well developed hydrogen hub ecosystem. Recycled water from a co-located wastewater treatment plant is already used for steel and hydrogen production.

Pure hydrogen produced at Port Kembla from natural gas, recycled water and renewable electricity is used for transport and industrial uses around Australia. By-product hydrogen from is generating electricity to help power steel making at Port Kembla.

The opportunity is to utilise electrolyser technology and recycled water feedstock to produce green hydrogen. Based on available recycled water feedstock, there is 5GW+ (1,500 tonnes/day) of potential hydrogen production capacity. There is sufficient electricity transmission capacity to support initial green hydrogen projects.

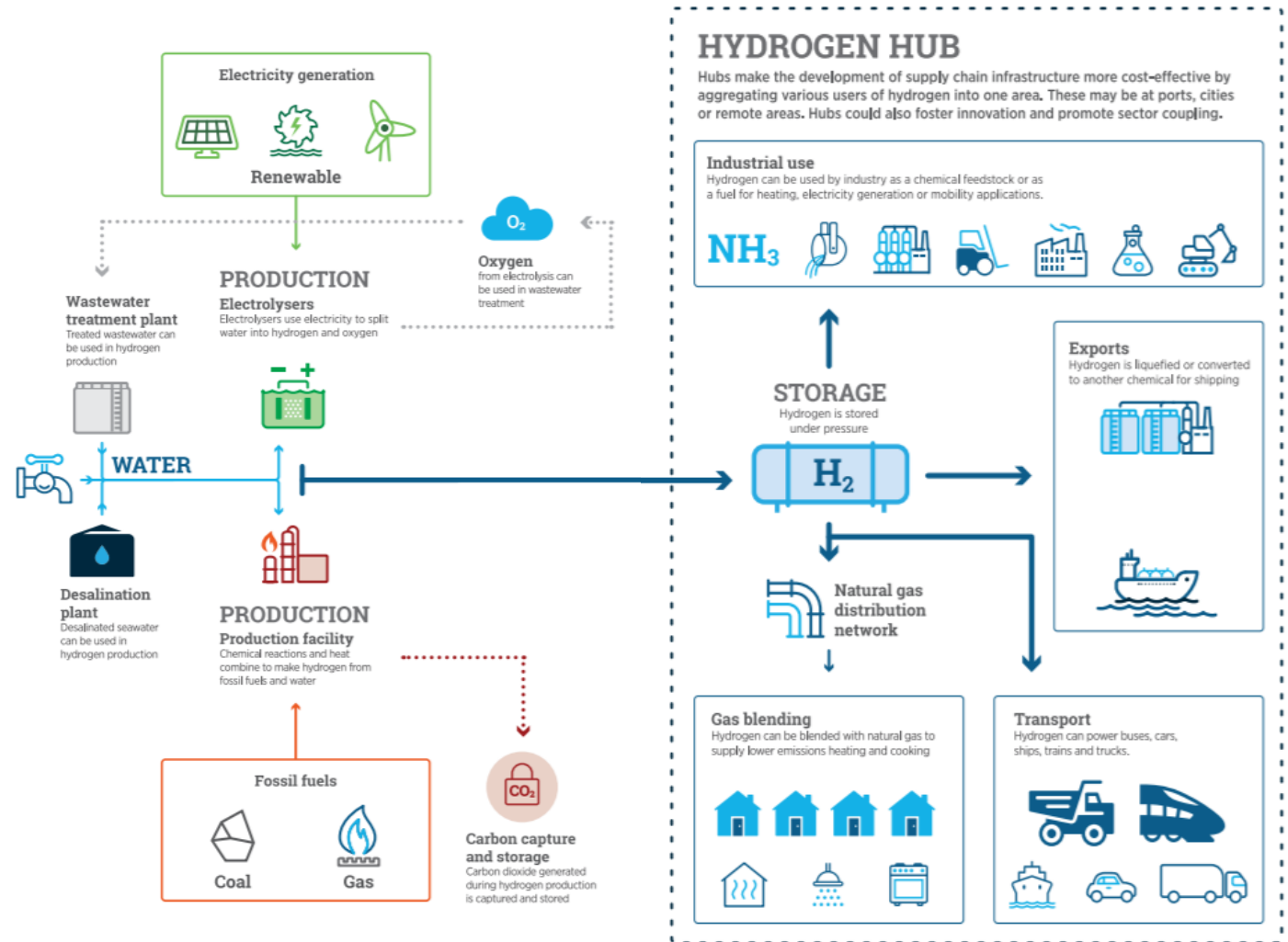
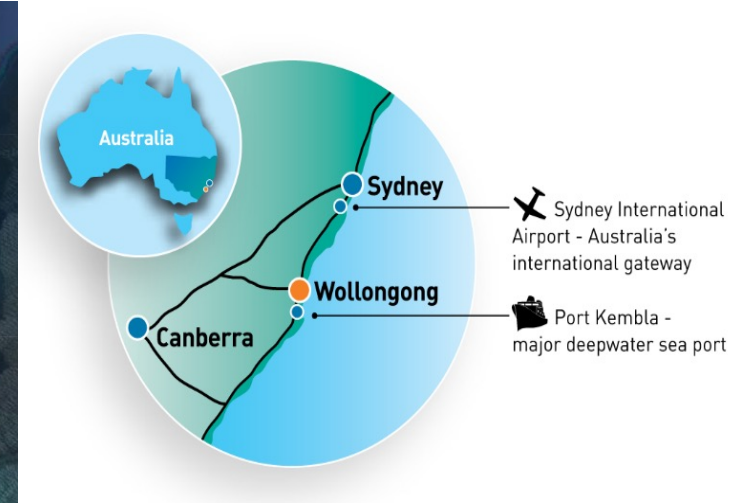
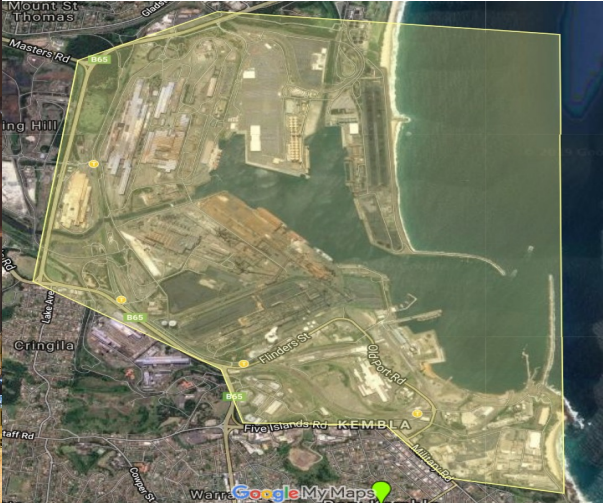


Image: National Hydrogen Strategy Report – COAG Energy Council 2019





# Superior location for Australia's first 5GW+ large scale hydrogen hub

## WHY PORT KEMBLA

**Advantage #1 - Feedstock:** renewable electricity and recycled water supplies with redundancy options to de-risk major projects.

**Advantage #2 - Customers:** large scale potential users in power generation, industrial processes, transport mobility, gas network injection and export.

**Advantage #3 - Distribution:** direct deep sea port access for export with existing connections to Asian markets; gas pipeline, road and rail access to major domestic markets that account for 80 percent of Australia's population and industrial base.

**Advantage #4 - Location:** heavy industrial precinct offers 24/7 operation, world class research ecosystem, large skilled labour base, 30+ years of hydrogen production, handling and distribution experience with a supportive community and social licence to operate.



# ADVANTAGE #1 - FEEDSTOCK



## ADVANTAGE #1 - FEEDSTOCK

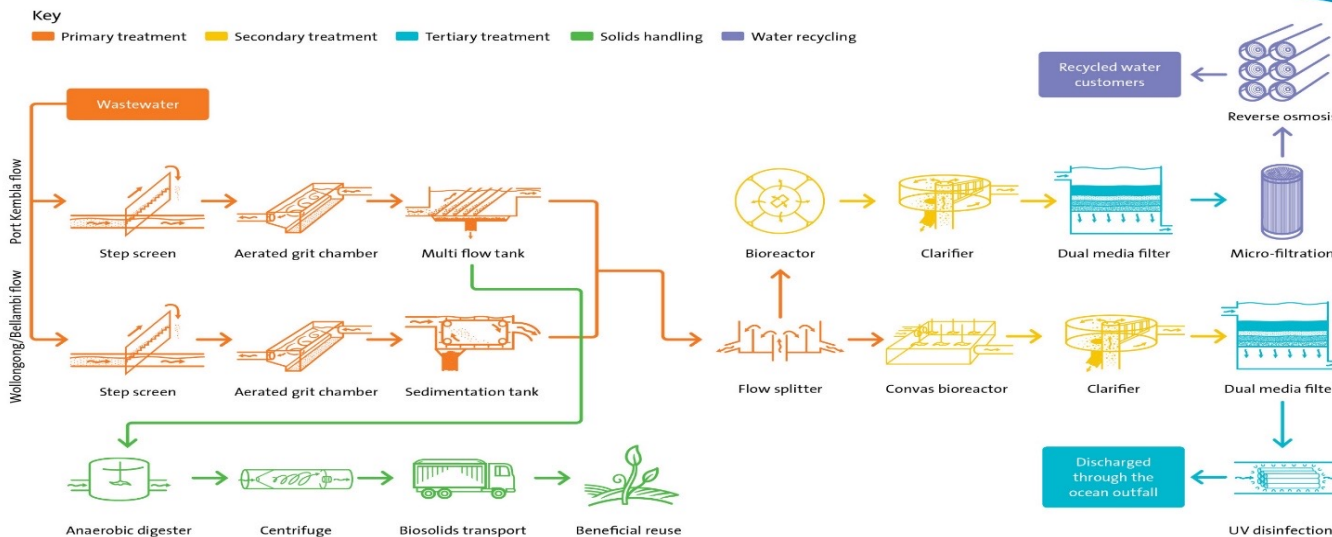
# Large scale recycled water and renewable electricity available to support 1,500 tonnes /day/ 5GW+ of green hydrogen electrolyser production capacity

# Recycled Water: Minimum supply of 15ML/day of recycled effluent water from the Wollongong Water Recycling Plant that is currently discarded through ocean outfall

# Renewable Electricity: 132 KVA heavy voltage electrical network provides multiple renewable energy options

Sydney WATER

### Wollongong Water Recycling Plant





# ADVANTAGE #2 - CUSTOMERS



## ADVANTAGE #2 - CUSTOMERS

- # Transport: Australia's first heavy road transport trial, opportunities for buses, trains, mining and materials handling equipment
- # Industrial processes: Large scale users in steel making, manufacturing and processing
- # Power Generation: Blended use in gas fired power stations - Tallawarra A + B and proposed Port Kembla Power Station
- # Gas networks: NSW Govt has set a 10 percent target for injection in the gas grid through the Eastern Gas Pipeline

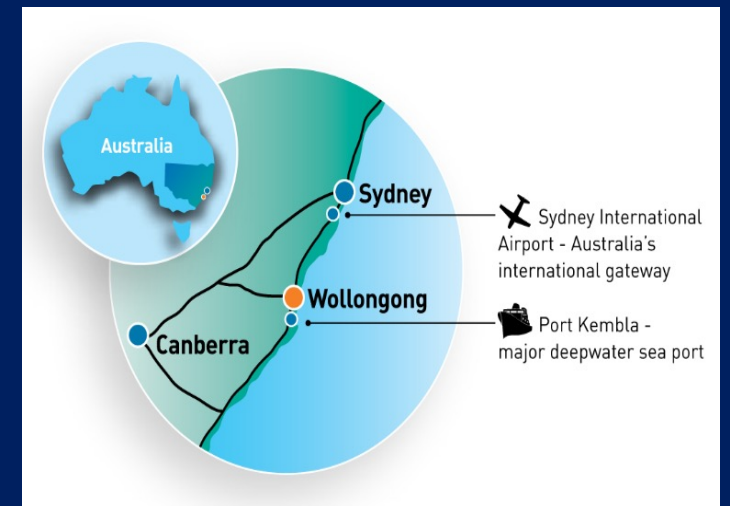


Image: BlueScope Port Kembla Steelworks

© 2017 lostcollective.com



# ADVANTAGE #3 - DISTRIBUTION

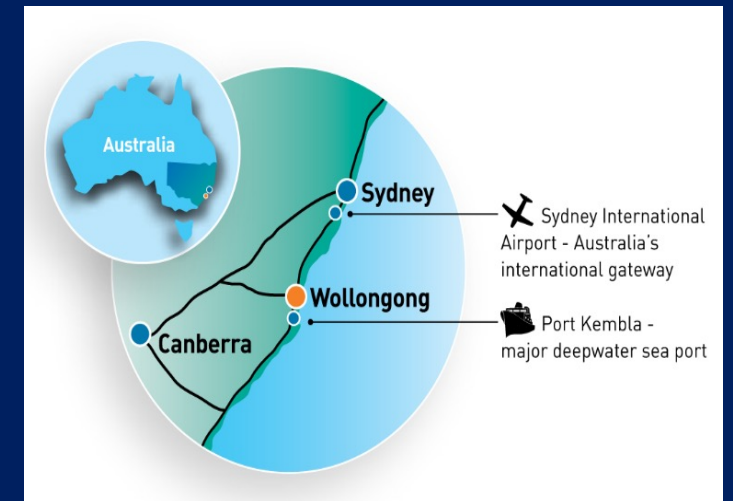


## ADVANTAGE #3 - DISTRIBUTION

# Road and Rail: service 80 percent of Australia's population and industrial markets within 24 hours through existing road and rail networks

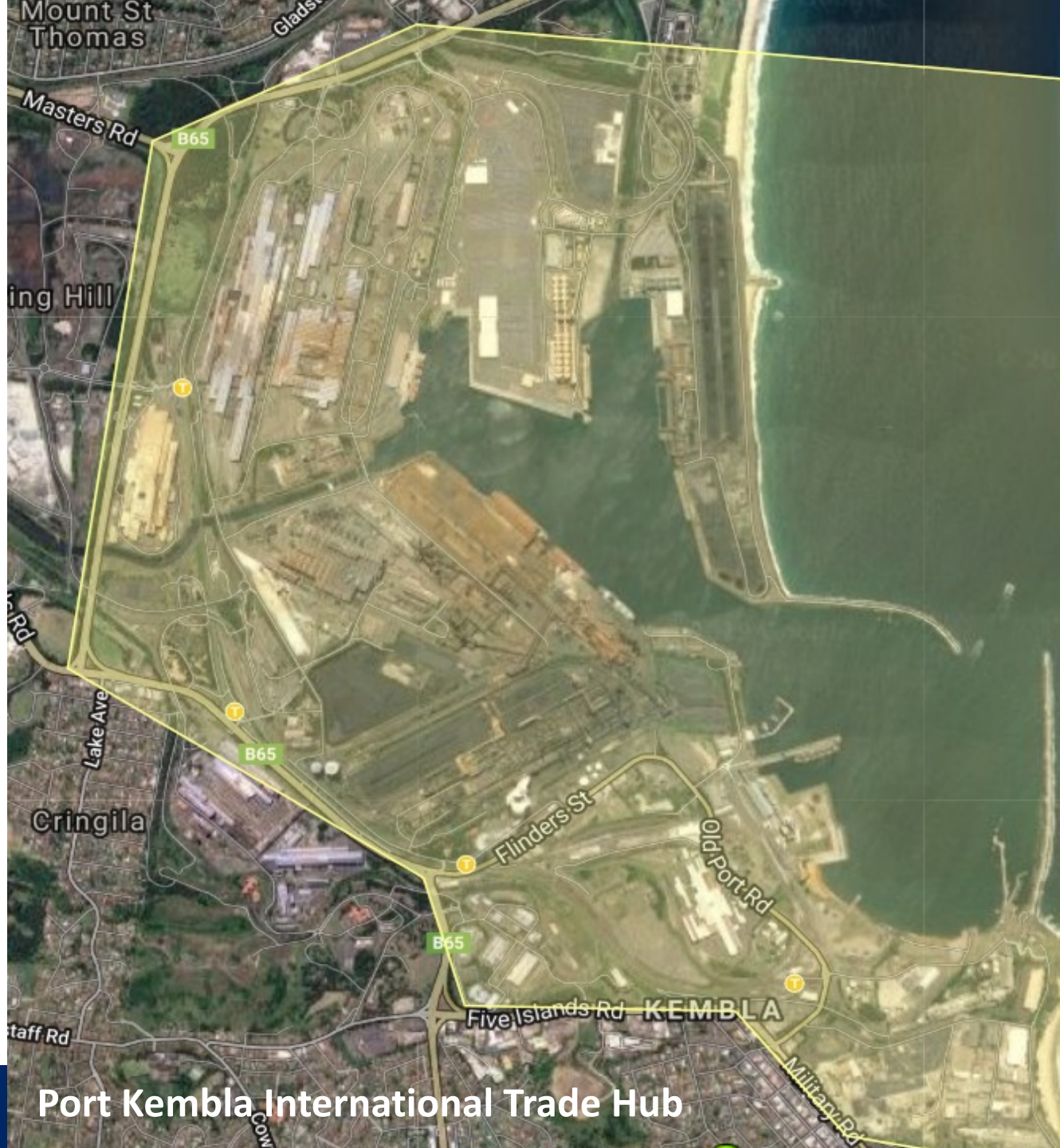
# Pipeline: Injection through existing Eastern Gas Pipeline to service east coast residential and industrial users

# Sea: major deep water sea port offers direct access to Japan and Korea





# ADVANTAGE #4 - LOCATION



## ADVANTAGE #4 - LOCATION

- # Port Kembla heavy industrial precinct offers 24/7 unimpeded operations
- # 30+ years of hydrogen production, storage and distribution expertise
- # Heavy industry DNA - skilled labour pool of over 200,000 people and social licence to operate
- # Innovation - collaborate with 11 universities and CSIRO through NSW Govt initiatives



Port Kembla International Trade Hub



# Manufacturing & Services

The **Port Kembla Hydrogen Hub** is supported by an **incredible array of engineering expertise and capabilities** from over **100 years** of heavy industry.

The University of Wollongong's **Facility for Intelligent Fabrication** links world class **research, prototyping, training and certification** to industry needs.

**Oceanex** have plans to establish related **manufacturing and servicing** facilities at Port Kembla creating opportunities for **local industry participation and new jobs**.

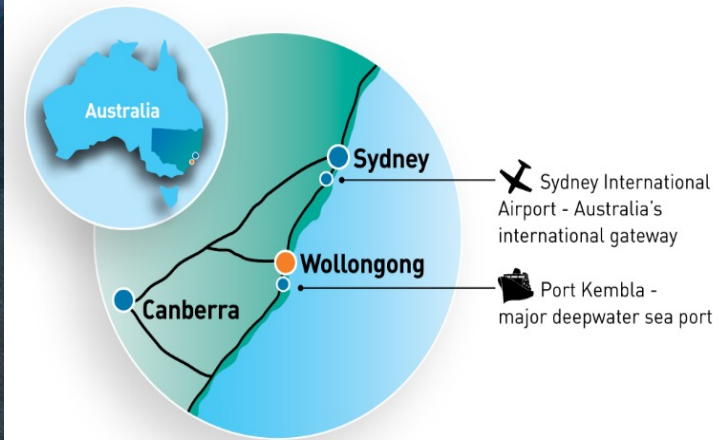
With **30+ years** of hydrogen expertise, Coregas are providing key technical services to the **\$500 million Hydrogen Energy Supply Chain** project in Victoria.



**Facility for  
Intelligent Fabrication**

Research, prototyping, training and certification





## Be part of this Global Opportunity

The **Port Kembla Hydrogen Hub** is playing a **key role** in the Australia's journey towards a **zero emissions future**.

**Investment opportunities** span large scale **hydrogen production**, **power generation**, offshore wind, gas **pipeline**, **import** and **export terminal infrastructure**.

**Contact** us now to be part of this **exciting global opportunity**.

## Contacts

Nigel McKinnon  
Deputy Director  
Department of Regional NSW  
e| [nigel.mckinnon@regional.nsw.gov.au](mailto:nigel.mckinnon@regional.nsw.gov.au)  
m| +61 418 259 055

Tony Dyer  
Business Development Manager  
Department of Regional NSW  
e| [tony.dyer@regional.nsw.gov.au](mailto:tony.dyer@regional.nsw.gov.au)  
m| +61 419 093 081





## **ATTACHMENT A MAJOR NEW ENERGY PROJECT SUMMARIES**

### Disclaimer

- The following one page project summaries are based on approved information from the project proponent or drawn from information already in the public domain.

## COREGAS HYDROGEN REFUELLING STATION

**OWNER:** Coregas

**DESCRIPTION:** Installation of a Hydrogen Refuelling Station adjacent to the existing Coregas Hydrogen Plant at Port Kembla. Project includes associated civil works for heavy vehicle access.

**STATUS:** Estimated to be operational by mid 2023.

**TYPE:** Hydrogen Refuelling Station featuring a Haskel Geno dispenser unit.

**CAPACITY:** 400kg/day of compressed fuel cell quality hydrogen at 350 bar (5,000 psi) pressure. Project is linked to heavy road transport trial with two fuel cell electric prime movers joining the Coregas NSW distribution fleet.

**INVESTMENT:** \$2m estimate with NSW Govt (DRNSW) contribution of \$500,000.

**LOCATION:** Port Kembla, Wollongong LGA.

**CONTACT:** Wodek Jakubik | 0409 227 209  
wodek.jakubik@coregas.com

# HYDROGEN FUEL STATION





# LARGE SCALE HYDROGEN PRODUCTION

## LARGE SCALE HYDROGEN PRODUCTION FACILITIES

**OWNER:** Various.

**DESCRIPTION:** Establishment of large scale hydrogen production facilities at 5GW (1,500 tonnes/day) combined capacity to service initially domestic markets scaling into exports by 2030.

**STATUS:** Concept stage.

**TYPE:** Electrolyser technology utilising renewable energy and recycled water feedstock (15ML/day capacity).

**CAPACITY:** Multiple GW scale sites giving 5GW combined capacity. Staged development based on domestic and export market activation pathways.

**INVESTMENT:** \$2.5bn+ estimate.

**LOCATION:** Wollongong LGA.

**CONTACT:** Nigel McKinnon, NSW Govt | 0418 259 055  
nigel.mckinnon@regional.nsw.gov.au

Image: Asahi Kasei 10MW single stack alkaline electrolyser commenced operation in April 2020 in Fukushima Japan





## PORT KEMBLA HYDROGEN EXPORT TERMINAL

**OWNER:** Consortium TBA.

**DESCRIPTION:** Construction of a dedicated facility for liquefied hydrogen exports including liquefaction plant, storage and pipeline infrastructure.

**STATUS:** Concept stage.

**TYPE:** Ship loading system and related dock side infrastructure. Liquefaction plant to convert gaseous hydrogen to liquid by reducing it to -253 degrees celcius. Hydrogen is 800 times more dense in liquid form making long distance transportation more viable. Gaseous hydrogen supplied by pipeline to Export Terminal.

**CAPACITY:** TBA.

**INVESTMENT:** \$300m estimate.

**LOCATION:** Wollongong LGA.

**CONTACT:** Nigel McKinnon, NSW Govt | 0418 259 055  
nigel.mckinnon@regional.nsw.gov.au



Image: The first liquefied hydrogen carrier Suiso Frontier built by Kawasaki Heavy Industries launched in December 2019

# COREGAS PORT KEMBLA HYDROGEN PRODUCTION FACILITY



Image: Coregas Steam Methane Reformer trains at Port Kembla



Image: Coregas tube trailer distributing compressed hydrogen

## COREGAS HYDROGEN PLANT

**OWNER:** Coregas.

**DESCRIPTION:** Existing hydrogen production plant. Largest merchant facility in Australia producing marketable grey hydrogen in a range of certified purities for industrial, food production, scientific and transport mobility applications. This includes fuel cell grade hydrogen at 99.999% purity.

**STATUS:** Facility opened in 1989.

**TYPE:** Two Steam Methane Reformer trains using natural gas feedstock with on-site storage and compression facilities.

**CAPACITY:** Up to 2,000kg/day.

**LOCATION:** Port Kembla Steelworks, Wollongong LGA.

**CONTACT:** Wodek Jakubik, Coregas | 0409 227 209  
wodek.jakubik@coregas.com



## TALLAWARRA B POWER STATION

**OWNER:** Energy Australia.

**DESCRIPTION:** Construction of a new gas fired power station known as Tallawarra B adjacent to the existing Tallawarra A Power Station.

**STATUS:** Final investment decision - May 2021. Two year build program, operational by Dec 2023.

**JOBS:** 250 during construction phase.

**TYPE:** GE F class (9F.05) dual fuel open cycle gas turbine. Commitment to purchase 200 tonnes of green hydrogen @ 5 percent blend from 2025.

**CAPACITY:** 316MW planned.

**INVESTMENT:** \$300m estimate, \$83m public funding contribution - \$78m NSW Govt + \$5m Federal Govt.

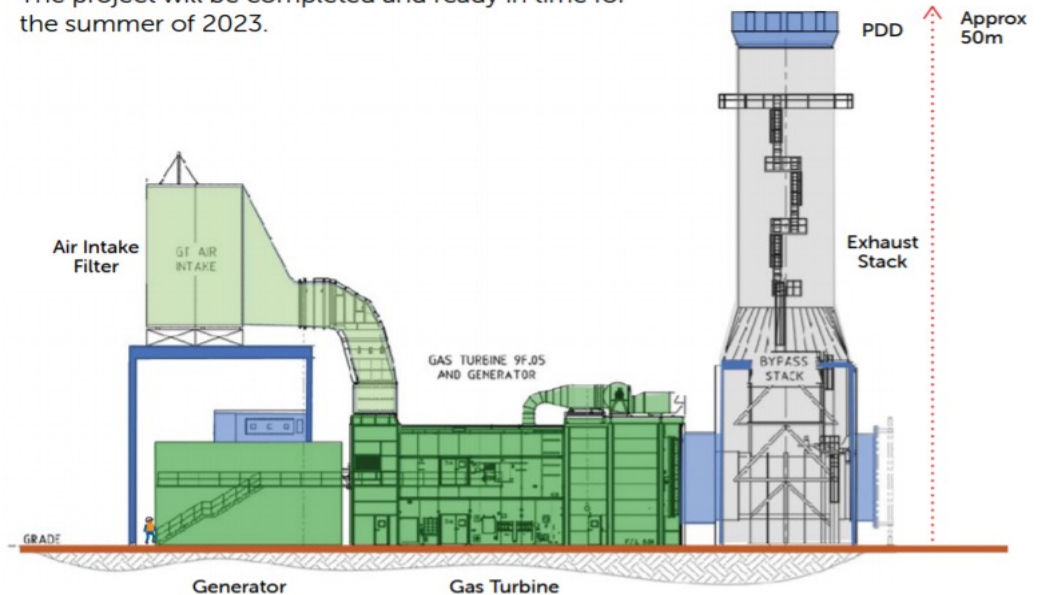
**LOCATION:** Wollongong LGA.

**WEBLINK**

Image courtesy of Energy Australia - site for Tallawarra B is yellow shaded area.



The project will be completed and ready in time for the summer of 2023.



Above: An elevation drawing of the Tallawarra B project. The Project is Australia's first net zero emissions hydrogen and gas capable power plant, with direct carbon emissions from the project offset over its operational life.



# A GREAT LEAP TOWARDS A **DECARBONIZED ENERGY FUTURE IN AUSTRALIA**

## EnergyAustralia's Tallawarra B 316MW dual-fuel, gas and green Hydrogen power plant



**1<sup>st</sup>** natural gas + green Hydrogen dual-fuel peaker power plant in Australia



Utilizing GE's decades of experience in burning Hydrogen in gas turbines



Contributing to Australia's goals in delivering up to 1GW dispatchable power while ensuring transition to a lower carbon energy future



**1<sup>st</sup>** large scale heavy-duty gas turbine power project in Australia in 12 years



Supporting growth in renewables in the phase-out of coal-fired power generation



EnergyAustralia expects to contribute AU\$300 million to the economy and create 250 jobs during the construction phase



**1<sup>st</sup>** GE 9F.05 gas turbine to generate reliable and affordable power in Australia



GE 9F Fleet ... > 450 units operating in 40 countries ... clocked over 24 million hours



GE's F-class gas turbine portfolio is capable to burn H<sub>2</sub> from 5% to 100% by Vol levels





# SQUADRON ENERGY PORT KEMBLA ENERGY TERMINAL

## PORT KEMBLA ENERGY TERMINAL

**OWNER:** Squadron Energy.

**DESCRIPTION:** LNG import terminal with a Floating Storage and Regasification Unit (FSRU) and dedicated pipeline connection to Eastern Gas Pipeline (EGP).

**STATUS:** Planning approval in April 2019, modification in April 2020. Lease signed in November 2020 for 25 years. Construction commenced in May 2021 with completion by end of 2023.

**JOBS:** 150 jobs during construction phase, 50 new jobs during operation & maintenance phase.

**TYPE:** Import terminal featuring FSRU.

**CAPACITY:** Supply up to 130 petajoules of natural gas annually which represents 75+ percent of the existing NSW demand.

**INVESTMENT:** \$250m estimate.

**LOCATION:** Port Kembla, Wollongong LGA.

**WEBLINK**



Image courtesy of Squadron Energy - Port Kembla Energy Terminal site with permanently moored FSRU with LNG carrier alongside to deliver its cargo





Image courtesy of Origin Energy - Fitzroy Canal and Kangaroo Valley pipeline connection point

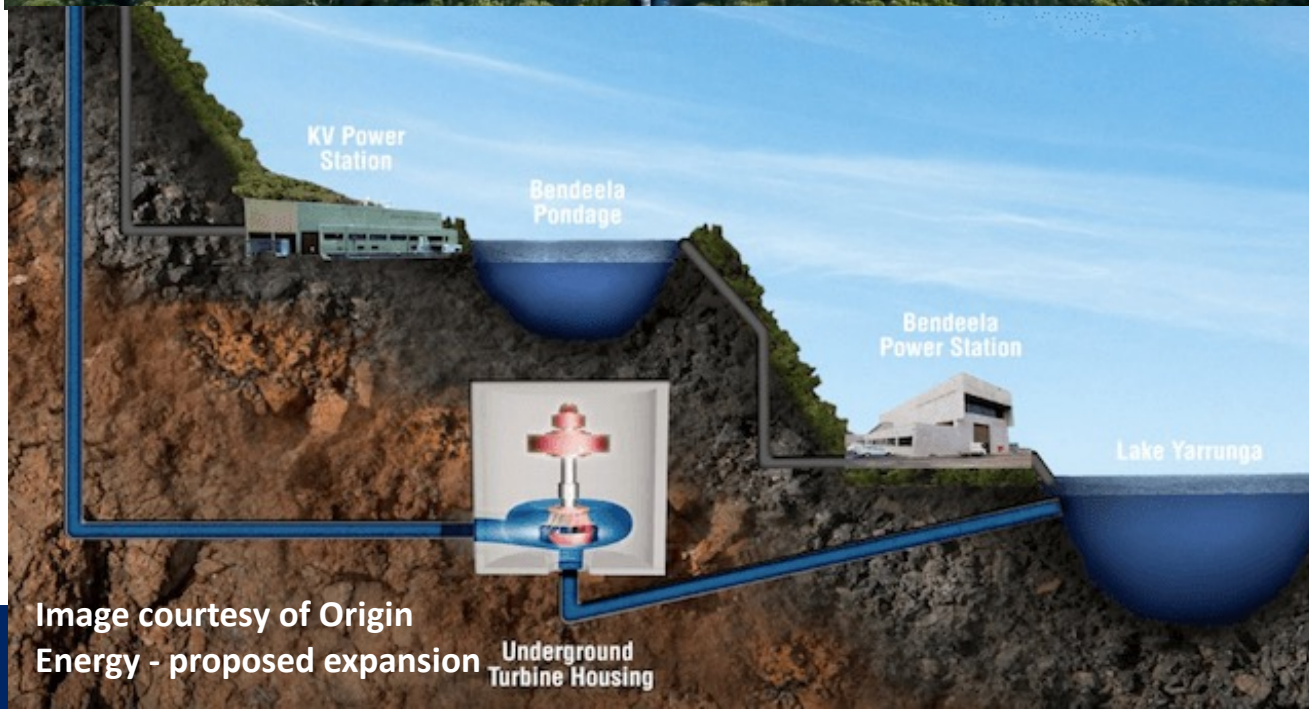


Image courtesy of Origin Energy - proposed expansion Underground Turbine Housing

## SHOALHAVEN HYDRO SCHEME

**OWNER:** Origin Energy.

**DESCRIPTION:** Construction of a new underground generation and pumping facility utilising the existing dam infrastructure and grid connection.

**STATUS:** Existing facility opened in 1977. Proposed expansion declared a Critical State Significant Infrastructure project. ARENA funded feasibility study and preliminary geotechnical works completed. EIS for expansion project currently on display.

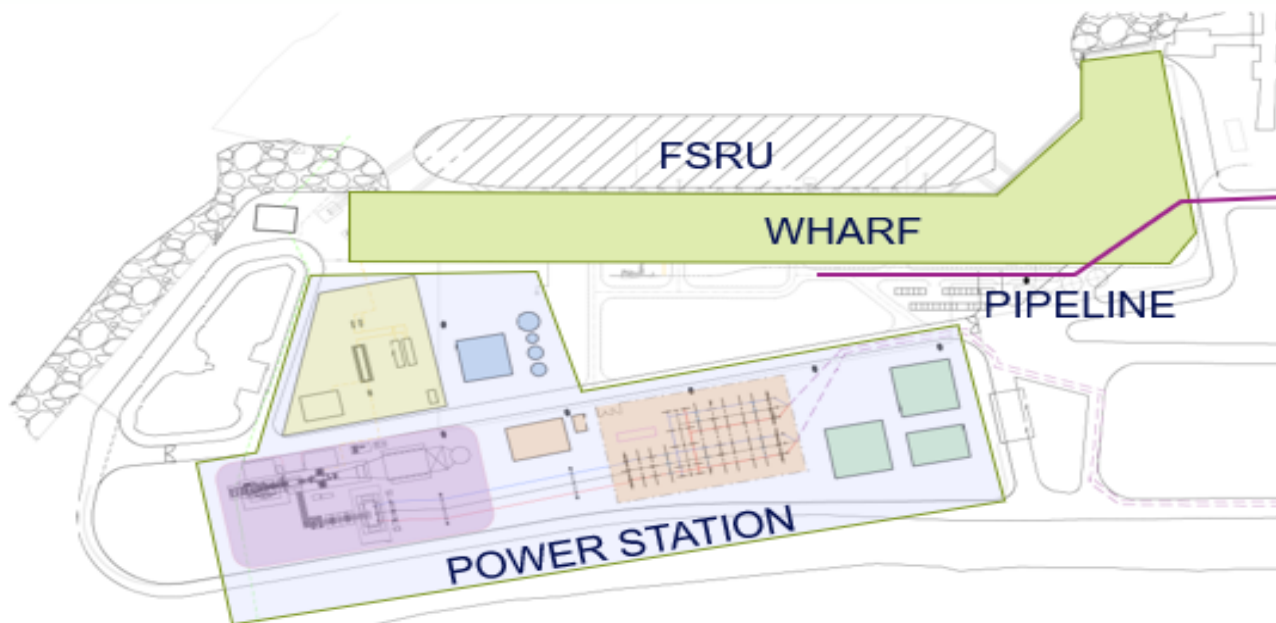
**TYPE:** Pumped hydro system consisting of four water storage facilities and two existing power stations (Bendeela and Kangaroo Valley).

**CAPACITY:** 240MW existing + 235MW of planned new capacity giving combined capacity of 475MW on completion.

**LOCATION:** Shoalhaven LGA.

**CONTACT:** Jim Belford | 0427 169 889  
[jim.belford@originenergy.com.au](mailto:jim.belford@originenergy.com.au)





## PORT KEMBLA POWER STATION

**OWNER:** Squadron Energy.

**DESCRIPTION:** Construction of a dual fuel, natural gas and hydrogen, power station.

**STATUS:** Project shortlisted in Underwriting New Generation Investment (UNGI) energy scheme in 2019. Pre-feasibility stage completed. Received Critical State Significant Infrastructure (CSSI) classification in Aug 2021. Operational by Dec 24.

**JOBS:** 600-700 jobs during construction phase, 25-35 during operations and maintenance phase.

**TYPE:** Combined cycle gas fired power station linked to the Port Kembla Energy Terminal project. Single H class gas turbine, capable to run 30% hydrogen blend (100 tonnes/day) increasing to 100% by 2030.

**CAPACITY:** 635MW proposed.

**INVESTMENT:** \$1.2bn estimate.

**LOCATION:** Port Kembla, Wollongong LGA.

**WEBLINK**

Image courtesy of Boskalis



Offshore Wind Farm	Foundation Technology	Major Port	Indicative Capacity	Distance to Shore	Distance to Port	Construction Period
Novocastrian	Floating	Newcastle	2,000MW	30km+	68km	2028-2031
Illawarra	Floating	Port Kembla	2,000MW	20km+	40km	2028-2031
Eden	Floating	Port Kembla	2,000MW	20km+	315km	2031-2034
Ulladulla	Floating	Port Kembla	2,000MW	20km+	99km	2032-2035

## ILLAWARRA OFFSHORE WIND FARM

**OWNER:** Oceanex Energy.

**DESCRIPTION:** Construction of a large scale offshore wind farm to supply renewable electricity to the national grid and direct to customers.

**STATUS:** Feasibility stage. Construction is expected to commence in 2028, be completed by 2031 followed by a 30 year operations and maintenance phase.

**TYPE:** Offshore wind farm with up to 130+ 15MW floating wind turbines. Floating substation connected to the national grid by subsea transmission cable.

**CAPACITY:** 2GW proposed for the Illawarra Offshore Wind Farm. Illawarra is part of a portfolio of projects that includes Newcastle, Ulladulla and Eden offshore wind projects.

**INVESTMENT:** \$10bn estimate.

**WEBLINK**



# GREEN ENERGY PARTNERS OFFSHORE WIND FARM



Image courtesy of Orsted - offshore wind turbines and electrical substation

## WOLLONGONG OFFSHORE WIND FARM

**OWNER:** [Green Energy Partners Australia.](#)

**DESCRIPTION:** Construction of large scale floating offshore wind project to supply renewable electricity to the National Electricity Market grid.

**STATUS:** Preliminary feasibility work commenced.

**TYPE:** Offshore windfarm with up to 200 floating wind towers developed in four phases.

**CAPACITY:** 3GW proposed with opportunity for another 5GW of capacity to support large scale hydrogen production.

**INVESTMENT:** \$15bn estimate.

**LOCATION:** Wollongong LGA.

**[WEBLINK](#)**



# BLUEFLOAT ENERGY OFFSHORE WIND PROJECT



Image courtesy of BlueFloat Energy - quayside assembly of floating wind turbines

## SOUTH PACIFIC OFFSHORE WIND PROJECT

**OWNER:** BlueFloat Energy.

**DESCRIPTION:** Construction of a large scale floating offshore wind farm in three stages:

Stage 1: development - 5 years

Stage 2: construction - 2 years

Stage 3: operations and maintenance - 30 years.

**STATUS:** Early development stage.

**TYPE:** Offshore wind project with up to 105 floating wind turbines (15-20MW capacity) connected to offshore substations. Onshore grid connection via the Transgrid Dapto substation.

**CAPACITY:** 1.6GW proposed.

**INVESTMENT:** \$7.5bn estimate.

**LOCATION:** Illawarra-Shoalhaven coast.

**WEBLINK**



# JEMENA PORT KEMBLA LATERAL LATERAL LOOPING PIPELINE

## JEMENA PORT KEMBLA LATERAL LOOPING PIPELINE

**OWNER:** Jemena

**DESCRIPTION:** Duplication of the existing 6.3 kilometre high pressure 450mm steel pipeline that supplies industrial users in Port Kembla. The new pipeline is 100 percent hydrogen compatible. It will allow direct injection of gas from the Port Kembla Energy Terminal into the Eastern Gas Pipeline at the existing Jemena Kembla Grange tie in facility.

**STATUS:** Construction commenced in Jan 2023.

**INVESTMENT:** \$70 million estimate as part of a larger upgrade to the Eastern Gas Pipeline to increase capacity and make it bidirectional.

**LOCATION:** Port Kembla, Wollongong LGA

**WEB LINK**



# JEMENA PORT KEMBLA HYDROGEN PIPELINE

## JEMENA PORT KEMBLA HYDROGEN PIPELINE

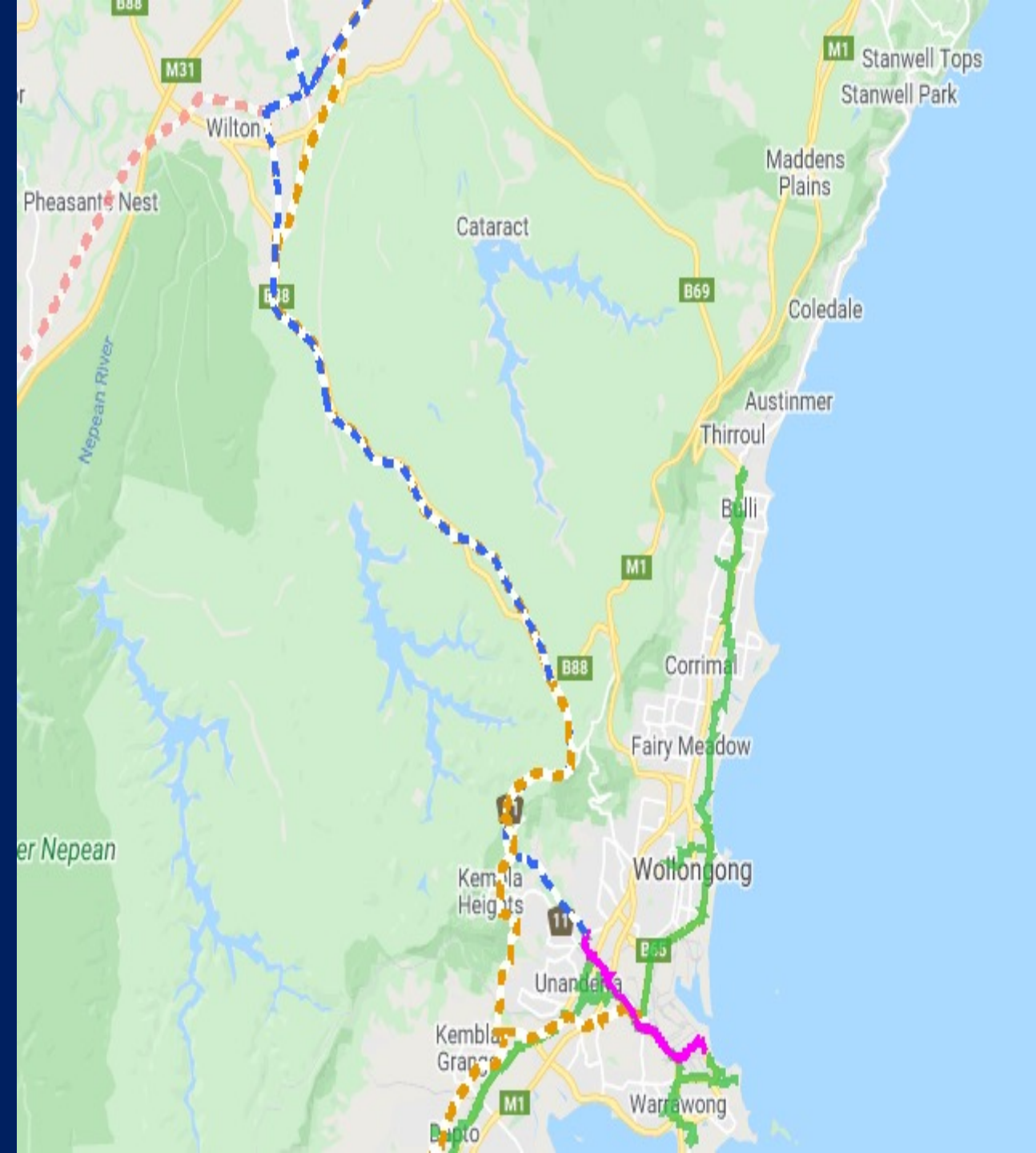
**OWNER:** Jemena.

**DESCRIPTION:** Existing 40.3 kilometre high pressure steel pipeline from Wilton to Port Kembla that is no longer in use for natural gas transmission. Repurpose pipeline for potential hydrogen storage. A range of studies would need to be undertaken to determine the technical viability of the project. Initial estimate of capacity is 1 GWh (300 tonnes) of hydrogen.

**STATUS:** Concept stage. Pipeline could link individual production sites with potential offtake locations within the Port Kembla precinct.

**INVESTMENT:** Concept stage.

**LOCATION:** Port Kembla, Wollongong LGA.





## SHOALHAVEN BIOENERGY FACILITY

**OWNER:** Innovating Energy.

**DESCRIPTION:** Construction of a waste to energy facility at Nowra. Biogas produced from anaerobic digestion of food and farm waste streams is used to generate renewable electricity.

**STATUS:** Joint Venture agreement has been signed. Estimated 14 month construction phase. Expected to be operational by the end of 2023.

**TYPE:** Botres Global Bioenergy Plant utilising Schumann Tanks technology.

**CAPACITY:** 18,000 MWh per year initially. Additional waste streams will increase future planned capacity.

**INVESTMENT:** \$28m estimate with Federal Govt contribution of \$3m.

**LOCATION:** Shoalhaven LGA.

**WEBLINK**



Image courtesy of Botres Global showing a Bioenergy Plant