

Port Kembla Hydrogen Hub

INVESTMENT PROSPECTUS

October 2021



www.portkemblahydrogenhub.com.au

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



JULY 15, 2021



Hydrogen Superpower

Port Kembla is poised to become a **hydrogen superpower** with an ambitious vision to create Australia's first **5GW+ scale green hydrogen hub**. Supportive **major energy projects** include:

- **\$2m Coregas Hydrogen Refuelling Station** will deliver Australia's first zero emissions **heavy road transport trial** by mid 2022
- **\$250m AIE Port Kembla Gas Terminal** will deliver Australia's first **gas importation** facility by late 2022, with construction already underway
- **\$300m EnergyAustralia Tallawarra B** project will deliver Australia's first net zero emissions **hydrogen and gas fired power station** by late 2023
- **\$25bn of offshore wind projects** that by 2030 will deliver **10GW of renewable electricity**

PRESS RELEASE

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

June 16, 2021

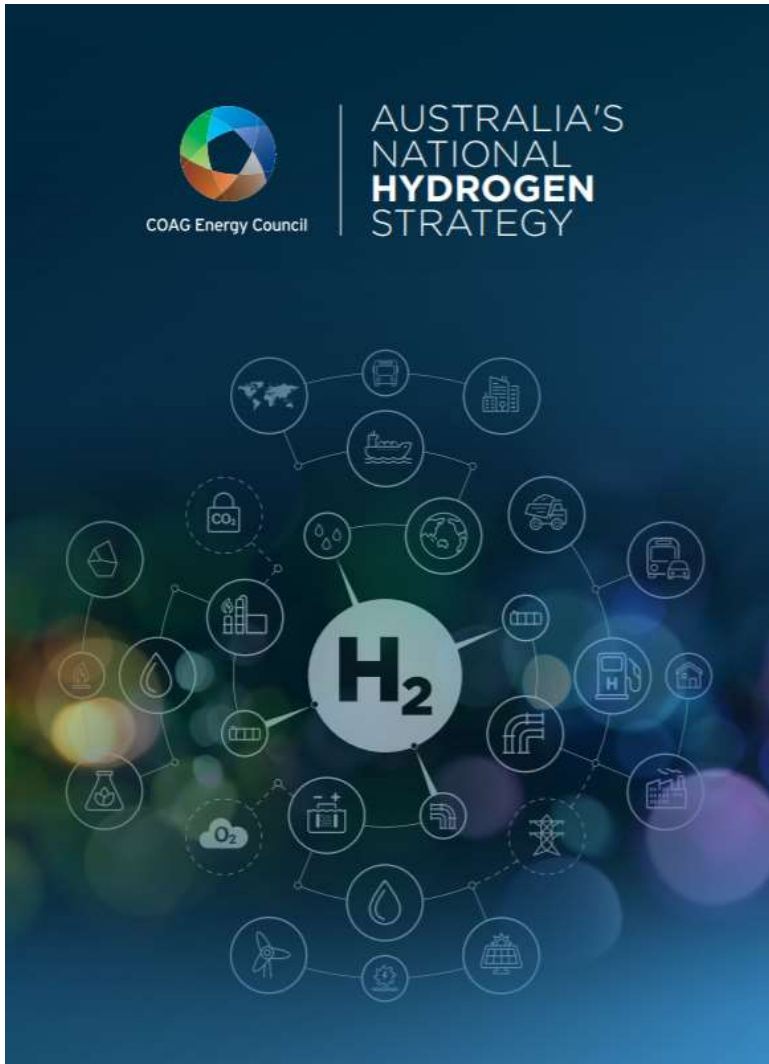
Strategic Location

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, distribution and storage** and over a century of **heavy industry** expertise. **Pure and by-product** hydrogen made from **fossil fuels** at Port Kembla is already used by industry around Australia.

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





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 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 **Port Kembla Hydrogen Hub** in collaboration with key stakeholders across **industry, government and research organisations**.

Hydrogen Hub Vision

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

Key Strategies

Build a **world class hydrogen hub ecosystem** that maximises opportunities through facilitating:

#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

PORT KEMBLA HYDROGEN HUB

#H2HubPortKembla



Strategic Alignment

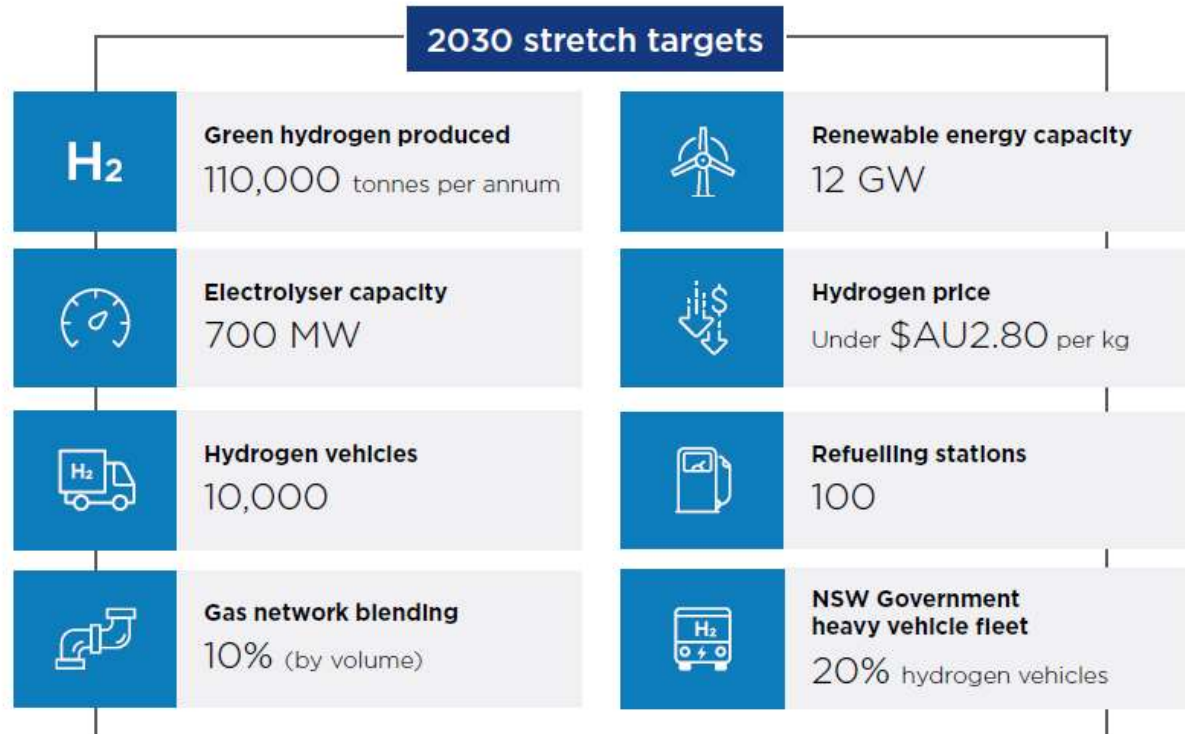
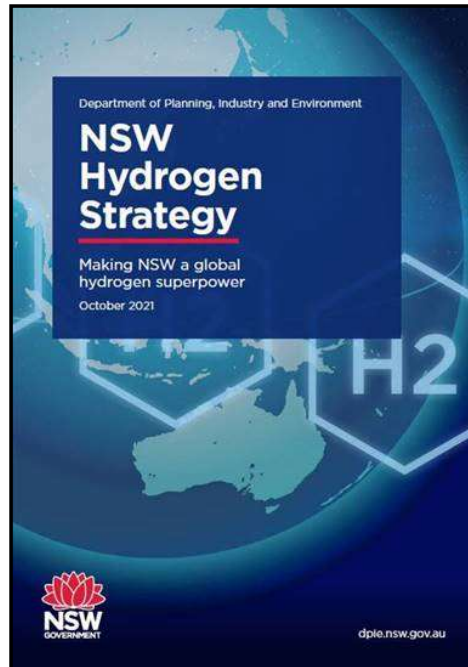
The **Vision** and **Key Strategies** of the **Port Kembla Hydrogen Hub** are consistent with the principles of the **National Hydrogen Strategy** and **NSW Government** policy initiatives including the recently released **NSW Hydrogen Strategy**.



NSW Hydrogen Strategy

NSW - global hydrogen superpower

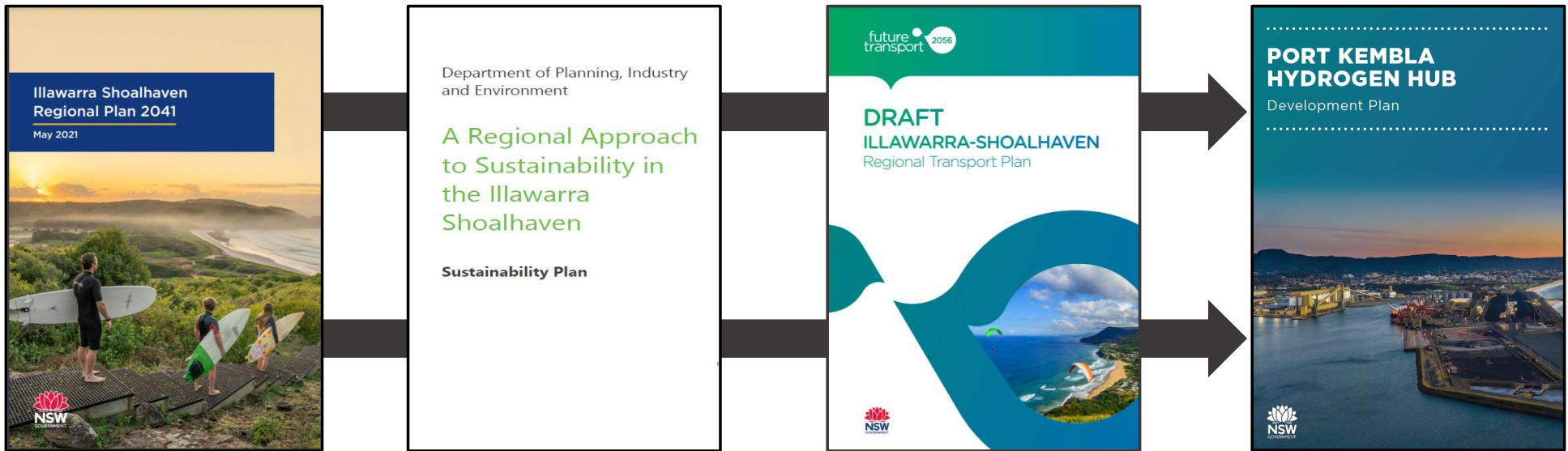
The \$3 billion **NSW Hydrogen Strategy** builds on the principles of the **National Hydrogen Strategy** and related **NSW Government** policy initiatives and sets out a range of **stretch targets** for **2030** including **green hydrogen** production, **electrolyser** capacity and hydrogen **price**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



Regional Strategies

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

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





EnergyAustralia - Tallawarra B Power Station

AIE - Port Kembla Gas Terminal

Jemena - Port Kembla Lateral Pipeline Duplication

Origin - Shoalhaven Hydro Scheme Expansion

AIP - Port Kembla Power Station

Oceanex - Illawarra Offshore Wind Farm

GEP - Wollongong Offshore Wind Farm

Port Kembla Hydrogen Export Terminal

Innovating Energy - Shoalhaven Bioenergy Facility

\$27.5bn+
=
of major
new energy
projects

Hydrogen Ecosystem

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

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

The **opportunity** is to utilise **electrolyser technology** and surplus **recycled water** feedstock to produce **green hydrogen**. Based on available recycled water feedstock at Port Kembla, there is **5GW+ (1,500 tonnes/day)** of potential **hydrogen production capacity**.

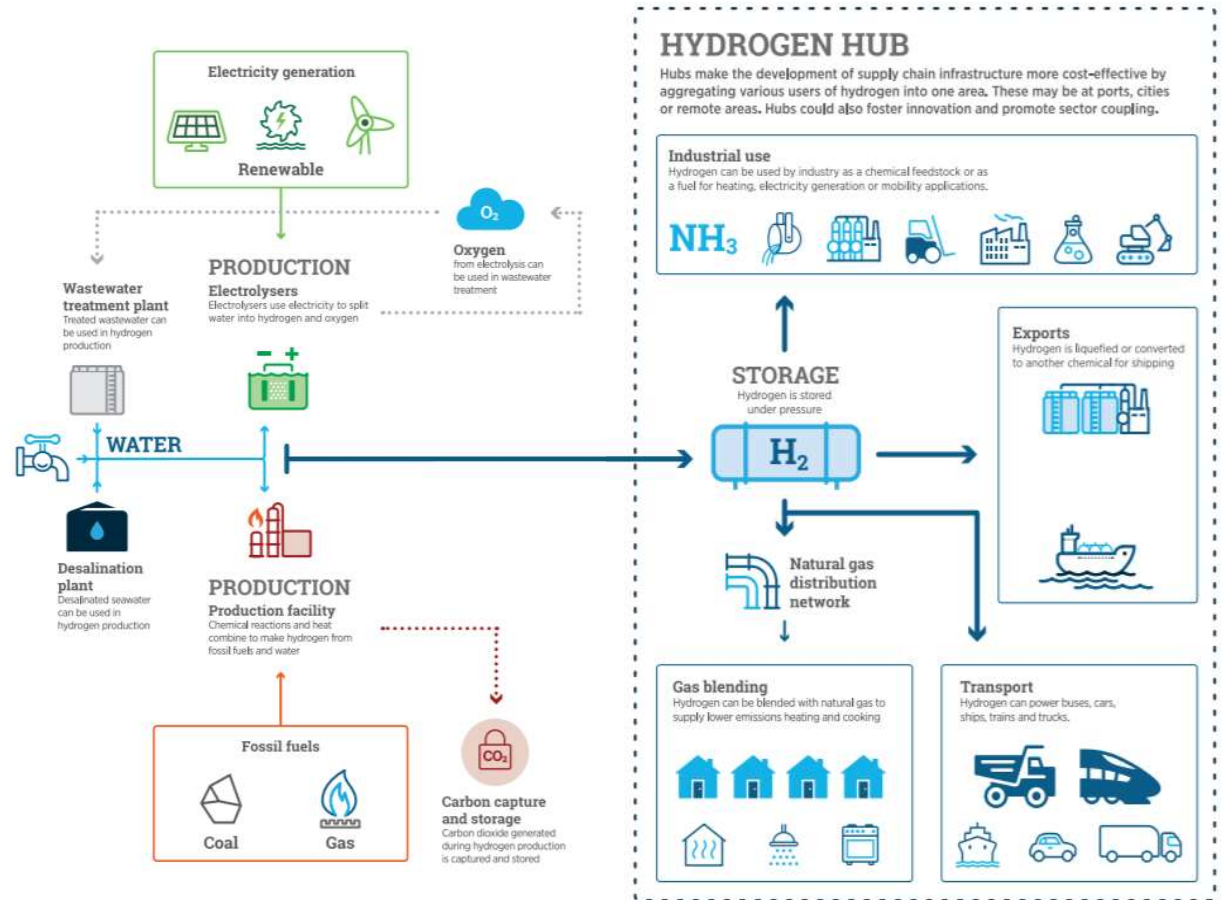


Image: National Hydrogen Strategy Report – COAG Energy Council 2019

PORT KEMBLA HYDROGEN HUB

Future Mobility Day #2
10 June 2021



The **Department of Regional NSW** is facilitating the **Port Kembla Hydrogen Hub** in collaboration with **key stakeholders**. Regular **Port Kembla Hydrogen Hub** meetings and events are held. Member organisations include:

Government

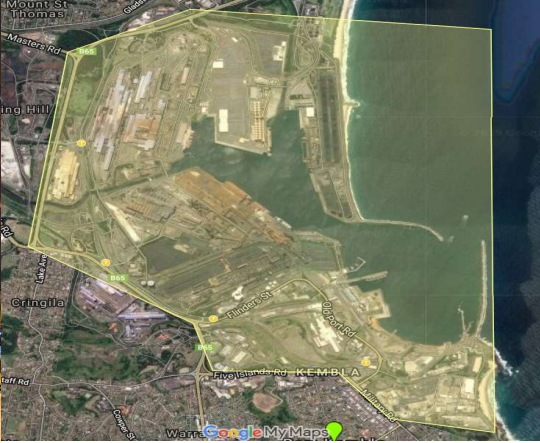
- DRNSW, DPIE, Investment NSW, NSW OCSE, DISER, NERA, Austrade, Wollongong City Council

Industry

- AIE/AIP. BlueScope. Coregas, EnergyAustralia, Jemena, NSW Ports, Oceanex, Origin Energy, Sydney Water, Green Energy Partners, Innovating Energy

Business Groups & Research Organisations

- University of Wollongong. University of NSW, University of WA, Future Fuels CRC, Future Energy Exports CRC, i3net, Business Illawarra



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



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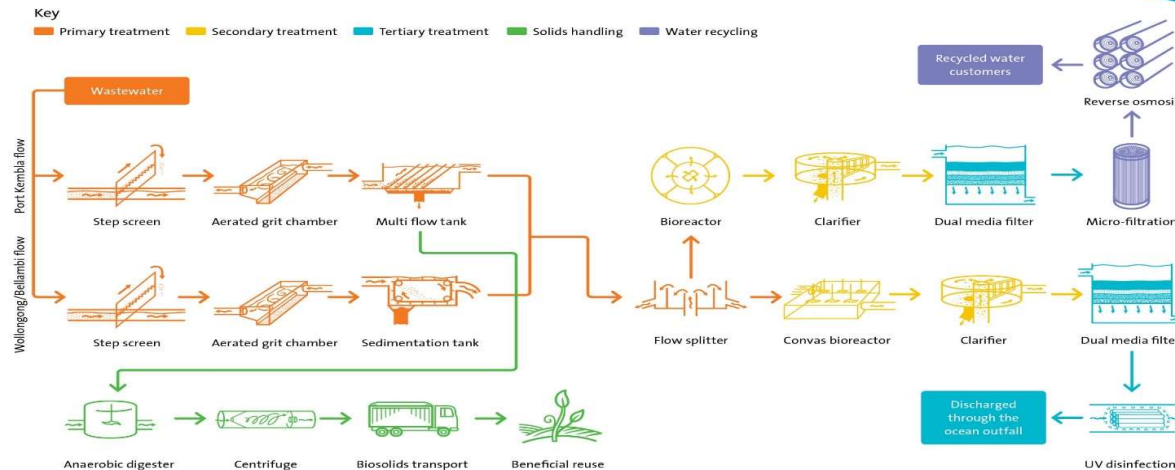
Large scale recycled water and renewable electricity available to support 1,500 tonnes /day/ 5GW+ of green hydrogen electrolyser production capacity

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

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ADVANTAGE #3 - DISTRIBUTION



ADVANTAGE #3 - DISTRIBUTION

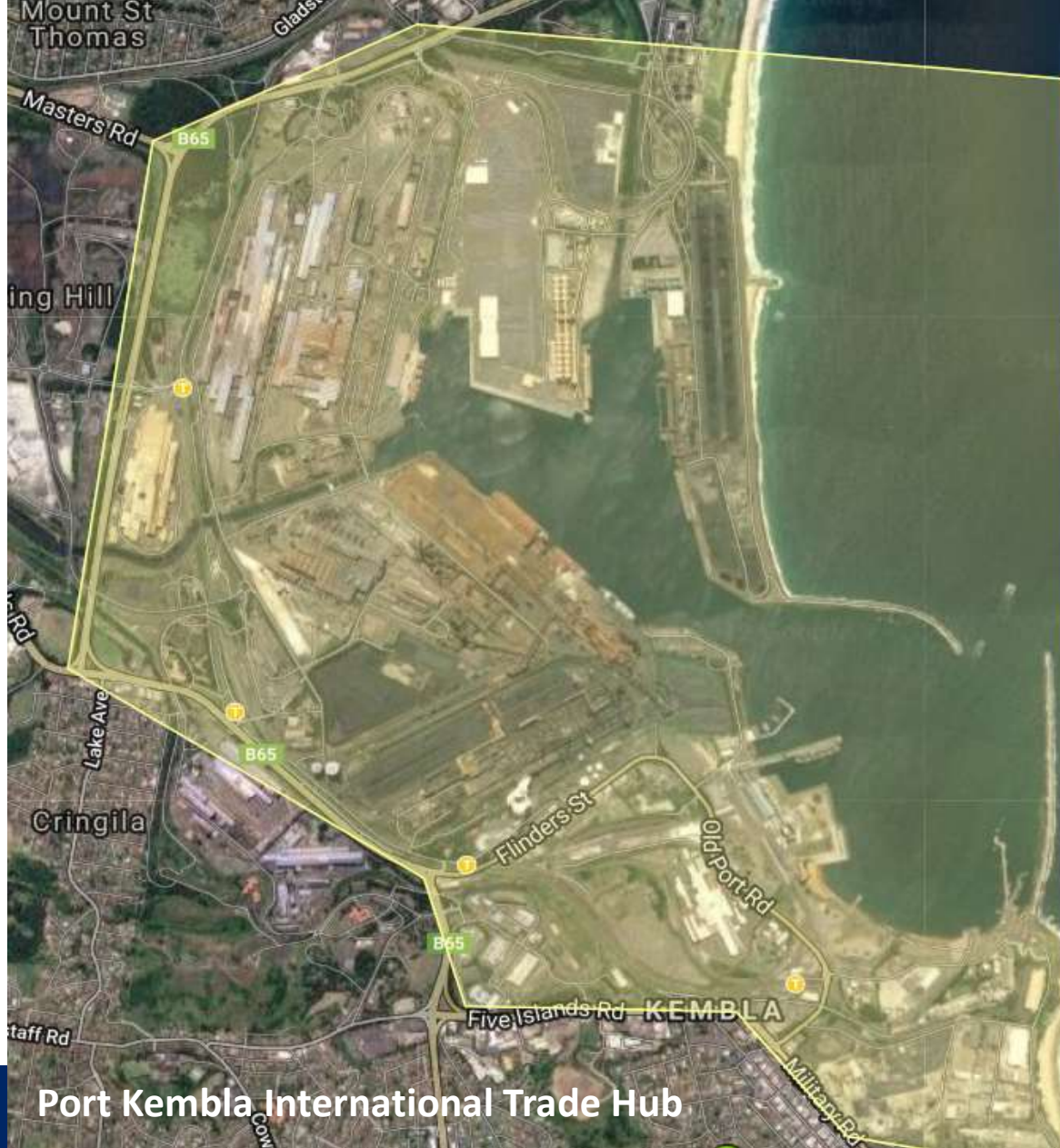
Road and Rail: service 80 percent of Australia's population and industrial markets within 24 hours through existing road and rail networks

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



Technology Demonstration Projects =

Hydrogen in Power Generation - EnergyAustralia Tallawarra B

Waste to Energy - Innovating Energy

Heavy Road Transport Trial (Stage 1) - Coregas, Hyzon, DRNSW

Hydrogen Freight Train Trial - DRNSW



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

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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 production facility at Port Kembla. Project includes associated civil works for heavy vehicle access.

STATUS: Estimated to be operational mid 2022.

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 mid 2022.

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



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

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 Hydrogen Production Facility at Port Kembla



Image: Coregas tube trailer distributing compressed hydrogen

PORT KEMBLA HYDROGEN PRODUCTION FACILITY

OWNER: Coregas.

DESCRIPTION: Existing hydrogen production facility. 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: Steam Methane Reformer using natural gas as feedstock with on-site compression for distribution by pipeline and road via tube trailers.

CAPACITY: Up to 2,000kg/day.

LOCATION: Port Kembla Steelworks, Wollongong LGA.

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

ENERGY AUSTRALIA TALLAWARRA B POWER STATION

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.

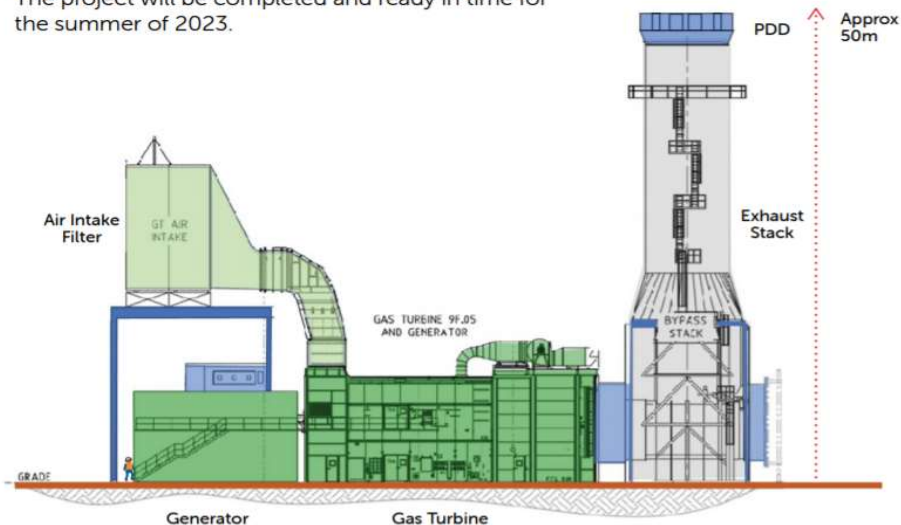
LOCATION: Wollongong LGA.

CONTACT: Sarah Hafez | 0466 698 306
sarah.hafez@energyaustralia.com.au

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



1st 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



1st 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



1st 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 H₂ from 5% to 100% by Vol levels



PORT KEMBLA GAS TERMINAL

OWNER: Australian Industrial Energy (AIE) - owned by 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 2022.

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.

CONTACT: Kylie Hargreaves | 0438 451 652
kylie.hargreaves@ausindenergy.com



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



Image: Fitzroy Canal and Kangaroo Valley pipeline connection point

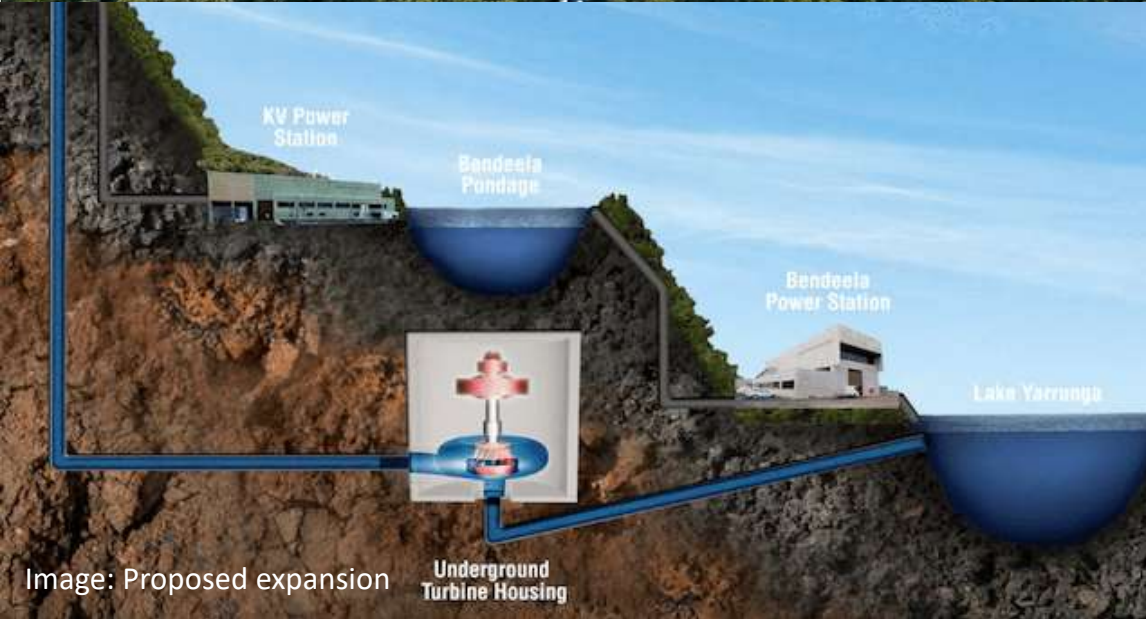


Image: Proposed expansion

SHOALHAVEN HYDRO SCHEME

OWNER: Origin Energy.

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

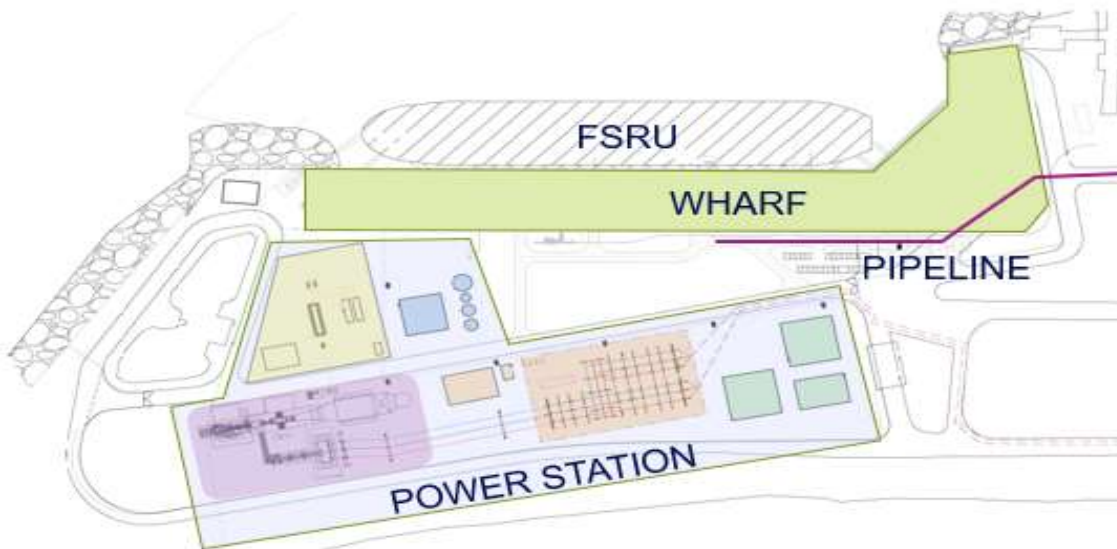
STATUS: Existing facility opened in 1977. Proposed expansion has been declared a Critical State Significant Infrastructure project and has attracted ARENA funding for the feasibility study. Preliminary geotechnical works have been completed.

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: Elise Ring | 0458 204 791
Elise.Ring@originenergy.com.au



PORT KEMBLA POWER STATION

OWNER: Australian Industrial Power (AIP) - owned by 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.

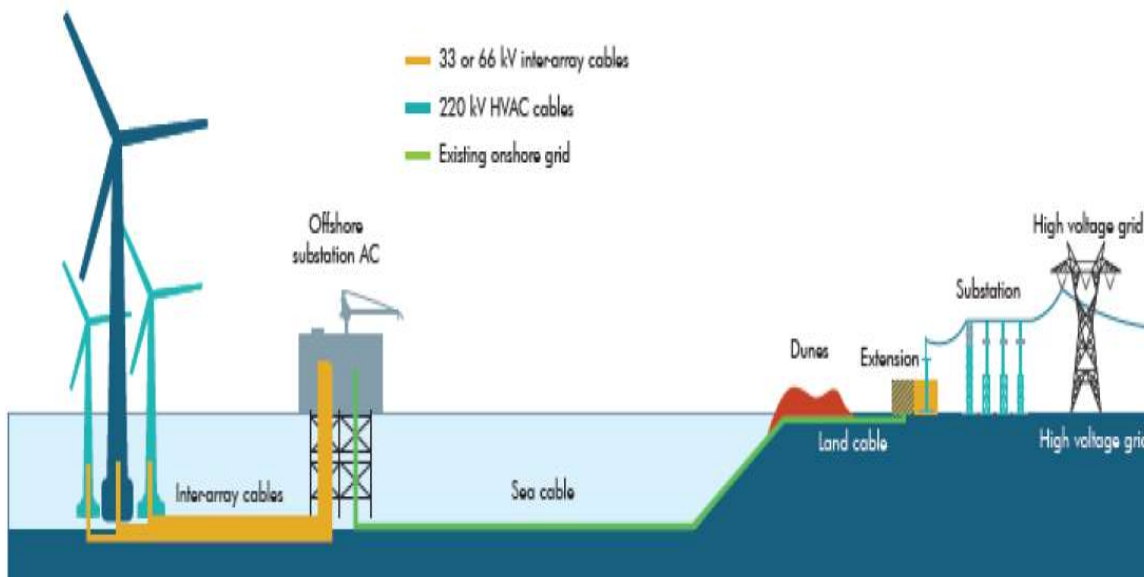
TYPE: Combined cycle gas fired power station linked to the Port Kembla Gas Terminal project. Single H class gas turbine, capable to run 30% hydrogen blend (100 tonnes/day) increasing to 100% by 2030.

CAPACITY: 635MW proposed.

INVESTMENT: \$1.3bn estimate.

LOCATION: Port Kembla, Wollongong LGA.

CONTACT: Kylie Hargreaves | 0438 451 652
kylie.hargreaves@ausindenergy.com



HUNTER/NEWCASTLE

Foundation	Area km ²	Indicative MW	Distance shore	Ports	Commencement	Completion
Floating	499	1,800	30 km	Newcastle, 68km	2027	2031

ILLAWARRA/WOLLONGONG

Foundation	Area km ²	Indicative MW	Distance shore	Ports	Commencement	Completion
Floating	382	2,000	27 km	Port Kembla, 40km	2029	2032

ULLADULLA

Foundation	Area km ²	Indicative MW	Distance shore	Ports	Commencement	Completion
Floating	262	1,800	21 km	Port Kembla, 99km	2030	2033

EDEN

Foundation	Area km ²	Indicative MW	Distance shore	Ports	Commencement	Completion
Floating	493	1,800	18 km	Port Kembla, 315km	2032	2036

ILLAWARRA OFFSHORE WIND FARM

OWNER: Oceanex Energy.

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

STATUS: Preliminary feasibility work commenced.

TYPE: Offshore wind farm with up to 180 floating wind towers.

CAPACITY: 2GW proposed for Illawarra Offshore Wind Farm. Proposal is part of broader scheme that includes Newcastle, Ulladulla and Eden offshore wind farms.

INVESTMENT: \$10bn estimate.

LOCATION: Port Kembla, Wollongong LGA

CONTACT: Andy Evans | 0400 018 087
aevans@oceanexenergy.com

GREEN ENERGY PARTNERS OFFSHORE WIND FARM



Image courtesy of Orsted - offshore wind turbines and electrical sub-station

WOLLONGONG OFFSHORE WIND FARM

OWNER: Green Energy Partners Australia.

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

STATUS: Preliminary feasibility work commenced.

TYPE: Offshore wind farm 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

CONTACT: Dan Hansen | 0419 707 858
dkh@greenenergy.partners



JEMENA PORT KEMBLA LATERAL LOOPING PIPELINE

PORT KEMBLA LATERAL LOOPING PIPELINE DUPLICATION

OWNER: Jemena.

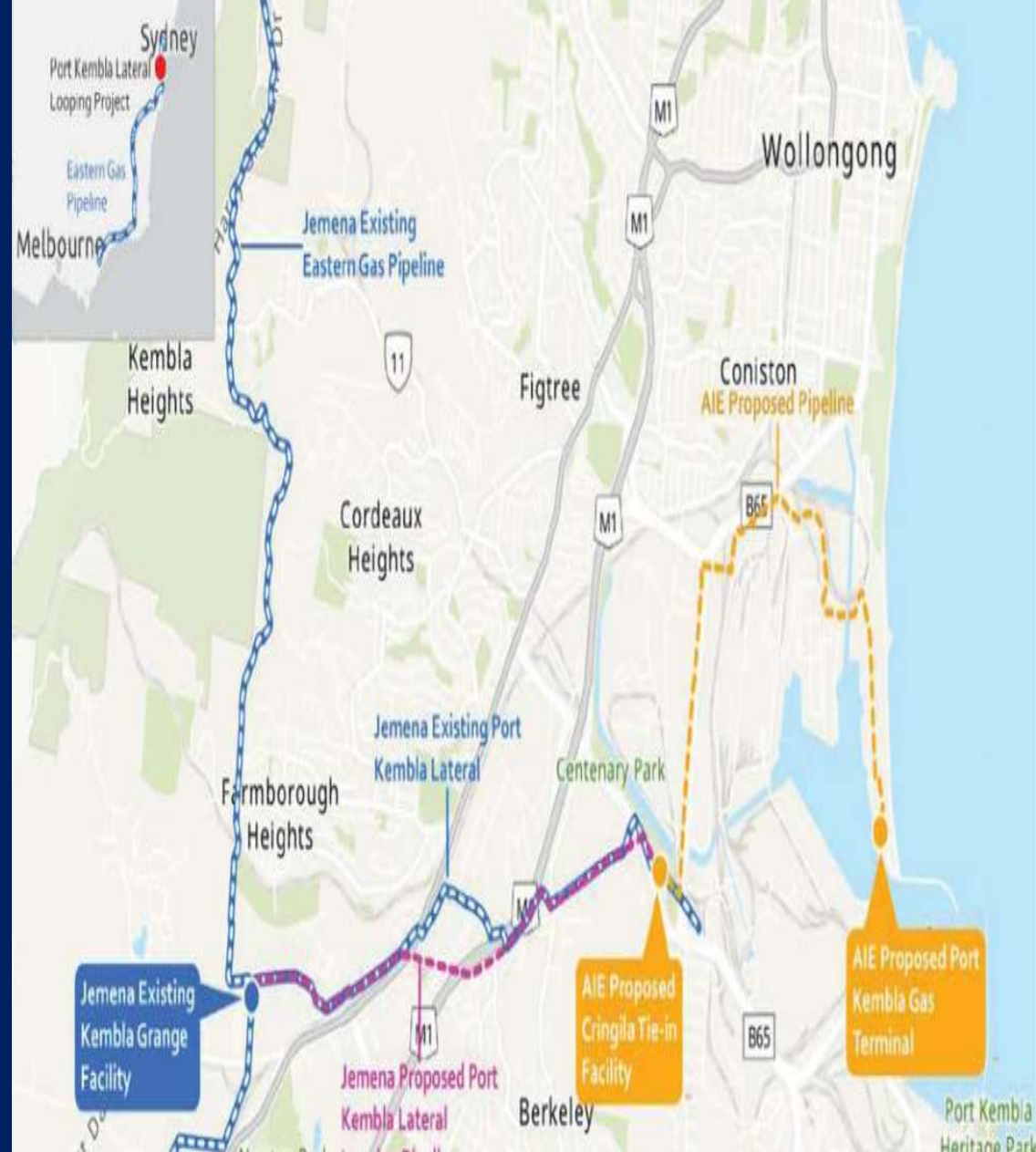
DESCRIPTION: Duplication of the existing 6.3 kilometre high pressure steel pipeline that supplies industrial users in Port Kembla. The new lateral will allow direct injection of gas from the proposed Port Kembla Gas Terminal (PKGT) into the Eastern Gas Pipeline at the Jemena Kembla Grange tie in facility.

STATUS: Project completed and operational by 2022. Dependent upon PKGT getting Final Investment Decision approval.

INVESTMENT: \$70m estimate as part of a larger upgrade to increase the Eastern Gas Pipeline capacity by 25 percent.

LOCATION: Port Kembla, Wollongong LGA.

CONTACT: Michael Pintabona | 0428 742 804
michael.pintabona@jemena.com.au



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 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: \$17m estimate with Federal Govt contribution of \$3m.

LOCATION: Shoalhaven LGA.

CONTACT: Phil Horan | 0412 042 615
phil@innovatingenergy.com.au



Image courtesy of Botres
Global - Bioenergy Plant