

ITEM 2

WOLLONGONG CITY COUNCIL - DRAFT SUBMISSION TO THE INQUIRY INTO THE DEVELOPMENT OF A HYDROGEN INDUSTRY IN NEW SOUTH WALES

Wollongong is a city committed to a clean energy future with demonstrated capability to develop a large-scale hydrogen industry as identified by both the Commonwealth and New South Wales Governments. Wollongong City Council strongly supports this vision given its alignment to Council's adopted target of net zero emissions by 2050, as well as long lasting economic benefit to the Illawarra region and New South Wales.

The NSW Standing Committee on State Development is currently undertaking an Inquiry into the development of a hydrogen industry in New South Wales. This report seeks Council's endorsement for its submission to the Inquiry about Wollongong's capability and commitment to hydrogen industry.

RECOMMENDATION.

Council endorse the draft submission to the Inquiry into the development of a hydrogen industry in New South Wales and submit to the NSW Standing Committee on State Development.

REPORT AUTHORISATIONS

Report of: Sue Savage, Manager Community Cultural + Economic Development
Authorised by: Kerry Hunt, Director Community Services - Creative and Innovative City

ATTACHMENTS

- 1 Terms of Reference - Inquiry into the Development of a Hydrogen Industry in New South Wales
- 2 Wollongong City Council - Submission - Inquiry into the Development of a Hydrogen Industry in New South Wales

BACKGROUND

The NSW Upper House is undertaking an inquiry into and report on the current state of, and opportunities for, the development of a hydrogen industry in New South Wales. In summary, the Terms of Reference for the Inquiry are focused on:

1. The size of the economic and employment opportunity created by the development of a hydrogen industry in New South Wales, in particular those opportunities for regional New South Wales.
2. The state's existing hydrogen capabilities.
3. The capacity of and barriers to New South Wales becoming a major production, storage and export hub for hydrogen.
4. The economics of hydrogen's use in different sectors of the economy, including emerging opportunities to use hydrogen in industrial processes and as a feedstock.
5. The infrastructure, technology, skills, workforce capabilities and other things needed to realise the economic opportunities of hydrogen as and when it becomes commercial in different sectors of the economy.
6. The actions needed of the public and private sectors, to support the development of a hydrogen industry in New South Wales and to realise the associated economic opportunities, including actions to manage any safety risks in the hydrogen industry.
7. The potential for jobs in New South Wales, both directly in the hydrogen industry and in other industries powered by hydrogen.
8. Any other pertinent matters the committee wishes to draw to the Government's attention in this regard.

The full Terms of Reference are included in Attachment 1.

The City of Wollongong is well placed with regard to the development of an emerging hydrogen industry. The draft submission seeks to highlight the strong alignment of hydrogen as an alternate energy source to Council’s strategic directions, namely the Economic Development Strategy 2019-29, which sets a target of 10,500 net new jobs within Wollongong over the next decade, and Council’s commitments to a clean energy future as reflected in Council’s participation in the Global Covenant of Mayors for Climate and Energy and the City Power Partnership Program, Council’s Climate Change Mitigation Plan 2020 and Sustainable Wollongong 2030: A Climate Healthy City Strategy.

In addition, strategic alignment, well established partnerships, networks and research capabilities, and infrastructure exists within the region to support the development of hydrogen industries. These capabilities are expanded in the attached submission.

Submissions are due by Friday, 26 February 2021.

PROPOSAL

A draft submission has been prepared and outlines the many competitive advantages that Wollongong has regarding the hydrogen industry and the economic benefits it offers to the state of New South Wales.

The draft submission is attached to this report.

CONSULTATION AND COMMUNICATION

The Community Cultural and Economic Development Division, through the Economic Development Team, prepared the submission in consultation with Council’s City Strategy Division, in particular the Environment Planning Manager. Externally, Council worked closely with the Department of Regional NSW, Illawarra Innovative Industry Network (i3net) and the University of Wollongong.

PLANNING AND POLICY IMPACT

This report contributes to the delivery of Our Wollongong 2028 goal “We have an innovative and sustainable economy”. It specifically delivers on the following:

Community Strategic Plan	Delivery Program 2018-2022	Operational Plan 2020-21
Strategy	4 Year Action	Operational Plan Actions
2.1.3 Cross sector initiatives are coordinated and implemented to increase and attract business investment, supporting small businesses and encouraging jobs growth.	2.1.3.1 Support regional activities and partnerships that promote business investment and jobs growth	Implement the Economic Development Strategy 2019-29

CONCLUSION

The NSW Standing Committee on State Development is seeking submissions to the Inquiry into the development of a hydrogen industry in New South Wales until 26 February 2021. This report seeks Council’s endorsement to lodge a submission into the Inquiry by the due date.



LEGISLATIVE COUNCIL

STANDING COMMITTEE ON STATE DEVELOPMENT

Inquiry into the development of a hydrogen industry in New South Wales

Terms of Reference

That the Standing Committee on State Development inquire into and report on the current state of, and opportunities for, the development of a hydrogen industry in New South Wales, and in particular:

1. The size of the economic and employment opportunity created by the development of a hydrogen industry in NSW, in particular those opportunities for regional NSW, including having regard to:
 - (a) the emerging domestic and international trends in the production and demand for hydrogen, including in South Korea, the Netherlands, Japan and other Australian states and territories; and
 - (b) NSW's existing and potential linkages to those markets.
2. The State's existing hydrogen capabilities, including:
 - (a) NSW's research and development capacity for all elements of the hydrogen supply and demand chain, including existing research and development work of the Government, academic and private sector; and
 - (b) The State's energy and industrial infrastructure which could support the production, storage, distribution, use and export of hydrogen.
3. The capacity of and barriers to NSW becoming a major production, storage and export hub for hydrogen, including NSW's capacity to:
 - (a) develop and commercialise hydrogen technologies;
 - (b) manufacture and export hydrogen production componentry, including electrolysis componentry;
 - (c) manufacture and export hydrogen storage and transport infrastructure, including in heavy transport and shipping vessels;
 - (d) generate green hydrogen through renewable energy sources;
 - (e) use hydrogen for transport;
 - (f) use hydrogen in its own industrial processes, such as in steel, aluminium and chemical production;
 - (g) use hydrogen for electricity generation, including the feasibility of retrofitting existing and proposed electricity generation assets to use hydrogen; and
 - (h) manage the safety and safeguarding of hydrogen utilisation.

4. The economics of hydrogen's use in different sectors of the economy, including emerging opportunities to use hydrogen in industrial processes and as a feedstock.
5. The infrastructure, technology, skills, workforce capabilities and other things needed to realise the economic opportunities of hydrogen as and when it becomes commercial in different sectors of the economy.
6. The actions needed of the public and private sectors, to support the development of a hydrogen industry in NSW and to realise the associated economic opportunities, including actions to manage any safety risks in the hydrogen industry.
7. The potential for jobs in New South Wales, both directly in the hydrogen industry and in other industries powered by hydrogen.
8. Any other pertinent matters the Committee wishes to draw to the Government's attention in this regard.

Committee membership

Hon Taylor Martin MLC	Liberal Party	<i>Chair</i>
Hon Mick Veitch MLC	Australian Labor Party	<i>Deputy Chair</i>
Hon Mark Banasiak MLC	Shooters, Fishers and Farmers Party	
Hon Wes Fang MLC	The Nationals	
Hon Sam Farraway MLC	The Nationals	
Hon John Graham MLC	Australian Labor Party	
Hon Natasha Maclaren-Jones MLC	Liberal Party	
Hon Mark Pearson MLC	Animal Justice Party	
Mr David Shoebridge MLC *	The Greens	

* Mr David Shoebridge is a participating member for the duration of the inquiry.



WOLLONGONG CITY COUNCIL

Address 41 Burelli Street Wollongong • Post Locked Bag 8821 Wollongong DC NSW 2500

Phone (02) 4227 7111 • Fax (02) 4227 7277 • Email council@wollongong.nsw.gov.au

Web www.wollongong.nsw.gov.au • ABN 63 139 525 939 - GST Registered

015



NSW Standing Committee on State Development
Parliament of New South Wales
6 Macquarie Street
SYDNEY NSW 2000

Our Ref:
File:
Date:

Z21/23814
CCE-025.10.014
26 February 2021

Dear Sir/Madam

DEVELOPMENT OF A HYDROGEN INDUSTRY IN NEW SOUTH WALES

Wollongong City Council welcomes the opportunity to provide a submission to the NSW Standing Committee of State Development inquiry into the development of a hydrogen industry in New South Wales.

Wollongong is a city committed to a clean energy future with demonstrated capability to develop a large-scale hydrogen industry, as identified by both the Commonwealth and New South Wales Governments. Wollongong City Council strongly supports this vision and is working proactively to encourage the development of a hydrogen hub at Port Kembla. This will not only help the city achieve its adopted target of net zero emissions by 2050 but also deliver long lasting economic benefit to the both the Illawarra region and New South Wales.

This submission aims to inform the inquiry of Wollongong's capability as a location for large-scale hydrogen production and export and advise of the next phase in its development as a large-scale hydrogen hub.

Wollongong: a globally connected, international trade hub

Wollongong is the regional capital of the Illawarra, contributing \$12.2B (60%) of the Illawarra's \$20.4B economy. By 2041, Wollongong will be home to more than 265,000 residents, part of a broader population of almost half a million people across the Illawarra region.

Wollongong is a city transformed. Traditionally known for its world class steel making and coal mining industry, Wollongong today is an important knowledge service centre, a globally connected international trade hub and home to an industry-focused global university. Wollongong is New South Wales' third largest city, approximately 80km south of Sydney. Wollongong is strategically located just over an hour south of Sydney International Airport, just over two hours from Canberra and has global connections through the port of Port Kembla.

In September 2019, Council adopted its Economic Development Strategy 2019-2029, setting a target of 10,500 net new jobs within Wollongong over the next decade. Many of these new jobs will be in sectors such as Professional Services and Technology, but there is also an opportunity to build on Wollongong's existing skill base in Advanced Manufacturing, supporting jobs in emerging sectors such as Clean Energy. Manufacturing employs close to 11,500 people across the Illawarra Shoalhaven region, 67% within Wollongong local government area (LGA), and remains the largest sector in terms of export income.

Council through its participation in the Invest Wollongong partnership (along with the NSW Government and the University of Wollongong), has identified clean energy as a target investment sector. Wollongong is envisaged to play a key role in Australia's decarbonised energy future, with Port Kembla identified as a superior location for Australia's first large scale hydrogen facility.

Wollongong has a supportive business environment with a highly collaborative manufacturing sector. Council currently supports the Illawarra Innovative Industry Network (i3net), a network established to promote the collective capability of the manufacturing industry to local, national, and international markets. The network is comprised of over 55 local companies employing over 10,000 personnel. Whilst representing the interests of the

region's industry, i3net collaborates closely with the Department of Regional NSW (DRNSW), the University of Wollongong (UOW), NSW TAFE and Wollongong City Council.

At a local level, I3Net on behalf of the Industry submitted an application to the National Energy Resources Australia's recent EOI process to establish a series of Hydrogen Technology Cluster across the country. Despite an established ecosystem and a submission with strong local support, with the backing of UOW, the Port Kembla application was not successful.

The network advocates strongly for the continued development of a local hydrogen cluster at Port Kembla, to build the capabilities of companies and opportunities within the hydrogen supply chain and industry.

Wollongong is committed to a clean energy future

Over the last five years, Wollongong City Council has embarked on significant environmental policy development and partnerships to address the ongoing threat of climate change and promote a clean energy future. A summary of Council's recent plans and activities is as follows:

- In August 2017, Council became a signatory to the Global Covenant of Mayors for Climate and Energy (GCoM), which commits Council to a series of activities to achieve a resilient and low-emission society
- In August 2019, Council declared a state of climate emergency that requires urgent action by all levels of government. As part of the GCoM, Council set a target of net zero emissions by 2050 for the City of Wollongong. Council also recognised the significance of its own contribution to the city's emissions and the need to demonstrate leadership, and so set a target of net zero emissions by 2030 for its own operations
- In January 2020, Council joined the City Power Partnership Program (CPP) to help reduce emissions and to promote opportunities to our community and businesses. This program will support the city's transition to a clean energy future by providing access to a range of resources to help evaluate and monitor actions and opportunities to collaborate and share knowledge with other Councils
- At its meeting of 16 November 2020, Council adopted its Climate Change Mitigation Plan 2020 and Sustainable Wollongong 2030: A Climate Healthy City Strategy

Council's Climate Change Mitigation Plan 2020 recognises the need for Council to stay up-to-date with electric, hybrid and hydrogen vehicle technology, infrastructure needs, and opportunities to support the transition from non-renewable fossil fuels. The Plan identifies the long-term benefit of developing alternative fuels including lower running costs for users, reduced air pollution and lower greenhouse gas emissions, health benefits from air quality improvements, and reduced noise which will improve liveability. It will also contribute to improved energy security through reduced reliance on imported, non-renewable fuels.

The Plan notes the transformational opportunities presented in the transport sector through a shift to fuel cell electric vehicles (FUEVs) to complement the already underway uptake of conventional electric vehicles (EVs). Fuel Cell Electric Vehicles (FCEVs) powered by renewable hydrogen have high range and quick refuelling times and when combined with the use of EVs, there is a long-term opportunity for all motorised vehicles to be an emissions-free solution at point of vehicle use. The opportunity for hydrogen vehicles is particularly relevant given Port Kembla's role as a major logistics and freight hub. The Plan acknowledges that hydrogen refuelling infrastructure, not currently available, is necessary though to support commercialisation of this potential market.

National and State Policy Context

The Commonwealth of Australia released Australia's National Hydrogen Strategy in November 2019. A key element of the Strategy is port based hydrogen 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. The port of Port Kembla was identified as a potential hydrogen export hub in the Strategy.

The NSW Government through DRNSW is coordinating a regional effort with a vision to create Australia's first large scale 5-gigawatt (GW) hydrogen hub to service domestic and export markets by 2030 at Port Kembla.

The hub would successfully integrate production with multi sector utilisation opportunities across gas network injection, industrial processes, transport (cars, buses trucks trains and shipping), power generation and export. To deliver on the vision, the Port Kembla Hydrogen Hub has been established, which aims to maximise the opportunities through:

- Facilitating the more than \$2.5B of major energy projects in hydrogen production, power generation, gas pipeline, import and export terminal infrastructure at the port of Port Kembla
- Supporting technology demonstration projects that leverage existing infrastructure, connect industry expertise with research institutions and create new highly skilled jobs
- Educating the community about the benefits of a hydrogen economy to build public trust, confidence, and social licence to operate

The Draft Illawarra Shoalhaven Regional Plan 2041 also recognises the development of Port Kembla as an international trade hub, NSW's second container port and emerging hydrogen hub to grow the local economy and new jobs in the clean energy sector. Specifically, the Draft Plan contains the following strategy 15.3 to "promote opportunities for clean energy in the region including pumped hydro, hydrogen and biogenic gas" (pg. 57).

Further, the Draft Illawarra Shoalhaven Regional Transport Plan identifies that the regional freight task will continue to grow over the next 20 years, particularly with Port Kembla identified as a future container terminal, and a future hub for hydrogen production and export. The Plan notes that to support this expansion, supporting road and rail networks will need to embrace technology-driven solutions, and address first mile/last mile limitations.

The Draft Plan contains the following vision for Port Kembla over the next 20 years:

"The region will be well on the way to a low emissions future, with Port Kembla playing a key role in hydrogen production and distribution. With the ongoing transition of the electricity grid to renewables, public transport services will be both cleaner and more accessible and take up of electric vehicles will be supported by a comprehensive, local fast charging network underpinning the electric evolution of the vehicle fleet." (pg. 21)

The Draft Plan notes the following:

"To reach net zero emissions by 2050, the transport sector will need to play a key role in this transition towards a low emissions future. With Port Kembla identified as a potential hydrogen hub and electric vehicles forecast to reach upfront price parity with traditional combustion engine vehicles in Australia from 2046, the region's transport network and transport fleet will need to evolve to capitalise on this change" (pg. 17)

"To boost the commercialisation of low emissions hydrogen production and applications, the NSW Government has set an aspirational target for hydrogen to comprise up to 10% of the gas network by 2030. This commitment is likely to have associated benefits for the transport sector and could open up opportunities for hydrogen fuel cell vehicles across New South Wales". (pg. 48)

"Transport for NSW, in conjunction with the DPIE and DRNSW, will investigate opportunities with key industry partners for a hydrogen mobility pilot in the Illawarra-Shoalhaven. If supported, the pilot would provide valuable lessons for New South Wales on the wider expansion of hydrogen use in the transport sector, as well as support the growth of hydrogen-associated industries within the region" (pg. 48).

University of Wollongong's research capability

The UOW research and development area is currently addressing the issues of decarbonisation of the energy sector through the development of reliable and affordable hydrogen, syngas and biogas supply chains.

UOW researchers have also provided significant advances on the engineering and management of pipelines for carbon capture and storage projects. The headquarters of the Energy Pipelines CRC was at UOW for 10 years, as is its current successor, the Future Fuels CRC. This long-term collaboration has led to close engagement with all the natural gas and other energy suppliers in Australia, along with regulators, industry associations and government agencies.

UOW is also working closely with the NSW State Government, the Future Fuels CRC and Illawarra industry and energy suppliers as part of the Port Kembla Hydrogen Hub in the region. UOW is well positioned to be a leading research provider into the larger hydrogen energy drive within Australia. UOW is also part of the NUW Alliance - with the University of Newcastle, University of NSW and Western Sydney University. The Alliance is developing the NUW Energy initiative, of which, UOW brings unique and complementary skills and capabilities to this work.

Port Kembla as a large-scale hydrogen hub

The Illawarra region is particularly well suited to capitalise on both the use of hydrogen and the development of supporting technologies that will enable the adoption of the hydrogen supply chain. Companies in the region contain a mix of heavy industrial, engineering, technology and services businesses that support a client base that extends across the region, NSW, Australia and internationally.

The Illawarra region has a long history of innovation within the industrial sector, most notably in mining and manufacturing, which have shown the region's ability to diversify to adapt to the needs of the market place. The businesses within this region have developed a high level of resilience as they have continued to evolve to improve the way they deliver value to clients across the region, around the country and internationally. Continued development of a national hydrogen cluster will provide the opportunity for a number of these businesses to develop their product and service value offering, being part of this new industry and creating new jobs.

The region has already attracted the attention of several significant projects that will provide early-stage opportunities for the adoption of hydrogen and development of a regional industry focusing on supporting the hydrogen supply chain. These include H2X's announcement of their intent to build a hydrogen fuel cell vehicle manufacturing facility, Energy Australia's Tallawarra power station expansion, Australian Industrial Energy's (AIE) gas import terminal and potential gas turbine, and investigation to possible adoption of hydrogen into the steelmaking processes at BlueScope Port Kembla Steelworks.

Industrial gas company Coregas has operated a gas production facility at the Port Kembla steelworks for over thirty years. Coregas operate the largest hydrogen merchant facility in Australia, producing marketable hydrogen (2,000kg/day capacity) in a range of certified purities for industrial, food production, scientific and transport mobility applications. Coregas are providing technical services to the \$500M Hydrogen Energy Supply Chain Project in Victoria.

Port Kembla is an ideal location for large-scale clean energy hydrogen production due to the following factors:

- Access to significant quantities of renewable electricity and recycled water
- Access to customers across the industrial, heavy transport, electricity generation, gas network injection sectors in the Illawarra and proximity to the Sydney market, as well as to export markets such as Japan and Korea (through the internationally-connected port)
- Access to distribution infrastructure including road, rail, the Eastern Gas Pipeline, connecting to 80% of Australia's population and industry
- An industrialised precinct for 24/7 operations
- An existing supply-chain and skills base that could pivot to support large-scale hydrogen production

Attachment A is an Investment Prospectus for the Port Kembla Hydrogen Hub prepared by DRNSW.

Port Kembla Hydrogen Hub Development Plan

The next phase of work for the Port Kembla Hydrogen Hub working collaboratively with local stakeholders, is to develop a roadmap for a 5GW clean energy hydrogen hub supporting multiple GW scale water electrolyser production facilities. The Plan aims to assess the following:

- Potential GW production facility site locations
- Production technology and demand (power to X)
- Electrical infrastructure and grid connections
- Gas pipeline infrastructure
- Export terminal site and connections
- Refuelling station site location identification

Further, the Port Kembla Hydrogen Hub is advancing several initiatives related to future transport mobility, including a series of community education workshops in 2021 to showcase hydrogen fuel cell technology as a key enabler of zero emission transport.

Wollongong City Council commends the NSW Government on its support for the development of a hydrogen industry in NSW and looks forward to continuing to work in partnership to deliver on the substantive environmental and economic opportunities associated with the potential of a large-scale hydrogen industry.

Please contact Mark Grimson, Economic Development Manager on 02 42277166 should you require further information.

Yours faithfully

Greg Doyle
General Manager
Wollongong City Council
Telephone: (02) 4227 7111

Attachment A: Port Kembla Hydrogen Hub – Investment Prospectus November 2020

Port Kembla Hydrogen Hub

#H2Hub@PK

**INVESTMENT
PROSPECTUS**
NOVEMBER 2020

Global Opportunity

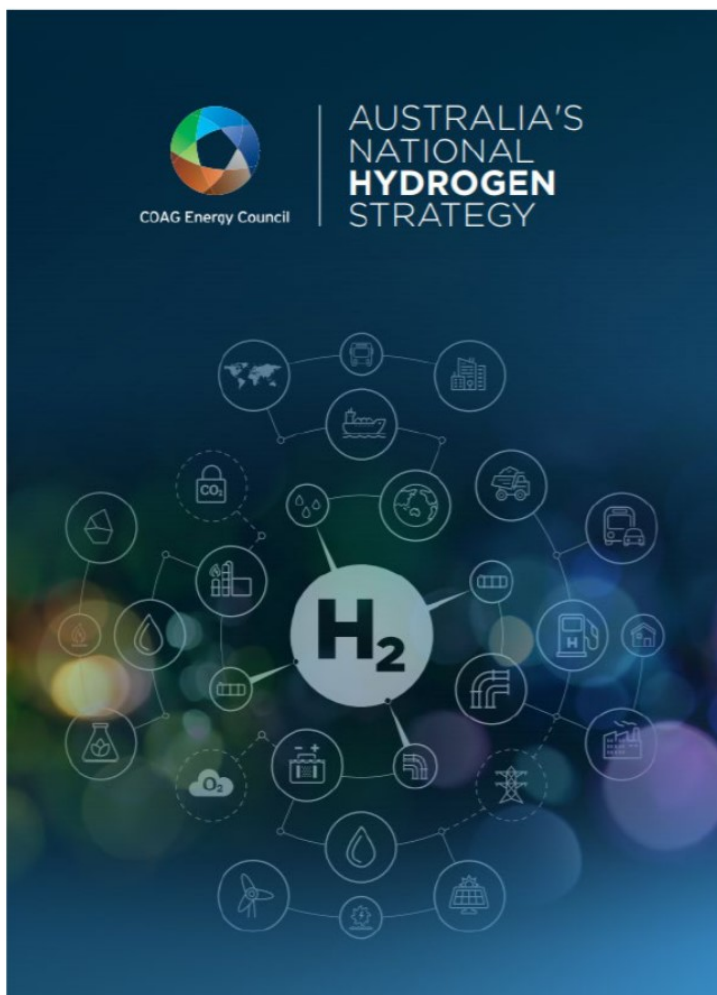
Port Kembla is a major industrial sea port on the **east coast of Australia**. It is **strategically** located just over an hour by road south of **Sydney** and its **International Airport**. Port Kembla is part of **Wollongong**, a modern vibrant city with a population over **200,000 people**.

Port Kembla has a **30+ year** demonstrated track record in **hydrogen production** and over a century of **heavy industry**.

Based on available feedstock, Port Kembla has a **5GW** or **1,500 tonnes/day** of potential green hydrogen production capacity.

The **NSW Government** is leveraging this **expertise** and **supporting infrastructure** to develop **Port Kembla** as Australia's first **large scale 5GW Hydrogen Hub**.





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 NSW Government is facilitating the development of the **Port Kembla Hydrogen Hub** in collaboration with key stakeholders across **government, industry and research institutions**.



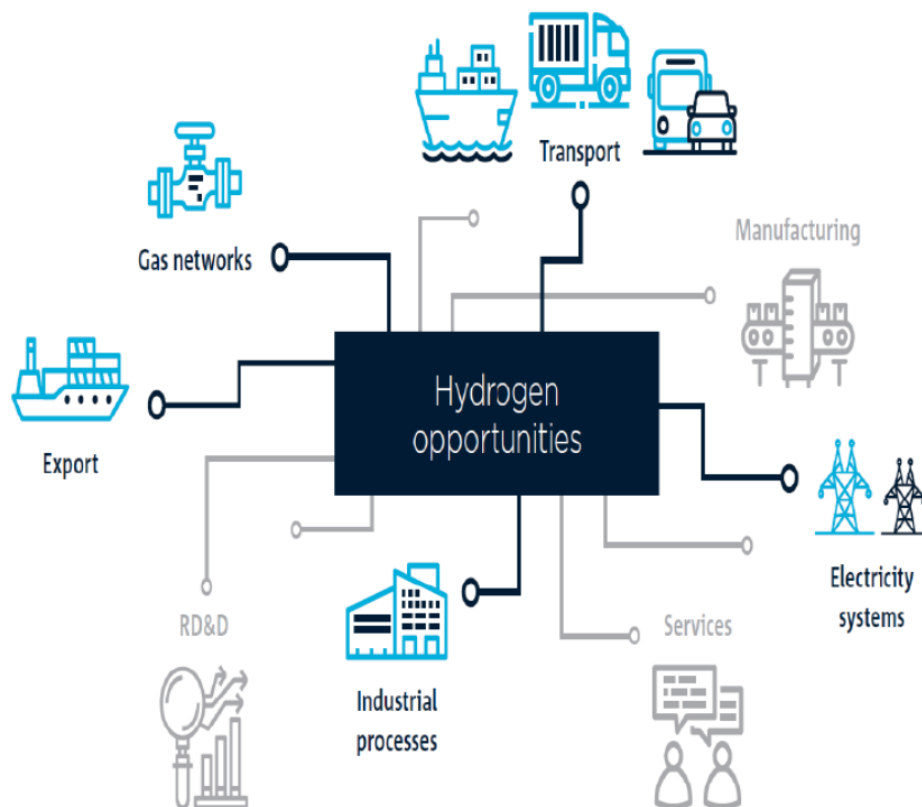


Image: Hydrogen Research, Development and Demonstration Report – CSIRO 2019

Investment Opportunities

Australia's **Port Kembla** - Australia's first **large scale 5GW green hydrogen hub** that successfully integrates production with multi sector utilisation opportunities across **gas network injection, industrial processes, transport** (cars, buses, trucks, trains and shipping) and power generation and **export**.

Port Kembla's **strategic location** makes **sector coupling** possible with road, rail and pipeline connections to **80 percent of Australia's population and industry**, and existing connections to **export markets** in Japan and Korea.

There are **\$2.5bn+** in **transformative new investment opportunities** spanning large scale green **hydrogen production**, power generation, gas pipeline, import and export terminal infrastructure.





Large Scale Green Hydrogen Production Facilities

Port Kembla Hydrogen Export Terminal

Coregas Port Kembla Hydrogen Production Facility

Energy Australia Tallawarra A + B Power Stations

Origin Energy Shoalhaven Hydro Scheme

AIE Port Kembla Gas Terminal + Power Station

APA Port Kembla to Wilton Gas Pipeline

Jemena Port Kembla Lateral Looping Pipeline

= \$2.5bn+ of investment opportunities





Superior location for Australia's first 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 RD&D ecosystem, large skilled labour base, 30+ years of hydrogen production, handling and distribution experience and supportive community and social licence to operate



ADVANTAGE #1 - FEEDSTOCK

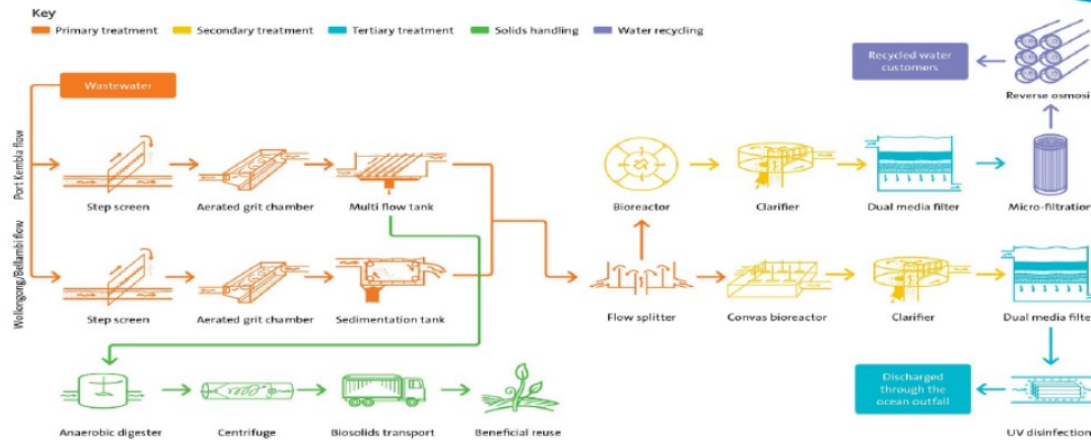


ADVANTAGE #1 - FEEDSTOCK

- # Large scale recycled water and renewable electricity available to support 1,500 tonnes, 5GW of green hydrogen 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 infrastructure network provides multiple renewable energy options

Wollongong Water Recycling Plant

Sydney WATER



ADVANTAGE #2 - CUSTOMERS



Image: BlueScope Port Kembla Steelworks

© 2017 lostedtoedive.com

ADVANTAGE #2 - CUSTOMERS

- # Transport: NSW Govt is replacing its 8,000 bus fleet with zero emission vehicles
- # Industrial processes: Large scale users in steel making, manufacturing and processing
- # Electricity Generation: Blended use in gas fired power stations - Tallawarra A + B and proposed Port Kembla power stations
- # Gas networks: NSW Govt has set a 10 percent target for injection in the gas grid through the Eastern Gas Pipeline



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



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.

H2X Australia has plans to establish a **hydrogen vehicle manufacturing** facility at Port Kembla creating opportunities for **local industry 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.



H2X
AUSTRALIA



Hydrogen Hub Ecosystem

Hydrogen can be produced from many energy sources and technologies. **Green hydrogen** is produced from recycled waste water and renewable energy from solar, wind, hydro and biomass sources through **electrolysis**.

Heavy voltage grid connections are available with two 132KVA transmission substations servicing the precinct. Recycled water currently discarded through ocean outfall gives the Port Kembla **5GW of potential production capacity**.

Blue hydrogen produced at Port Kembla from **steam methane reforming** is already being utilised across the supply chain in a range of innovative **technology demonstration projects** that drive industry research and collaboration.

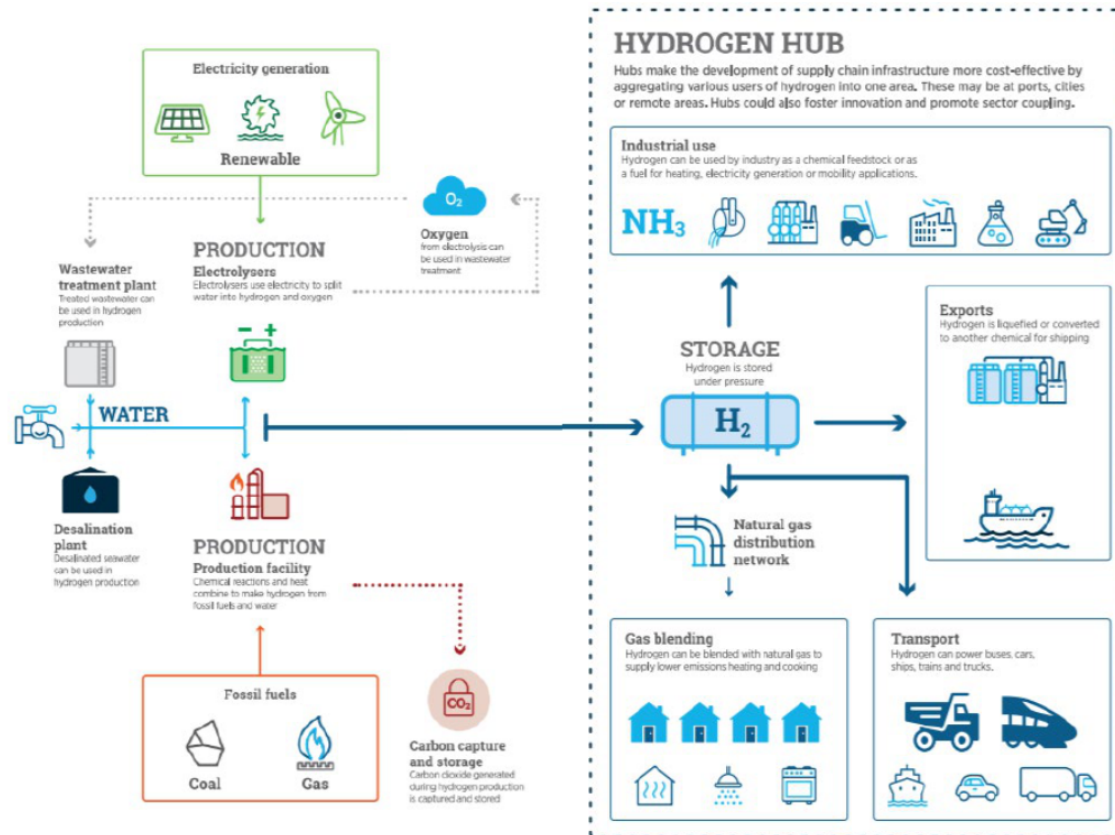


Image: National Hydrogen Strategy Report – COAG Energy Council 2019



Technology Demonstration Projects =

Hydrogen in Steel Making - BlueScope, Future Fuels CRC, Steel Research Hub, UOW, Dept of Regional NSW (DRNSW)

Hydrogen Train Trial - Transport for NSW, DRNSW, UOW

Hydrogen Bus Trial - Various ZEB Proposals

Hydrogen Refuelling Station + Trucks - Coregas, Hyzon

Metal Hydride Hydrogen Storage - UNSW, H2 Store, Coregas

Electrolyser Production Technology - UOW





Be part of this Global Opportunity

Port Kembla Hydrogen Hub is set to play a **key role** in the Australia's journey towards a **zero emission future**.

Investment opportunities span large scale **green hydrogen** production, **power generation**, 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@dpc.nsw.gov.au
m| +61 418 259 055





Attachments

- Investment opportunities summaries



LARGE SCALE GREEN HYDROGEN PRODUCTION

LARGE SCALE GREEN HYDROGEN PRODUCTION FACILITIES

OWNER: Various

DESCRIPTION: Establishment of large scale green 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: \$1 billion + estimate.

LOCATION: Wollongong LGA

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

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



COREGAS PORT KEMBLA HYDROGEN PRODUCTION FACILITY



Image: Coregas Hydrogen Production Facility at Port Kembla



Image: Coregas tube trailer distributing compressed hydrogen

COREGAS PORT KEMBLA HYDROGEN PRODUCTION FACILITY

OWNER: Coregas

DESCRIPTION: Existing hydrogen production facility. Largest merchant facility in Australia producing marketable hydrogen in a range of certified purities for industrial, food production, scientific and transport mobility applications.

STATUS: Facility opened in 1989.

TYPE: Steam Methane Reformer using natural gas as feedstock with on-site compression for distribution by pipeline, road and rail.

CAPACITY: Up to 2,000kg/day.

LOCATION: Port Kembla Steelworks, Wollongong LGA.

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

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@dpc.nsw.gov.au



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

ORIGIN ENERGY SHOALHAVEN HYDRO SCHEME

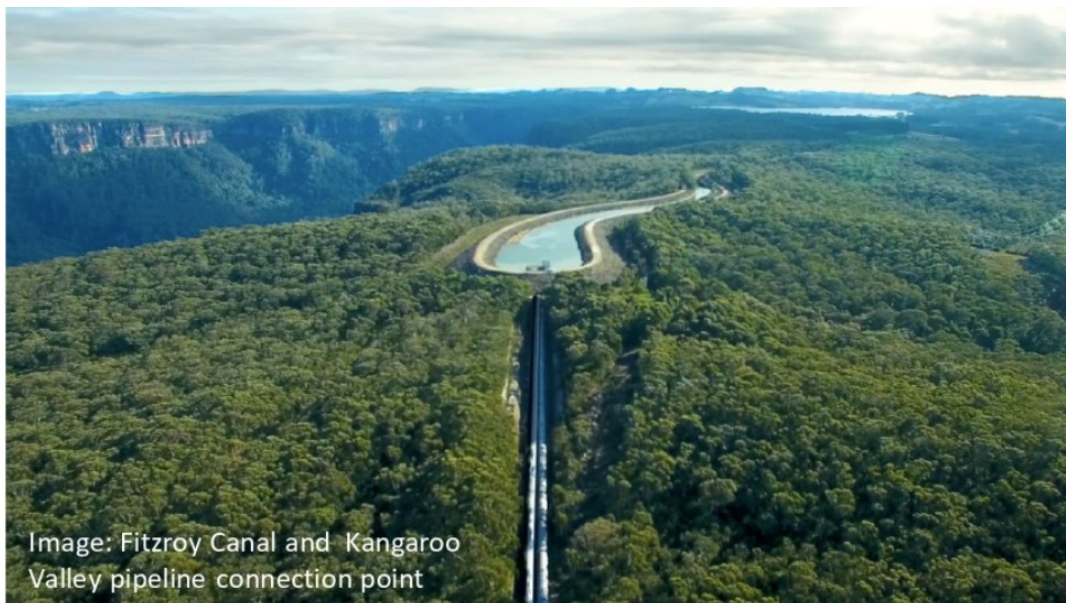


Image: Fitzroy Canal and Kangaroo Valley pipeline connection point

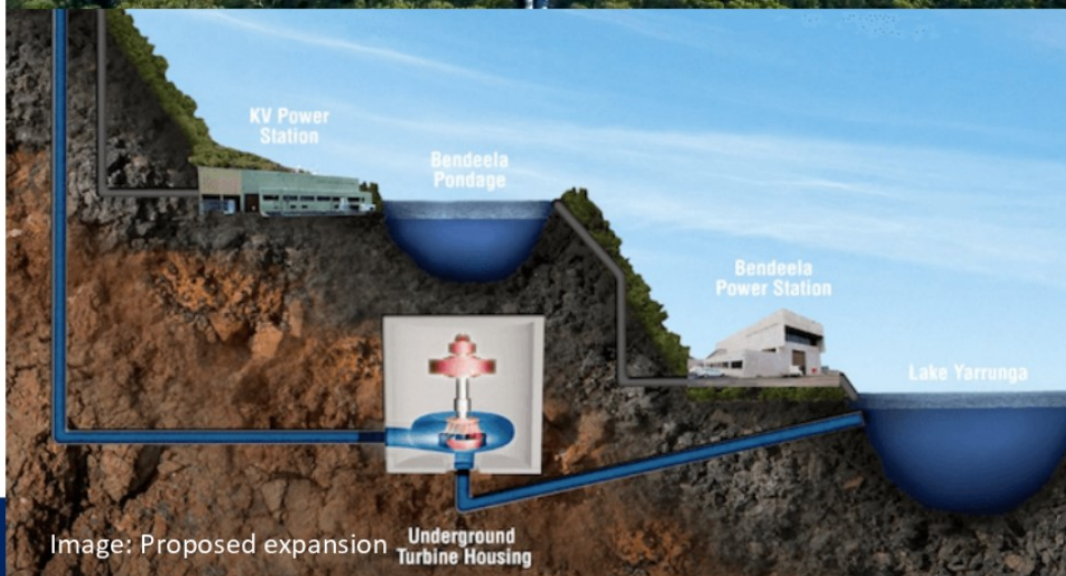


Image: Proposed expansion
Underground Turbine Housing

ORIGIN ENERGY 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

ENERGY AUSTRALIA TALLAWARRA POWER STATION

ENERGY AUSTRALIA TALLAWARRA A+B POWER STATIONS

OWNER: Energy Australia

DESCRIPTION: Construction of a new gas fired power station to be known as Tallawarra B.

STATUS: Existing Tallawarra A was commissioned in 2009. Proposed Tallawarra B – Final Investment Decision expected in Sept 2020, estimated two year build program, 250 jobs during construction phase.

TYPE: Tallawarra A - combined cycle gas turbine, Tallawarra B - open cycle gas turbine.

CAPACITY: 435MW existing + 300MW planned giving 735MW of generating capacity on completion.

INVESTMENT: Tallawarra A - \$400 million + \$300m estimate for Tallawarra B.

LOCATION: Wollongong LGA

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



Image: Tallawarra A Power Station and existing water and site for Tallawarra B Power is yellow shaded area.

AIE
PORT KEMBLA POWER STATION



Image: Proposed AIE Port Kembla Power Station

AIE PORT KEMBLA POWER STATION

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

STATUS: Project shortlisted in Underwriting New Generation Investment (UNGI) energy scheme in 2019.

TYPE: Combined cycle gas fired power station linked to the company's Port Kembla Gas Terminal project.

CAPACITY: 825MW proposed.

INVESTMENT: \$800 million estimate.

LOCATION: Port Kembla, Wollongong LGA

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

**AIE
PORT KEMBLA GAS TERMINAL**

AIE 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 connection to Eastern Gas Pipeline lateral.

STATUS: Project announced in June 2018. Planning approval in April 2019, modification approval in April 2020. Final Investment Decision by end of 2020.

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: \$250 million estimate.

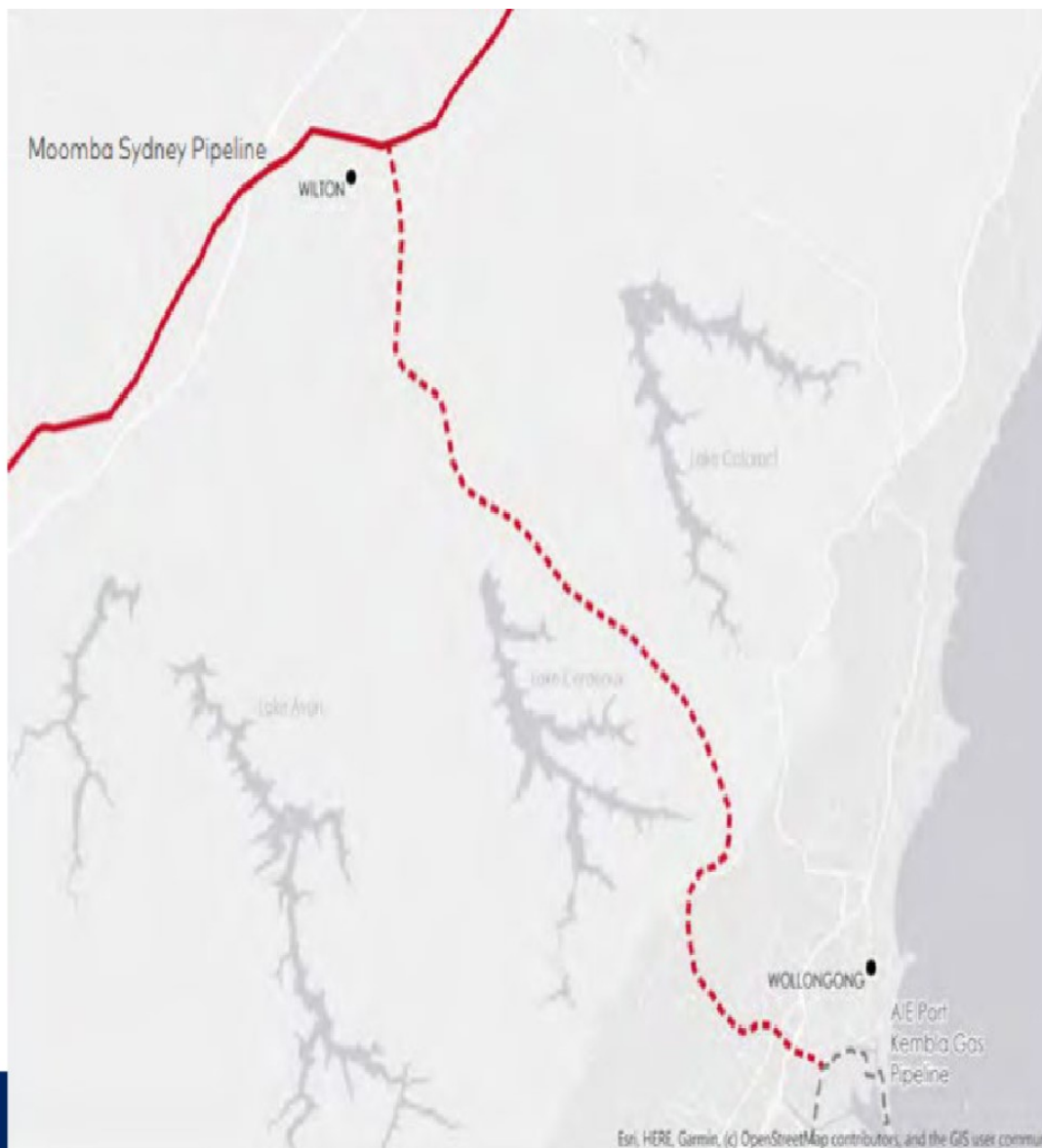
LOCATION: Port Kembla, Wollongong LGA

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



Image: Proposed Port Kembla Gas Terminal site with permanently moored FSRU with LNG carrier alongside to deliver its cargo

**APA
PORT KEMBLA – WILTON GAS PIPELINE**



APA PORT KEMBLA - WILTON GAS PIPELINE

OWNER: APA

DESCRIPTION: Construction of a 37km high pressure steel pipeline to connect the proposed Port Kembla Gas Terminal to the Moomba-Sydney Gas Pipeline near Wilton.

STATUS: Planning stage.

TYPE: Final design TBA

CAPACITY: 500TJ/day of pressured natural gas.

INVESTMENT: \$130 million estimate.

LOCATION: Port Kembla, Wollongong LGA

CONTACT: Warren Twist, APA | 0410 541 391
warren.twist@apa.com.au

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 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 (PKGTT) into the Eastern Gas Pipeline at the Jemena Kembla Grange tie in facility.

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

INVESTMENT: \$70 million 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

