



# Energy Capability

 Sustainable

 Renewable

 Clean & Green



# Hydrogen Valves



## THE FUTURE OF OUR ENERGY MIX

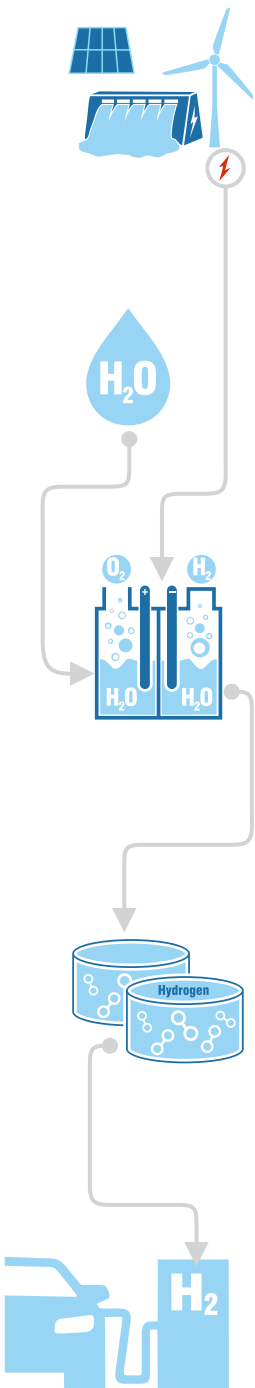
As the energy sector continues to transition from conventional oil and gas projects to more sustainable technology solutions, suppliers are increasingly required to be well researched, prepared and open-minded to assist customers in riding the wave of change our industry is inevitably facing.

- By offering specialised valve and process solutions for hydrogen technologies, Winnellie Valve & Process is ready to assist clients that are ready to spearhead this change.
- The team at Winnellie Valve & Process understand the key to being successful throughout this transition is to remain flexible and proactive in our approach to ensure our valued suppliers and ourselves do not get left behind. We manage this through dedicated working groups within the company, each tasked with investigating and sharing market intelligence from within Australia and abroad to ensure we are at the forefront of the latest technologies and opportunities.
- A recent example of our success on this strategy has been the recent contract award for steam valves and speciality items supply for Acciona's East Rockingham Waste to Energy Project, which signals to industry that we are a capable provider in this space.

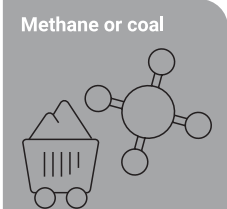
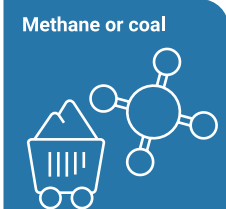

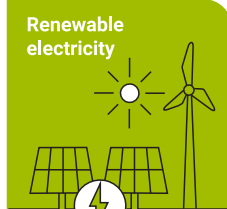
## PROVEN EXPERIENCE

Winnellie Valve & Process have supplied valves and associated equipment to industrial gas users and power stations in Australia with our team supporting these applications for over 30 years.

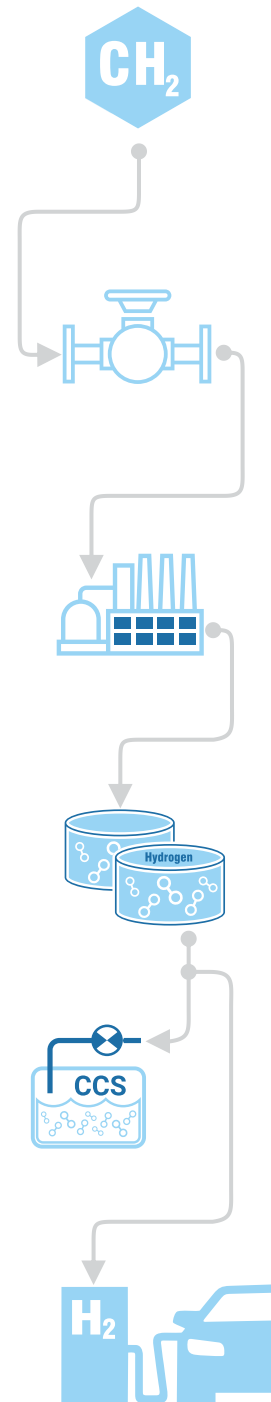
- By supplying equipment and systems for the generation, transportation and storage of hydrogen, we're playing our part in the de-carbonisation of Australia's energy systems. Hydrogen can do this through storage of renewable electricity, direct heating and as a fuel for transport.
- With decades of experience and strong relationships with our international manufacturing partners Winnellie Valve and Process is well equipped to work with you to develop valve solutions to suit your specific application no matter how arduous.



# SPECIALISED VALVES & PROCESS EQUIPMENT FOR HYDROGEN

| Colour  | GRAY<br>HYDROGEN   | BLUE<br>HYDROGEN   | TURQUOISE<br>HYDROGEN  | GREEN<br>HYDROGEN  |
|---------|--|--|--|--|
| Process | Process SMR or gasification  | SMR or gasification with carbon capture (85-95%)   | Pyrolysis  | Electrolysis   |
| Source  | Methane or coal<br> | Methane or coal<br> | Methane<br> | Renewable electricity<br> |

Note: SMR = Steam methane reforming.  
\* Turquoise hydrogen is an emerging decarbonisation option



We understand the important role that specialised valve & process equipment play in the clean energy industry. Hydrogen is extremely flammable, has a broader explosive limit, as well as a higher flame speed compared to natural gas and burns with an invisible flame. H<sub>2</sub> is also a very small molecule, making it difficult to contain 'very leaky' especially at high pressures. As hydrogen molecules attack most high strength steels causing cracking, embrittlement and accelerated corrosion, it is critical for safety and reliability measures that materials and components are compatible with the hydrogen process conditions.

Winnellie Valve & Process' extensive range of hydrogen valves and associated equipment are suitable for use with hydrogen liquid and gas no matter how it is sourced. With increasing global demand for decarbonised energy sources, Green Hydrogen can enable PJ scale storage and international trading of 100% renewably sourced energy.

We also recognise the importance of all hydrogen sources as the hydrogen economy continues to build up. This includes hydrogen sourced from natural gas with CCS, also known as 'Blue Hydrogen'. Winnellie Valve & Process' capabilities cover valves and process systems for CO<sub>2</sub> applications.

## OUR SUPPLIERS

**oliver**valves

**AMPO**  
POYAM VALVES

**Parker**

**Perar**

**HABONIM**  
Industrial Valves & Actuators

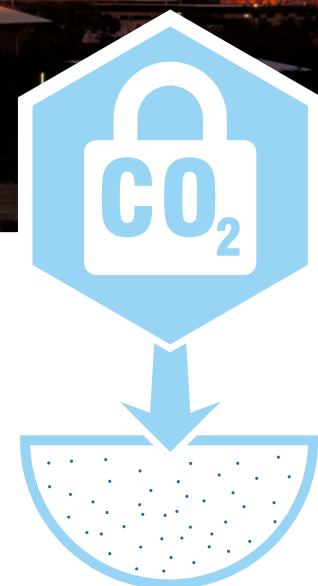
## PRODUCTS FOR HYDROGEN AND AMMONIA PROCESS

Our H<sub>2</sub> range spans valves, filters, manifolds, fluid controls, high-pressure hoses, connectors and sealing solutions for all hydrogen applications:

- High-Pressure Hydrogen Hose
- Fittings and tube
- Valves for H<sub>2</sub> and Ammonia
- O-Ring Pradifa Series V1, Ultrath
- Hydrogen Filtration
- Pressure reducing stations
- Hydrogen & Ammonia Ball Valve
- SEAL-LOK111 /O-LOK® For Hydrogen
- Isolation valves
- Instrumentation valves
- Distribution manifolds & panels
- Subsea Ammonia Ball Valve
- A-LOK® Compression Fittings
- Slam-shut valves
- Pressure reduction valves
- Autoclave SF Series Cone & Thread Fittings
- Autoclave Needle Valves

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# Carbon Capture



## ONBOARD THE ENERGY TRANSITION TO A CLEANER FUTURE

We believe in creating positive change by providing clients with high quality valve solutions for low-emission technologies. As Australia looks to decarbonise its economy, carbon capture, use and storage (CCUS) is well-positioned to permanently cut emissions in:

- Energy Generation
- Natural Gas
- Hydrogen Production
- Heavy Industry

These sectors demand high quality engineered solutions, complete with all relevant quality documentation and implemented with the confidence that first-class local support is available to their operations long after projects have been delivered.

With decades of experience in natural gas applications, Winnellie Valve & Process is positioned as a trusted supply and service provider to support our partners' visions to reduce emissions as the industry continues to develop across Australia.

## SPECIALISED VALVES & PROCESS EQUIPMENT FOR CCUS APPLICATIONS

Here at Winnellie Valves & Process, we specialise in the supply of safe, effective and reliable valves and process equipment in a range of sizes and pressure classes to meet client and application requirements in the CCUS space.

Valves offered meet applications necessary for amine scrubbing and carbon dioxide transportation, as well as the demands of amine absorption carbon capture using solvents such as monoethanolamine (MEA).





## MORE PRODUCTS FOR CARBON, CAPTURE & STORAGE TECHNOLOGIES

- GAS COALESCERS
- PARTICULATE FILTERS
- CARBON ABSORBERS
- CARBON CAPTURE TRANSPORTATION VALVES
- CARBON CAPTURE STORAGE VALVES

## WHY CHOOSE WINNELLIE VALVES?

Winnellie Valve & Process is a second-generation Australia business that supplies valves and process equipment to the oil and gas, mineral processing, power generation and pulp and paper industries. Born out of the success of leading hydraulic service provider Winnellie Hydraulics, Winnellie Valve & Process has almost 40 years' experience in supplying and servicing products that work under extreme conditions, including process gas (topside and subsea), cryogenic, steam and erosive and corrosive applications.

If you require valve and process solutions for both post and pre-combustion carbon capture applications you can rest assured products supplied by Winnellie Valve & Process are highly reliable, fit for purpose with long standing install based within the oil & gas industry.



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# Transporting Ammonia



## Transporting Hydrogen as Ammonia

**A process that could make Australia a world leader in renewable energy export on an international scale**

Converting hydrogen into ammonia only to convert it back again might seem strange. But hydrogen is hard to ship: It has to be liquefied by chilling it to temperatures below  $-253^{\circ}\text{C}$ , using up a third of its energy content.

**Ammonia, by contrast, liquefies at  $-33^{\circ}\text{C}$  at 3kpag**

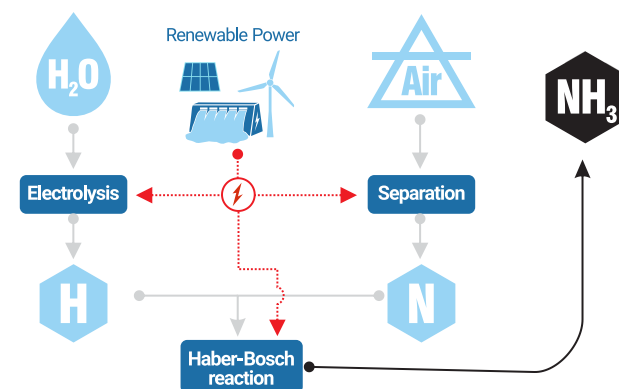
The energy penalty of converting the hydrogen to ammonia and back is roughly the same as chilling hydrogen, and because far more infrastructure already exists for storage, handling and transporting ammonia, ammonia is the safer bet.

## What is green ammonia?

Ammonia is a pungent gas that is widely used to make agricultural fertilisers. Green ammonia production is where the process of making ammonia is 100% renewable and carbon-free.

One way of making green ammonia is by using hydrogen from water electrolysis and nitrogen separated from the air. These are then fed into the Haber process (also known as Haber-Bosch), all powered by sustainable electricity. In the Haber process, hydrogen and nitrogen are reacted together at high temperatures and pressures to produce ammonia,  $\text{NH}_3$ .

However, the process of making ammonia is currently not a “green” process. It is most commonly made from methane, water and air, using steam methane reforming (SMR) (to produce the hydrogen) and the Haber process. Approximately 90% of the carbon dioxide produced is from the SMR process. This process consumes a lot of energy and produces around 1.8% of global carbon dioxide emissions.



### Existing uses

- Fertilisers
- Refrigeration
- Explosives
- Textiles and Pharmaceuticals

### Expanded uses

- Energy store to energy production
- Power generation
- Transport fuel
- Heat transfer technology

## Decarbonisation of ammonia production

Reducing the amount of carbon dioxide produced during the ammonia manufacturing process is critical to achieve net-zero targets by 2050. The best way to reduce carbon emissions when making ammonia is to use low-carbon hydrogen.

The most likely short-term options for creating carbon-free hydrogen at scale are blue hydrogen and green hydrogen:

- **Blue hydrogen** is where carbon emissions from the steam methane reforming (SMR) process are captured and stored (CCS).
- **Green hydrogen** is produced using water electrolysis to generate hydrogen and oxygen, using sustainable electricity in the process.

## What's the future for green ammonia?

The production of green ammonia could offer further options in the transition to net-zero carbon dioxide emissions. These include:

- **Energy storage** – ammonia is easily stored in bulk as a liquid at modest pressures (10-15 bar) or refrigerated to  $-33^{\circ}\text{C}$ . This makes it an ideal chemical store for renewable energy. There is an existing distribution network, in which ammonia is stored in large refrigerated tanks and transported around the world by pipes, road tankers and ships.
- **Zero-carbon fuel** – ammonia can be burnt in an engine or used in a fuel cell to produce electricity. When used, ammonia's only by-products are water and nitrogen. The maritime industry is likely to be an early adopter, replacing the use of fuel oil in marine engines.

**Questions? Read more**



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# Waste to Energy



East Rockingham  
**Waste to Energy**

## Client : Project : Location

East Rockingham Waste to Energy project  
Tribe Infrastructure, New Energy Corporation, HZI

## Summary

The East Rockingham Waste to Energy project will process up to 330,000 tonnes of residual waste per annum and recover energy to produce 28.9 MW of power.

## Environmental Need

The East Rockingham Waste to Energy project addresses two major challenges facing Australia; delivering sustainable and affordable solutions for both electricity generation and waste management. Australia disposes over 23 million tonnes of waste to landfill every year, with Western Australia having the highest waste generation rate per capita coupled with the lowest recovery rate.

There are significant environmental costs to land, air and water associated with landfilling. For example, Perth is built on a sandy coastal plain that relies heavily on groundwater as its primary source of potable water.



As readily accessible landfill sites reach capacity, and with no new metropolitan landfill sites likely to be approved, it is imperative to adopt other solutions to improve waste diversion rates.

## Environmental Outcome

Reduction of 9.7m tonnes of GHG over 30 years  
Supply of 28.9 MW of electricity to the grid (50% renewable)  
Diversion of 288,000 tonnes of waste per year from landfill  
Development of new aggregate product replacing virgin materials

## Winnellie Valve & Process

Winnellie Valve & Process initially supply 885 valves for the plant, gradually rising to over 1,000 valves, for various applications such as water, steam and condensate.



Landfill diversion  
95.8%



Generating 28.9MW  
of electricity per hour



50% deemed  
renewable energy



Power for 36,000  
homes

## Customer Support Locations

Winnellie Valve & Process has grown to become a leader in the supply and technical support of valves and associated process equipment to the oil and gas, mineral processing, pulp & paper, chemical processing and power generation industries.

Our reactive team understands the strict needs of our clients ensuring our technical capability, first class service levels and global supply chain are continuously improving to add value and reliability. We are always working with our customers to provide solutions for both upstream and downstream applications.

We understand that our customers need somebody to take ownership of their problems and our commitment is to standby the products we supply by providing the best technical support possible.



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**NT** 08 8984 4939

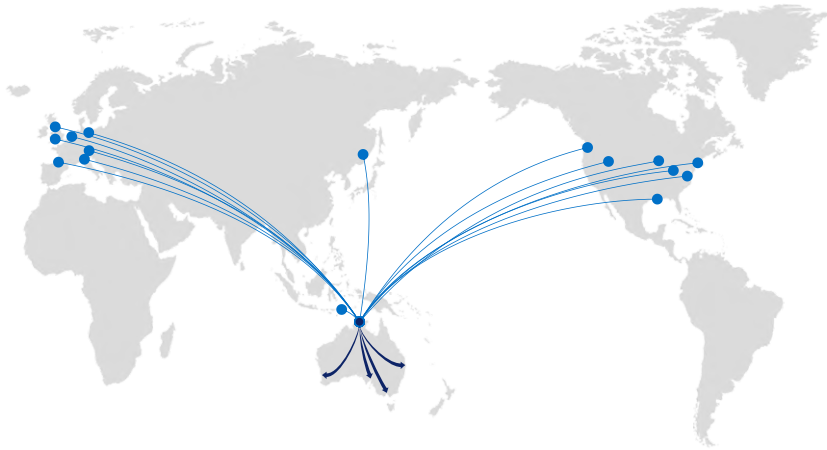
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## GLOBAL PROCUREMENT

A locally invested supplier of equipment and services to oil & gas, mining, marine, defence and general industry.



Our team specialises in global procurement and has strong relationships with 100s of quality original equipment manufacturers around the world including France, Italy, UK, Korea, USA and many more. Our ability to work directly with the overseas factories gives our valued customers piece of mind that we will work day and night to provide the best technical support and pricing, but most importantly take ownership of the supply chain challenges faced by our time critical industry.

## Our Product Suppliers



## Our clients



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NT 08 8984 4939

SA 08 8297 9700

WA 08 6119 3731

Vic 03 4320 0812

Qld & Asia Pacific 07 5607 1262

| OIL & GAS | MINING | LNG | PIPELINES | MARINE | DEFENCE |