



# WESTERN AUSTRALIA AUSTRALIA'S HYDROGEN POWERHOUSE

**AS ONE OF THE WORLD'S LEADING EXPORTERS OF LIQUIFIED NATURAL GAS (LNG), WESTERN AUSTRALIA IS ALREADY A GLOBAL ENERGY POWERHOUSE. AT THE START OF A NEW DECADE, THE STATE CAN TAP INTO AN ENORMOUS NEW OPPORTUNITY - ITS WORLD-CLASS SOLAR AND WIND RESOURCES - TO BECOME A LEADING PRODUCER OF RENEWABLE HYDROGEN (H<sub>2</sub>) THAT CAN RIVAL WESTERN AUSTRALIA'S LNG SECTOR OVER TIME.**

The production of renewable hydrogen (splitting water into hydrogen and oxygen through the process of electrolysis, using renewable electricity) can provide a clean alternative to polluting natural gas for local households and businesses and support the competitiveness and expansion of minerals processing and industrial manufacturing.

For example, renewable hydrogen can be used to reduce iron ore into iron metal, and ultimately steel, without greenhouse gas emissions. As a producer of both hydrogen and iron ore, Western Australia is ideally placed to build new iron metal or steel production industries that can provide sustainable long-term employment opportunities for thousands of people.

Renewable hydrogen and its derivatives, such as ammonia, also have the potential to become a massive export market to service Australia's power-hungry, resource-poor neighbours in Asia and beyond, which are looking for suppliers of clean energy to replace natural gas, oil and coal to support their emissions reduction ambitions. A report by Deloitte in 2019 found that if Australia were to secure the same global market share percentage of the hydrogen market as it has today for LNG, it would result in an increase to Australian GDP of up to \$26 billion on a net present value basis and 16,900 new jobs by 2050.

In 2019, Western Australia declared its ambition to be a significant producer, exporter and user of renewable hydrogen, with the aim of capturing an equivalent share of the global hydrogen market as it currently enjoys in the global LNG market.

While Western Australia has made good early progress, it should accelerate the speed and scale of its investment in the sector to position itself as a leading global renewable hydrogen producer. Western Australia is in a highly competitive race with other Australian states and foreign markets to establish a new renewable hydrogen sector that can rival and succeed its LNG industry. It must demonstrate to the nation and the world that it means business.

Building a globally significant renewable hydrogen industry from the ground up in Western Australia over the coming decade is a big undertaking – particularly considering that there is currently very low demand for clean hydrogen. But the potential payoff from a world-beating hydrogen sector is worth the large upfront investment. Similarly, the risks from under-investing are significant as emerging renewable hydrogen markets erode global demand for LNG.

The state must accelerate its efforts now to attract the vast private sector interest in hydrogen, bring down the costs of new renewable energy generation, provide the enabling infrastructure and cultivate the skilled workforce it needs to meet its 2030 ambitions.

In doing so, Western Australia has the opportunity to support a clean economic recovery from the COVID-19 pandemic by creating jobs, economic activity and productive assets that will set the state up for continued long-term growth.

# RECOMMENDATIONS



## GO HARD, GO EARLY

**Western Australia must continue to invest strongly and early if it is to put itself in pole position to capture trade opportunities as they emerge. While smart, targeted investments have been made over the past two years, this funding must be substantially increased to support projects that can be designed, approved, developed and begin operation within the next 5-10 years.**

**The funding gap that many projects currently face in order to be economically viable is substantial, and no project is as yet considered to be financially viable without government funding support.**

### **1.1 Allocate a minimum of \$100 million to make WA a hydrogen leader**

The state government should commit to investing a minimum of \$100 million over the next 5-10 years – which can be added to over the course of the decade – to support Western Australia's aspirations to become a global leader in renewable hydrogen production.

This fund can be used to support a range of initiatives, outlined in this document, that will create demand, enable and attract private investment, increase industry scale, lower the cost of hydrogen production and cultivate the skilled workforce required.



## CREATE EARLY DEMAND FOR RENEWABLE HYDROGEN

**While international trade partners have signalled an appetite for purchasing renewable hydrogen from Australia in coming years, there is very little demand at the present time.**

**Therefore, the state government has a critical role to play in creating early demand for renewable hydrogen, which will allow a local industry to develop its production capabilities, scale-up the sector and drive down costs. The following actions can bolster demand.**

### **2.1 Commit to a 10 per cent renewable hydrogen blending target for gas distribution networks, with a view to fully transitioning networks to 100 per cent hydrogen**

Renewable hydrogen could ultimately replace natural gas in our gas distribution networks. In the meantime, it is widely considered that existing distribution networks can safely accommodate 10 per cent renewable hydrogen blended with natural gas.

The state government is commissioning a study into the feasibility of blending hydrogen in the Western Australian gas network. This study should be followed up with a targeted funding program for local blending trials on the distribution network to commence by 2023/24 in order to build knowledge, experience and confidence in the feasibility of broad-scale blending across the gas distribution networks in metropolitan and regional centres.

The state government's purchasing power could also be used to drive early demand through a commitment to satisfy 10 per cent of its gas needs with renewable hydrogen from a local producer.

# RECOMMENDATIONS



## CREATE EARLY DEMAND FOR RENEWABLE HYDROGEN CONTINUED

### 2.2 Set a zero emissions target for public buses and the government-owned vehicle fleet

Western Australia can turn its publicly owned transport fleet – from buses through to state and local council fleets – green by 2030 with a mix of hydrogen fuel cell vehicles and battery electric vehicles (EVs).

Hydrogen fuel cell buses could create significant local demand for this emerging clean fuel, with a typical bus requiring 30 kg of hydrogen per day on average. Multiplied by hundreds of buses, the demand would be substantial.

Hydrogen fuel cells are currently considered a lighter, more flexible and competitive form of clean energy for heavy, back-to-base vehicles than batteries. However, the government should remain open-minded as to which of the EV technologies it will adopt in meeting its needs for phasing out fossil-fuel use.

Such a shift will not only support further demand for Western Australia's fledgling hydrogen sector, it will also cut fleet emissions and contribute to cleaner air.

### 2.3 Formulate a plan to develop green steel production or part-processing facilities in Western Australia

As one of the world's largest producers of iron ore, Western Australia has a golden opportunity to capture a larger share of the global steel manufacturing value chain by reducing the iron ore to iron metal onshore (and potentially refining it further into steel) using renewable hydrogen.

The state government should undertake a pre-feasibility study of the economics of developing green iron metal processes and facilities in Western Australia, and develop a plan to guide state support that will attract private investment in this major new market opportunity.

### 2.4 Develop a strategy for industrial usage of renewable hydrogen

The industrial manufacturing sector is a significant potential user of natural gas as an energy source and industrial feedstock. The state government should develop a strategy

(matched with appropriate funding) to accelerate fuel switching from natural gas to renewable hydrogen at large manufacturing sites.

### 2.5 Establish a target to phase out the use of diesel at Western Australian mine sites

Diesel is used across the mining sector to power heavy haulage trucks and equipment, provide underground mine ventilation, and in some locations, to generate power. It represents a major operating expense for mining operations, is one of the most significant sources of greenhouse gas emissions in mining, and the diesel particulates represent a health hazard to mine workers.

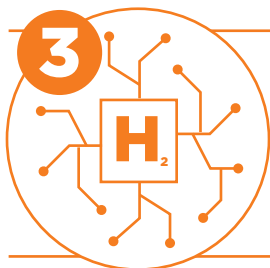
Western Australia could pursue its vision for 'net zero emissions mining', and increase its competitive advantage as a clean investment destination and commodities supplier by working with the resources sector to pursue a sector-wide target to phase out the use of diesel at Western Australian mine sites.

Diesel could be replaced with a mix of clean energy and storage technologies, including wind, solar and renewable hydrogen, and in the process, stimulate economic activity across the state, lower emissions and create significant demand for renewable hydrogen.

### 2.6 Commit to a phase out of diesel-powered microgrids in remote communities by 2030

The state government should commit to replacing all diesel-powered standalone power systems in remote communities with clean energy alternatives by 2030. This could include renewable electricity (typically solar), complemented by small-scale renewable electrolyzers and/or batteries that can utilise 'spilled' renewables. The government should reinforce this commitment with a fund to support the conversion of remote communities, which can draw on the learnings from the world-first hydrogen microgrid trial at Denham.

# RECOMMENDATIONS



## ENABLING INFRASTRUCTURE

**Strategic planning and public investment in new or upgraded infrastructure – from roads and ports to refuelling networks – will enable Western Australia to become hydrogen-ready, and unlock billions of dollars of private investment in a new Western Australian renewable hydrogen sector.**

### **3.1 Identify and invest in WA's most prospective hydrogen hubs**

A globally significant renewable hydrogen industry will require renewable hydrogen hubs. These will be regions that are positioned to leverage strong renewable energy resources, electricity grid and gas networks, port facilities and a skilled workforce.

The state government is prioritising the development of the Oakajee Strategic Industrial Area as a prospective renewable hydrogen hub, which has attracted substantial local and international investment interest. There are a range of other prospective locations across the state that also deserve evaluation as potential hubs.

In the interests of knowledge sharing and investment attraction, there would be significant benefits in the government directly commissioning a pre-feasibility study of other prospective sites.

The study would determine the most suitable zones/hubs for hydrogen production and export, potential volumes of supply, enabling infrastructure and supply chain needs, and the forecast costs for renewable hydrogen in these respective locations.

### **3.2 Develop a hydrogen refuelling network for key freight routes**

With the reliance of some key regional centres across Western Australia on road freight, and the prospect of early competitiveness of renewable hydrogen with diesel, the state government should work to establish the enabling infrastructure to support fuel switching. Long-haul hydrogen vehicles will soon be readily available and the state government should examine the feasibility of a renewable hydrogen refuelling station backbone that can support the major freight routes across the state.



## DEVELOP A SKILLED HYDROGEN WORKFORCE

**A world-leading hydrogen industry will require a skilled hydrogen workforce capable not just of servicing large industrial manufacturing sites, but also residential and commercial premises across cities, towns and remote communities. Training and upskilling tradespeople will take years and planning must begin right away to ensure that a lack of localised skills does not prove a barrier to the growth of the sector.**

### **4.1 Map the existing skills base and future needs**

The state government should undertake a study to understand the existing local skills base, the ability of this base to meet the needs of an emerging hydrogen sector and any gaps that will need to be addressed through skills development and training programs over the coming decade.

The state should also embed renewable energy and hydrogen education within the curriculum of state schools.

# RECOMMENDATIONS



## BUILDING BRAND WA

**Western Australia is competing with every other state in Australia, and many countries abroad, to become the most desirable place in which to build renewable hydrogen production facilities. The state will need to market its credentials as an attractive location in which to manufacture clean, competitively priced hydrogen.**

### 5.1 Establish a renewable energy target

Potential buyers of hydrogen have signalled that they are in the market for renewable (not fossil-fuel based) hydrogen over the medium to long term. Marketing Western Australia's hydrogen credentials in overseas markets will be all the stronger if the state has strong renewable energy credentials – something which it presently lacks outside of the distributed energy resources sector.

The state's recent Whole of System Plan for the South-West Integrated System (SWIS) identified that under all scenarios, the region would achieve 70 per cent renewables by 2040. This inevitable shift in the most populous area of the state can continue to be complemented by Western Australia's world-leading applications of renewable energy in isolated networks.

With this clear transition to clean energy power supplies already under way, the state should amplify its clean energy credentials by establishing a minimum 50 per cent renewable energy target for 2030, creating a strong guidepost to the state's renewable energy transition and supporting the image of a cleaner, greener investment destination.

### 5.2 Develop an investment prospectus to market Brand WA

To support Western Australia's investment attraction activities and international marketing, the state government should prepare an investment prospectus that promotes the state's comparative advantages as a producer and supplier of renewable hydrogen.

The prospectus could include an overview of the state's supporting infrastructure assets (e.g. transmission networks, pipelines, ports, roads), renewable energy resources, policy settings, load attraction initiatives, skills base, government incentives and support for major projects.