



Mr Steve Georganas MP
Chair
Joint Standing Committee on Trade and
Investment Growth

Submitted via the APH website

22 December 2022

Dear Mr Georganas MP,

Inquiry into Australia's transition to a green energy superpower

Executive summary

Australia – along with the rest of the world – is at a pivotal point in the transition away from fossil fuels and toward green energy. There is a clear global shift occurring and action is required now to ensure that Australia is best positioned to realise the environmental and economic benefits presented by it.

A transition to a green energy superpower is about getting ahead of the curve – not only for environmental gain - but also economic. The transition if done successfully at scale, will see the creation of new energy production, export and manufacturing sectors; new employment opportunities including roles which build on existing fossil fuel skill sets; and new revenue streams, locally and nationally.

Fortescue welcomes the government's approach to resetting Australia's strategy on climate and energy policy and seeking to establish Australia as a global green energy leader. Climate change is a threat to our environments (built and natural), our economy and our communities throughout Australia. It is also an opportunity for Australia to transform our economy to one that is powered by green energy – particularly in regional Australian communities - and leverages our natural advantages in renewable resources to decarbonise worldwide energy markets and supply chains.

As the formation of this Joint Standing Committee attests, consumers, businesses, and policy makers are increasingly identifying that future energy needs must be met by green alternatives to fossil fuels. Customers and financial markets are demanding action on climate change. Emissions targets are legislated in Australia and committed in place worldwide. And it is widely accepted that the price of carbon will soon impact how businesses operate and ultimately succeed.

In considering this opportunity, Fortescue's view is that our nation's natural assets and political and economic stability mean Australia has the potential to be a green energy superpower. Fortescue's ambition is to build a renewable company of the scale of *Saudi Aramco*. Saudi Arabia's dominance of global energy markets is well known, with its abundance of oil and gas resources it exports to the



world. In our view Australia, with our abundance of renewable resources and critical minerals, pedigree as an exporter of resources commodities to the world and our economic strength, can match it. To be an energy superpower like Saudi Arabia requires a significant export industry. For Australia to become a green energy superpower, governments must act now with policies to support the large-scale infrastructure and technology required to build a green energy export industry, sooner.

In terms of providing future green fuels to the world at scale, Australia is well positioned as a prospective green hydrogen exporter. The emerging market structure for green hydrogen appears likely to be a race to scale and offtake, similar to the Liquid Natural Gas (LNG) industry where first movers can expect to lock in significant and persistent advantages. Early years of the Australian LNG industry (e.g., North West Shelf) were dominated by projects with 20-year offtake agreements to the Japanese market – and Australia's first mover advantage here has persisted to greater market share today. Similar trajectories are observable in China's dominance of the solar PV & lithium-ion value chains, Europe's outsized role in wind turbine manufacturing and offshore wind services, US shale gas and the UK's shipbuilding industry in the early 20th century. By reaching scale early and locking users into long term supply contracts, first movers can strengthen their client relationships, build a brand and track record of delivery, and credibility with investors. This will position them to capture post-2030 offtake agreements as demand starts to scale more substantially. By contrast, those who fail to move early will have to develop differentiated capabilities to challenge incumbent advantages and will be locked out of a significant share of the market.

Demand for green hydrogen is on the rise and to help make it, we have world class renewable energy potential, ranking in the top two globally for onshore wind capacity and utility-scale PV capacity. Significant tracts of uncontested land also lower the risk that land-intensive renewables for green hydrogen production will conflict with other uses. Finally, proximity to Asia provides a natural advantage exporting seaborne renewable hydrogen to Asia relative to other prospective exporters – effectively lower shipping costs. However, Australia's green hydrogen competitiveness is being eroded by several factors including, persistently high prices for energy, misaligned decarbonisation incentives for domestic hydrogen users, and assertive policy interventions by export competitors such as the United States' *Inflation Reduction Act* and Gulf State Sovereign Wealth Funds.

Fortescue recommends that the Committee provides advice to government that, for trade and investment to support Australia's transition and make a green energy superpower here a reality, the Commonwealth must develop substantial policies – very soon - to ensure a large-scale green energy industry can be built to supply to both domestic and export markets, to counter other first-mover nations taking our potential markets in Asia and to maintain regional value chains of economic productivity and exports where Australia has a comparative advantage.



The opportunity for Australia

Fortescue's perspective is that the green energy economy provides tremendous opportunities for economic development of the Australian economy that will offset the inevitable decline in fossil fuel dependent industries. The economic growth opportunities presented by the decarbonisation of industry and new renewable fuels at scale, such as green hydrogen, can create thousands of jobs for Australians. These jobs will disproportionately be in rural and regional locations. Moreover, large-scale low-cost renewable energy will be a critical input to future manufacturing opportunities and employment.

The International Energy Agency describes decarbonisation strategies globally as being underpinned by six pillars: energy efficiency, behavioural change, electrification, renewables, carbon capture and storage (CCUS), and hydrogen or hydrogen-based fuels¹. In the International Energy Agency's (IEA's) Net Zero to 2050 Roadmap², renewable energy is expected to have the largest share of cumulative emissions reductions, accounting for 35 per cent of emissions reductions to 2050. The IEA predict that global demand for hydrogen will hit almost 200 million tonnes per annum if we are to be on track for net-zero by 2050³.

Estimates of hydrogen's share of global energy demand in 2050 range from 6 to 24 per cent⁴, reflecting the immense latent potential of hydrogen in the climate transition and supporting Fortescue's and other hydrogen industry proponents' views that significant global demand for green hydrogen exists. Likewise, there will be strong demand for the green technology that leaders like Fortescue are spending billions on and developing. This is evident through the discussions we are having on several offtake agreements with companies around the world, including E.ON, Germany's largest energy distributor, that we aim to supply five million tonnes of green hydrogen per year to from mid-decade.

Australia's potential to develop a green hydrogen export industry is underpinned by an abundance of natural resources, and its reputation as a reliable exporter of commodities. The suitability of land for green hydrogen production is determined by its capability to generate low-cost renewable energy, access to water, and proximity to relevant infrastructure. According to Lazard's levelized cost of electricity (LCOE) analysis for 2021, Australia has one of the lowest costs of production for wind and solar energy in the Indo-Pacific⁵, which provides it with a comparative advantage when exporting to the region.

¹ International Energy Agency, 'Hydrogen' - <https://www.iea.org/fuels-and-technologies/hydrogen>

² International Energy Agency, 'Roadmap to Net Zero to 2050' (2021)

³ IEA, Global Hydrogen Review, September 2022, available at <https://www.iea.org/reports/global-hydrogen-review-2022/executive-summary>

⁴ Energy Transitions Commission, 'Making the Hydrogen Economy Possible' (2021) - <https://www.energy-transitions.org/wp-content/uploads/2021/04/ETC-Global-Hydrogen-Report.pdf>

⁵ Lazard, 'Levelised Cost of Energy V1.50' (2021) <https://www.lazard.com/media/451905/lazards-levelized-cost-of-energy-version-150-vf.pdf>



Green hydrogen is produced through electrolysis and uses 100% renewable energy to split water molecules into their component parts of hydrogen and oxygen. The potential benefits of developing a large Australian green hydrogen industry are significant to our nation's energy system and economy. The significance of green hydrogen stems from its potential to decarbonise sectors where electrification is difficult, with a range of applications across hard-to-abate sectors, such as long-haul transport, chemical manufacturing, and steelmaking.

Green hydrogen is an increasingly important part of the climate transition. It has a high energy-density, which makes it suitable for energy generation either through combustion or as a substitute for gas in pipeline networks. Green hydrogen can also be used within fuel cells to cleanly and efficiently produce electricity, which has applications across transportation, industrial, residential, and commercial buildings, and long-term energy storage for electricity grids.

From a strategic energy security perspective, a stable supply of green hydrogen can bolster Australia's energy or fuel self-sufficiency and reduce Australian dependency on foreign fuels specifically for the transport and defence industries. It can also be used to stabilise a renewables-based energy grid connected to consumer electricity networks, providing a new opportunity for large scale storages of energy and a new, fast and large scale flexible or demand-side response to releasing electricity during periods of grid congestion, instability or peak demand.

From an economic perspective, green hydrogen production at scale has the potential to sustain Australian standards of living even as the demand for fossil fuels exports, such as coal, declines. Hydrogen produced from renewable energy is a critical enabler for future-facing goods such as green iron for decarbonised steel-making and green ammonia for decarbonised fertiliser and presents a substantial export opportunity for Australia.

In line with this, Fortescue, as a global leader in the iron ore industry and employer of choice for Australia's mining sector, is working to end our fossil fuel use this decade, and evolve into a world leading green metals, minerals, energy and technology company..

In our analysis of green hydrogen projects identified by FFI in Australia in August of 2022 27,000 full-time equivalent jobs (FTE) are expected to be created each year, on average⁶. At the height of the construction phase, it is forecast that more than 48,000 full-time equivalent jobs will be created in 2029 across the economy. as construction activity peaks⁷. For context, the forecast peak in economy-wide employment is comparable to the current workforce of the Coal Mining sector, which is approximately 46,000 FTE.

⁶ Deloitte Access Economics - The Economic Impact of a green hydrogen Production Industry in Australia – Fortescue Future Industries, November 2022

⁷ Ibid



Australia's policy settings for climate and energy

Globally, significant barriers to commercialising renewable fuels, such as green hydrogen, remain, including the cost of production, transportation and storage challenges, and the nascent stage of end-use technologies. While the cost of generating the renewable energy required to produce green hydrogen has decreased substantially in recent years⁸, electrolyser capacity remains a challenge. According to the IEA's Net Zero by 2050 scenario, more than 700GW of installed electrolytic capacity will be required by 2030⁹. This gap in electrolyser capacity provides Australia with an opportunity to manufacture and supply both domestic and global markets with electrolyser and associated green hydrogen and green electricity supply chain inputs. As Australia develops large scale renewables and hydrogen generating capacity it in turns becomes an attractive location for manufacturing of electrolyzers.

The first step in realising this opportunity and potential for Australia, is putting in place policy settings to provide Australia with comparative advantage – through attracting investment, rewarding consumer uptake and kickstarting local production.

Our international peers are already well-progressed in this regard. Competitor nations with the resources and ability to export to Asia, such as the United States and Canada, see the opportunity of green hydrogen and green energy and are implementing policies that incentivise downstream manufacturing arising from it. The recent United States' Government passage of the *Inflation Reduction Act* is the prime example of government intervention that will attract green technology and green energy investment at scale – and spur the creation of significant numbers of jobs across regional United States – to set the conditions to create a globally dominating green energy industry in that country. The US *Inflation Reduction Act* establishes tax credits and funding that is available for green manufacturing, renewable energy and low emissions hydrogen production that is estimated to reach US\$374 billion. However, the production tax credits are uncapped, so in reality a much greater level of support to green hydrogen and green ammonia production in the United States could be provided.

BloombergNEF forecasts that the cost of green hydrogen in some parts of USA will fall below zero and it is highly likely that we will see net costs for green hydrogen production to be close to \$1kg by 2025, due to the *Inflation Reduction Act*.

Fortescue agrees there will be a period of time for it along with the rest of the country to transition to 100% green energy. But to best position our nation to capitalise upon the shift to guarantee our future environmental and economic prosperity, we need to move faster. There is a short window for Australia to act and ensure its competitiveness and lay the foundations for a significant new industry. The competition will continue to increase, but without intervention, Australia risks a smaller

⁸ Lazard, 'Levelised Cost of Energy V1.50' (2021) - <https://www.lazard.com/media/451905/lazards-levelized-cost-of-energy-version-150-vf.pdf>

⁹ Calculated using values from the International Energy Agency, 'Global Hydrogen Review' (2022) - <https://www.iea.org/reports/hydrogen>



industry that does not live up to public promises, fails to deliver for regions in transition, and fails to provide an export revenue stream to replace declining fossil fuels. Australia's current energy policies and incentives are targeted towards our domestic energy transition to ensure we can meet our updated climate targets. If we continue a business-as-usual approach to trying to unlock a green energy superpower opportunity for Australia, we risk missing out.

To assist the Commonwealth in this, Fortescue recommends that a key outcome of the Committee's inquiry should be to define what the opportunity represents for Australia's economy. It should also provide advice to government that, for trade and investment to support Australia's transition to a green energy superpower, the Commonwealth must act quickly and at scale in its fiscal policies and to ensure efficient approvals processes for green energy developments to support a green energy export industry – potentially focussed on green hydrogen and its derivatives – being built to support Australia becoming a green energy superpower.

About Fortescue

A proud Australian company, Fortescue Metals (**FMG**) is the fourth largest producer of iron ore in the world, exporting over 185 million tonnes of iron ore annually through our integrated mining, rail, and shipping network in the Pilbara.

We are a global leader in large-scale, ultra-efficient and highly complex developments with a proven track record in developing and operating assets in remote and isolated locations, and our business is evolving as we move to introduce value added iron products, decarbonise our operations and seek to build a global green energy business.

Through Fortescue Future Industries (**FFI**), we are establishing a global portfolio of renewable energy, green hydrogen production and manufacturing projects and operations that will position us at the forefront of the global green energy industry.

Fortescue's decarbonisation strategy and roadmap

On 20 September 2022, we announced our [world-leading heavy industry decarbonisation strategy](#), aiming to eliminate fossil fuel use and achieve real zero terrestrial emissions (Scope 1 and 2) across our iron ore operations by 2030.

We will invest US\$6.2 billion in capital to realise this aim by 2030 across all our terrestrial iron ore operations. In addition to being the immediate action that is needed to address climate change, this investment will also generate economic returns by eliminating our need for diesel, natural gas and carbon offset purchases. Fortescue's first-mover advantage will position us to ascertain attractive environmental and economic returns in the long-term, including:

- Avoidance of 3 million tonnes of CO₂ equivalent emissions per annum



- Net operating cost savings of US\$818 million per annum from 2030, at prevailing market prices of diesel, gas and Australian Carbon Credit Units (ACCUs)
- Cumulative operating cost savings of US\$3 billion by 2030 and payback of capital by 2034, at prevailing market prices
- Elimination of Fortescue's exposure to fossil fuels and associated fossil fuel price volatility which in turn, will de-risk the operating cost profile
- Removal of the company's exposure to price risks associated with relying on carbon offsets as well as carbon tax regulatory risk
- Establish a significant new green growth opportunity by producing a carbon-free iron ore product and through the commercialisation of decarbonisation technologies

[Fortescue's decarbonisation program](#) and our transition into a global green energy and resources company is an investment in our future as a business. Our roadmap outlines the technology, timetable and costings required to decarbonise profitably; avoid financial, commercial environmental and social risk; and future-proof the business. We are committed to driving change and proving that the transition to green energy can be achieved, profitably.

Fortescue's green energy and technology portfolio

Fortescue is transitioning into the global green energy, resources and technology company of tomorrow, and is positioned to aid Australia's role as a key green energy producer and exporter. We are also driving the global establishment of a new market for renewable, green energy and green fuels, such as green hydrogen, green ammonia, sustainable aviation fuel and green methanol, which will replace fossil fuels. FFI is already acknowledged as one of the world's leading developers of green hydrogen, as evidenced in our commercial discussions with offtake customers. FFI is building a portfolio of renewable resources across Australia. Key Australian projects include:

- Together with Incitec Pivot, converting an existing ammonia production facility at Gibson Island in Queensland to produce green ammonia from renewable energy. Once completed, this project could see the construction of a new ~500mw hydrogen electrolysis facility at the site to produce green hydrogen as well as the retrofitting of IPL's existing ammonia manufacturing facility to run on the green hydrogen produced onsite.
- Earlier this year we broke ground on the world's largest electrolyser facility, our Green Energy Manufacturing (GEM) Centre, at Gladstone in Queensland – with the first electrolyser to be manufactured next calendar year. With an initial capacity of two gigawatts per year, the GEM will be powered by green energy and become a major new pollution-free green manufacturing hub for electrolysers, cables, batteries, wind turbines and solar panels.



- A joint venture with Windlab to deliver the North Queensland Super Hub – one of the largest wind and solar generation projects ever undertaken in Queensland which stands to generate ~10GW.

Along our journey FFI will also become a technology company. Technology will be the key to scaling up the green energy economy and making it cheaper and more efficient. The critical challenge ahead of us is to decarbonise the parts of heavy industry that cannot be electrified using existing technology. Long distance transport. Haul trucks. Trains. Overwhelmingly, the tech already exists – it just needs to be put together in new ways or optimised. And where technology or manufacturing capacity doesn't exist yet, we are investing to make it happen faster.

Supporting our team on this work on zero-emission power system technologies is our purchase of Williams Advanced Engineering, as well as our partnership with equipment manufacturer Liebherr to develop and supply green mining haul trucks. These zero-emissions haul trucks will enter Fortescue's fleet from 2025. Our truck haulage currently consumes around 200 million litres of diesel per year and accounts for 26 per cent of our Scope 1 and 2 emissions – so as of 2025, we will start to significantly reduce this.

Economic benefits of Fortescue's green hydrogen developments

Fortescue has identified a range of potential projects across Australian states and territories that, taken together, would create a thriving green hydrogen production sector. Fortescue recently commissioned Deloitte Access Economics to analyse the economic impact of seizing the opportunity to activate Australia's green hydrogen production industry. Broadly it concluded through modelling that the portfolio of projects identified by FFI in August 2022, has the potential to reshape the Australian economy.

Employment impacts

Implementing and developing the portfolio of projects identified by FFI will create significant employment opportunities across Australia. Throughout the economy, more than 27,000 full-time equivalent jobs (FTE) are expected to be created each year, on average¹⁰. The employment impacts represent both the direct employment associated with the development and operations of the green hydrogen industry as well as the indirect employment opportunities generated in other sectors. Importantly, the employment impacts reflect net job creation, which accounts for job losses across industries that experience crowding out in the labour market because of the investments¹¹.

At the height of the construction phase, it is forecast that more than 48,000 full-time equivalent jobs will be created in 2029 across the economy as construction activity peaks (Chart 2)¹². For context,

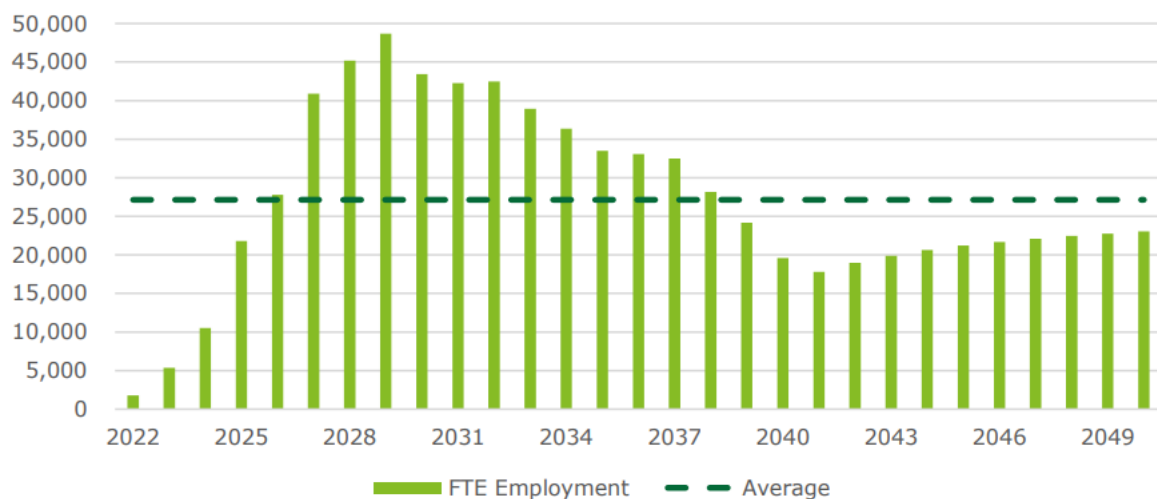
¹⁰ Deloitte Access Economics - The Economic Impact of a green hydrogen Production Industry in Australia – Fortescue Future Industries, November 2022

¹¹ Ibid

¹² Ibid

the forecast peak in economy-wide employment is comparable to the current workforce of the Coal Mining sector, which is approximately 46,000 FTE¹³.

Chart 1 - Employment impacts of Green Hydrogen - FFI projects - August 2022



Source: Deloitte Access Economics

Sectoral impacts

The initial uplift in activity is concentrated in the green hydrogen industry, which includes construction, hydrogen production, and clean energy sectors. At its peak in 2029, the uplift in employment is expected to be around 68,000 FTE in the construction sector¹⁴. Employment here is higher than economy-wide peak employment figures of 48,000 FTE due to the impacts of 'crowding-out', where labour and capital move away from other sectors to support new economic activity¹⁵.

The green hydrogen industry is expected to see an increase in annual average output of \$19.2 billion in undiscounted terms¹⁶. Over time, the uplift in activity to build out the green hydrogen economy spills over into existing industries. In the first instance, service sectors expand to support activities during the construction and operations phases of the green hydrogen projects. This includes financial, professional, and food and accommodation services¹⁷. Through to 2050, it is expected the services sector will see an average uplift of \$19.7 billion per year, in undiscounted terms, which is greater than the average yearly increase of the hydrogen sector¹⁸. This reflects the strong positive spillovers from

¹³ Australian Bureau of Statistics, 'Labour Force, Australia, Detailed' (2022)

¹⁴ Deloitte Access Economics - The Economic Impact of a green hydrogen Production Industry in Australia – Fortescue Future Industries, November 2022

¹⁵ Ibid

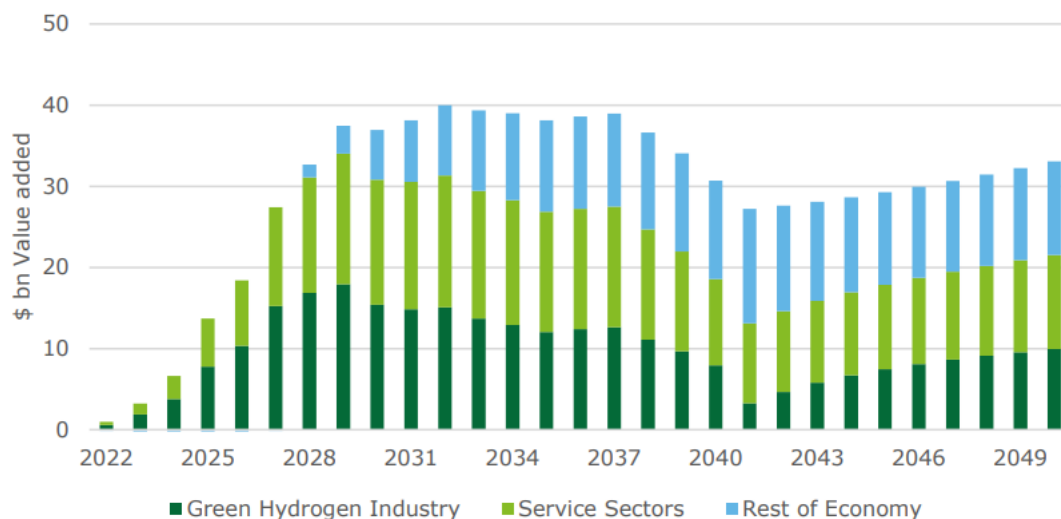
¹⁶ Ibid

¹⁷ Ibid

¹⁸ Ibid

the green hydrogen sector to other parts of the economy. Notably, by 2050, approximately two-thirds of the economic impact is concentrated in sectors outside the green hydrogen industry¹⁹.

Chart 2 - Sectoral impacts of green hydrogen – FFI projects – August 2022



Source: Deloitte Access Economics

Regional Australia benefits of the economic transition to green energy

All Australian states are expected to play a key role in Australia's Green Hydrogen production sector under the scenario modelled. FFI has identified a range of potential projects across most states and territories in Australia. Many of these projects are positioned within regional areas of Australia, sometimes remote. Of note are the large-scale wind and solar power generation projects which will provide the renewable energy to produce green hydrogen or feed into the grid for industry and consumer power decarbonisation or power storage.

Economic modelling by Deloitte suggests that the impact of developing a thriving Green Hydrogen sector would generate large positive spillovers across all State and Territory economies²⁰. These spillovers are expected to be particularly pronounced in the services sector, which grows to accommodate increased demand from the rapidly growing green hydrogen industry²¹. The projects identified by FFI would likely enable Australia to not only catalyse a local green hydrogen production sector, but also become a significant global player in export markets.

¹⁹ Deloitte Access Economics - The Economic Impact of a green hydrogen Production Industry in Australia – Fortescue Future Industries, November 2022

²⁰ Ibid

²¹ Ibid



This would provide Australia with a key opportunity to establish long-term (e.g., multi-decade and multi-generational) offtake agreements with importers, providing Australia with an important foothold in this emerging global industry. The modelling suggests that the significant capital expenditure proposed would lead to a rapid ramp-up in the green hydrogen sector across Australia²². The most rapid growth phase of the green hydrogen industry would occur over the next eight years²³. Overall, output impacts for each state are significant. These impacts are a function of the level of investment received by each state and their potential to support the development of the green hydrogen sector nationwide.

Regional Australia has the best renewable resources and the bulk of the landmass to generate green energy in the country. Renewable resources never deplete, and regional Australians will benefit over generations from both the construction and ongoing operations and maintenance of large-scale renewable generation (wind, solar and battery storage) and green hydrogen production assets. Services industries in regional Australia - financial, professional, and food and accommodation services - will benefit and be required to support large scale renewable assets just like they do with large scale fossil fuel and minerals extraction industries. These assets will require secure supply chains of critical minerals and materials and parts to manufacture and build projects. Regional Australia has significant deposits of critical minerals with current mining operations and service industries in operation and a track record of advanced technology manufacturing in difficult environmental conditions. It is a world leader in mining and agricultural science, techniques, processes and services and is renowned as an efficient and dependable export partner. Regional Australian communities should expect and be prepared to attract considerable investment in green energy production and technology manufacturing.

Communities in regional Australia such as the Hunter Valley, Pilbara, Whyalla, Darwin and Central Queensland, are well placed to benefit from the transition to a large-scale renewable energy sector due to the presence of existing transmission, water sources, industrial zoned land, trade gateways such as ports and freight terminals and existing labour pools of heavy industry and skilled trade workforces. Green hydrogen produced at scale in regional areas with local agriculture, chemical, aluminium, steel and other manufacturing industries will greatly benefit from the proximity and large-scale operations of locally produced green hydrogen to be used as a catalyst to be turned into, for example, anhydrous ammonia for fertiliser or for burning to provide process heat gas or directly used as fuel in vehicles. Trade in hydrogen is likely to be driven by the comparative differences in the cost of green hydrogen production between countries, and for countries with limited technical potential for renewables, hydrogen is expected to be a critical driver of the net-zero transition.

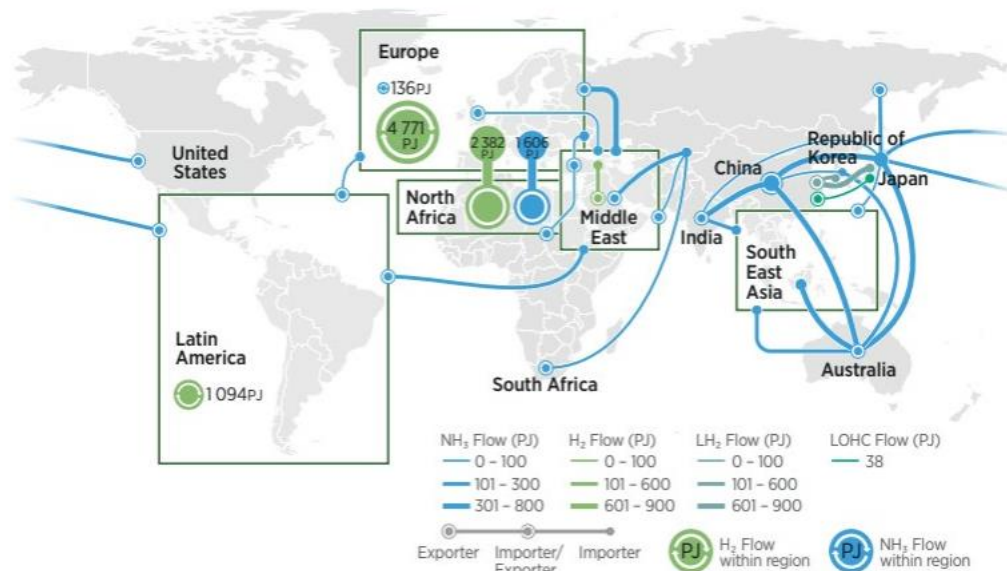
Given the emergence of significant comparative advantages between countries, some nations are facing immense economic opportunities. Australia is expected to emerge as a major supplier of

²² Deloitte Access Economics - The Economic Impact of a green hydrogen Production Industry in Australia – Fortescue Future Industries, November 2022

²³ Ibid

hydrogen to South-East Asia, including countries such as China, Japan, and the Republic of Korea (Figure 1).

Figure 1 - Global hydrogen trade flows in 2050 under IRENA's optimistic assumptions scenario



Source: IRENA Hydrogen Trade Outlook

Australia's Green Hydrogen opportunity is underpinned by an abundance of natural resources, and strong relationships with trade partners in the Indo-Pacific, developed through decades of resource exports. Australia has 262,000 km² of land which, due to its potential for renewable energy generation, access to water, and access to transport infrastructure like ports, is judged to be highly suited for green hydrogen production²⁴.

This area reflects approximately three per cent of Australia's total land area and is larger than the size of the United Kingdom²⁵, and more than twice the size of Portugal²⁶. In addition to the requisite natural resources, Australia has the regulatory and investment environment to create a competitive green hydrogen production industry.

As of 2022, every state and territory has announced a net-zero energy plan, aiming to achieve net-zero emissions by 2050, and in the case of Tasmania, by 2030. Australian research into storage, distribution, and hydrogen use is ranked highly globally²⁷, and Australia has also seen the

²⁴ Department of Climate Change, Energy, the Environment, and Water, 'Australia's National Hydrogen Strategy' (2019)

²⁵ Calculated using land area data from the World Bank

<https://data.worldbank.org/indicator/AG.LND.TOTL.K2?end=2020&locations=GB&start=2020&view=bar>

²⁶ Calculated using land area data from the World Bank

<https://data.worldbank.org/indicator/AG.LND.TOTL.K2?end=2020&locations=PT&start=2020&view=bar>

²⁷ Department of Climate Change, Energy, the Environment, and Water, 'Australia's National Hydrogen Strategy' (2019)



announcement of multiple private-sector projects to enable hydrogen production. Finally, Australian producers in regional Australia have strong international relationships from decades of supplying to Asian markets, creating a solid foundation for building an export industry. Three of Australia's top four trading partners, Japan, the Republic of Korea, and China, have already made clear commitments to use clean hydrogen in their pursuit of net-zero emissions. The potential benefits to regional communities from the transition to a green energy or net zero future and of developing an Australian green hydrogen industry are quite large.

Conclusion

Australia is well-placed to provide green energy to the world – we have the land mass, the sunlight wind and water, and the political stability to do that. There is now acknowledgement across Governments here that green hydrogen and green energy more broadly presents a very real opportunity for Australia. Not only in terms of decarbonising heavy industry and making huge impacts on emissions reductions, but in terms of employment and economic prosperity moving forward. FFI is leading the charge on green hydrogen. We are making real progress in terms of projects here in Australia and internationally on production – including the manufacture of electrolyzers, as well as in terms of renewable energy supply. Above the actual energy source, we are also developing technology to underpin decarbonisation of heavy industry. We are ourselves helping to decarbonise Fortescue by 2030, and we are also partnering with others to help them on their decarbonisation journey.

Fortescue recommends that the Committee provides advice to government that, for trade and investment to support Australia's transition and make a green energy superpower here a reality, the Commonwealth must develop substantial policies – very soon - to ensure a large-scale green energy industry can be built to supply to both domestic and export markets, to counter other first-mover nations taking our potential markets in Asia and to maintain regional value chains of economic productivity and exports where Australia has a comparative advantage. Fortescue thanks the Committee for the opportunity to provide feedback on *the Inquiry into Australia's transition to a green energy superpower*. Fortescue would welcome the opportunity to meet with the Committee to discuss these opportunities. Should the Committee opt to hold public hearings as part of this consultation, Fortescue would welcome the opportunity to present. If there is any further information required regarding this submission, please contact Nick Berry, FFI, at Nick.Berry@fmgl.com.au.

Yours sincerely

Mark Hutchinson

CEO

FORTESCUE FUTURE INDUSTRIES



Appendix A – key green energy and green technology Fortescue initiatives

Below is a summary of further key announcements in Fortescue's green energy transition. We are establishing the building blocks of a new, global renewable energy value chain spanning technology, manufacturing, green energy generation and distribution.

FFI and Incitec Pivot progress green conversion of Gibson Island ammonia facility

[FFI and Incitec Pivot Limited \(IPL\) are progressing planning for the conversion of IPL's Gibson Island ammonia facility](#) to run on green hydrogen, commencing Front End Engineering and Design. IPL's Gibson Island facility will cease traditional fertiliser manufacturing early in the new year. As part of IPL's decarbonisation strategy and in line with FFI's goals to help heavy industry decarbonise, the Brisbane ammonia manufacturing and port facility conversion will be a world-first.

FFI's Green Energy Manufacturing Centre (GEM) in Gladstone, Queensland

FFI has [commenced construction](#) of the world's largest electrolyser facility in Gladstone, Queensland. Building on Gladstone's skilled workforce, the GEM will be powered by green energy and become a major new green manufacturing hub creating hundreds of direct and indirect jobs in regional Queensland. The facility will have the capacity to create up to 2GW of electrolysers per year – vital to the production of renewable hydrogen.

FFI announce North Queensland Super Hub to power green hydrogen with wind and solar

[FFI and Windlab are partnering](#) on a Super Hub which could generate more than 10GW of wind and solar power and underpin the industrial-scale production of green hydrogen from purpose-built facilities within Queensland. The first stage of the proposed project includes the 800MW Prairie Wind Farm and the 1000MW Wongalee project. Subject to approvals, construction on the first stage is expected to commence in 2025 with the projects anticipated to begin to produce power by 2027. Energy generated from the project stands to produce green hydrogen as well as feed renewable power to the grid.

FFI and E.ON partner to become Europe's largest green hydrogen supplier and distributor

FFI and E.ON have [agreed to partner](#) to deliver up to 5 million tonnes per annum of GH2 to Europe by 2030 which is approximately one third of calorific energy German imports from Russia. E.ON is one of Europe's largest operators of energy networks and infrastructure and a provider of innovative customer solutions for 50 million customers.

FFI x Liebherr

FFI is [partnering with German-Swiss multinational equipment manufacturer Liebherr](#) to support the development and supply of green mining haul trucks for integration with the zero emission power



system technologies being developed by FFI and Williams Advanced Engineering (WAE). This partnership underpins the role FFI is playing in FMG's plan to decarbonise all mining operations by 2030 and provides a secure pathway for Fortescue to become a zero-emission power system supplier to a tier one original equipment manufacturer.

FFI and Williams Advanced Engineering

In March 2022, [FFI acquired UK based Williams Advanced Engineering \(WAE\)](#). WAE is an offshoot of Williams F1 team and is a world leading technology and engineering business with ground-breaking projects in high performance battery systems and electrification. WAE will bring its race bred critical battery technology to FFI and enable Fortescue to become a major player in the global market for green industrial transport equipment. As part of the acquisition, Fortescue and WAE announced the development of a world first, zero emission "INFINITY TRAIN™" which will operate out of Fortescue's iron ore mine sites. The regenerating battery electric iron ore train project will use gravitational energy to fully recharge its battery electric systems without any additional charging requirements for the return trip reload. This accelerates Fortescue's race to reach real zero emissions by 2030.

FFI and Airbus join forces to decarbonise the aviation sector

FFI and Airbus have signed a [Memorandum of Understanding \(MoU\)](#) which will allow both companies to collaborate closely in order to implement green hydrogen as a fuel within the aviation sector. The companies are targeting the entry-into-service of a green hydrogen-based aircraft by 2035. FFI will provide cost outlook, build infrastructure deployment scenarios and technology drivers – supply chain. Airbus will provide characteristics on fleet energy usage, hydrogen demand aviation, refuelling specs, and aviation regulatory framework.