Submission No 240

SUSTAINABILITY OF ENERGY SUPPLY AND RESOURCES IN NSW

Organisation: Energy Estate

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Submission to NSW Legislative Assembly Committee on Environment and Planning

Inquiry into the Sustainability of Energy Supply and Resources in NSW

Introduction

Energy Estate is pleased to have the opportunity to make this submission to the NSW Legislative Assembly Standing Committee on Environment and Planning inquiry into the sustainability of energy supply and resources in NSW. Energy Estate is a clean energy advisory and accelerator company based in Sydney NSW, with satellite offices in Canberra and Adelaide. We advise investors, developers and technology providers on strategy and transactions in the clean energy sector in Australia and overseas.

Energy Estate also operates as a renewable energy developer itself, and has successfully developed multiple utility scale solar farms in NSW and QLD through its sister business Renew Estate. Energy Estate is currently developing the 4GW Walcha Energy project in the New England region of NSW as part of the Walcha Energy partnership. We are also involved in the development of a range of other renewable energy projects in the state and other parts of the National Electricity Market.

Energy Estate is pleased to provide this submission to the Committee's inquiry into the sustainability of the NSW energy supply and resources. We have identified the key trends occurring in the sector, the risks of inaction for carbon-fuel reliant regions and economies, and the opportunities and risks associated with the transition to a low carbon, clean energy future. In particular, we seek to highlight the opportunities posed by new technologies such a hydrogen fuel development for areas like the Hunter Valley region.

Energy Estate thanks the committee for the opportunity to submit to the inquiry and looks forward to learning more about its deliberations in due course.

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Disclaimer

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Table of Contents

Executive Summary

The energy transition is accelerating across Australia. Low-cost renewables are the now the most competitive form of new build of electricity generation in the National Electricity Market. Utility scale wind and solar generation can now deliver electricity for between $40 – $50 per MWh. In comparison new build coal and gas generation is between $100-$150 per MWh.

The Hunter region is currently home to the world's largest coal export port, 40 different coal mines and several large power stations including Liddell and Bayswater. With four of NSW's coal fired power stations expected to close in the next 17 years (all of which are located within the greater Hunter region), and declines in global demands for coal exports, the state will need to act quickly in order to adapt. The NSW Government will need to be strategic in the way that it facilitates a just transition away from coal and creates policies that support structural adjustment and growth in the Hunter. If the Hunter region does not prepare for these global changes by supporting other industries to grow, over 5,000 jobs and $705 million in wages and salaries are at risk due to global declines in coal demand.

New South Wales is particularly vulnerable to changes in global coal markets as overseas customers make shifts in their energy systems towards low or zero carbon energy and fuel sources. Japan is currently New South Wales' largest coal exporting destination, accounting for 45% of total exports from the state. Since 2015, however, total exports to Japan from Australia have been steadily declining. In March, the Japanese government announced that it would no longer sanction the construction of new coal-fired power plants, and would instead look to renewable energy, LNG and hydrogen to power the nation. Major Japanese investors and trading houses have also signalled a move away from coal towards other forms of energy generation. In 2018, Mitsui & Co. and Mitsubishi Corp. announced the sale of three thermal coal investments in Australia. Other large trading houses have followed suit, and large Japanese financial Institutions such as Mitsubishi UFJ publicly declared withdrawal from investments in coal.

The Hunter region is extremely well placed to become a key renewable energy generation and hydrogen production and export hub. The Hunter is home to an established manufacturing base with expertise in advanced manufacturing production processes, making it an ideal location for investment. The region also has a technically skilled workforce, especially in the energy and resources sector, a world- class large-scale port that is ideal for hydrogen exportation to Asia as well as a significant availability of land and existing renewable energy sites close by. Similarly, existing energy production sites in the area can be repurposed for hydrogen development, allowing established transport infrastructure to be utilised. The University of Newcastle and CSIRO have already built a foundation for R&D and sector-leading expertise on hydrogen through their research, including a joint research program between the University of Newcastle and University of Tokyo on Photocatalytic Hydrogen Generation.

Development of a transition plan for the Hunter Valley focused on the significant renewable energy development available within the region, as well on the capacity to switch to new export fuel markets

such as hydrogen, are key opportunities open to policy makers. Policies and approaches adopted in other Australian jurisdictions and overseas should be leveraged to facilitate this transition and ameliorate the risks to communities and local economies.

1 The Energy Transition in Australia

Despite being required to meet at least twice each year, the COAG Energy Council has not met since December 2018. This absence of an enduring national consensus on energy policy has caused widespread uncertainty over the future of the energy market in Australia. In response to the ongoing failure to achieve consensus on climate and energy policy at a federal level, state and territory governments have sought to take a proactive approach to energy policy in their own jurisdictions in order to deliver more reliable, cheaper and sustainable energy for their communities, as well as create jobs and economic opportunity. The Australian Capital Territory, South Australia and Tasmania are all on track to meet their renewable energy targets of 100% by 2030. New South Wales and Queensland, however, are the furthest behind on their commitments to achieve net zero emissions by 2050 and 50% renewable by 2030 respectively.

The reliability of existing coal generators is increasingly declining as coal fired power plants age. AEMO has recently warned of the growing risks faced by Australia's energy system due to its reliance on coal generators, especially in summer when electricity demand is highest.[1] The cost of building new coal fired power plants is more expensive – between $100 - $150 per MWh, than the price of new wind and solar projects which is between $40 - 50 per MWh.[2] Similarly, the Levelised Cost of Electricity (LCOE), which represents the total cost required to cover the construction and operational costs of different energy sources, is significantly higher for coal than most renewable sources. As of December 2018, the LCOE of onshore wind generated energy and utility-scale solar PV were US$29/ MWh and US$36/ MWh respectively.[3] By contrast, the LCOE for coal was US$68/ MWh.[4] One of the main reasons why there is such a large difference between the LCOE of these energy generation types is because once built, many renewable generators have no input fuel costs. Advancements in technologies and improvements to economies of scale will continue to drive down the cost of renewables by approximately 10% per year over the coming decade.[5]

In parallel to advancements in renewable energy technologies, storage technologies are also improving and being more widely adopted in Australia and abroad. Currently, there are multiple battery storage projects underway in South Australia, Western Australia, the Northern Territory and Victoria. The ACT has also recently announced plans to hold a further reverse auction for renewable energy procurement in the territory, with 40 MWh of local energy storage being a major component of the project. The development of Snowy 2.0 and a broad range of other pumped hydro storage projects are also bolstering the NEM's storage capability. These advancements in energy storage and

[1] Australian Energy Market Operator 2018, *Summer 2018-19 Readiness Plan*, available at: <https://www.aemo.com.au/-/media/Files/Electricity/NEM/Security_and_Reliability/AEMO-2018-19-Summer-Readiness-Plan.pdf>
[2] CSIRO, media release, Annual update finds renewables are cheapest new build power, 21 December 2018, https://www.csiro.au/en/News/News-releases/2018/Annual-update-finds-renewables-are-cheapest-new-build-power
[3] Lazard 2018, *Levelized Cost of Energy and Levelized Cost of Storage 2018*, available at: <https://www.lazard.com/perspective/levelized-cost-of-energy-and-levelized-cost-of-storage-2018/>
[4] Bloomberg New Energy Finance 2018, *Tumbling Costs for Wind, Solar, Batteries Are Squeezing Fossil Fuels*, available at: <https://about.bnef.com/blog/tumbling-costs-wind-solar-batteries-squeezing-fossil-fuels/>
[5] Institute for Energy Economics and Financial Analysis 2019, *Why Renewables are the Solution for Australia*, available at: <http://ieefa.org/wp-content/uploads/2019/04/Why-Renewables-are-the-Solution-for-Australia_April-2019.pdf>

firming technologies will increasingly render the need for older firming technologies obsolete. Energy generation from daytime loads are able to be stored and effectively dispatched during peak evening demand times. Diversification of batteries and technology innovations will allow peaking capacity and firming needs of the grid to be met, while renewable generators offer electricity that is clean and affordable.

Investment and industry trends in Australia are also demonstrating a significant push towards renewables and adoption of low-emission technologies. In the last year, industry giants such as BHP Billiton, Rio Tinto, Glencore and Shell have publicly declared emission reduction targets in their operations. Other large companies outside of the energy sector, such as Westpac and the Sydney Opera House, are looking to procure up to 100% of their energy consumption from renewable sources through Corporate Power Purchase Agreements (PPA). In 2018, a total of 932 MW of renewable energy was directly contracted through corporate PPAs in Australia. A further 2600 MW in renewable projects was supported through these agreements.[6] At the same time, investment in large-scale renewable projects doubled from 2017-2018, reaching $20 billion.[7] More recently, one of the largest industry superannuation companies in Australia, IMF Investors, has set an emissions reduction target of 8-25% across all its asset holdings by 2024. These assets include the Ausgrid electricity network, Melbourne and Brisbane airports and NSW Ports. By 2030, IMF Investors have committed to cutting carbon in these projects by between 38-100%.

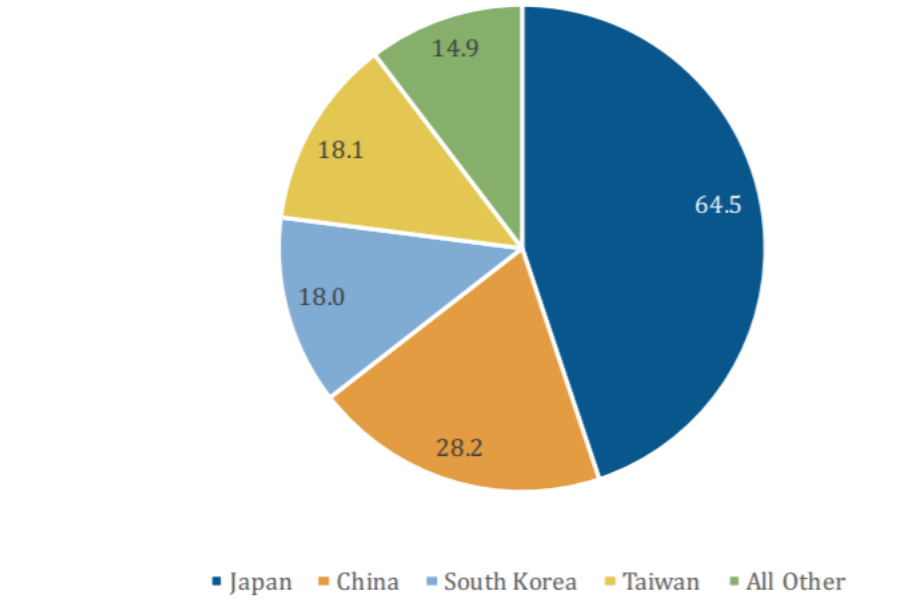
These trends in investment, commitments to decarbonisation and adoption of corporate PPAs reflect the economic viability and price certainty of renewable energy, and the inevitability of the transition of the energy system. They are also evidence of a growing concern over the environmental, economic and social effects climate change will bring to Australia.

The push towards adopting cheaper renewable energy, however, is not specific to the Australian context. New South Wales is particularly vulnerable to changes in global coal markets as overseas customers make shifts in their energy systems towards low or zero carbon energy and fuel sources. Japan is currently New South Wales' largest coal exporting destination, accounting for 45% of total exports from the state.[8] Since 2015, however, total exports to Japan from Australia have been steadily declining.[9] In March, the Japanese government announced that it would no longer sanction the construction of new coal-fired power plants, and would instead look to renewable energy, LNG and hydrogen to power the nation. Major Japanese investors and trading houses have also signalled a move away from coal towards other forms of energy generation. In 2018, Mitsui & Co. and Mitsubishi Corp. announced the sale of three thermal coal investments in Australia. Other large

[6] Clean Energy Council 2019, *Clean Energy Australia Report 2019*, available at <https://assets.cleanenergycouncil.org.au/documents/resources/reports/clean-energy-australia/clean-energy-australia-report-2019.pdf>
[7] Ibid.
[8] Institute for Energy Economics and Financial Analysis 2019, *Japanese Thermal Coal Consumption Approaching Long Term Decline*, available at: <http://ieefa.org/wp-content/uploads/2019/07/Japan_Coal_July-2019.pdf>
[9] Ibid.

trading houses have followed suit, and large Japanese financial Institutions such as Mitsubishi UFJ publicly declared withdrawal from investments in coal.

Figure 1: NSW Thermal Coal Exports 2018 (million tonnes)



Source: DFAT STARS Database, based on ABS Cat No 5368.0, December 2018 data.

The decline in Japan's appetite for coal is a trend that is being mirrored in NSW's other major export destinations – China, South Korea and Taiwan. Combined with Japan, these nations imported 90% of the state's coal in 2018.[10] The economic viability of coal exports is also being threatened by states who are looking to take steps towards decarbonisation. Earlier this year, the South Korean government increased the coal importing tax by 28% to US$40/t.[11] These global trends present serious threats to the future of NSW's regional economies.

[10] Ibid.
[11] Institute for Energy Economics and Financial Analysis 2019, *South Korea Shifting Further Away from Coal*, available at: <http://ieefa.org/wp-content/uploads/2019/04/South-Korea-Shifting-Further-Away-from-Coal_April-2019.pdf>

2 The risks of inaction

As the rest of the world and parts of Australia begin to transition away from coal towards renewable sources of energy, there will be an increasing need for the government to support coal- dependent economies and communities. In New South Wales, it will be particularly critical to create a transition plan for the Hunter Valley region and proactively support those who are currently reliant on the coal industry.

The Hunter region is currently home to the world's largest coal export port, 40 different coal mines and several large power stations including Liddell and Bayswater. With four of NSW's coal fired power stations expected to close in the next 17 years (all of which are located within the greater Hunter region), and declines in global demands for coal exports, the state will need to act quickly in order to adapt. The NSW Government will need to be strategic in the way that it facilitates a just transition away from coal and creates policies that support structural adjustment and growth in the Hunter. If the Hunter region does not prepare for these global changes by supporting other industries to grow, over 5,000 jobs and $705 million in wages and salaries could be lost due to global declines in coal demand.

Lessons for transition can be learned from the mistakes of other jurisdictions such as the Appalachian region in America. Due to a sharp decline in coal demand in the region since 2011, more than thirty thousand coal mining jobs have been lost. In the time since, the unemployment rate for Kentucky has risen from around 7% to close to 11%.[12] The growth in unemployment is largely a reflection of the absence of a coordinated government approach to facilitating structural adjustment in the region and supporting the growth of new industries. Instead, the policy response was localised, ad-hoc and inadequate for addressing the scale of economic, environmental and social issues. This lack of planning and coordination has resulted in entrenched poverty and significantly increased social inequalities.

If New South Wales' major coal exporting destinations continue to move away from coal consumption, and the composition of renewables in the NEM continues to increase, the Hunter Valley will suffer significantly. In order to avoid the detrimental economic and social losses experienced by the Appalachian region during its transition, the New South Wales Government will need to be proactive in creating a plan that supports growth and protects vulnerable communities. The below case studies reveal some key lessons that New South Wales can learn from and provide a reference point for adequate government planning.

[12] Industrial Relation Research Centre 2018, *The Ruhr or Appalachia? Deciding the future of Australia's coal power workers and communities*, <https://me.cfmeu.org.au/sites/me.cfmeu.org.au/files/uploads/Campaign%20Materials/RuhrorAppalachia_Report_final.pdf>

3 Case Studies

#1 - Establishing a German Coal Commission

Germany has traditionally been a large economy that has relied on coal for electricity generation. In recognising the need to move away from coal to renewable energy sources, Germany established a 'Coal Commission' to determine an energy transition plan. The Coal Commission is comprised of a range of stakeholders, including government representatives, members of utility companies, electricity users, local communities, NGOs and academics. Collectively, this group has put forward a blueprint for how the country should completely phase out coal- fired power production before 2038. Their analyses and recommendations address issues of just transition and compensation for coal-dependent regions, management of power prices, energy supply security and continued industry competitiveness.

Whilst unique to the German context, New South Wales could learn from the processes and findings of the German Coal Commission. In particular, it should look to the way in which Germany has engaged industry representatives as well as other key stakeholders to collectively implement changes. The German case also demonstrates some of the wider implications of industry transition, and the broader policy areas that will need to be addressed.

#2 - Transforming the LaTrobe Valley Region

The transition away from coal in the LaTrobe Valley in Victoria is another case from which New South Wales can learn and adopt similar policy measures. Like the Hunter region, the LaTrobe Valley has been a state powerhouse for energy generation over the past century. With the closure of the Hazelwood Power Station in 2017 and decreasing reliability of Yallorn and Loy Yang power stations, however, the Victorian Government has identified a need to move beyond coal and maximise the opportunities that exist in the renewables sector. By introducing a New Energy Technologies Sector Strategy – which includes the introduction of a $200 million Future Industries Fund, the New Energy Job Fund and the Future Industries Sector Growth Program – the Victorian Government has identified the investment and employment opportunities available across the renewable energy value chain. These policies and programs have been established through sector-wide collaboration processes and the involvement of universities and industry groups.

Central to the New Energy Technologies Sector Strategy, is the adoption and investment into emerging energy industries. Victoria is currently developing a world-first liquid hydrogen fuel pilot program in the LaTrobe Valley with the intention of exporting hydrogen to Japan for electricity generation in the coming year. The LaTrobe Valley Authority has recently announced plans to help fund a large-scale SEA Electric Vehicle factory and the state government has declared commitments to promoting the growth of bioenergy, marine energy and other new industries as they emerge. The LaTrobe Valley was also the site for a 2018 ARENA-funded Microgrid Feasibility Study, which aimed to create a localised energy marketplace for commercial and residential participants. Combined, these projects have supported thousands of jobs, established new export markets, incentivised investment into the region and facilitated a gradual transition away from reliance on coal.

4 Opportunities for growth in NSW

Whilst a state-wide transition towards adopting a greater mix of renewable energy generation will be needed in New South Wales, the Hunter Valley will require targeted government support in creating a plan for the region's future. The Hunter is home to a skilled workforce, extensive high-quality infrastructure, diverse industries and abundant resources. Focusing on local initiatives that help to drive investment into new industries in the region, whilst leveraging the existing skills and resources, will allow the Hunter to continue to prosper and provide sustainable energy for the state. If action is taken now to prepare for change, and a clear transition plan is developed, the Hunter region could become a pioneering environment for innovation and investment in the state.

4.1 Renewables in the Hunter

The Hunter Valley and surrounding tablelands are areas that benefit from complementary renewable energy resources, with night-time wind and day-time solar. The large-scale availability of land also makes this location the ideal site for new renewable energy generation in the state.

The Hunter region has the potential to continue to develop large utility-scale hybrid renewable energy and storage projects, similar to the Walcha Energy Project being proposed in the New England region and can help lead the nation in energy generation.

The expansion and establishment of renewable energy projects within the Hunter region will allow clean and dispatchable electricity generation to meet existing and future demand. These projects will also enable new economic development, employment and investment opportunities in the region.

Table 1: Renewable Energy Projects Pipeline for the Hunter and adjacent regions

#	Name	Tech	Owner	Developer	Stage	Size (MW)
1	Undisclosed	Pumped Hydro	AGL and Idemitsu	AGL and Indemitsu	Planning	250
2	Hunter Pilot Biorefinery (HPB)	Biofuel	TBA	Ethanol Technologies Limited (Ethtec) in collaboration with Apace Research Limited.	TBA	TBA
3	Walcha Energy	Solar and Wind	Mirus Wind and Energy Estate	Walcha Energy	Various	4000
4	Liverpool Range Wind Farm	Wind	Tilt Renewables	Tilt Renewables	Approval Granted	
5	Upper Hunter Energy Park 1	Solar	Upper Hunter Energy Park Pty Ltd		Announced	10
6	Upper Hunter Energy Park 2	Wind	Upper Hunter Energy Park Pty Ltd		Announced	TBA

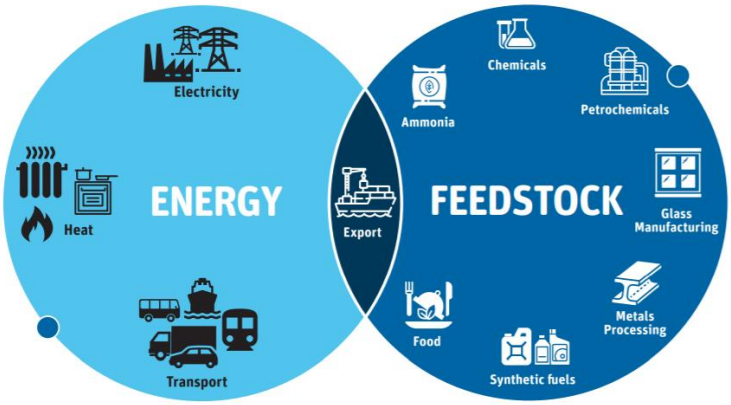
4.2 Hydrogen in the Hunter

Global demand for hydrogen as a low-emission fuel source is increasing significantly. Asian and European nations are already signalling a move towards adopting hydrogen fuel for electricity generation and transportation, and global investment into hydrogen technologies has been increasing exponentially. In particular, Australia's existing major energy export partners, Japan and South Korea, have developed state-wide policies to secure hydrogen as a clean primary energy source for their nations. In line with these national political commitments, the global market for hydrogen is expected to reach USD155 billion by 2022.[13]

Being a nation replete with natural resources, including wind, solar and ammonia, Australia is in a perfect position to take advantage of this growing market. It is anticipated that by 2030, under medium demand growth settings, a domestic hydrogen exporting industry could be worth $1.7 billion and provide close to 3,000 jobs.[14] In this same timeframe, potential demand for imported hydrogen by China, South Korea, Japan and Singapore could reach up to 3.8 million tonnes.

Hydrogen will also play a central role domestically in the near future. Due to its versatility, hydrogen can be used as an input into a range of different industrial processes including metals processing, synthetic fuel production and glass manufacturing. It can also serve replacement for natural gas for domestic and commercial use. As the cost of LNG prices remain high due to domestic supply constraints, hydrogen may offer a lower-cost and cleaner alternative. Similarly, hydrogen can play a significant role in mitigating the effects of liquid fuel supply shocks by localising supply and providing an alternative to transport fuels. Hydrogen also has the potential to play a firming role in the increasingly variable Australian electricity sector, providing a secure source of energy storage to be dispatched in times of intermittent supply to the grid.

Figure 2: Applications for Hydrogen



Source: CSIRO Energy and Futures, 2018, *National Hydrogen Roadmap*.

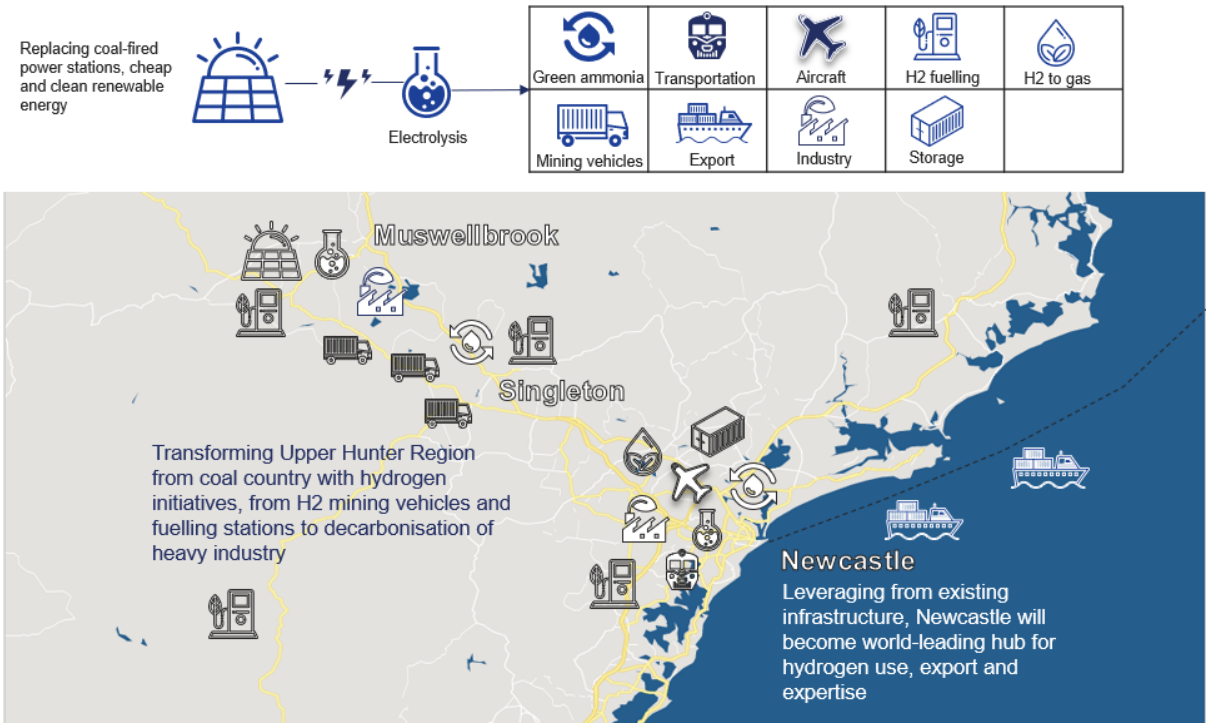
[13] International Energy Agency Hydrogen Technology Collaboration Program 2017, *Global Trends and Outlook for Hydrogen.*
[14] ACIL Allen for ARENA 2018, Opportunities for Australia from Hydrogen Exports.

Building the Hydrogen Industry in NSW

The Queensland and Victorian governments have already realised the potential opportunities that establishing a local hydrogen industry can bring. Both states have developed their own Hydrogen industry plans in line with the National Hydrogen Strategy. Similarly, there are various hydrogen investment initiatives currently in place nationally, including: CEFC and ARENA funding for hydrogen projects, Queensland Industry Development Fund, Victoria Hydrogen Investment Program and South Australia's $150 million Renewable Technology Fund. By pursuing similar policies to establish and financially support hydrogen production sites in the state, New South Wales has the potential to capitalise on this emerging industry.

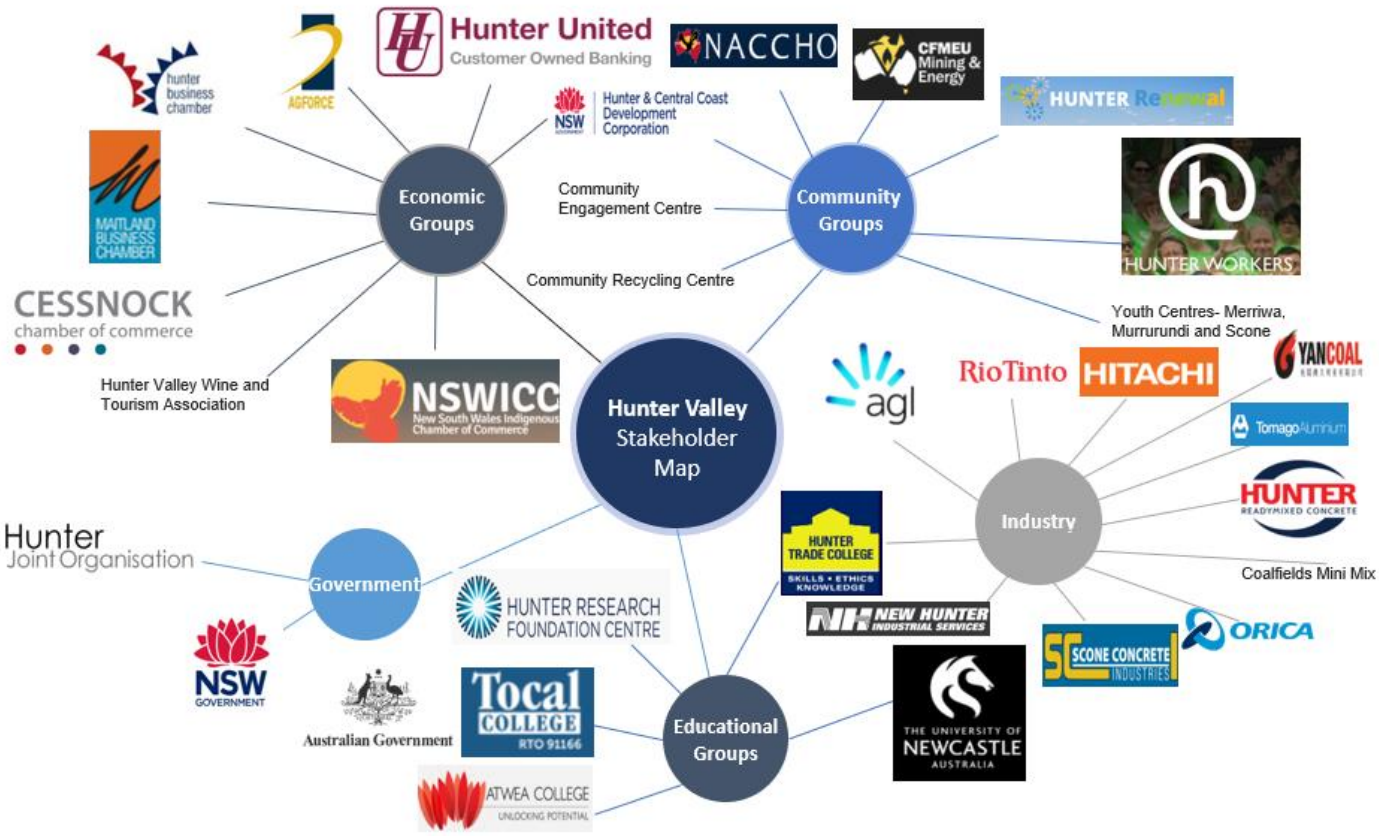
The Hunter region is extremely well placed to become one of the first Hydrogen production and exporting hubs in the world and would be an ideal location to establish Australia's future Hydrogen industry. The Hunter is home to an established manufacturing base with expertise in advanced manufacturing production processes, making it an ideal location for investment. The region also has a technically skilled workforce, especially in the energy and resources sector, a world- class large-scale port that is ideal for hydrogen exportation to Asia as well as a significant availability of land and existing renewable energy sites close by. Similarly, existing energy production sites in the area can be repurposed for hydrogen development, allowing established transport infrastructure to be utilised. The University of Newcastle and CSIRO have already built a foundation for R&D and sector-leading expertise on hydrogen through their research, including a joint research program between the University of Newcastle and University of Tokyo on Photocatalytic Hydrogen Generation.

Figure 3: Roadmap for Transforming the Hunter with Hydrogen



The combined strength of these resources will allow the Hunter region to rapidly and effectively establish a hydrogen industry. To effectively plan for such a transition, the New South Wales government will need to engage with key stakeholders from local and state-wide economic, community, industry, government and educational groups. Some of these groups have been highlighted below.

Figure 4: Key Stakeholder Groups



5 Key opportunities for the energy transition

01

The NSW Government will need to develop an integrated transition plan for those regions most impacted by the decarbonisation of the energy system, including the Hunter Valley. This plan should be established through a process of deliberation and engagement with key stakeholders in the region and be incorporated into the existing Hunter Regional Plan 2036.

02

The NSW Government should develop an NSW Hydrogen Strategy that seeks to facilitate multi-sector growth across an integrated hydrogen supply chain within the Hunter Valley and other regions. The strategy should prioritise investment in education and training as well as support further R&D in the hydrogen industry and its integration with renewable energy projects.

03

The NSW Government should further investigate lessons learnt form the implementation of economic transition agencies, such as the Latrobe Valley Authority in Victoria and the German Coal Commission. Doing so will enable the Government to identify the best approach to prepare for and proactively manage the transition associated with changes in overseas coal export markets currently supplied by regions such as the Hunter Valley.