SUSTAINABILITY OF ENERGY SUPPLY AND RESOURCES IN NSW

Organisation: Hunter Joint Organisation

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Hunter Joint Organisation

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Committee on Environment and Planning

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SUBMISSION: SUSTAINABILITY OF ENERGY SUPPLY AND RESOURCES IN NSW

Hunter Joint Organisation of Councils

Regional Economic Transition Standing Committee

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The Hunter Joint Organisation (**HJO**) welcomes the opportunity to make a submission to the Parliamentary Committee on Environment and Planning.

1. INTRODUCTION TO THE HUNTER JOINT ORGANISATION OF COUNCILS

The HJO, originally Hunter Councils, was created as a collaborative association of the Region's Councils.

The HJO is a statutory body corporate – constituted pursuant to s400Q of the *Local Government Act*, 1993 (NSW) – with the function, amongst other things, of establishing strategic regional priorities for the Hunter.

The HJO has the following member councils:

- The City of Cessnock;
- · Dungog Shire Council;
- The City of Lake Macquarie;
- The City of Maitland;
- MidCoast Council;
- Muswellbrook Shire Council;
- The City of Newcastle;
- · Port Stephens Council;
- · Singleton Council; and
- Upper Hunter Shire Council.

The HJO has established a Hunter Economic Transition Standing Committee (**HESTC**) with representatives from all member councils. The HESTC supports the HJO in giving strategic focus to the issue of economic transition in the Hunter.

2. THE HUNTER REGION - PROFILE

The Hunter is the largest regional economy in Australia, with a greater economic output than Tasmania, the Northern Territory and the Australian Capital Territory. It drives approximately 28% of regional New South Wales' total economic output and is the largest regional contributor to the State's gross domestic product.

The Hunter is home to more than 860,000 people, making it the most populous regional area in Australia and has an estimated workforce of 373,631. The projected population in the Hunter is estimated to be 1.1 million by 2036.

3. THE HUNTER'S PREVAILING ENERGY ECO-SYSTEM

The prevailing energy eco-system in the Hunter is dominated by thermal coal mining for export and thermal coal power generation:

- four black thermal coal-fired power stations that account for 25% of the National Energy Market (NEM). The Hunter's power generation industry produces over 60% of New South Wales' electricity grid supply and employs approximately 2,200 people and contributes up to 14,000 indirect jobs; and
- 21 coal mining operations that account for approximately 11% of globally traded thermal coal. The Port of Newcastle is the largest coal export port in the world. The mining of thermal coal continues to be a significant component of the Hunter's economy with over \$19.4 billion in coal exported through the Port of Newcastle. The coal sector in the Hunter is estimated to provide direct employment for up to 11,000 people and contributes up to 40,000 indirect jobs.

The prevailing energy eco-system is depicted in Figure 1.

FIGURE 1 – THE HUNTER'S PREVAILING ENERGY ECO-SYSTEM



[Also replicated as Plate 1 in the Annexure]

4. REGIONAL CHALLENGE

It is important to acknowledge the need for the Hunter to mitigate the significant risks from the economic trends associated with the future of thermal coal mining and power generation. It is also important to acknowledge the overlapping impact of automation in those industries. The Hunter's key markets for thermal coal – Japan, Korea, China and Taiwan (collectively representing over 90% of thermal coal exports from the Hunter) – have plans for transition away from coal-fired power generation. These plans are being operationalised through various policy levers, including: increasing coal importation tariffs; embargos on new or expansions to coal-fired power stations; repositioning of energy generation towards gas and renewables; and, carbon pricing mechanisms.

Domestically, the Hunter's four coal-fired power stations – Liddell, Vales Point, Eraring and Bayswater – have planned closure dates of 2023, 2028, 2034 and 2035 respectively.

Given that the mining and energy generation sector directly employs over 13,000 people and indirectly contributes to the employment of over 50,000 Hunter residents, these international and domestic trends have critical implications for communities across the Hunter. The Hunter should be closely consulted on any changes to energy policy and, given the Hunter's dependence on thermal coal based industries, particular support is warranted. The more settled view is that early planning and intervention can markedly reduce the costs of transition including labour supply (and other economic impacts) as well as societal impacts.

5. THE HUNTER'S EMERGING ENERGY ECO-SYSTEM

The Hunter's emerging energy eco-system is depicted in **Figure 2**. The particular competitive advantages of new energy will result in a much more distributed energy generation industry in New South Wales. Nonetheless, the Hunter retains comparative advantages as a result of proximity to the transmission network, to large energy consumers – including Tomago Aluminium – and a skilled workforce. It also has some competitive advantages in some aspects of new energy generation – more fully explored in Part 6 of this paper. As a consequence, the Hunter will nonetheless continue to play an important, if reduced role, in electrical energy generation in years to come.

Committed new generation projects include: Liverpool Range Wind Farm (1000MW), Bell's Mountain Pumped Hydro Power Station (250MW), Liddell Lithium-ion Battery Array (250MW), AGL Newcastle Power Project (peaking gas) 250MW, Bowman Creek Wind Farm (250MW), Upper Hunter Energy Park (113 MW), Vales Point Solar Project (55 MW), Summerhill Solar Farm (5 MW) and Liddell synchronous condenser.

FIGURE 2 – THE HUNTER'S EMERGING ENERGY ECO-SYSTEM



[Also replicated as Plate 2 in the Annexure]

6. THE HUNTER, IF PROPERLY RESOURCED AND SUPPORTED, CAN DO MUCH MORE

The Productivity Commission (2017) recognised that '(r)egional development should...work with, rather than against, the natural, historical or social advantages of a region.'¹

The Hunter is ideally placed to benefit from the transition to a sustainable, low carbon future. It has the natural assets, infrastructure and skills to become Australia's 'new energy' powerhouse, capitalising on the global momentum behind clean energy, sustainable food and bio-innovation to create new industries, new jobs and a new path to prosperity for Hunter communities.

¹ Productivity Commission (2017). Transitioning Regional Economies, Initial Report, Canberra.

Future opportunities for wind generation

The Hunter's wind resource is depicted in **Figure 3**. Whilst several of the optimal wind resource sites in the Hunter (above 7.5m/s) have moved into development, there remains considerable scope for further wind electrical generation development once the issue of energy firming is resolved. Much of the optimal wind resource sites along the Liverpool Ranges remain undeveloped – particularly around Murrurundi and in the foothills of the Barrington Tops near Rouchel and Upper Rouchel. Modest augmentations of the transmission network would be required making the sites comparatively economic.

FIGURE 3 – THE HUNTER'S WIND ENERGY RESOURCE

[Also replicated as Plate 3 in the Annexure]



Source: Australian Renewable Energy (2019)

Future opportunities for Pumped Hydro Energy Storage (PHES)

The Hunter is also well positioned to develop PHES and has financially competitive sites which, aggregated, could comfortably deliver the energy firming requirements of both the Hunter and Sydney. In addition to AGL's development of the Bell's Mountain site near Muswellbrook (250MW) – a project potentially paired with the Bowman Creek Wind Farm – there is enormous scope for much larger projects across the Upper Hunter. Those projects might also be paired with wind electrical generation along the steppes of the Liverpool Ranges and in close proximity to the transmission network – including the 500kv interconnections between the Hunter and Sydney.

The Hunter's PHES resource potential is depicted in Figure 4.

FIGURE 4 – THE HUNTER'S PHES RESOURCE

[Also replicated as Plate 4 in the Annexure]

Source: RE100 Group, Australian National University (2019)

PHES is a matured technology which has been deployed globally. Australia's PHES capacity is 300 times larger than the current need for 500GWh of storage.² Despite the technological maturity and affordability of PHES Federal and State policy has inhibited rather than facilitated its development. The possibility of a public subsidy of and extended Snowy River Scheme (sometimes referred to Snowy 2.0) has and will continue to create a substantial impediment to investment in other PHES.

Federal and State government should ensure energy policy certainty for firming supply and storage to build confidence amongst potential investors. To further manage the ongoing energy transition, the HJO also recommends that the State Government lobby its Federal counterparts to ensure that appropriate funds are allocated to the Australian Renewable Energy Agency (**ARENA**) to continue its important work. The HJO particularly recommends that ARENA release a National expression of interest for the delivery of incentivised firming or stored energy investment around the key parameters of affordability, reliability, timing and environmental sustainability. Given the timing of the closure of Liddell Power Station in the Hunter, ARENA should, also be resourced to undertake a bespoke expression of interest for delivery of energy security to the Hunter's aluminium industry beyond 2022/23 with a view to incentivising the development of PHES or other firming or peaking supply by a fixed date to ensure the long-term growth and productivity of that industry. Since its establishment in 1983 in the Hunter Valley, Tomago Aluminium Company has grown to produce 590,000 tonnes of aluminium per annum, employ 1,150 staff and contractors and support more than 1,800 jobs. Tomago consumes about 12% of the NSW electricity consumption.³

² RE100 Group, Australian National University (2019)

³ Tomago Aluminum (2017). Tomago Aluminium Company Pty Ltd - Submission to the ACCC Inquiry into Retail Electricity Supply and Pricing.

Future opportunities for bio-fuels and green chemicals

Renewable energy derived from biological sources (bio-fuels) will be increasingly important in the energy mix. Biofuels can use the same infrastructure and transport networks as petrol and has more energy per kilogram than batteries. While first generation bio-ethanol is produced from food crops and crop waste via fermentation, the second generation bio-ethanol can be produced from lignocellulosic materials (non-food, woody or fibrous). Decoupling bio-fuels production from food provides an opportunity for creating a new value chain rather than compete with the existing food production industry – i.e. giving growers an additional income stream from what would otherwise have been a waste stream.

A bio-economy offers a unique opportunity to achieve economic growth by investing in green chemistry, too. Green chemicals are renewable chemicals produced from non-food bio-based feedstock and can replace chemicals made from fossil raw materials (petrochemicals). Rising levels of pollution in water and air will expedite adoption of bio-based materials globally as they are less harmful to the environment.

Bio-energy value chains have enormous power to transform regional economies. A notable international example is Flanders Bio-Based Valley (FBBV) in Belgium. The FBBV was established as a Public Private Partnership between Ghent University, the City of Ghent, the Port of Ghent, the Development Agency East-Flanders and a number of industrial companies related to the Ghent Region, active in the fields of generation, distribution, storage and use of bio-energy. The FBBV attracted over 420 million Euros and created more than 500 jobs.⁴

Similar model can be replicated in the Hunter building on the Region's competitive and comparative advantages of having suitable land, reliable and existing rail freight networks, major exporting port and a Pilot Bio-refinery. Feedstock can be sourced from land areas that are not ideal for food crops (e.g. rehabilitated mine areas supported by existing rail loops). The raw materials can then undergo chipping, dehydration, and pelletisation (primary processing) at a Regional facility and transported to Newcastle using the existing rail network. A commercial bio-refinery producing bio-fuels (secondary processing) in the Lower Hunter for domestic use and export. The Pilot Bio-refinery in the Upper Hunter aims to optimise the selection of feedstock for bio-fuels and production of green chemicals and optimise the chemistry and processing. Finally, the bio-fuels can be shipped via the Port of Newcastle to major international markets. A conceptual layout of a Hunter bio-ethanol industry is depicted in **Figure 5**.

⁴ Dobbelaere, Sofie (2019). Flanders Biobased Valley a Leading International Biobased Cluster. PowerPoint Presentation March 2019, Ghent, Belgium.

FIGURE 5 – A CONCEPTUAL LAYOUT OF A HUNTER BIO-ETHANOL INDUSTRY

[Also replicated as Plate 5 in the Annexure]



Future opportunities for hydrogen

Hydrogen can be produced from renewable energy sources via electrolysis (zero-emissions) or from fossil fuels by utilizing carbon capture and storage technology (low-emission). In the long term it has the capacity to decarbonize electricity, heating, transport and industry. Future scenario modelling for global hydrogen demand suggests that the global demand can rise from the current 55t to 530t per year in the next 30 years.⁵

For Australia, there are opportunities for creating a new value chain for the domestic economy, build energy resilience and increase exports. The Australian hydrogen export industry could also provide around 2,800 direct and indirect jobs by 2030.⁶ The Australian government is currently developing a national strategy to explore this potential.⁷

The Hunter can be a major centre for hydrogen production and export. The Hunter's place at the centre of the transmission network and generation together with its skilled workforce and large export port gives it a comparative advantage in the processing and export of hydrogen to major global markets.

Finding solutions to unlock the potential of mining buffer and rehabilitation land

⁵ COAG Energy Council (2018). Hydrogen for Australia's future: A briefing paper for the COAG Energy Council Prepared by the Hydrogen Strategy Group, August 2019.

⁶ ACIL Allen Consulting for ARENA (2018). Opportunities for Australia from Hydrogen Exports, August 2018.

⁷ COAG Energy Council (2019). National Hydrogen Strategy: Request for Information – Discussion paper, March 2019

There is an opportunity more state and local government to explore, with industry and community, a more flexible approach to unlocking the potential of mine buffer land and rehabilitation sites.

In terms of the NSW mining industry, buffer land is considered to be land owned by mining companies that is outside the area of operations of currently approved operations. This land is set aside to minimise the impacts of mining operations and to ensure coexistence with other landholders.

Rehabilitation land is land disturbed by operational activities of mines and where re-establishing a safe, final land use, in line with agreed post-mining land use planning objectives, must occur.

It is critical that mine owners remain a responsible and accountable members of the communities in which they operate. Through the mine approval process a mine owner makes a commitment to the NSW government and the community, before mining occurs, that disturbed land will be progressively rehabilitated during operations to an agreed final post-mining NSW. These commitments are outlined in detail through extensive Mining Operations Plans, or Rehabilitation Management Plans approved by the NSW Government.

Often these detailed commitments have been made in a historical context, radically different from the current economic, technological, social and environmental context and a drafted with little regard to exploring future use options.

There are many features of mining buffer land and rehabilitated mined land that make an attractive investment option:.

- A landscape that is able to be tailored to suit multiple land uses.
- Availability of existing infrastructure onsite (e.g. Buildings, Rail loops, Roads and pathways, Water storage facilities, and Security and fencing)
- Access to various utilities (e.g. Water supply, Electricity supply, Gas supply, Telecommunications connections)
- Range of local suppliers across various industries
- Proximity to export channels and transport infrastructure (e.g. rail, main highways and roads)
- Surrounded by agriculture properties.
- Potentially large pool of skilled local employees.
- Local governments that understand and support the economy of the region.

Whilst mine owners can explore alternative future uses within the existing planning system, there is often little incentive to do so given that they will be trading a more certain outcome, for a less certain outcome within the planning system. There are many reasons why this is the case but, in short, the focus of the existing system is compliance with historical plans, rather than exploration of current potential.

Of course any change in approach should be motivated by the best interests of the community, particularly the local community, and ideally have the clear support of the local community.

7. THE NEED FOR A PLANNED, COLLABORATIVE TRANSITION

The Hunter has a number of initiatives underway to build its transition infrastructure, community literacy, and capacity in transition by facilitating and supporting new industries and transition 'frontrunners' and improving science, technology, engineering and mathematics (**STEM**) education and training.

Two of the HJO members, City of Newcastle and the City of Lake Macquarie, are well recognised for their progressive approach to planning and building a Smart City. There is significant opportunity to leverage this existing local expertise across the Hunter, creating a genuine point of attraction and difference to businesses and employment talent.

The HJO and its members, in cooperation with the NSW Government, support various planning and innovation initiatives, including:

• Strategic planning. The Hunter Regional Plan 2036 aims to strengthen the Hunter's economic resilience, protect its well-established economic and employment bases and build on its existing strengths to foster

greater market and industry diversification with the goal of adding 64,000 new jobs.⁸ Other strategic documents include The Greater Newcastle Metropolitan Plan 2036, which is first-ever Metropolitan Plan for a non-capital city in Australia, and the Upper Hunter Economic Diversification Action Plan: Implementation Priorities.⁹

- Australian Transition Academy (ATA). The ATA is established by the Monash Sustainable Development Institute (MSDI) as the first transition science training centre in Australia.
- Australian Foundation for Economic Transitions (the Foundation). The Foundation is an initiative of the HJO and is intended to be a cross-sectoral multi- industry alliance which will lead industry sectoral transitions within the Hunter initially but ultimately seek to support other regions and whole of government responses to regional transitions through the sharing of practical learnings, frameworks and tools.
- Advanced Energy Integration Initiative (AEII). AEII is collaboration between the University of Newcastle, the University of New South Wales and the University of Wollongong. AEII's objective is to develop and progress catalyst projects that explore the stability of our energy future.
- Workforce Transitions Initiative. The HJO in collaboration the Hunter Employment Facilitator considers the facilitation of pooled redundancy schemes, Regional workforce planning, re-skilling and up-skilling of the workforce, STEM education, and other education and training initiatives. However, given the existing challenges to the Regional workforce, the HJO recognizes that there is insufficient support and funding available for the Employment Facilitator for the Hunter.
- The opportunity for the first combined City and Regional Deal with the Greater Newcastle and the entire Hunter Region. City and Regional Deals aim to align planning, investment and governance between all levels of government. The purpose of those partnerships is to accelerate growth and job creation, stimulate urban renewal and drive economic reforms to secure the future prosperity and liveability. A unique economic, social and environmental relationship exists within the Hunter between its rural, Regional townships and urban communities and the already diverse industry sectors contained within it. The HJO has already expressed readiness to pursue a partnership with the New South Wales and Commonwealth Governments.¹⁰

Whilst these initiatives demonstrate a commitment from the HJO and its members to the strengthening of the Hunter's economic and social resilience, the Federal and State government's involvement, through enabling policies and funding, is essential in the Hunter. Government, collectively then, needs to prioritise the early deployment of locally led transition governance, hard and soft infrastructure, community transition literacy, capacity building, and the facilitation of new industries.

Lessons learned from the Latrobe Valley Worker Transfer Scheme confirm that social, economic and employment transition programs, when funded and executed properly, can be successful. The Latrobe Valley Community Infrastructure and Investment Fund and the Latrobe Valley Authority were established to minimise the impact of the Hazelwood power station and mine closure. This partnership between government, unions, and the power plant operators was supported by \$266 million of government funds. Similar support is needed for the impending closures of Liddell, Vales Point, Eraring and Bayswater power stations.¹¹

A SMART Region approach and development of a skills pipeline. Some industry sectors report significant skills shortages. In the 2019 Workforce Skills Survey done by the NSW Business chamber it is noted that the Hunter Valley (excluding Newcastle) is one of the regions with most significant skills shortage.¹² As a result, businesses

⁸ NSW Department of Planning, Industry and Planning (2016). The Hunter Regional Plan 2036, NSW Government

⁹ NSW Department of Planning, Industry and Planning (2018). The Greater Newcastle Metropolitan Plan 2036, NSW Government

¹⁰ See The Hunter Joint Organisation (n.d). Intergovernmental Partnerships Project Partnering for Prosperity: a collaborative governance approach for the Greater Newcastle and the Hunter. The Hunter Joint Organisation (2019). A Growth Agenda for the Hunter: Drivers of Population Growth.

¹¹ Latrobe Valley Authority (2019). Latrobe Valley Worker Transfer Scheme Report, March 2019, Victoria State Government

¹² NSW Business Chamber (2019). Workforce Skills Survey.

face difficulties in recruiting suitable staff and are at risk of missing opportunities and losing customers. This also acts as an anchor on investment attraction.

The HJO is championing the leveraging existing expertise from its member councils to promote a SMART Region which could act as both a major feature to attract and retain talent and investment.

Another key attraction for investment is the existance of a skills pipeline that leads potential employees through education right up to job readiness. This starts within the education system and across the Hunter there are ongoing initiatives to increase the number of students enrolled in STEM subjects. Regional Development Australia (RDA) Hunter designs and implements initiatives which focus on moving students towards future technologies such as 3D design and printing, robotics, Unmanned Aerial Vehicles, cyber-security and embedded systems.¹³

Whist improving STEM education outcomes has been relatively successfully deployed across the Hunter, it has been a bit of a 'hit and miss' exercise in some areas – including in the Upper Hunter. Additional investments and future government support is needed, particularly to the RDA Hunter, in order to prepare the young workforce with the right skills for the jobs of the future. The HJO encourages the State Government to advocate to its Federal counterparts for additional funding for the RDA STEM initiative.

Providing pathways to university education for students from both urban and rural areas in the Hunter is equally important. Deloitte forecasts that the ongoing shift towards cognitive-based jobs will continue and about 80% of the Australian jobs created by 2030 will be for knowledge workers.¹⁴ As per the most recent Census, 34% of all employees in the Hunter did not have any form of education or were still studying. Most of the employees with a completed education had certificates (31.4%), while only 15.5% employees had a Bachelor degree.¹⁵ Low numbers of well qualified employees suggests that many residents in the Hunter are vulnerable to the transition process.

An educated and skilled workforce is resilient to automation and structural industry decline. As witnessed during the decline in the Australian car industry, many automotive workers were able to successfully move to other manufacturing sectors due to their transferable skills.¹⁶ The Hunter is facing similar challenges and needs to ensure its workforce is resilient, agile and adaptive.

RECOMMENDATIONS

1. The Hunter Joint Organisation makes the following recommendations:

That the Committee recommend to the Parliament that, given the particular issues facing Australia's largest regional economy, the Government:

- **Collaborate with, and provide funding to**, the Australian Foundation for Economic Transition, established by the Hunter Joint Organisation of Councils, to undertake a detailed strategy identifying:
 - Opportunities for the development of critical industry clusters in areas of comparative advantage or opportunities to develop existing clusters together with identifying infrastructure or other targeted investments necessary to unlock growth and private sector investment in emerging or potential clusters,
 - > Opportunities for the development of the metallurgical coal industry,
 - Opportunities for the development of a bio-fuels, hydrogen and green chemicals industry and value chain in the Hunter – identifying gaps in the value chain and opportunities to invest;
 - Collaborate with, and provide funding to, the Hunter Joint Organisation on a

¹³ Regional Development Australia Hunter (2019). https://www.rdahunterstem.org.au/

¹⁴ Deloitte (2019). The path to prosperity: Why the future of work is human, Building the Lucky Country #7, Deloitte Insights.

¹⁵ Australian Bureau of Statistics (2016). The Census of Population and Housing.

¹⁶ Deloitte.

SMART Region Strategy, leveraging the recognised SMART City expertise of the City of Newcastle and the City of Lake Macquarie.

- Release a bespoke expression of interest for delivery of energy security to the Hunter's aluminium industry beyond 2022/23 with a view to incentivising the development of pumped hydro and other firming energy or peaking supply by a fixed date to ensure the long-term growth and productivity of that industry; and
- Advocate and liaise with the Federal Government to empower and fund the Australian Renewable Energy Agency to release a National Expression of Interest for the delivery of incentivised firming of stored energy investment around the key parameters of affordability, reliability, timing and environmental sustainability.
- **Collaborate with, and provide funding to** further the STEM education expertise of RDA (Hunter) to undertake a detailed strategy for building upon its STEM education and training initiatives in the Hunter and particularly deploying those initiatives in areas of an identified gap;
- **Collaborate with, and provide funding to**, the Australian Transitions Academy (Monash University) to deliver bespoke training in economic transition management to build capacity and transition literacy throughout the Hunter;
- Change the application of planning regulation in NSW to allow exploration alternative future uses for mining buffer and rehabilitation land, to create more incentive for mining companies to work with their local communities on economically, socially and environmental sound futures uses.
- **Prioritise the first combined City and Regional Deal within the Hunter**, incorporating its both its metropolitan heart, Greater Newcastle and the industries and communities based in the sub-regions existing urban areas;

HJO urges the Select Committee to carefully examine the information outlined above and to consider the recommendations in this Submission.

ANNEXURE - PLATE 1: THE HUNTER'S PREVAILING ENERGY ECO-SYSTEM



ANNEXURE - PLATE 2: THE HUNTER'S EMERGING ENERGY ECO-SYSTEM



ANNEXURE - PLATE 3: THE HUNTER'S WIND ENERGY RESOURCE



ANNEXURE – PLATE 4: THE HUNTER'S PHES RESOURCE



ANNEXURE - PLATE 5: A CONCEPTUAL LAYOUT OF A HUNTER BIO-ETHANOL INDUSTRY

