AEMO: Submission on Draft IASR

Energy Estate

February 2021

Background

Energy Estate would like to thank AEMO for the opportunity to submit this feedback for your consideration as part of the 2020-21 Planning and Forecasting Consultation on Inputs, Assumptions and Scenarios. We are active and passionate supporters of the ISP and the REZs.

In this submission we have given our comments on matters of general interest.

Please note that we have also submitted (in some cases with our joint venture partners) specific submissions:

- **Walcha Energy**, a joint venture between Energy Estate and Mirus Wind, which is developing the Walcha Energy Project, situated within the New England Renewable Energy Zone in northern New South Wales. This is the largest renewable energy project in the NEM, which comprises a 4GW+ portfolio of wind, solar, pumped hydro and battery storage projects
- **Central Queensland Power**, a joint venture between Energy Estate and RES, which is developing a portfolio of wind, solar, storage and transmission projects in the Central Queensland to support the transition of large energy users in this region and the growth of Gladstone as a green hydrogen production hub
- **Compressed Air Storage**, a joint venture between Energy Estate and Hydorstor, which is developing the first large scale compressed air project within the Broken Hill REZ
- **Hydrogen Growth**, our hydrogen accelerator which is developing green hydrogen and green chemicals projects across Australia and other markets and supporting our clients in the development of their projects and acceleration of technologies.

Responses to Matters for Consultation

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2.3.2 Sustainable Growth

What, if any, elements of the Sustainable Growth scenario as proposed are not plausible or internally consistent, and how would you suggest they should be altered?

What approach should be used in determining the timing of coal closures in the Sustainable Growth scenario? If you consider that early retirements should be treated as an exogenous input, should this be applied consistently to all power stations, or should only specific power stations be identified and brought forward? (p. 24)

Energy Estate is developing large scale renewbale energy projects in regions where there are currently several operating coal-fired power stations such as the Hunter and Central Queensland.

We have focussed on these regions in order to help transition the energy sector in Australia and co-ordinate the new renewbale generation and storage assets with the existing grid infrastructure and the existing and future loads.

We support an approach which looks at each unit in the coal-power fleet specifically rather than treating all of the plants and each of their units the same. We believe this will enable the industry to deliver a smoother transition which meets the expectation of all stakeholders.

This is particularly important in places like Gladstone where the Gladstone Power Station plays a critical role – not only in providing power to the Boyne smelter but in supporting the entire Queensland system. We would support focussing more closely on the pratcial ability to repurpose units of coal-fired power stations as batteries, synchronous condensers or gas/hydrogen-powered plants and viability of doing so is included as one of the inputs to the model. This will better enable the ISP to pinpoint the infrastructure which is required rather than assuming that all of the existing plants will be closed and needed to be replaced by new assets located close to the available renewbale resources rather than where the current grid infrastructure is located.

4.1 Public policies

Do you support the approach outlined for the inclusion of government policy across the scenarios?

Do you have any further views on the individual policies and their application?

Are there any energy or environmental policies missing that you consider important to include in some or all of the proposed scenarios? Please provide details. (p. 47)

Currently the ISP does not seem to deal with the renewable energy procurement policies which are being pursued by governments, government agencies (such as universities and schools) and local councils/cities over and above the renewable energy targets described in this section.

We have already seen significant procurement of renewable energy from major cities in Australia (which comes on top of the State based targets. This shows no sign of slowing up as evidenced by the data prepared by Business Renewables Centre – Australia. https://businessrenewables.org.au/deal-tracker/

This tracker includes details of the power purchase agreements entered into by such parties which has help to underwrite the demand for new renewable energy projects across the NEM.

When assessing the procurement policies of the governments and their agencies you also need to take into account the number of large energy users who have now committed to 100% renewbale energy or net zero. The prices offered to such customers from coal-fired or gas-fired power plants is now irrelevant as they have made public commitments to source renewable energy, and in some cases have committed to do so by as early as 2025.

If the ISP des not take these buying policies into account when assessing the demand for renewable energy we believe that you are under-estimating the factors which will encourage the build-out of new generation – and the accelerated closure of coal-fired power plants and lower capacity factors for gas plants.

4.4.4 DERs

Was the breadth of behind-the-meter battery storage uptake trajectories used in the 2020 scenarios appropriate to sufficiently cover the range of possible outcomes?

What other factors should be considered in the development of these forecasts? (p. 63)

In assessing the impact of DERs on the NEM we recommend that the ISP refers to the recent work done in the US by Vibrant Clean Energy which has modelling the impact of DERs at a distribution system level in much more detail than had been done previously. The results of the modelling demonstrated that there were very material savings in transmission costs if DERS were accelerated in the distribution systems. Links to the modelling and a report are set out below.

https://www.vibrantcleanenergy.com/wp-content/uploads/2019/04/VCE-WISdom-Brochure.pdf

https://www.vibrantcleanenergy.com/wp-content/uploads/2020/12/WhyDERs_ES_Final.pdf

4.5.4 Retirement and refurbishment

Do stakeholders support AEMO's proposal to remove coal-life extensions across the scenarios (noting that the inclusion only featured in the Slow Change scenario in 2019-20)? (p. 88)

We strongly agree with this proposal.

Please note our earlier comment about the ISP considering the ability to replace existing coal-fired power stations with new assets on-site to reduce down the transmission costs. We have already seen examples of this approach with the announced new large BESS in the Hunter Valley.

4.6.2 Candidate technology options

Is AEMO's proposed list of candidate technologies reasonable? If not, what should be included/ excluded? (p.92)

Compressed air storage – please refer to our separate submission on A-CEAS technology. We strongly submit that this should now be included in view of the Broken Hill A-CAES project, the inclusion of compressed air in the Lazards LCOS tracker and the recent report from the US on comparative storage costs.

Non-lithium ion BESS – we believe that the input assumptions should contemplate alternative BESS technologies such as iron flow batteries in view of their attractiveness for long duration options, The Buronga Energy Station project in NSW which is developed y Renew Estate (a joint venture between Energy Estate, Wirsol and Beast Solutions) has been supported by the NSW Government under its emerging energy program and the preferred technology solution is ESS ironflow batteries from the US. For more details please refer to https://essinc.com/the-ess-energy-center/

4.6.3 Regional Cost Factors

Do you agree with AEMO's proposal to use the same regional cost factors used in the 2020 ISP for its 2021-22 modelling? If not, please provide suggestions for improvements or alternative data sources. (p. 98)

We believe that AEMO should **not** use the same regional cost factors used in the 2020 ISP for the 2021-22 modelling.

Firstly, in relation to Figure 28 (p.98) – Locational Cost Map, we believe the approach taken does not reflect the different cost structures which are found across regional towns and cities in the NEM. It seems to be largely based purely on distribution of population along the coast and major inland centres rather than the presence of existing industries and in particular industrial communities and competing land-use and social licence.

We believe that the locational cost factors used in Table 24 are materially incorrect and in particular the approach taken in relation to Victoria on the one hand and Queensland and NSW on the other. From the projects we are developing across the NEM we see no justification for installation costs in NSW to 18% higher than Victoria in the low grouping. Similarly, there is no justification that the installation costs in Victoria in medium and high are 1.03 and 1.05 respectively but 1.27 and 1.44 for Queensland and 1.30 and 1.42 in NSW. This indicates to us that there has been insufficient data collected by AEMO's adviser or other factors have been taken into account which do not reflect the experience of the people who are developing, constructing and operating projects across the NEM.

We have examples which we can share with you. We are developing the Buronga Energy Station in NSW which is located near Wentworth in South West NSW, close to the border with Victoria. This project will connect to the Buronga sub-station which forms part of the EnergyConnect transmission project. The Buronga Energy Station falls within a blue, high locational cost region in Figure 28. According to the regional cost factors used in the 2020 ISP we would have cost factors of 1.10 for equipment, 1.42 for installation and 1.32 for O&M. However, if the same plant was developed across the border plugging into the Redcliffs sub-station (around 20kms away) the cost factors would be 1.05 for equipment, 1.05 for installation and 1.05 for O&M.

This analysis also applies to the projects located in N5 when compared to the costs incurred by projects developed in V2.

While we understand the need to simplify the datasets for the ISP we submit that the current approach distorts the perceived competitiveness of projects in Victoria versus other markets and can lead to incorrect assumptions as to comparative costs

We recommend for the 2022 ISP further analysis is done by AEMO's advisers including engagement with existing developers, owners and operators across the NEM requested to provide details of their actual and expected costs so AEMO has better information to inform the regional cost factors.

4.6.3 Regional Cost Factors

Are there other social licence or competing land-use cost considerations that should be factored into these regional cost factors, or that would require use of more granular sub-regions? (p. 98)

We strongly believe that the ISP should explicitly take into account social licence and competing land-use cost assumptions in regional cost factors and more generally when assessing the viability of the REZs and the new infrastructure and augmentations contemplated by the ISP.

We have already seen in Victoria the issues caused at a local level when there is a hostile reaction to new transmission infrastructure and what impact this can have on the cost of development (and the cost to the system of delays through continuing curtailment, reduced MLF, increased cost of capital and economic development).

Energy Estate has successful developed large scale projects within the REZs such as the Bomen Solar Farm which falls within N5. We are developing large scale projects in numerous REZs across the NEM including:

- Q4 – Abbot Point Clean Energy Hub
- Q6 – Central Queensland Power
- Q9 – Central Queensland Power
- N2 – Walcha Energy Project
- N4 – Broken Hill A-CAES
- V2 – Buronga Energy Station

There are materially different competing land-use across each of the REZs and the NEM generally. These have material impact on the costs of development including land acquisition, planning, community and stakeholder consultation and engagement.

A critical factor in the costs of new generation is the risk of delays in obtaining the necessary planning consents for the new generation facility AND the necessary grid infrastructure.

An important factor for the viability of a project and each REZ is the focus that corporate and State Government offtakers now place on the social licence of a project. Major corporates are now the largest procurers of renewable energy in Australia, followed by the State Governments. Over the last 2 years the gentailers have been far less active. The buyer principles espoused by organisations such as Business Renewables Centre-Australia encourage corporates to support projects with demonstrable social licence such as using low grade or industrial land rather than prime agricultural land.

4.9.1 REZ Geographic Boundaries

Do you have specific feedback on the proposed updates to the candidate REZs?(p. 111)

Q9 – Banana.

We strongly support the inclusion of a new REZ in Central Queensland as suggested in Figure 32 (p. 110). Central Queensland Power is developing large scale projects in this region in addition to the Q6 - Fitzroy REZ. Please see the submission made by Central Queensland Power.

The Banana REZ would be consistent with the Central Queensland REZ promoted by the Queensland State Government.

In addition to the attraction of the development of Gladstone as one of the green hydrogen export ports we would like to highlight the other features of the Banana REZ:

- **Proximity to existing grid infrastructure** – due to location of Stanwell and Callide power stations, the existing lines to large scale mines such as Blackwater and the lines to the south from Calvale
- **Strong wind resource** – as demonstrated by the development of the Banana wind farm
- **Excellent solar resource** – there are already a number of projects in development within this REZ
- **Local load** – In addition to the mining loads and the local communities, there are loads which can be electrified such as Queensland Nitrates ammonia plant at Moura. Please see the knowledge sharing report published by ARENA (//arena.gov.au/assets/2020/07/qnp-green-ammonia-feasibility-study.pdf)
- **Reducing impact of coal retirement risks** - Potential to replace coal-fired generation with local generation which will reduce transmission augmentation costs compared with development in some of the other REZs in Queensland. Recent reports from leading market forecasters are predicting accelerated retirement of Callide and Stanwell compared with AEMO forecasts.
- **Infrastructure** - Good infrastructure in terms of roads and site suitability for wind and solar farms

4.9.1 REZ Geographic Boundaries

New Hunter REZ

Energy Estate strongly supports the designation of the Hunter REZ by the NSW Government and we believe it should be included in the ISP. In our view the designation of the Hunter REZ can be supported by a number of factors including:

- **Reasonable to strong wind resources** – in terms of evidence of the adequacy of the wind resource to justify development of wind projects this is demonstrated by the NSW wind maps and the development of large scale and strategically located projects such as Bowmans Creek wind farm (https://epuron.com.au/wind/bowmans-creek/)
- **Good solar resources** – there are several solar projects now in development
- **Industrial land** – there are large tracts of industrial land throughout the Hunter which are suitable for renewable energy development and need to be remediated
- **PHES opportunities** – there are several dams and existing mines which have been identified as potential PHES sites including Bell's Mountain/Muswellbrook mine, Glennies (water NSW), Glenbawn (Water NSW) and Centennial Coal's mine at Fassifern.
- **Existing grid infrastructure** - this reduces the costs of delivering large quantities of new generation compared with other REZs in NSW
- **Aging coal-fired power stations and opportunities to repurpose** - Recent announcements by AGL and Origin to install large BESS within the Hunter region emphasise the strategic location and comparative advantage of this region
- **Proximity to the Port of Newcastle** - one of the candidate ports in Australia for green hydrogen exports
- **Proximity to large electrical loads** – in particular Tomago aluminium smelter
- **Proximity to large existing loads** - which can be electrified such as Orica's ammonia plant at Kooragang island

Critically, the Hunter REZ gives the energy sector the opportunity to repurpose large scale coal mines, coal-fired power stations and associated infrastructure in a way which meets the expectations of all stakeholders and deals with the realities of the impacts of the coal industry on the natural environment of the Hunter.

There are competing land-use requirements in the Hunter including existing and growing communities, industrial demand for land particularly in the southern parts of the Hunter region and agriculture (such as the equine industry and viniculture).

4.9.1 REZ Geographic Boundaries

N3 – Orana.

In our view the Orana REZ could be extended to the south as this would capture additional wind resources beyond the current boundary and additional PHES opportunities (such as Central West PHES https://www.alturagroup.com.au/central-west-pumped-storage-hydro).

One advantage of this approach is that the Orana REZ would then capture the existing and growing industrial loads in the Central West minerals zone and the Parkes Special Activation Precinct which would better alignment the development of the renewable resources with the loads and avoid the development of the Orana REZ being focussed on supplying energy into the broader NSW system.

We recommend that the ISP engages with the NSW regional growth team based in Dubbo as they responsible for the Parkes SAP and are working with major potential new large energy users such as gold, lithium, scandium and rare earths mines in this region which gives them good visibility as to the growing load in the region.

4.9.1 Export Superpower Scenario

Do you have specific feedback on whether REZ definitions should change further in the Export Superpower scenario? (p. 111)

Alignment of REZs with Renewable Energy Industrial Precincts

We would like to make a general suggestion about the potential to align the REZs with the development of Renewable Energy Industrial Precincts.

The concept of new and/or revised industrial precincts which catalyse the availability of abundant, affordable clean energy has been promoted widely in Australia over the last 12 months.

In 2020, Beyond Zero Emissions and WWF – Australia published the Renewable Energy Industrial Precincts Briefing Paper. This paper, which was picked up widely by governments, industry bodies and developers, built upon previous ARENA-funded studies, smaller scale pilot projects and detailed modelling to demonstrate the feasibility and benefits of establishing renewable energy industrial precincts.

In the NEM potential precincts have been identified in each State. The leading candidates are identified in the image opposite and include Townsville, Bowen/Abbot Point, Gladstone, Newcastle/Tomago, Pt Kembla, Gippsland, Bell Bay, Whyalla/Cultana/Eyre Peninsula. There is significant investor interest in such precincts from domestic and global players which can be confirmed by each State.

There is significant overlap with the ISP's suggestions as green hydrogen candidate ports.

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4.9.1 Export Superpower scenario

In Western Australia, the government has promoted a new greenfield industrial precinct in the Mid-West region and requested expressions of interest in Dec 2020. This has attracted very high levels of global interest as evidenced in the article set out below:

https://www.pv-magazine-australia.com/2021/01/22/was-mid-west-green-hydrogen-potential-flooded-with-global-interest/

The successful development of these precincts will require integrated strategic planning at multiple levels including resources, available infrastructure such as ports, rail and roads, communities, land-use and planning. Reliability of energy and ensuring that the energy supply meets the build-out of the precincts will put unique pressures on the electricity transmission system and, where applicable, distribution system. In some cases such as Newcastle/Tomago, Gippsland and Gladstone there is robust grid infrastructure in place because of the existing energy users and/or thermal generation. But even in these situations major expansions and augmentations will be required. This is consistent with the Export Superpower scenario and in may cases there will be alignment between the anticipated hydrogen ports and production/export hubs and the REIPs.

Energy Estate recommends that the ISP takes into account the potential growth of demand around these new and/or expanded load centres when undertaking the system planning analysis.

CLEAN INDUSTRIAL PRECINCT REQUIREMENTS

- Critical mass of population and local business to create a viable supply chain
- Potential large industrial users requiring different types and purity levels of hydrogen fuel including high load usage
- World-class port with existing and economically viable shipping routes to the key hydrogen export markets
- Proximity of available land and solar/wind resource for renewable energy generation sites close to port
- Numerous sites of resources projects that can be repurposed for hydrogen close to existing rail and transportation lines
- Strong grid interconnection opportunities for the addition of new renewables generation
- Mining companies with an active interest in conducting trials of hydrogen fueled mine site vehicles

4.9.2 REZ resource limits

AEMO seeks stakeholders' views on the approach to REZ transmission limits for future build of REZs.

AEMO requests stakeholders' views on the proposed approach to explicit incorporation of system strength remediation cost estimates in the analysis (p. 116)

Energy Estate is of the view that the coal-fired power station fleet across the NEM will well in advance of their scheduled retirement dates which currently underpin the ISP. This point has also been made in other submissions such as Walcha Energy and Central Queensland Power.

The REZ transmission limits set out in Table 34 do not give the correct signal to the market as these limits are based on the available capacity assuming that the coal fleet retires as anticipated.

This approach is not limited to the transmission limits. For example in Table 46 it states that reinforcement is required "*To increase thermal capability of transmission lines to supply Boyne Island load and load supplied from Calliope River, Larcom Creek and Raglan substation following retirement of Gladstone power station*."

We believe that new projects should not be saddled with transmission augmentation costs arising by virtue of the retirement of coal fired power stations in circumstances where major existing and future load cannot otherwise be met. This will only lead to increased costs for major energy users as the transmission augmentation costs will be factored into the price upon which the new generators need to charge in order to achieve a WACC consistent with the ISP assumptions on returns.

4.9.3 REZ transmission limits

Do you have specific feedback on the proposed transmission expansion costs for use in the Export Superpower scenario, noting the different objective of connecting to ports rather than city centres? (p. 116)

Our separate submission as Hydrogen Growth has included feedback on these issues.

We would like to emphasise that the rapid growth of the hydorgen economy in Australia is not solely focussed on the export opportunities but also replacing fossil molecules domestically with green fuels and chemicals.

A good example is the mining services industry. We have already seen material moves by major resources companies to move to electric and hydorgen powered fleets and mining equipment. The largest demand is expected to come from the chemicals industry with explosives being required for the Australian resources sector well after the world has stopped exploiting fossil fuels. Moving to green hydrogen based chemicals as the feedstock for ammonia nitrate and other chemicals used in the mining sector will reduce the volatility of pricing for the relevant manufacturers as well as help the resources sector and these manufacturers meet the sustainability goals imposed by investors, stock exchanges and governments.

Accordingly, the transmission costs for the Export Superpower scenario and other scenarios where we believe green hydrogen should be considered (such as Sustainable Growth) should not just be focussed on the candidate ports but areas of the NEM where there are existing or potential industries which are major hydorgen users. A good example of this is Queensland Nitrates plant at Noura in Central Queensland.

4.9.3 Inter-related constraints

Do stakeholders have any other suggestions for representation of inter-related constraints across REZ? (p. 118)

We believe that the ISP should consider a grouping of NSW REZs – in view of the size of these REZs and the urgent need to plan for the retirement of all of the coal-fired generation in NSW and service the large energy users in Newcastle/Tomago and the Sydney and Newcastle load centre currently supplied by the coal fleet.

4.11.5 Inter-zonal augmentation options

Do the augmentation options for the inter-zonal model listed above capture a good spread of credible options?

Is the evolution into inter-zonal augmentation options from inter-regional options appropriately defined? (p. 148)

We believe that more analysis needs to be conducted on the benefits which can be delivered by large scale non-network options. This approach is supported by the conclusions of the Broken Hill RIT-T which has preferred a long duration compressed air storage solution over transmission upgrades and other “shallower” storage options.

We believe the ISP and the Government Technology Roadmap should encourage all stakeholders to explore a wide range of non-network options especially when the system will need to deal with the accelerated retirement of existing synchronous generation. Without this assessment on a case by case basis there is significant risk of transmission over-build to meet the demands of renewbale energy generators without properly assessing the system wide benefits which can accrue if a non-network solution is implemented.

4.11.8 Non-network options

Is there any information on non-network technologies or proponents regarding opportunities for competitive non-network investment?

Given that non-network investments generally involve commercial arrangements with plant with multiple revenue streams, how should AEMO estimate their cost transparently? (p. 154)

- Please refer to our submission on compressed air storage technologies.
- We would be happy to provide EMO with more detail around the viable non-network options including solar thermal, long duration BESS technology.
- We agree that the approach taken to the revenue modelling for non-network options needs to be different to traditional transmission-led approach. We would encourage AEMO to consider options such as the cap and floor mechanism used in Europe for new infrastructure and the approach which has been taken for the Copperstring transmission line in Queensland where the proposed underwriting of the revenue is subject to certainty of a proportion of the other revenue streams.

About Us

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About Energy Estate

Accelerating the transformation of the energy sector

Experienced advisor and accelerator

- Provides project development, strategic and transaction advisory services to the global energy sector.
- International team of energy industry experts with experience across the energy value chain from development to capital raising, equity and debt finance, M&A advisory and offtake agreements.
- Accelerating approximately 15GW of solar, onshore and offshore wind and storage developments across multiple markets including Australia, NZ, US, Chile, Asia and MENA.
- Focus on responsible, sustainable development of renewable energy.
- Deep long-standing relationships with key stakeholders, including transmission and market operators and regulators.

Development

- In-house capabilities across site selection, grid, planning, community and stakeholder engagement and development of wind, solar and storage (battery and pumped hydro) and green hydrogen

Strategic consulting

- Deep and holistic understanding of the energy market, what it takes to successfully finance, develop and contract large-scale energy projects.

Transaction advisory and management

- Matching opportunities with capital and optimally structuring and executing transactions.

Time/cost optimisation

- Agile multi-disciplinary team that complements the skill sets of our partners.
- Track record of delivering quality projects on time and within budget.

200+ YEARS
COMBINED ENERGY INDUSTRY EXPERIENCE

16
EMPLOYEES

ADVISED ON PROJECTS TOTALLING MORE THAN **25GW**

KEY SERVICES

- DEVELOPMENT ADVISORY
- FINANCIAL ADVISORY
- COMMERCIAL ADVISORY
- ROUTE TO MARKET

KEY SECTORS

- SOLAR
- WIND
- BATTERIES
- PHES
- GREEN CHEMICALS
- BIOMASS
- EV / TRANSPORT
- TECH

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Development “Case studies”

BOMEN SOLAR FARM

- 120MW solar farm in Southwest NSW, Australia
- Developed by Renew Estate – a joint venture of Wirsol, Energy Estate and Beast Solutions
- Energy Estate undertook all stakeholder activities and provided transaction advisory services on the equity and debt processes and secured and negotiated the necessary PPAs – all in under 4 months
- Successful sale to Spark Infrastructure in April 2019. COD Q2 2020
- PPAs with Westpac, Flow Power, Sydney Opera House, Molycop

WINTERBOURNE WIND

- Walcha Energy is a joint venture between Energy Estate and MirusWind to develop a 4GW wind, solar, battery, PHES project in NSW, Australia
- Winterbourne Wind is the first 700MW wind development and was sold to Vestas in 2019
- Energy Estate is the co-developer of the project and negotiated all aspects of the transaction with Vestas.

RODDS BAY SOLAR FARM

- 300MW solar farm approximately 50km south-west of Gladstone
- Developed by Renew Estate – a joint venture of Wirsol, Energy Estate and Beast Solutions
- Our team identified the site, undertook all stakeholder engagement activities, negotiated the power purchase agreements and delivered the partnering arrangements with the investor.
- Successful sale to United Green in July 2020

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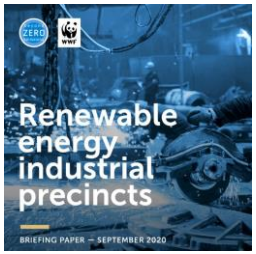
Developer of Clean Energy Industrial Precincts

Energy Estate is proud to be one of the leading developers and strategic designers of Clean Energy Industrial Precincts (CEIPs) across Australia. Energy Estate is in the process of developing CEIPs in Abbot Point, Gladstone and potentially Collie, and has advised Beyond Zero Emissions on its 2020 report on Renewable Energy Industrial Precincts.



WHAT IS A CLEAN INDUSTRIAL PRECINCT?

A CEIP can provide an enduring high-tech manufacturing base for a Regional area developed in a manner consistent with the UN Sustainability Development Goals. The purpose is to attract and retain highly-skilled workforce and secondary/tertiary production and recycling initiatives into a sophisticated industrial ecosystem. The key industries being focused on include dispatchable renewable energy (including energy storage), hydrogen, green chemicals, and recycling as import replacement and export opportunities, and will require ongoing training of the local workforce.

Key aspects of a Clean Industrial Precinct include:

- High-capacity transmission lines to unlock renewable energy sources in surrounding areas
- Low-cost renewable energy, firmed using storage
- Focus on energy-intensive industry such as metals processing; hydrogen production; chemicals production

WHAT ARE THE BENEFITS?

Clean energy industrial precincts will attract businesses and investors, support local industries, create jobs, and boost the economy.

89% of Australians believe Australia should be manufacturing more products domestically following the COVID-19 pandemic. Top reasons for wanting more local production are: reducing reliance on other countries (38%), create jobs (2%), supporting Australian business and industry (2%), safeguarding for vulnerable international supply chains (20%) and strengthening Australia's economy (16%). Clean Industrial Precincts can accelerate the growth of domestic manufacturing and provide additional benefits including:

- Local supplier commitments – guaranteed level of supply manufactured locally where possible
- Jobs creation, training, and reskilling to ensure a "Just Transition" for the energy workforce in Regional areas
- Seeding the development of hydrogen and green chemicals opportunities
- Indigenous employment – engaging with indigenous organisations to participate in the Precincts
- Opportunities for apprentices, students, and graduates to work on the development and construction of the Precincts

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Our experience – Clean Energy Industrial Precincts

Central Queensland Clean Industrial Precinct (CQIP)

Developing one of the first precinct scale renewable energy developments in the Gladstone region. CQIP will include green chemicals production, electrolyser manufacturing and green aluminium.

Abbot Point Clean Energy Hub, QLD

Large-scale hydrogen production and export project located at an existing coal export terminal with 260MW behind the meter solar PV.

Walcha Energy, NSW

Developing the largest renewable energy project in the NEM with ~2,500 MW of wind developed in multiple stages around Walcha, NSW in the New England REZ.

Williamtown Special Activation Precinct, NSW

Energy Estate is in initial discussions with the NSW Department of Planning, Industry and the Environment to provide renewable power and energy storage to the proposed Williamtown SAP

Parkes Special Activation Precinct, NSW

Energy Estate is in detailed discussions with the NSW government in relation to a number of circular economy and renewable projects in the Parkes SAP.

Collie Energy Transition Hub, WA

Energy Estate is developing a portfolio of projects, including a hydrogen gas 'peaking plant', a large-scale energy storage that includes both pumped hydropower and compressed air energy storage technologies, and large scale solar and wind renewable energy generation

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SYDNEY CANBERRA ADELAIDE