Gladstone Regional Readiness Report

A National Action Plan Case Study

OCTOBER 2025

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About this Compendium

Preface

This document is a **compendium to Beyond Zero Emissions' (BZE) *Powering Up Gladstone*, which provides a summary of findings** based on our research on Gladstone, and should be read in conjunction with the summary.

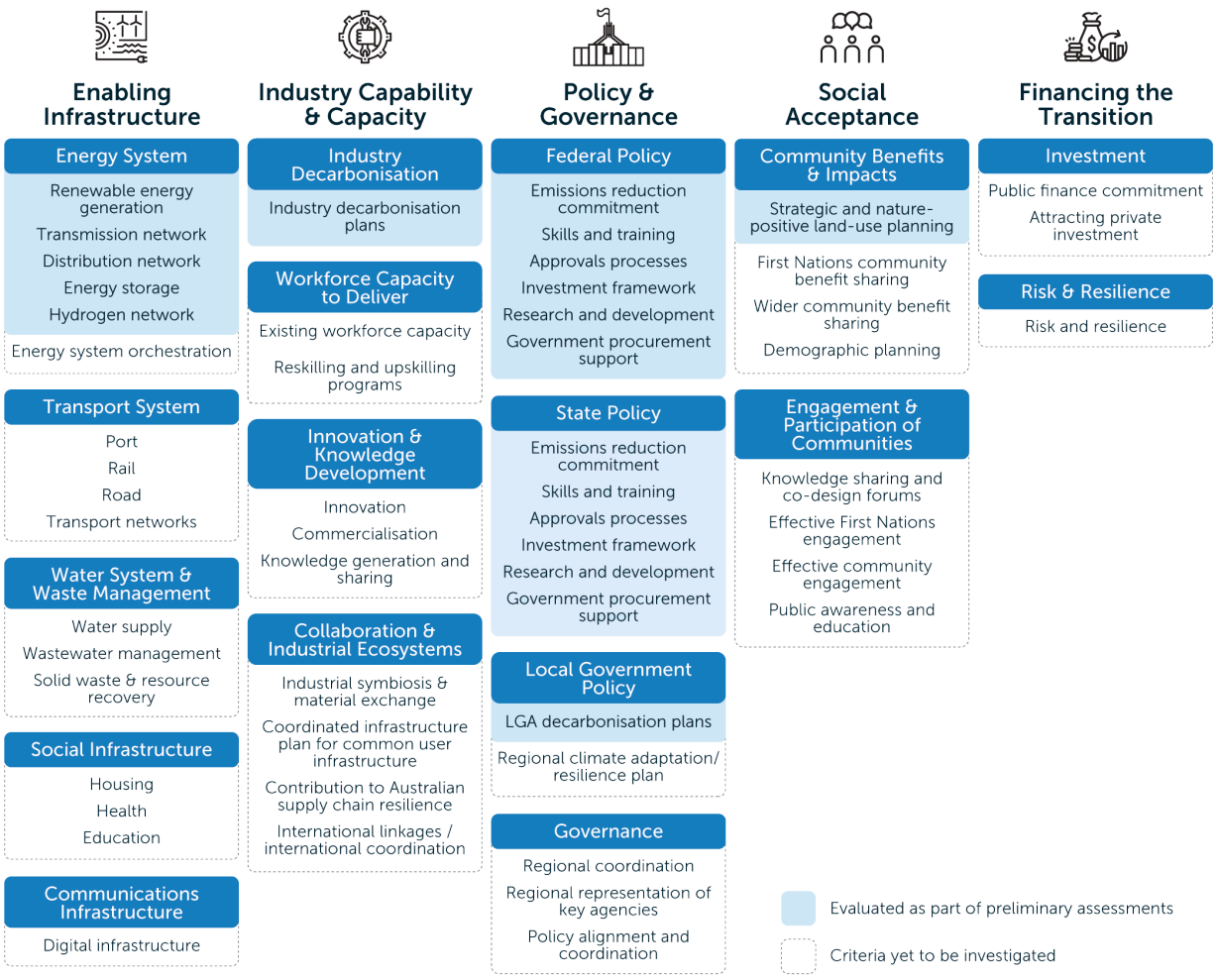
This compendium provides a detailed assessment based on a **subset of the National Action Plan's Critical Success Criteria used to assess progress in Gladstone towards a Renewable Energy Industrial Precinct (REIP).** The selected criteria (shaded in light blue in Table 1) **evaluate the supply and demand for renewable energy in the region, the readiness of key infrastructure, as well as the government policies and the industry commitments that shape them**. This second regional insights paper after the *Hunter Regional Readiness Report* (May 2025) includes analysis of an additional indicator related to social acceptance, a key factor influencing the speed and scale of the energy transition in any given region. The subset serves as a foundation for future research and collaboration to assess the broader Critical Success Criteria across Gladstone.

Details on the process of assessment for each criteria can be found in the **National Action Plan: Regional Assessment Process (Version 2) which will soon be released. Please visit our website and subscribe for updates to be notified.**

Out of scope

Social Acceptance, Finance and Common Use Infrastructure: Transparent communication of development processes and clear communication of benefits are key to building local support for large infrastructure projects. This extends beyond renewable energy infrastructure to include all common user infrastructure and community infrastructure vital for regional development such as roads, water and waste infrastructure, and health and education services.

Table 1. Critical Success Criteria



Although a detailed assessment of these broader common user infrastructure, social acceptance, finance and other remaining indicators was outside of scope of *Powering Up Gladstone* and the *Gladstone Regional Readiness Report,* we acknowledge their importance in fostering social engagement and support, which are critical to the successful delivery of all new infrastructure projects.

Accounting for Coal Emissions and Closures: Similarly, there is a need to better understand the relationship between coal mine closures, fossil fuel emissions, and the progress of cleantech.

In this report, we have not included an assessment of Gladstone's existing liquefied natural gas (LNG) export industry or coal export industry. As our primary focus is on zero-emissions

manufacturing, fossil fuel export industries are not included in this analysis. They do not have the potential to contribute significantly to the decarbonisation of existing or future regional manufacturing, and so have been excluded from this analysis. We welcome other organisations and researchers focused on analysing these industries.

The elements cited above fall outside BZE's usual remit. **We are inviting researchers and community groups to partner with us** to assess these important pieces of the puzzle.

Overview

The Gladstone Critical Success Criteria Assessment is the second in a series of assessments we are conducting across Australia's industrial regions and clean economy opportunities.

Insights from this and future assessments will inform the National Action Plan – a master plan to efficiently unlock Australia's zero-emissions economy and drive long-term prosperity in industrial regions.

The **National Action Plan will define a clear sequence of the 'what', 'where', and 'when' major projects must happen**, so that Australia can retain our significant role in global energy markets, and lay the foundations for a resilient and sustainable zero-emissions economy.

Unlike government energy planning, which focuses on grid reliability, BZE's regional assessments set a higher benchmark to evaluate Australia's readiness to replace fossil fuels exports with green exports.

This body of work is different from other reports published by BZE. It is a work in progress and invites new partners, collaborators, and stakeholders to join us as we build the National Action Plan.

The project began in July 2024 with the engagement of industry, government, community and research stakeholders in the identification of key themes and Critical Success Criteria to assess regional progress toward successful coordination of Australia's clean energy and industry opportunity (Table 1).

By testing our strategies and solutions in the complex, high-stakes environment of the Gladstone region, we aim to provide scalable insights that can drive meaningful change both regionally and nationally. The assessment provides the **state of play in the region as of September 2025**. An overview of the assessment is presented in Table 2. The *Powering Up Gladstone* report provides a summary of findings and recommendations from this assessment.

Table 2. Summary of Critical Success Criteria assessment

1. Enabling Infrastructure	2. Industry Capability & Capacity	3. Policy & Governance	4. Social Acceptance	5. Financing the Transition
1.1 Energy System	*2.1 Industry Decarbonisation*	*3.1 Federal Policy*	*4.1 Engagement & Participation of Communities*	*5.1 Investment*
1.1.1 Renewable energy generation	2.1.1 Industry decarbonisation plans	3.1.1 Emissions reduction commitment	4.1.1 Knowledge sharing and co-design forums	5.1.1 Public finance commitment
1.1.2 Transmission network	*2.2 Workforce Capacity to Deliver*	3.1.2 Skills and training	4.1.2 Effective First Nations engagement	5.1.2 Attracting private investment
1.1.3 Distribution network	2.2.1 Existing workforce capacity	3.1.3 Approvals processes	4.1.3 Effective community engagement	*5.2 Risk & Resilience*
1.1.4 Energy storage	2.2.2 Reskilling and upskilling programs	3.1.4 Investment framework	4.1.4 Public awareness and education	5.2.1 Risk and resilience
1.1.5 Hydrogen network	*2.3 Innovation & Knowledge Development*	3.1.5 Research and development	*4.2 Community Benefits & Impacts*	
1.1.6 Energy System Orchestration	2.3.1 Innovation	3.1.6 Government procurement support	4.2.1 First Nations community benefit sharing	
1.2 Transport System	2.3.2 Commercialisation	*3.2 State Policy*	4.2.2 Wider community benefit sharing	
1.2.1 Port	2.3.3 Knowledge generation and sharing	3.2.1 Emissions reduction commitment	4.2.3 Strategic & nature-positive land-use planning	
1.2.2 Rail	*2.4 Collaboration & Industrial Ecosystems*	3.2.2 Skills and training	4.2.4 Demographic planning	
1.2.3 Road	2.4.1 Industrial symbiosis & material exchange	3.2.3 Approvals processes		
1.2.4 Transport	2.4.2 Coordinated plan for common user infrastructure	3.2.4 Investment framework		
1.3 Water System & Waste Management	2.4.3 Contribution to Australian supply chain resilience	3.2.5 Research and development		
1.3.1 Water supply	2.4.4 International linkages / coordination	3.2.6 Government procurement support		
1.3.2 Wastewater management		*3.3 Local Government Policy*		
1.3.3 Solid waste & resource recovery		3.3.1 LGA decarbonisation plans		
1.4 Social infrastructure		3.3.2 Regional climate adaptation/ resilience plans		
1.4.1 Housing		*3.4 Governance*		
1.4.2 Health		3.4.1 Regional coordination		
1.4.3 Education		3.4.2 Regional representation of key agencies		
1.5 Communications infrastructure		3.4.3 Policy alignment and coordination		
1.5.1 Digital infrastructure				

Legend

5 (Very High)
4 (High)
3 (Medium)
2 (Low)
1 (Very Low)
Not Assessed

Note: The indicators are numbered here to correspond with the Critical Success Criteria as specified in the National Action Plan: Regional Assessment Process (Version 2). Version 2 will soon be released. Please visit our website and subscribe for updates to be notified.

Critical Success Criteria Assessment

Assumptions

The assessment focuses on regional progress toward the coordinated delivery of key projects needed to realise Australia's clean energy and industry opportunity. In order to do this, the analysis draws on the Australian Energy Market Operator's (AEMO) 2024 Integrated Systems Plan (ISP).[1] The ISP outlines modelled pathways for transmission, generation and storage infrastructure required to support the retirement of coal-fired power generation and energy system modernisation across the National Energy Market (NEM), primarily through the use of renewable energy.

These development pathways are designed to meet demand under three scenarios: Progressive Change, Step Change and Green Energy Exports. Of these, the Green Energy Exports scenario best reflects the system requirements of a clean export economy. It approaches a net-zero electricity grid by 2035, reflecting an energy system aligned with limiting the rise of global temperatures to within 1.5°C above pre-industrial levels. Accordingly, the Indicators(Footnote 1) for **Enabling Infrastructure (Energy System)** are benchmarked against AEMO's Green Energy Exports scenario. Current system planning is taken to align with AEMO's Step Change scenario.

Indicators in the Critical Success Criteria under the themes of **Industry Capability and Capacity**, and **Policy and Governance**, are assessed against a target of a 75% reduction in emissions by 2035 below 2005 levels, consistent with a trajectory to limit global warming to 1.5°C, as outlined in the Intergovernmental Panel on Climate Change's SSP1-1.9 scenario.[2–4]

Why the Gladstone region?

Gladstone is Central Queensland's biggest regional manufacturing and industry hub. Manufacturing employs 15% of the region's workforce, produces 67% of the region's exports, and generates almost $9 billion annually in regional output.[5] Gladstone is the source of over 35% of Australia's alumina production and the Boyne Smelter is Australia's second largest aluminium production facility.[6] Besides these facilities, it is also home to one of Australia's largest multi-commodity ports, critical to the movement of products for global markets.[7]

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[1] The Critical Success Criteria are broken down into five **Themes** (first level), 17 **Categories** (second level) and 55 **Indicators** (third level) – see Tables 1 and 2. **Definitions: Themes** represent the top-level conditions that underpin success, such as Enabling Infrastructure, Policy and Governance, and Social Acceptance. **Categories** are sub-areas within each theme, such as water infrastructure, workforce, or federal policy settings. **Indicators** are the specific, measurable criteria used to assess whether each category is 'ready' or needs attention. For more details, see *National Action Plan: Regional Assessment Process (Version 1)*.

Gladstone is one of Australia's highest-emitting industrial regions, making its decarbonisation an urgent priority. Its manufacturing emissions are driven by aluminium smelting, alumina refining, cement production, and chemical manufacturing – all of which are covered under the federal Safeguard Mechanism and produce 8.1 Mt CO_2-e of emissions annually(Footnote 2). Gladstone also has significant coal and LNG industries which power much of the region, with the bulk of what is produced exported, further increasing global emissions. Over 75% of Gladstone's industrial energy usage comes from fossil fuels – primarily gas and coal.[8]

If Gladstone does not move quickly, it risks losing its pole position as an industrial powerhouse. Global markets for aluminium, ammonia, iron and other commodities are rapidly shifting to low-emissions supply chains, and trade partners are already setting strict carbon standards. Key trading partners with specific requirements for green hydrogen and derivatives for energy and chemical feedstock are exploring international offtake agreements. Inaction means stranded assets, declining exports, and thousands of local jobs under threat.

Yet this same concentration of heavy-emitting facilities makes Gladstone Australia's best opportunity for deep, coordinated decarbonisation without de-industrialisation. With investment in electrification, green hydrogen and renewable heat, Gladstone can reinvent itself, shedding its high emissions profile to instead secure a competitive edge by supplying green commodities, such as green aluminium, green ammonia and green iron, to the world. Gladstone is well positioned to pivot to a zero-emissions future with its proximity to several potential Queensland Renewable Energy Zones (REZs) as well as its port and rail infrastructure, and skilled workforce.

As a natural fit for Renewable Energy Industrial Precinct development, Gladstone is one of fourteen key industrial regions that we have identified where clusters of manufacturers and exporters can benefit from shared access to renewable energy and clean hydrogen infrastructure.[9]

Fossil fuel industries in the region

Gladstone is a major hub for the export of coal and LNG.

The region's coal sector is dominated by metallurgical coal exports for steelmaking in Asia, which accounted for approximately 39% of the Port of Gladstone's throughput in FY 2023-24, or 46.2 Mt.[10] Current forecasts project long-term mine operations extending beyond 2050, with some expected to continue past 2100.[11] Thermal coal, used for electricity generation domestically and in Asia, represents a smaller share of mine activity. It comprised 17% of port

[2] This value does not include emissions from electricity generation for Boyne smelter's operations.

throughput in 2023-24 at 19.8 Mt, and fuels Central Queensland's coal-fired power stations.[10] These include:

- NRG Gladstone (1,680 MW), which currently powers much of Gladstone's industry including Rio Tinto's Boyne aluminium smelter, and is preliminarily scheduled to retire in 2029 based on recent Rio Tinto announcements.[12]
- Callide B (700 MW), whose retirement was recently delayed to at least the end of its technical-life in 2031.[13]
- Callide C (848 MW), with no confirmed date at present.[14]
- Stanwell Power Station (1,445 MW), which will reach the end of its technical life between 2043 and 2046.[14]

Curtis Island, near Gladstone, is home to three LNG plants and export wharves – Santos GLNG, the Shell-operated QGC plant, and the Australia Pacific LNG plant. These facilities process coal seam gas, piped from Queensland's Surat and Bowen basins, into liquid form for domestic use and international export. Together, they have a combined annual production capacity of 25.3 Mt.[15–17] In 2023-24, LNG exports accounted for 23.7 Mt of port throughput – around 6% of global trade.[18]

With many of Australia's key trade partners setting net-zero targets, Central Queensland's reliance on coal and LNG exports exposes the region to significant long-term economic risk. However, emerging green export industries – including aluminium, ammonia, and potentially iron – offer a pathway to maintain the region's status as an export powerhouse.[19] A coordinated Renewable Energy Industrial Precinct (REIP) can help streamline this transition and secure a more resilient economic future for Gladstone.

Green iron in the Gladstone region's future

The 2022 Gladstone REIP briefing paper highlighted opportunities to decarbonise existing industry – including alumina, aluminium, chemicals and cement – and showcased potential new industries, including high purity alumina products, green hydrogen and green ammonia.[9]

Since then, interest in Gladstone as a green iron production hub has developed. In 2024, Quinbrook Infrastructure Partners announced plans to develop a facility in the Gladstone region to process magnetite ore from Central Queensland Metals' Eulogie site.[20] It was also one of the five locations tested in the Superpower Institute's recent report, *A Green Iron Plan for Australia.*[21] Anticipated green iron production pathways, and their place within the broader green steel value chain, are outlined in Box 1. While it is possible for the full green steel

production chain to be sited in the Gladstone region, green iron production is the more immediate opportunity.

Revising the 2022 REIP analysis to incorporate green iron production and reduced hydrogen exports shows renewable energy, storage and transmission needs are broadly consistent with the original calculations and with AEMO's 2024 ISP Green Energy Exports scenario. Existing green aluminium and future green ammonia and iron industries all depend on green hydrogen as an essential feedstock and fuel – making Gladstone a fertile industrial ecosystem for a green hydrogen industry.

Box 1: Green iron generation pathways

Green iron is the more immediate opportunity for Gladstone than green steel. However, it is worth considering how green iron fits into the overall green steel production chain.

Steelmaking begins with iron ore (a mixture of iron oxides and other contaminants) and proceeds through three main steps:

- **Reduction:** Removing oxygen to yield impure metallic iron.
- **Melting:** Producing liquid iron and slag, enabling separation of contaminants.
- **Refining:** Removing impurities and adjusting carbon content to desired levels.

In traditional steelmaking, reduction and melting are combined in a blast furnace (BF), using metallurgical coal as both the reductant and heat source, producing carbon dioxide as a byproduct. The resulting pig iron is then refined into steel in a basic oxygen furnace (BOF).

In contrast, green iron production uses green hydrogen as the reductant to produce *direct reduced iron* (DRI), which can then be converted to steel in an electric arc furnace (EAF). Lower-grade ores require an intermediate melting step in an electric smelting furnace (ESF). When powered by renewable electricity, these processes yield low-carbon steel.

The Superpower Institute's recent report, *A Green Iron Plan for Australia* examined four production pathways for green iron, varying by ore type and technological flexibility.[21] These are summarised in Figure 1, along with their energy needs. All pathways rely on substantial volumes of green hydrogen, approximately 55 kg per tonne DRI, which accounts for 60–72% of total electricity demand across the production chain.

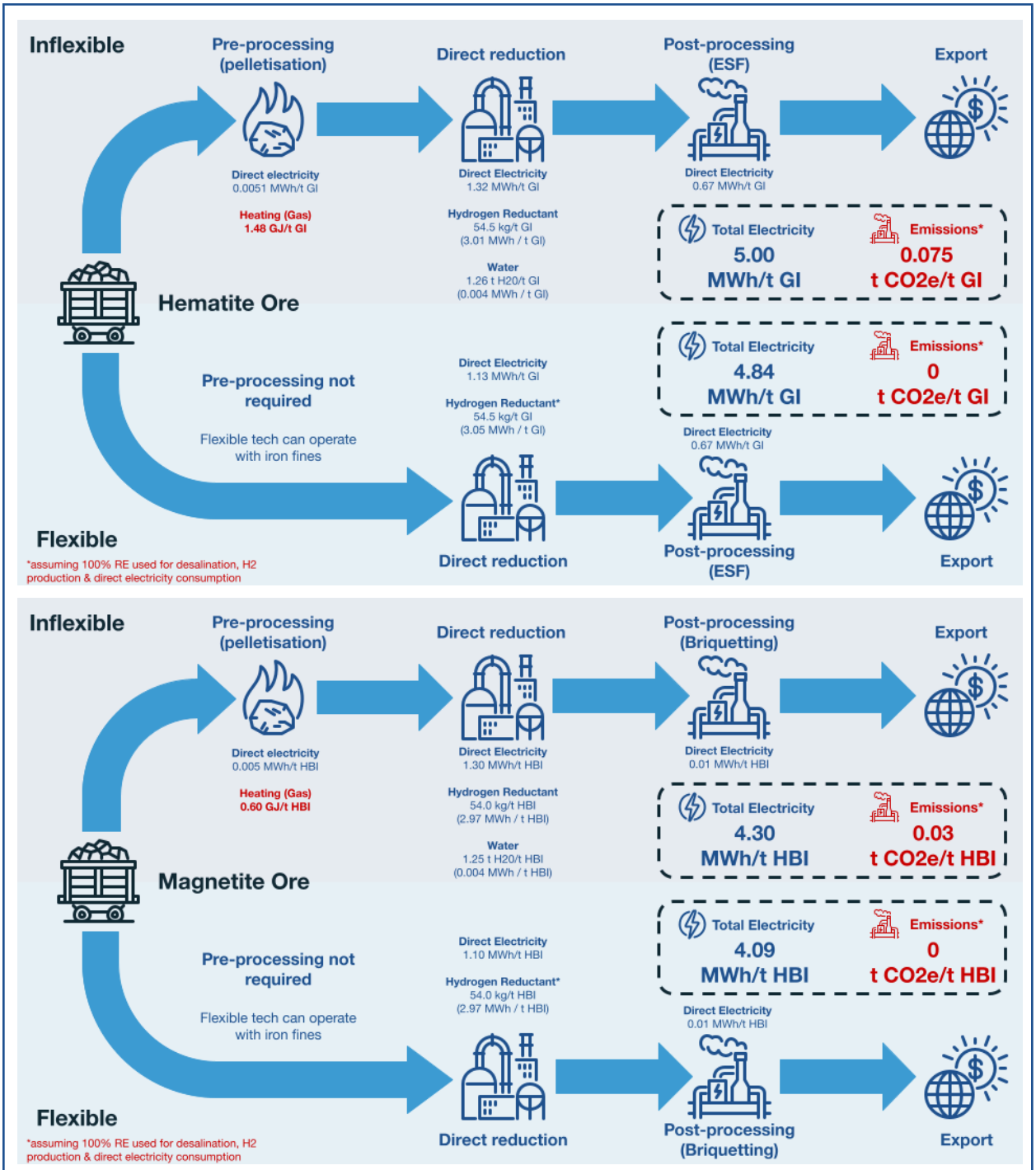

Figure 1. Green iron generation pathways anticipated by TSI

AEMO's Green Energy Exports scenario includes state-level forecasts of electricity demand for hydrogen production – including export, domestic use, and green iron – as well as operational requirements for electric arc furnaces in green steelmaking. These forecasts are disaggregated

by sub-region in the ISP's development pathways. In the 2024 ISP, the majority of hydrogen-related electricity demand in Central Queensland is associated with exports, while domestic use and green iron make smaller contributions. However, given the flexibility of hydrogen use once produced – and the slower-than-anticipated development of export markets – the combined hydrogen demand profile can reasonably be taken to reflect the needs of both existing local and green iron industries. For this reason, we adopt the Green Energy Exports scenario as our benchmark for assessing energy system readiness for green iron production in Gladstone.

Green alumina and aluminium – anchor tenants in Gladstone

There is a pressing need to decarbonise Gladstone's existing industries. Aluminium and alumina manufacturers are the largest current local energy users seeking to decarbonise.

Queensland supports almost the entire aluminium value chain, with bauxite mined at Weipa in Far North Queensland shipped to Gladstone, where it is refined into alumina at the Yarwun and Queensland Alumina Limited refineries.[22] Most of this alumina is exported, with some retained and smelted into aluminium at the Boyne Island smelter or processed locally by Alpha HPA.[23] Across these operations, Rio Tinto employs over 4,500 people, with around 3,000 jobs concentrated in Gladstone.[24] Pathways to the decarbonisation of aluminum and alumina are outlined in Box 2.

As well as protecting existing jobs and industry, the successful decarbonisation of aluminium, alumina, and other existing local industries is a key stepping stone to new green manufacturing opportunities. For example, the technologies highlighted in Box 2 – affordable, firmed renewable energy and green hydrogen – are critical to future green iron and ammonia industries.

Box 2: Green alumina and aluminium in Gladstone

Green alumina

Aluminium is seldom naturally found in its pure metallic form.[25] Instead, it must be refined from **bauxite**, a red ore containing aluminium hydroxides and oxyhydroxides such as **gibbsite, boehmite,** and **diaspore**, together with impurities like iron oxides, silica, and titanium oxides. Before smelting, these minerals are refined into alumina (Al_2O_3) via the **Bayer process**, summarised in Figure 2.[26]

Within the Bayer process, the two most energy-intensive steps are **digestion** and **calcination**, which currently rely on process heat generated by the combustion of natural

gas. As well as being a major source of greenhouse gas emissions, this also contaminates byproduct steam, preventing it from being reused.

Several federally-funded pilots are exploring options for decarbonising these steps. For digestion, possible pathways include energy efficiency improvements via double digestion, as well as deployment of electric boilers, paired with mechanical vapour recompression (MVR) to recycle low pressure steam.[27,28] For calcination, Rio Tinto and Sumitomo are trialling a green-hydrogen fuelled calciner at Yarwun, while Alcoa is testing electric calcination at its Pinjarra pilot plant in Western Australia.[29,30] Both approaches produce clean exhaust steam that, when teamed with MVR, can be recycled, improving process efficiency. The parallel development of multiple credible pathways is a promising step toward decarbonising this hard-to-abate sector.

Aluminium smelting

Aluminium is smelted from alumina via the **Hall-Héroult process**, which is also depicted in Figure 2.[26] Because the Hall-Héroult process is already electrified, major emissions reductions can be achieved by repowering smelters with firmed renewable energy. To support its Gladstone operations, Rio Tinto has secured agreements for 2.7 GW of renewable generation and 2.16 GWh of storage.[24] With renewables now the cheapest source of new electricity, this shift is seen as essential to the industry's future.[31] Additional emissions arise from the carbon anodes consumed during the Hall-Héroult process.[32] *Inert anodes*, which are not consumed during oxidation and release oxygen instead of CO_2, are under development and are currently being trialled at Rio Tinto's Arvida smelter in Quebec in a joint venture with Alcoa and the Quebec government.[33]

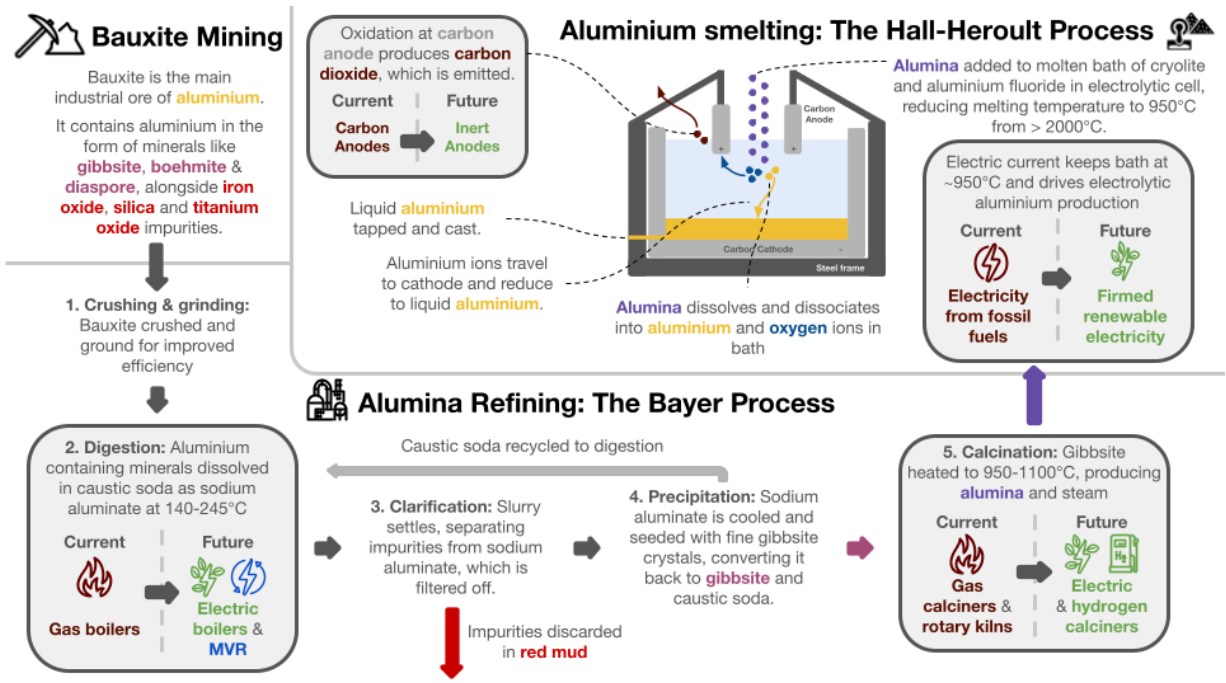

Figure 2. Alumina and aluminium production and decarbonisation opportunities

1.1 Enabling Infrastructure: Energy System

Today, Queensland is powered by 31% renewable energy.[34] Current system planning, aligned with AEMO's Step Change scenario, projects that this share will rise to 88% by 2035 if only committed and anticipated generation and transmission projects proceed. This could increase to 96% if all actionable projects in the Step Change least-cost development pathway are delivered.

A more ambitious trajectory, aligned with AEMO's Green Energy Exports scenario, reflects the infrastructure needed to rapidly decarbonise existing manufacturing and establish new clean export industries. Under this scenario, Queensland would reach 95% renewables by 2035 based on committed and anticipated projects, rising to 99% with full delivery of all actionable projects in the Green Energy Exports least-cost development pathway.

These projections are drawn from the counterfactual and least-cost candidate development paths for each scenario in AEMO's 2024 ISP generation and storage outlook data sets.[35,36] The percentage of renewable energy generation takes into account the modelled energy generation as well as demand.

Table 3: Step Change and Green Energy Exports REZ generation

Renewable Energy Zone	Initial Build Limit (GW)	2035-36 Step Change generation (GW) (Least cost / counterfactual)	2035-36 Green Energy Exports generation (GW) (Least cost / counterfactual)
Isaac (Q4)	10.7	2.9 / 3.7	6.0 / 8.0
Barcaldine (Q5)	11.9	0.2 / 0.2	0.2 / 0.2
Fitzroy (Q6)	11.0	5.3 / 5.5	13.2 / 8.5
Wide Bay (Q7)	3.3	2.2 / 3.6	2.4 / 3.6
Darling Downs (Q8)	12.6	10.6 / 10.2	13.9 / 14.2
Banana (Q9)	9.5	0 / 0	1.5 / 0.2
Total (excl Q8)	**46.4**	**10.6 / 13.0**	**23.3 / 20.5**
Total	**59.0**	**21.2 / 23.2**	**37.3 / 34.7**

Note: numbers may not sum up to total due to rounding.

Gladstone sits within AEMO's Fitzroy Renewable Energy Zone (REZ) (Q6) and is directly connected to the Isaac (Q4), Wide Bay (Q7), Banana (Q9), and – more distantly – Barcaldine (Q5) REZs.[37] Additional transmission infrastructure has been proposed to reinforce Gladstone's connection to the Darling Downs REZ (Q8), which has significant renewable energy potential.[38,39] The generation build limits and 2035-36 targets for each of these REZs under the Step Change and Green Energy Exports scenarios are provided in Table 3.

The Queensland Government is also pursuing a set of 12 smaller REZs, most of which fall within AEMO's broader candidate zones.[40] Because this *Gladstone Regional Readiness Report* benchmarks Gladstone's prospects against AEMO's ISP and Green Energy Exports scenario, which includes system-optimised transmission and generation modelling, we base our analysis on AEMO's REZ definitions for consistency.

Gladstone's electricity demand

Gladstone is home to a concentration of energy-intensive manufacturing industries which can decarbonise as part of a Renewable Energy Industrial Precinct (REIP), including:

- **Aluminium smelting** at Rio Tinto's Boyne Smelter, Queensland's largest individual electrical load.
- **Alumina refining** at Queensland Alumina Limited, Yarwun Alumina, and Alpha HPA.
- **Chemical manufacturing** at Orica Yarwun.
- **Cement production** at Cement Australia's Fisherman's Landing facility.

The Boyne Smelter is already electrified and draws its power from the NRG Gladstone Power Station. Gladstone's other industries still source most of their energy from fossil fuels, but multiple electrification pathways are available.

A range of studies have assessed the renewable generation required to repower these facilities and develop new ones for green exports. These include Gladstone-specific analyses – such as BZE's *Gladstone REIP Briefing Paper* (2022) and ClimateWorks' *Seizing Gladstone's low-carbon opportunity* (2025)– as well as broader sectoral modelling with results applicable to the region.[9,8] Examples include CSIRO's AusTIMES multi-sector modelling and ACIL Allen's fuel price forecasts, both inputs to AEMO's Integrated System Plan, and the Superpower Institute's *A Green Iron Plan for Australia.*[41,42,21]

Differences in assumptions, technology pathways, and decarbonisation ambition lead these studies to project a wide range of possible electricity demand for Gladstone's major industries. The total load(Footnote 3) of existing and new export industries is within the range of 5.7–8.8 GW,

[3] The quantities in Figure 3 represent the average power requirements of each industry given their anticipated annual electricity consumption. Inflexible loads, which cannot be ramped up or down, are well represented by this value, while flexible technologies will fluctuate around it.

as shown in Figure 3. Note that Cement Australia and Alpha HPA have minor loads and are not shown for clarity.

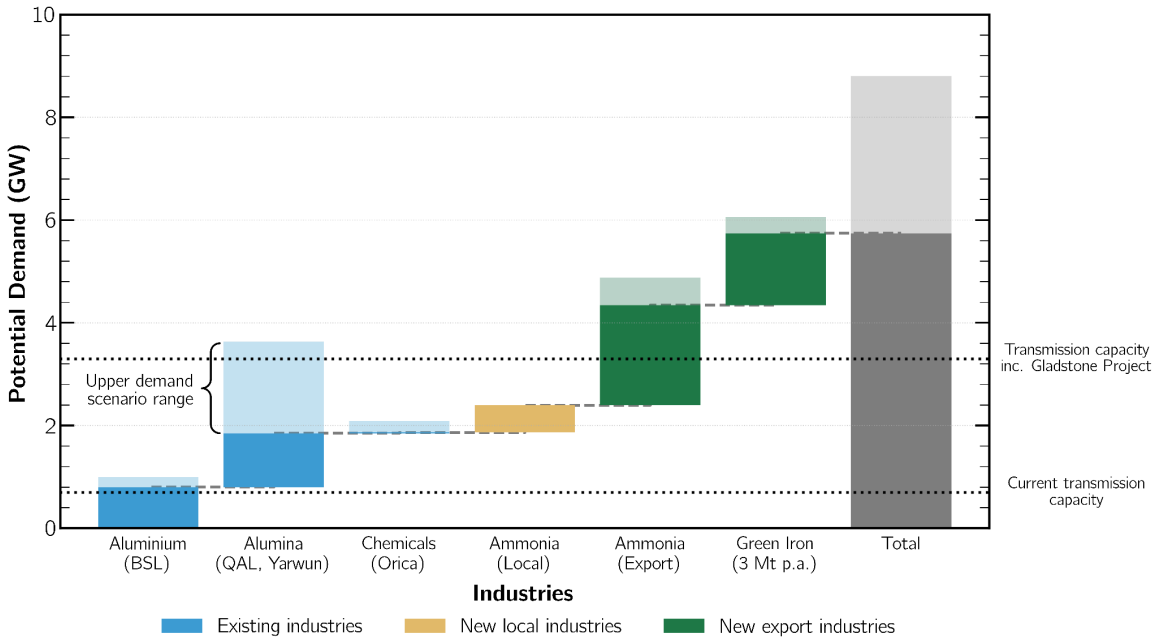

Figure 3. Demand scenarios for a Gladstone REIP

Repowering Gladstone's existing industries and establishing ammonia production for local industries would require **8.0-15.4 GW** of generation capacity[(Footnote 4)]. Including new export-scale green ammonia and green iron industries raises this to **19.1-29.3 GW**. The upper bound is slightly lower than in earlier analyses due to the reduced scope of the hydrogen and ammonia export sector following the cancellation of Stanwell's Central Queensland Hydrogen Project (CQ-H2).

Although these forecasts fall within the cumulative limits of the surrounding REZs (Table 3), matching the most ambitious demand within the next decade would require either:

- Increasing the 2035-36 generation targets for Green Energy Exports, or
- Strengthening transmission interconnection between Gladstone and other REZs.

The transmission investment required to supply this load will depend on how manufacturers choose to firm renewable energy for their processes. On-site firming, using batteries or thermal storage, offers manufacturers greater operational flexibility and arbitrage opportunities, but increases overall peak demand, since storage must be charged on top of serving base industrial load. Grid-distributed storage, by contrast, can reduce curtailment, limit the need for

[4] Assuming a 30% capacity factor for renewable generation.

transmission overbuild, and provide a steadier renewable supply to Gladstone, though with fewer arbitrage opportunities. In practice, a mix of both approaches is likely, meaning transmission capacity will need to be sized between the lower bound of operational load and the upper bound implied by maximum generation requirements.

In the following sections, under the theme of Enabling Infrastructure, we assess the progress of the energy systems of Gladstone and its surrounding regions – including generation, transmission, distribution, storage and hydrogen production – towards achieving these goals.

Figure 4 below provides an overview of the existing and planned transmission lines that will provide the foundation for Gladstone's REIP transition.

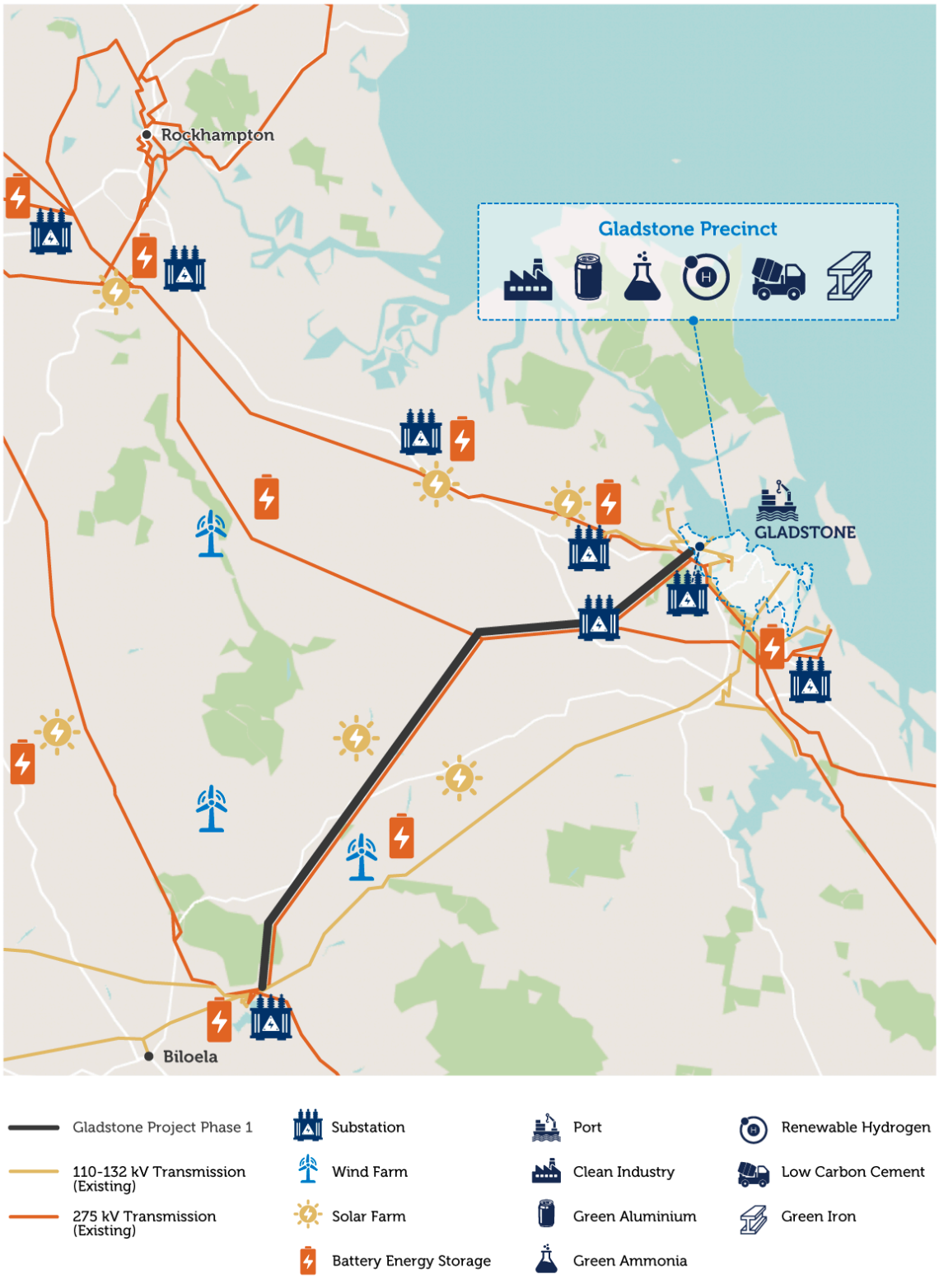

Figure 4. Central Queensland REZs and Clean Energy Precincts

1.1.1 Renewable energy generation

Indicator grading scale

1 - Poor progress towards 2035 Renewable Energy Zone (REZ) requirements. Less than 25% of required capacity is in development, with 15% or less approved and 10% or less in construction or operating.
2 - Improving progress towards 2035 REZ requirements. Between 25% and 50% of required capacity is in development, with 15-40% approved and 10-25% in construction or operating.
3 - Moderate progress towards 2035 REZ requirements. Between 50% and 75% of required capacity is in development, with 40-60% approved and 25-40% in construction or operating.
4 - Strong progress towards 2035 REZ requirements. Between 75% and 100% of required capacity is in development, with 60-85% approved and 40-50% in construction or operating.
5 - Exemplary progress towards 2035 REZ requirements. More than 100% of required capacity is in development, with over 85% approved and over 50% in construction or operating.

Assessment

The pipeline of renewable energy generation projects intended to supply Gladstone's industry is strong, but its realisation is at risk due to slow project progression and uncertainty surrounding Queensland's planning framework for renewable developments. We score it as **3**.

Over the past decade, the contribution of renewables to Queensland's energy consumption has increased nearly eightfold, from 4% to 31%.[34] This growth has been underpinned by substantial developer interest in Central and Southern Queensland. If delivered in full, the current pipeline would provide 40.0 GW of generation capacity across the Renewable Energy Zones (REZs) neighbouring Gladstone (excluding Darling Downs), or 169% of the 2035-36 target under AEMO's Green Energy Exports scenario.[36] This total represents 136% of the maximum generation requirements for a REIP in Gladstone estimated in Section 1.1. However, the current development pipeline exceeds the initial build limits in the Isaac, Fitzroy and Wide Bay REZs, necessitating transmission investment.

Spurred on by historically efficient assessment timelines, 64% of the Green Energy Exports generation target has received state development approval.[43] **However, just 12% has progressed into construction or operation, indicating a substantial bottleneck in the pre-construction phase.** These delays risk intensifying competition for skilled labour, materials, and shared infrastructure. If new transmission infrastructure between Gladstone and the Darling Downs REZ is delivered, these figures rise to 69% and 17% respectively.

Key issues contributing to delays nationally include slow development approval assessments, transmission buildout delays, grid connection challenges, lengthy environmental approvals, grid congestion, and challenges in securing social licence.[44] Several of these barriers align with our local findings. For example, only 29% of approved pre-construction capacity in the REZs surrounding Gladstone have received approval under the Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act). A further 46% remain under assessment, with an average wait time of 30 months to date.

To address concerns regarding social license and community benefits, the Queensland Government has recently reformed its planning framework for large-scale solar and wind farms.[45] The new rules now require such projects to undergo *impact assessments*, with mandated public consultation and third-party appeal rights. Developers must also complete a Social Impact Assessment and negotiate a Community Benefits Agreement prior to lodging a development application.[46] Legislating community engagement and benefits is a positive step towards a just transition. However, how this impacts project timelines is yet to be seen, and there is a risk that inefficiencies could be embedded into the planning framework, threatening project delivery.

If a balance between community benefits and efficient project delivery is achieved alongside accelerated EPBC assessments, Central Queensland will be able to generate the renewable electricity needed to electrify existing industries and establish new ones for green exports. Reinvigorated REZ development could help overcome these barriers by providing a framework for coordinated project connections, EPBC approvals, strategic land-use planning and community and regional benefits.

1.1.2 Transmission network

Indicator grading scale

1 - Minimal Transmission Network Service Provider (TNSP) planning for industrial electrification. Required AEMO Integrated System Plan (ISP) Optimal Development Path (ODP) projects well behind schedule with limited Renewable Energy Zone (REZ) activity.
2 - Planning for partial decarbonisation of existing industry. Some ODP actionable projects on schedule; preparatory REZ work underway but no declarations.
3 - Planning for full decarbonisation of existing industry. All ODP actionable projects on schedule; no progress on additional actionable ISP Green Energy Exports scenario (GEE) projects. Moderate REZ progress with some declarations.

4 - Planning for full decarbonisation & modest new green industries. All actionable ISP projects on schedule; some progress on GEE projects. All relevant REZs are declared with connection rights and transmission buildout on track, but short of GEE requirements.
5 - Planning for full decarbonisation & new green export industries. All actionable GEE projects on schedule; REZ development advanced to meet or exceed GEE requirements.

Assessment

Transmission upgrades for Gladstone are underway to repower existing manufacturing and partially electrify other industries. But Renewable Energy Zone (REZ) development has stalled, and further investment is needed to achieve full decarbonisation and create new green export industries. We score transmission readiness as **2**.

Powerlink, Queensland's transmission network service provider, publishes its own 10-year forecasts for electricity consumption and peak demand. Its most ambitious case projects Queensland's peak demand to grow by 6.6 GW by 2034 – nearly double AEMO's Green Energy Exports forecast.[40] Yet it predicts annual electricity consumption to increase by only 37.4 TWh, or 73% of AEMO's value.

Table 4: Delivery schedule of transmission projects relevant to Gladstone REIP

Project Name	2024 ISP Status	Additional Capacity (GW)	Optimal Delivery (GEE)	Scheduled completion (Powerlink)	Status (Powerlink)	Assessment (BZE)
Gladstone Project (also called Gladstone Grid Reinforcement)	Actionable	2.6	2030-31	**Stage 1:** 2028 **Stage 2:** March 2029 (possibly 2031)	Final Assessment Report published Public Environment Report in preparation	**Stage 1:** 4 - On track **Stage 2:** 3 - Moderate possibility of delay
SuperGrid South (and Borumba connection)	Actionable	3.2	2031-32	September 2031 (Earliest feasible)	Borumba commissioning delayed until 2035 SuperGrid blueprint retired and QEJP under review	**Stage 1 & 2:** 1 - Very high chance of delay

SuperGrid North	Future (GEE Actionable)	3.0	-	-	SuperGrid blueprint retired and QEJP under review Pioneer-Burdekin pumped hydro cancelled	1 - Very high chance of delay
Facilitating power to CQ	Future (GEE Actionable)	0.4	2030-31	-	No discernable plans	1 - Very high chance of delay
SQ to CQ Flow Path	Future (GEE Actionable)	0.9	2030-31	-	No discernable plans	1 - Very high chance of delay
TOTAL		**10.1**				

Legend:

1	Very high chance of delay
2	High chance of delay
3	Moderate possibility of delay
4	On track (likely to be completed on schedule)
5	Ahead of schedule (timely completion near certain)

Gladstone's industries are already decarbonising, with Rio Tinto having signed power purchase agreements for 2.7 GW of renewable energy to supply its already electrified Boyne aluminium smelter.[24] However, the current network lacks the capacity to deliver this energy from source to load. Within AEMO's 2024 ISP, a series of *actionable* and *future* projects are identified to address this shortfall and Central Queensland's broader transmission requirements. These projects, and their progress, are detailed in Table 4.

The most advanced of these, Powerlink's Gladstone Project[(Footnote 5)], will lift transfer capacity into Gladstone to around 3.3 GW at peak demand, and is on track to begin construction in 2026, subject to approvals.[39,47] However, the project's scope will only enable moderate industrial electrification. As shown in Figure 3, Gladstone's operational load would total 5.7-8.8

[5] This project is referred to as the Gladstone Grid Reinforcement in AEMO's 2024 ISP.

GW when accounting for the emergence of new green export industries. Depending on the deployed technology mix and the location of storage for firming, the total required transmission capacity into Gladstone will sit between the lower bound of operational load and the upper bound implied by generation requirements – 19.1-27.3 GW assuming typical 30% capacity factors. Our report, *Safeguarding our Future*, found that coordinated infrastructure investments cost 50–75% less than a facility-by-facility approach.[48] This underscores the need to properly size and build transmission as the foundation of Gladstone's clean industrial future.

The 2024 ISP identifies the need for network investment to connect Central Queensland with strong generation and storage resources in Southern Queensland, namely via the SuperGrid South project. This consists of two stages: Stage 1, the Borumba pumped hydro grid connection; and Stage 2, a new 500 kV inland transmission corridor connecting Gladstone with the Darling Downs REZ.[40] Although actionable in the 2024 ISP, the project's future is uncertain following the retirement of the SuperGrid infrastructure blueprint, an ongoing review into Borumba and the delay of its commissioning from 2031 to 2035.[49] In light of these setbacks, it is critical that Queensland continues to secure additional transmission between Southern and Central Queensland.[49] The government's $1.4 billion budget allocation for the CopperString project signals a commitment to delivering major transmission infrastructure.[50]

Three *future* ISP projects – including SuperGrid North – are considered *actionable* in the least-cost Green Energy Exports pathway, and are required to meet the demands of new green export industries over the next decade.[36] However, limited details are available concerning these, and the retirement of the SuperGrid blueprint, along with the cancellation of the Pioneer-Burdekin pumped hydro project, cast doubt over their viability. Their long-term role in the ISP optimal development path is also likely to shift given the significant transmission cost increases noted in AEMO's 2025 Electricity Network Options Report.[39]

Powerlink has also been appointed as Queensland's REZ delivery body. None of the 12 potential REZ sites outlined in its roadmap have been formally declared, and progress beyond the 2024 readiness assessments remains unclear.[40] Without momentum, opportunities to efficiently connect new generation, secure meaningful regional community benefits and streamline planning across state and federal jurisdictions risk being lost. The 2025 Queensland Energy Roadmap supersedes the previous Renewable Energy Zone (REZ) framework, introducing Regional Energy Hubs (REHs) as the new model for renewable energy development.[51] However, the roadmap does not specify priority hubs or provide clear coordination pathways for their rollout.

1.1.3 Distribution network

Indicator grading scale

1 - No electrification plans, including at the household level.
2 - Limited electrification planning. Planning for modest consumer energy resources (CER) uptake, but no industry electrification. Limited forecasting and network utilisation transparency.
3 - Moderate electrification planning. Planning for high uptake of CER, but no industry electrification. Improving forecasting and network utilisation transparency.
4 - Strong electrification planning. Planning for high uptake of CER and a modest level of industry electrification. Strong forecasting and network utilisation transparency.
5 - Exemplary electrification planning. Planning for high CER uptake and industrial electrification. Comprehensive forecasting and network status transparency.

Assessment

Despite preparing well for residential electrification and consumer energy resource adoption, limited data availability and forecast transparency from Gladstone's distribution network service provider create uncertainty around its planning for industrial decarbonisation. It scores a **2**.

The distribution network service providers (DNSPs) in South East and regional Queensland are Energex and Ergon, both owned by Energy Queensland (EQL). Gladstone sits within Ergon's network and is supplied by three bulk supply points – Gladstone South, Gladstone North, and Boat Creek – feeding nine zone substations.

EQL uses a scenario-based approach to forecast consumer energy resources (CER) uptake and electricity demand through to 2037, however, only results until 2034 are publicly available. Its most ambitious scenario predicts rooftop solar and electric vehicle (EV) adoption reaching 76% of AEMO's Green Energy Exports 2034 forecasts.[52,53] It has also developed a set of 25 EV readiness tactics and expanded dynamic solar connection capabilities, raising maximum export limits from 5 kW to 10 kW and guaranteeing 1.5 kW minimum export across the network.[54,55] EQL's Network Capacity Map provides export and spare hosting capacity estimates for many medium-voltage feeders and distribution transformers.[56]

Battery storage forecasts, however, lag behind. EQL's most ambitious scenario projects only 2.2 GWh of behind-the-meter (BTM) storage by 2034 – just 25% of AEMO's Green Energy Exports forecast for Queensland, and 30% of the Step Change forecasts.[52,53] Over 50 network batteries (4 MW/8 MWh each) are being rolled out at zone substations, including three in Gladstone, along with neighborhood battery programs in 20 communities, supported by DCCEEW and ARENA.[57,58] However, these network-led initiatives alone will not bridge the gap. Moreover, EQL's installations under the Community Batteries program have cost $2,448/kWh –

84% above average BTM costs – with the excess passed on to consumers through their regulated asset base.[59,60]

Planning for industrial electrification appears much less developed. EQL's most recent Distribution Annual Planning Reports does not directly address industrial decarbonisation.[61] Its EV Tactical Plan notes the need to monitor electrification of heavy vehicles and machinery, however it is unclear to what extent this is already factored into forecasts.

Such a gap could be significant given the possible scale of emerging loads. Across Queensland, road freight electrification alone could add 16.5 TWh of demand by 2040, much of it delivered through distribution networks.[62] In Gladstone, further demand could emerge from shore-to-ship power, desalination for green hydrogen and green iron, and proposed data centres like that of Energy Estate's.[63,64,65] Nevertheless, Gladstone does have headroom to absorb higher utilisation, with its bulk supply points collectively able to support 172 MW above their 2028–29 forecasts without breaching safety ratings.[61]

Benchmarking EQL's demand forecasting against AEMO's scenarios is complicated by limited data transparency. Ergon projects declining annual electricity consumption, even in its most ambitious scenario, but does not publicly disaggregate forecasts by region, customer-type or end-use, making it difficult to assess whether emerging loads are incorporated.[52] In Gladstone, only five-year Bulk Supply Point (BSP) forecasts are publicly available, despite internal ten-year scenario-based modelling.[61] AEMO publishes only state-level forecasts without disaggregation by network type.[66] Given that Gladstone's largest industrial loads are serviced directly by transmission infrastructure, increased granularity is critical to understanding future distribution network requirements. Improved complementarity and data-sharing between DNSPs and AEMO is an essential step, already underway, as distribution networks are integrated into future versions of the ISP.

1.1.4 Energy storage

Indicator grading scale

1 - Poor progress towards 2035 storage requirements. Less than 25% of required capacity/depth is in development, with 15% or less approved and 10% or less in construction or operating.
2 - Improving progress towards 2035 storage requirements. Between 25% and 50% of required capacity/depth is in development, with 15–40% approved and 10–25% in construction or operating.
3 - Moderate progress towards 2035 storage requirements. Between 50% and 75% of required capacity/depth is in development, with 40–60% approved and 25–40% in construction or operating.
4 - Strong progress towards 2035 storage requirements. Between 75% and 100% of required capacity/depth is in development, with 60–85% approved and 40–50% in construction or operating.
5 - Exemplary progress towards 2035 storage requirements. Over 100% of required capacity/depth is in development, with more than 85% approved and more than 50% in construction or operating.

Assessment

Central and Southern Queensland boast a strong pipeline of energy storage projects. However, slow progress – particularly in the development of long-duration pumped hydro – casts doubt on the region's ability to deliver firm, reliable electricity to Gladstone's industries. We score it as **3**.

The ISP reports storage requirements at the sub-regional level. Given the Renewable Energy Zones (REZs) considered in 1.1.1, the relevant ISP sub-regions for our analysis are Central Queensland (CQ) and Southern Queensland (SQ). Storage needs for 2035-36 are reported in terms of both capacity (power output) and depth (total stored energy). Our assessment derives separate scores for capacity and depth, which are then averaged.

When measured by discharge capacity, the current pipeline of projects appears well-progressed, with 635% of 2035-36 Green Energy Exports requirements in development, 212% approved and 45% in construction or operation. However, analysing by storage depth reveals the scale of action still needed. **While 252% of 2035-36 depth requirements are in development, only 59% has been approved, and just 14% has reached construction.**

The above reflects a lopsided pipeline – short- and medium-duration battery projects are progressing, but industrial-scale long-duration storage is lagging behind. This contrast between storage discharge capacity and storage depth is further underscored by the evolution of battery duration: 2.5 hours for projects that have reached construction, 2.9 hours for projects that have received development approval and 3.4 hours for those awaiting assessment.

Critically, nearly two-thirds of storage energy in development is concentrated in Southern Queensland. In order for Gladstone's energy-intensive industry to leverage these storage projects, significant additional transmission investment between regions is essential.

To address the gap between storage capacity and energy, the Queensland Government is backing four pumped hydro projects: Big-T, Capricornia Energy Hub, Borumba, and Mt Rawdon. All are progressing as Coordinated Projects[67] and are currently in the Environmental Impact Statement (EIS) preparation phase under the Coordinator-General.[68–71] These applications have been underway for an average of 883 days, with the EIS phase itself lasting 599 days. In the 2025–26 state budget, a combined $79 million was allocated to the government-owned corporations CleanCo and Stanwell for the acquisition of the Mt Rawdon and Big-T projects.[72(p. 8)] An additional $48 million is being invested in a major overhaul of the Wivenhoe Pumped Hydro power Station.[73]

The fact that the region’s storage ambitions hinge on the timely delivery of these large, complex projects introduces substantial risk. Hydroelectric developments are particularly prone to delays and cost overruns: Flyvbjerg’s global megaprojects database shows that hydroelectric dams have an average cost overrun of 75%, with 37% of projects exceeding 50%.[74] This has been borne out in the deferral of Borumba’s expected completion from 2031 to 2035. This challenge is compounded by recent changes to wind and solar farm approval processes, which may delay co-located battery projects.

If these risks can be mitigated and more projects reach construction, Central and Southern Queensland will be well positioned to supply firm and reliable green electricity to inflexible industrial loads in Gladstone. The 2025–26 state budget committed $435 million to pumped hydro projects, but delivery remains uncertain and delays are likely without clearer commitments.

1.1.5 Hydrogen network

Indicator grading scale

1 - Poor progress towards 2035 hydrogen production requirements. Less than 25% of required production capacity in development, with 15% or less approved and 10% or less in construction or operating.
2 - Improving progress towards 2035 hydrogen production requirements. Between 25% and 50% of required production capacity in development, with 15-40% approved and 10-25% in construction or operating.
3 - Moderate progress towards 2035 hydrogen production requirements. Between 50% and 75% of required production capacity is in development, with 40-60% approved and 25-40% in construction or operating.
4 - Good progress towards 2035 hydrogen production requirements. Between 75% and 100% of required production capacity in development, with 60-80% approved and 40-50% in construction or operating.
5 - Excellent progress towards 2035 hydrogen production requirements. Over 100% of required production capacity in development, with over 80% approved and over 50% in construction or operating.

Assessment

Despite early developer interest, recent setbacks – including cancelled projects and slow progress on remaining developments – have weakened Gladstone's green hydrogen pipeline. Pilot projects essential for local decarbonisation are underway, with ambitions to scale up if successful, while plans for export-scale green ammonia production remain in development. This indicator scores a **2**.

On paper, 560 kt per year of hydrogen production capacity is in development in Gladstone[75]– enough to meet 100% of projected domestic demand and 21% of export needs for Queensland by 2035–36.[36] But of this, only 0.27 kt per year has reached construction, covering just 0.2% of Central Queensland's needs, with no further projects approved.

Previous BZE research estimates that Gladstone's major manufacturers – including Orica, Queensland Alumina Limited, Rio Tinto Alcan Yarwun and Cement Australia – could require 282kt per year(Footnote 6) of hydrogen to displace fossil fuel use.[9] A potential 3 Mt per year green iron facility could demand a further 165 kt per year.[21] The current pipeline could theoretically meet this full demand, but its delivery trajectory risks falling dramatically short.

[6] This figure assumes a 50-50 split between electrification and hydrogen use to displace fossil fuels. It does not include the renewable hydrogen required for the production of green ammonia.

This risk is evident in the withdrawal of major developers. Stanwell's flagship 288 kt per year CQ-H2 project has been abandoned following the exit of key consortium members and the Queensland Government's withdrawal of funding.[76,77,78] Similarly, Fortescue's PEM50 facility has closed, with the company citing a renewed focus on research and development (R&D) to deliver 'green molecules at scale, efficiently and cost-effectively'.[79]

The remaining pipeline is now largely concentrated in two proposals: H2U's H2-Hub and Sumitomo's Gladstone Green Hydrogen Project. H2-Hub, an export-scale green ammonia facility, is progressing as a *Coordinated Project* under Queensland's Coordinator-General. H2U owns local land and holds a Memorandum of Understanding with Korea East West Power (EWP) to develop value chains for green energy export. Their EIS has been in preparation since February 2023, and its lapse date has been extended to August 2026.[80] Sumitomo's 200 kt per year project with Rio Tinto remains in the feasibility stage, and is contingent on the success of a pilot plant, running from 2025 to 2028, that will test hydrogen calcination at the Yarwun alumina refinery.[81,82] In addition, Sunshine Hydro's nearby Djandori Gung-i Superhybrid pumped hydro facility is planning green methanol production of up to 220 kt per year, requiring annual on-site production of approximately 42 kt of green hydrogen.[83,84]

Orica and Rio Tinto are two Gladstone companies that are highly likely to use green hydrogen as they decarbonise;[41,42] Orica as an essential chemical feedstock for green ammonia, and Rio Tinto through its potential as a fuel to power high-temperature processes for decarbonising alumina calcination, though direct electrification may also be feasible. A modular rollout strategy focused on meeting this domestic offtake, paired with the federal government's hydrogen production tax incentive and targeted demand-side interventions, could help to restore investor confidence and establish a scalable hydrogen industry in Gladstone.[8,85–87]

Green hydrogen and its derivatives are also central to Gladstone's future export prospects across energy, chemicals and green metals. Japan's national hydrogen strategy calls for large-scale imports to meet its decarbonisation targets, totalling 12 million tonnes by 2040 (including ammonia).[88] Green ammonia will likewise be needed in South Korea to replace grey imports as a key feedstock for fertilisers and chemicals.[89] There are already initial international offtake agreements for hydrogen and its derivatives (albeit mainly blue). Ammonia and methanol are being trialled as low-carbon marine fuels, with international fuel standards and emissions pricing due to take effect from 2027.[90,91,92] Hydrogen also plays an essential role as a reductant in the green iron production chain. Together, these applications and the multi-billion-dollar opportunities they present could unlock the upscaling of a globally competitive hydrogen industry in Gladstone.[19,93] Maintaining strong support for renewable energy and green hydrogen as foundational elements of industrial decarbonisation is critical to positioning Gladstone for success.

Key findings and recommendations for Enabling Infrastructure (Energy Systems)

Gladstone has strong potential to become a major Renewable Energy Industrial Precinct, supported by a robust pipeline of solar, wind, and storage projects in surrounding regions that already exceed the trajectory outlined in AEMO's Green Energy Exports scenario. **However, this potential has yet to translate into delivery: only 12% of the renewable generation capacity, 45% of storage discharge capacity and 14% of the storage depth targets have reached construction, despite 64%, over 100% and 59% respectively having secured development approval.** Progress is being constrained by delays to large-scale, deep storage – particularly key pumped hydro projects such as Borumba – as well as development challenges including transmission buildout delays, which our work has highlighted. Other issues acting as a handbrake on the renewable energy rollout include grid congestion, social licence concerns, and lengthy federal environmental approval timelines.[44]

Recent planning reforms aimed at strengthening social licence are well-intentioned but risk introducing delays if not carefully implemented. The requirement for developers to finalise Community Benefit Agreements (CBAs) before lodging development applications creates a bottleneck early in the process. It also risks undermining the planning efforts by the community and First Nations to secure benefits if projects ultimately do not proceed. These risks could potentially be mitigated by instead making CBAs a condition of development approval, rather than a pre-lodgement requirement. A renewed focus on coordinated Renewable Energy Zone (REZ) development could also help to streamline approvals, lock in regional community benefits, and deliver more efficient grid connections, a recommendation supported in a recent report by Queensland Renewable Energy Council (QREC).[94]

Gladstone's industries are already beginning to decarbonise. Rio Tinto has secured power purchase agreements (PPAs) for 2.7 GW of renewable energy to support its aluminium operations. However, without major transmission reinforcement, this electricity cannot reach Gladstone's industrial loads. Powerlink's Gladstone Project – which will increase the peak demand transfer capacity into Gladstone to approximately 3.3 GW – is a critical enabler for the early closure of the Gladstone Power Station and the partial decarbonisation of Rio Tinto's alumina and aluminium operations. However, further investment will be needed to fully decarbonise existing industries, establish new ones, and connect Gladstone to large-scale renewable generation and pumped hydro in Southern Queensland.

A failure to build for future transmission capacity from the outset can lead to higher overall costs in the long run. Our research shows that building coordinated infrastructure for industrial clusters, rather than taking a piecemeal, facility-by-facility approach, can reduce costs by 50-75%.[48] BZE strongly supports the progression of the Gladstone Project, and we recommend that Queensland investigate options to build transmission strategically to meet

future needs articulated in the *Gladstone Regional Readiness Report*. Through future-focused planning to enable the full potential of Gladstone's industrial growth, higher costs associated with subsequent extension projects can potentially be minimised.

Green hydrogen is a vital feedstock and fuel for powering the high-temperature processes of existing local manufacturers such as Queensland Alumina Limited (QAL), Yarwun Alumina, and Orica Yarwun. While global demand for green hydrogen and derivatives is consolidating in key locations such as Japan and Korea, their proximity makes Gladstone-made green hydrogen a priority. Despite the cancellation of Stanwell's CQ-H2 and Fortescue's PEM50 projects, key projects such as H2U's export-oriented green ammonia plans continue to progress and will require support for infrastructure build out. Local demand, local pilot projects, and Gladstone's proximity to renewable energy resources can provide a stable foundation for a scalable hydrogen industry to support future exports such as green iron for steelmaking, green ammonia and methanol for shipping fuels.

2.1 Industry Capability and Capacity: Industry Decarbonisation

2.1.1 Industry decarbonisation plans

Indicator grading scale

1 - Most companies have plans with no targets and or not funded (Limited plan / insufficient targets)
2 - Most companies have plans with targets, but only some are aligned to 75% emissions reduction by 2035. Not all commitments are funded (Basic Plans / Uncertain Implementation Pathways)
3 - Most companies have plans with targets, and most are aligned to 75% emissions reduction by 2035. Key commitments are funded (Intermediate Plans / Developing Momentum)
4 - All major companies have plans with targets aligned with 75% emissions reduction by 2035,with commitments funded but no internal performance initiatives (Comprehensive Plans / Aligned with Regional Goals)
5 - All major companies have plans aligned with 75% emissions reduction by 2035, are fully funded and have internal performance initiatives (Leading Practice / Exemplary Industry Leadership)

Assessment

Gladstone scores a **3** for industry decarbonisation plans. The majority of existing energy-intensive local manufacturing companies have set emissions reduction targets and published decarbonisation plans. The majority are publicly aligned with a 1.5°C pathway (at least 75% emissions cuts by 2035 below 2005 levels). We also accept pathways of 50% cuts by 2030 and net zero by 2050, provided companies show real progress in removing bottlenecks. Investment in pilot projects, renewables, demand response, and some work on scope 3 emissions demonstrate commitment.

All existing energy-intensive local manufacturing companies assessed (excluding fossil fuel producers) have emissions reduction targets and decarbonisation plans or low-emissions start-up plans (Table 5)[Footnote 7]. Indeed, most energy-intensive local manufacturing companies are demonstrating significant effort towards developing pathways and technology to decarbonise or to contribute to global decarbonisation. However, technological and economic

[7] Large energy intensive manufacturers are considered as those with above 25 kt CO_2-e emissions per year (Scope 1 and 2), or of a similar production scale.See *National Action Plan: Regional Assessment Process (Version 1)*

challenges remain, as do challenges to the delivery of the updated renewable energy grid they will require.

Table 5: Gladstone industry decarbonisation plans

Company/industrial site	Decarbonisation plan	23-24 Scope 1 emissions (Mt CO_2-e /yr)
Boyne Smelters Limited (BSL), Queensland's largest electrical load	50% by 2030 Net Zero by 2050 PPAs – 2.7GW.[95]	0.9 (excludes scope 2 electricity emissions)
Queensland Alumina Limited	50% by 2030 Net Zero by 2050, piloting double digestion	3.1
Yarwun Alumina	50% by 2030 Net Zero by 2050; hydrogen calcination pilot	2.1
Orica Yarwun	Tertiary abatement 50% scope 1 by 2024, 45% scope 1 and 2 by 2030, 100% renewable energy by 2040.[96]	0.4
Cement Australia (Fisherman's Landing site)	Net zero by 2050 - launched low-emission cement using alternative feedstocks, electrification of vehicles. [97]	1.6
Alpha HPA	Low emissions process, a 70% CO_2 emissions reduction compared to incumbent alkoxide process, 100% renewable energy for electrified processes.[98]	Not reported

The majority of existing industrial manufacturing emissions in Gladstone are linked to Rio Tinto's operations and are covered by its international targets of 50% by 2030 and net zero by 2050.[95] This includes Boyne Smelters Limited as well as Queensland Alumina Limited and the Yarwun Alumina Refinery. Rio Tinto acts as a key anchor tenant in Central Queensland, in terms of the number of jobs it supports as well as its potential to greatly reduce Gladstone's emissions if these facilities become part of a Renewable Energy Industrial Precinct (REIP). Boyne Smelters has required 13% of Queensland's electricity, with the alumina refineries requiring energy at a scale similar to the smelter, currently provided by onsite coal and gas power[99,9]. Rio Tinto's 2030 and 2050 targets have the potential to deliver 75% emissions reduction by 2035. Additionally, Rio Tinto has committed to investigate demand response for the future operations of Boyne Smelters.[100] However, the economic benefits of this are woven in complex ways with the overall design of renewable energy generation, storage and transmission. Rio Tinto's and Gladstone's successful industrial decarbonisation will depend on whether technical and economic issues can be resolved, as well as support for the delivery of

sufficient firmed renewable energy. Ongoing demand for Central Queensland's aluminium and alumina products depends on repowering local manufacturing with renewable energy; the cost of renewable energy and transmission build-out needs to be minimised to ensure these commodities are competitively priced in global markets.

Existing energy-intensive local manufacturing companies in the Gladstone region are focused on reducing their own process emissions (scope 1 and 2) and some are attempting to address their scope 3 emissions. For example, Orica's goal is a 25% reduction in scope 3 emissions by 2035.[101] Alpha HPA has had their scope 1, 2 and 3 emissions Product Carbon Footprint (PCF) certified by CarbonChain.[102] Gladstone companies are in some cases their own downstream suppliers (e.g. Rio Tinto provides bauxite to its own alumina factories, and hence to Boyne Smelter) or the supplier of reagent to other local suppliers (e.g. Rio Tinto provides industrial chemical feedstock to Alpha HPA).

Pilot projects provide evidence of action and commitment, such as a hydrogen calcination pilot at Rio Tinto Yarwun in collaboration with Sumitomo Corporation.[103] Rio Tinto is investing in large wind, solar and battery projects to deliver a large part of the energy needed to decarbonise Boyne Smelters Limited through power purchase agreements for wind and solar and solar and battery hybrid services agreements (HSAs)[104,105,24]. These include 1.1 GW wind from Windlab's Bungaban wind energy project, scheduled for completion in 2029, 1.1 GW solar from European Energy in the Upper Calliope Solar Farm, 540 MW of solar and 540 MW / 2,160 MWh of battery storage from Edify Energy in Central Queensland at Smoky Creek & Guthrie's Gap Solar Power Stations due for completion in 2028. Together, the four contracted projects are expected to supply 80% of Boyne Smelter's annual average electricity demand, reducing the smelter's scope 1 and 2 emissions by 70%, or 5.6 Mt CO_2-e. The Smoky Creek & Guthrie's Gap battery system will provide 30% of Boyne Smelter's renewable energy firming requirements.

Other indicators of local industry commitment to decarbonisation include that Orica and Rio Tinto have publicly committed to executive remuneration tied to emissions reduction.[95,106]

The Queensland priority transmission investments (PTI) process means that key transmission such as Powerlink's Gladstone Project is progressing relatively quickly but as noted in the Energy System analysis, future transmission planning is needed to ensure the ambition to reduce local industrial emissions is at the scale needed across the industrial ecosystem.

Industry clarity on the need for affordable firmed renewable energy

'[...] carbon abatement at these facilities is not possible without the development of a large-scale, competitive and firmed renewable energy in eastern Australia.'

'The main challenges to electric steam raising projects are the economics and availability of stable, firmed renewable energy from the Queensland grid at a competitive price, and the technology development required to operate at higher temperatures and pressures.'

– Rio Tinto[107]

Key findings and recommendations for Industry Capability and Capacity (Industry decarbonisation plans)

Local industry is making a clear commitment to decarbonise. Notable efforts include:

- Boyne Smelters Limited being already electrified. Its commitments to PPAs and HSAs to supply 80% of its annual average electricity demand will reduce the smelter's scope 1 and 2 emissions by 70%, or 5.6 Mt CO_2-e.
- Alpha HPA's application of novel approaches with up to 70% less emissions than other incumbent alkoxide processes.
- Orica's commitment to sourcing 100% renewable energy by 2040.
- Cement Australia's exploration of alternative feedstocks and electrification of vehicles to reach net zero by 2050.

However, the interdependence of all parties for full industrial decarbonisation requires coordination and alignment across both renewable generators and industrial companies. More renewable energy and transmission are essential, but unresolved technology and cost challenges – along with uncertainty in firmed renewable approvals – leave Gladstone's pathway and timelines unclear.

Rio Tinto's renewable PPAs are a strong step, anchoring investment at scale. But company-by-company deals cannot deliver the same economies of scale as coordinated planning through a Renewable Energy Industrial Precinct (REIP).[48] Pilot studies, exploration of scope 3 emissions considerations, and executive employee remuneration options could be expanded across local industries. We recommend continued support for pilot studies and expansion of successful ones.

Ongoing support for pathways to local generation and use of green hydrogen at scale is needed from industry and government.

Holistically, coordination remains key to ensuring industrial decarbonisation is efficient and timely. Renewable energy generators are represented through the Queensland Renewable Energy Council (QREC). However, there is no coordinating body to consolidate renewable energy demand for manufacturing across companies. A coordinated leadership body focused on consolidating demand and advocating for industries that use or plan to use renewable energy locally would provide the coordination needed to streamline industrial decarbonisation efforts, as well as achieve efficiencies and cost savings from economies of scale. The Central Queensland Statement of Cooperation can provide the foundations of some of this coordination.

As noted in the Enabling Infrastructure: Energy System section, the pace of deployment, approvals and coordination of energy infrastructure projects remain significant challenges. There is state government support for critical industrial decarbonisation infrastructure (e.g. for transmission such as Powerlink's Gladstone Project), but the Energy Roadmap will need to outline clear commitments to the suite of necessary infrastructure to ensure Gladstone's full industrial decarbonisation and support the growth of new green manufacturing.[108]

3.1 Policy and Governance: Federal Policy

3.1.1 Federal Policy –- Emissions reduction commitment

Indicator grading scale

1 - Minimal commitment (Severe Deficiency)
2 - Basic commitment (Moderate Deficiency)
3 - Moderate commitment (Developing)
4 - Strong commitment (Effective)
5 - Exemplary commitment (Leading Practice)

Assessment

The federal government's emissions reduction commitment is scored as **2**, indicating a basic plan with significant deficiencies. Approvals and extensions of fossil fuel projects seriously undermine the credibility of Australia's emission reduction targets. For example, The North West Shelf Project is Australia's third biggest emitter, producing almost 6.1 Mt CO_2-e per year and will now operate until 2070.[109]

The Climate Change Act 2022 sets a target of a 43% reduction in greenhouse gas emissions below 2005 levels by 2030 and net zero by 2050 which is currently being reviewed through the lens of greater ambition.[110,111] But since the 2022 legislation, approvals of large-scale fossil fuel projects risk locking in high-emission infrastructure, directly conflicting with necessary emission reductions outlined in the AEMO Green Energy Exports scenario, which benchmarks achieving a zero-emissions grid by 2035.

Additionally, the Safeguard Mechanism (SGM), designed to reduce industrial emissions, continues to feature substantial loopholes. Despite stipulating an emissions reduction rate of 4.9% annually for major emitters, allowances for trade-exposed facilities considerably dilute its effectiveness.[112] Further, reliance on Australian Carbon Credit Units (ACCUs) to offset emissions exacerbates concerns regarding the lack of genuine incentives for on-site emissions reductions within industrial sectors.

The continuation and extension of fossil fuel policies, such as the Future Gas Strategy, coupled with the approval of significant new fossil fuel expansions, undermine Australia's alignment

with international climate standards and jeopardise the country's international climate reputation, particularly concerning commitments under the United Nations Framework Convention on Climate Change.

To improve this score, the federal government must stop approving projects that are incompatible with its own climate targets, close loopholes in the Safeguard Mechanism, and strengthen mechanisms for monitoring and accountability. Aligning policies with international climate commitments will be critical to restoring credibility and achieving Australia's emissions reduction goals.

3.1.2 Federal Policy – Skills and training

Indicator grading scale

1 - Minimal support (Severe Deficiency)
2 - Basic support (Moderate Deficiency)
3 - Moderate support (Developing)
4 - Strong support (Effective)
5 - Exemplary support (Leading Practice)

Assessment

The federal government's skills and training policies are scored as a **3**. This reflects moderate support addressing critical skills shortages for the energy transition, offset by a number of challenges.

Key federal initiatives driving progress include micro-credential programs, skilled migrant visas, and significant regional training infrastructure investments such as the $69.2 million Central Queensland Hydrogen Hub, incorporating a Hydrogen Centre for Excellence at Central Queensland University's Gladstone campus.[113] The establishment of the Net Zero Economy Authority (NZEA) continues to offer a structured framework to support workforce transitions in regions such as Gladstone and Central Queensland.[114]

Despite ongoing efforts, challenges persist, including specific skills gaps, barriers to workforce attraction in cleantech industries, and competition from high-paying roles in traditional fossil fuel sectors, notably the extensive coal and gas projects prevalent in Central Queensland. Recent approvals, such as the North West Shelf gas extension, further complicate transition

efforts by reinforcing reliance on fossil fuel employment, thus hindering progress toward achieving a higher assessment score.[115]

To improve and attain a higher rating, the federal government needs focused reforms on workforce retention, expansion of targeted training opportunities, and proactive measures to enhance the attractiveness of cleantech careers. Strengthening and leveraging the NZEA's strategic role remains critical to effectively aligning Gladstone and the broader Central Queensland region with Australia's clean energy transition objectives.

A coordinated national communications plan emphasising skills for the energy transition will also be essential to increase awareness, clarify career pathways to make opportunities more compelling for students, apprentices and workers, and effectively guide workforce transitions in Gladstone and Central Queensland.

3.1.3 Federal Policy – Approvals processes

Indicator grading scale

1 - Minimal support (Severe Deficiency)
2 - Basic support (Moderate Deficiency)
3 - Moderate support (Developing)
4 - Strong support (Effective)
5 - Exemplary support (Leading Practice)

Assessment

The federal government's approval processes are scored as a **3,** indicating moderate support for the timely completion of renewable energy and major infrastructure projects. There has been progress in facilitating projects, particularly through initiatives aimed at simplifying approvals and enhancing efficiency, but several key challenges persist.

The Environment Protection and Biodiversity Conservation Act (EPBC) Act 1999 continues to require projects that significantly impact Matters of National Environmental Significance (MNES) to undergo rigorous environmental assessments.[116] This notably includes major infrastructure, renewable energy, mining, and urban developments in regions like Gladstone and Central Queensland, which are essential hubs for renewable and emerging energy

industries. The EPBC Act, however, still lacks a climate trigger, allowing significant emission-intensive projects such as new gas developments to proceed.

Persistent complexities in land-use planning, infrastructure, and finance regulations continue to create delays and hinder effective coordination across jurisdictions. Frequent regulatory changes, limited inter-agency collaboration, and community consultation fatigue remain significant obstacles, affecting renewable energy projects in Central Queensland. For instance, despite the proposed reforms and the introduction of the Future Made in Australia (FMiA) framework, the EPBC Act reforms have yet to be finalised, and the anticipated single 'front door' for streamlined project approvals is still under development.[117]

Recent initiatives have attempted to address these issues, including additional funding for EPBC Act reforms and consultations regarding the FMiA Bill. However, delays in implementing these reforms perpetuate uncertainties and inefficiencies in project delivery, impacting regions such as Gladstone and Central Queensland, which are central to Australia's clean energy ambitions.

To achieve a higher score, timely completion of the EPBC reforms, effective implementation of the single 'front door', and enhanced inter-agency coordination will be essential. Prioritising net-zero infrastructure projects and streamlining overlapping local, state, and federal frameworks are critical steps towards enabling efficient project delivery and reinforcing Central Queensland's role in Australia's renewable energy future.

3.1.4 Federal Policy – Investment framework

Indicator grading scale

1 - Minimal support (Severe Deficiency)
2 - Basic support (Moderate Deficiency)
3 - Moderate support (Developing)
4 - Strong support (Effective)
5 - Exemplary support (Leading Practice)

Assessment

The federal government's investment frameworks are scored as a **3**, providing moderate support and reflecting ongoing progress in supporting the transition to a zero-emissions economy.

Consistent with the previous assessment, the government has maintained supportive initiatives such as the Clean Energy Finance Corporation (CEFC), Australian Renewable Energy Agency (ARENA), the Capacity Investment Scheme (CIS), and notably, the recent Future Made in Australia (FMiA) Act 2024. In Gladstone, Alpha HPA has received $400 million in December 2024 in debt funding from the Northern Australia Infrastructure Facility (NAIF) and Export Finance Australia (EFA) for their Stage 2 High Purity Alumina facility, which at full capacity will produce 10 kt of high-purity alumina products per year.[118]

The overall scope and impact of these investments continue to face limitations due to coordination gaps between federal and state governments, particularly regarding consistent sectoral investment signals and regional implementation. The experience of Central Queensland, being a pivotal region for Australia's clean energy transition, particularly highlights the need for stronger cooperation frameworks between state and federal authorities.

For the investment framework to achieve a higher rating, the government must further enhance transparency, establish clear exit strategies from fossil fuel investments (especially significant given the region's ongoing fossil fuel industry), and ensure efficient and targeted allocation of future funding to grow zero-emission industries.

Stronger cooperation frameworks and consistent, strategically aligned investment signals from state and federal governments are crucial for maximising investment effectiveness. Addressing these ongoing challenges is vital for Central Queensland to fully capitalise on its potential as a leading hub for clean energy and cleantech industries, ultimately positioning Australia competitively in the global clean economy.

3.1.5 Federal Policy – Research and development

Indicator grading scale

1 - Minimal support (Severe Deficiency)
2 - Basic support (Moderate Deficiency)
3 - Moderate support (Developing)
4 - Strong support (Effective)
5 - Exemplary support (Leading Practice)

Assessment

The federal government's research and development policies for energy transition are scored as a **4,** demonstrating strong support and reflecting substantial investment and strategic prioritisation.

Region-specific research and development (R&D) initiatives, such as ARENA's $32.1 million commitment to Rio Tinto and Sumitomo's world-first hydrogen-powered calciner at the Yarwun alumina refinery near Gladstone, exemplify federal support for innovation in Central Queensland.[29,82,119] This project aims to abate approximately 3 kt of CO_2 emissions per year, with further reductions of up to 3.7 Mt CO_2-e per year possible if rolled out sector-wide.[119]

Further afield, but relevant in the national context, the federal government has also supported early-stage green iron and steel technologies through ARENA. This includes $19.8 million for BlueScope's NeoSmelt electric smelting furnace feasibility study in Kwinana and $44.9 million to support construction of Calix's flexible Zero Emissions Steel Technology (ZESTY) demonstration plant.[120,121] Although neither of these facilities are in Central Queensland, their development could lay foundations for the future deployment of green iron technologies in the Gladstone region.

Despite the progress, challenges persist. The reliance on carbon capture and storage and carbon offsets remains significant, potentially overshadowing direct emissions reduction technologies. To achieve a Leading Practice rating (5), increased focus on direct emissions reduction strategies is necessary. This includes additional R&D funding and sector-specific

partnerships for hard-to-abate sectors prevalent in Central Queensland, such as heavy manufacturing, chemical processing, and mining, alongside enhanced support mechanisms for technology commercialisation and deployment.

3.1.6 Federal Policy – Local procurement policies

Indicator grading scale

1 - Minimal support (Severe Deficiency)
2 - Basic support (Moderate Deficiency)
3 - Moderate support (Developing)
4 - Strong support (Effective)
5 - Exemplary support (Leading Practice)

Assessment

The federal government's procurement policies are scored as a **3**. Key policies have transitioned from proposal to active implementation, establishing a foundation for leveraging the Commonwealth's purchasing power. Full, consistent, and effective implementation of these new frameworks across all government agencies is still in its early stages and has not yet been demonstrated at scale.

Since BZE's Hunter assessment in May 2025, several federal initiatives have advanced, strengthening the framework for sustainable and local procurement.

A critical development occurred on 1 July 2025, when the Environmentally Sustainable Procurement (ESP) Policy's scope was officially expanded.[122] It now applies to procurements over $1 million for Information and Communication Technology (ICT), textiles, and furniture, in addition to the existing requirements for construction services. This move mandates that a wider range of government suppliers meet sustainability criteria, such as emissions reduction and use of recycled content, and report on these outcomes, increasing both the reach of and accountability demanded by the policy.

The passage and initial implementation of the Future Made in Australia (FMiA) Act provides a strategic framework that uses the power of government purchasing to build domestic industrial capability. The associated Buy Australian Plan and National Interest Framework are designed to

create demand-side certainty for local manufacturers in priority areas, including clean energy technologies.[123,124] This directly addresses the gap previously identified in BZE's *Make It Here* report concerning the need for more demand-side support to complement existing supply-side programs.[125]

The process for clean energy investment through the Capacity Investment Scheme (CIS) has been streamlined to a single-stage tender to accelerate the delivery of renewable energy projects. The inclusion of social outcomes and First Nations participation as merit criteria demonstrates a broadening of 'value for money' to include critical sustainability and community benefit factors.[126]

However, challenges remain in translating policy into universal practice. The success of these frameworks hinges on a cultural shift within procurement teams away from prioritising the lowest upfront cost towards a 'whole-of-life' value assessment. To achieve equitable implementation, it is vital to ensure that small and medium-sized enterprises (SMEs) in the Gladstone region have the capacity and support to meet new sustainability and reporting requirements.

For industrial regions like Gladstone, the consistent application of these policies – particularly requiring major public infrastructure projects to specify and procure locally manufactured, low-emission materials like green steel and cement – will be a critical test of their effectiveness in driving a genuine industrial transition.

3.2 Policy and Governance: State Policy

3.2.1 State Policy – Emissions reduction commitment

Indicator grading scale

1 - Minimal commitment (Severe Deficiency)
2 - Basic commitment (Moderate Deficiency)
3 - Moderate commitment (Developing)
4 - Strong commitment (Effective)
5 - Exemplary commitment (Leading Practice)

Assessment

The Queensland Government's emissions reduction commitment is scored as a **3**. This score reflects strong legislated targets and a commitment to sectoral plans, tempered by the absence of independent oversight and the potential removal of key interim targets. These targets are currently under review by the Queensland Productivity Commission and the FY2025-26 Queensland State Budget indicated change is likely, given reduced investment in renewable energy infrastructure and more investment in fossil fuel infrastructure.

At the time of writing, the Queensland Government's emissions reduction commitments are aligned with science-based trajectories for limiting global warming to 1.5°C. These include a net zero target by 2050, and a 75% emissions reduction by 2035 below 2005 levels.[127] However, these targets are currently under review by the Queensland Productivity Commission, with the results due at the end of 2025.[128] The Government has also exceeded its initial 2030 target of 30%, with current emissions reductions at 35%.[129] Net Zero Net However, the 30% by 2030 Queensland target itself remains out of step with national ambition (currently the legislated Australian national 2030 emissions reduction target is 43% below 2005 levels, and a lack of clarity around interim targets for 2040 and 2045 limits forward planning.[130]

The policy framework is supported by a Clean Economy Expert Panel and plans for comprehensive sectoral emissions strategies, spanning energy, resources, agriculture, transport, industry, and the built environment.[131,129] Annual progress reporting is mandated by legislation, with further reviews scheduled for 2025 and beyond. However, Queensland does not yet have an independent oversight body, such as New South Wales' Net Zero Commission, tasked with monitoring progress and ensuring transparency.

Historic financial commitments are significant, with $26 billion in clean energy investment including major allocations for renewable generation, storage, and transmission infrastructure. The FY 2025-2026 Queensland State Budget has revised this initial commitment and the cancellations of major projects such as the Pioneer-Burdekin pumped hydro storage and $1.6 billion for the upgrading of the state's coal fleet creates policy uncertainty and puts targets at risk.[132]

Programs such as the Low Emissions Investment Partnerships and the Land Restoration Fund aim to drive abatement across key sectors, including fossil-intensive industries. However, ongoing expansion of fossil fuel exports – particularly metallurgical coal – presents a material contradiction to the state's emissions targets, and risks undermining Queensland's credibility and investor confidence.

Queensland's legislative architecture includes notable provisions for stakeholder engagement, social licence, and regional economic development through initiatives like the Local Economic Opportunities (LEO) network.[133] However, until the Queensland Productivity Commission review is released, there is uncertainty around whether current targets and programs will be sustained, revised, or rescinded.

To strengthen its emissions reduction commitment, Queensland must maintain or exceed its legislated targets, rapidly deliver detailed sectoral plans, and establish stronger enforcement and independent monitoring. Limiting new fossil fuel developments and prioritising investment in zero-emissions technologies will be essential to securing a credible pathway to net zero. By addressing these gaps, regions like Gladstone can harness the economic and employment benefits of decarbonisation, and position themselves as leaders in Australia's clean energy transition.

3.2.2 State Policy – Skills and training

Indicator grading scale

1 - Minimal support (Severe Deficiency)
2 - Basic support (Moderate Deficiency)
3 - Moderate support (Developing)
4 - Strong support (Effective)
5 - Exemplary support (Leading Practice)

Assessment

The Queensland government has made meaningful investments in skills and training for the energy transition, and supporting projects are well-progressed. However, the absence of a credible energy workforce transition plan and the ongoing review of emissions reduction commitments under the Clean Energy Jobs Act, dilute the broader support and context for these initiatives. As a result, the overall score is a **3**.

To prepare the workforce for the energy transition, the Queensland Government has committed meaningful funding to a suite of targeted skills and training development initiatives. Notable investments include the Clean Energy Workforce Roadmap, and new regional transmission and training hubs for critical skills, including $29 million in the FY 2025-26 Queensland State Budget for a permanent Powerink Transmission Training Hub facility in Gladstone. This builds on an initial $10 million already invested.[132] The FY 2025-26 Queensland State Budget also allocated $61.1 million for a new TAFE precinct in Rockhampton for a wide range of trades from construction to electrical, some of which will support the energy transition.[134] A further $10 million is being invested to uplift existing state-owned training infrastructure, and $4 million was supplied to the VET Emerging Industries (VEI) initiative's energy program, supporting accredited training and micro-credentials for renewable energy, electric vehicle and hydrogen fundamentals until June 2024.[135]

Strong partnerships are contributing to industry and educational collaboration. For example, the *Future Energy Jobs Guide)*, aimed at advertising renewable energy opportunities to students and workers alike, was developed with input from industry, education providers and unions.[136] Queensland is also launching a Renewable Energy Gateway to Industry Schools Program, aiming to connect over 30 schools and 2,000 students with clean energy careers.[137] Energy Queensland offers 100 engineering scholarships annually and has partnered with TAFE

Queensland for vocational training.[138] Powerlink's future Gladstone Hub will also support a Central Queensland workforce, including through apprenticeships.[139]

Despite this progress, ongoing support for reskilling and workforce transition remains unclear in the absence of a credible transition to emissions reduction, compounded by the cancellation of Stanwell's Future Energy Innovation and Training Hub. This uncertainty also limits mechanisms for tracking the progress and effectiveness of announced programs.

3.2.3 State Policy – Approvals processes

Indicator grading scale

1 - Minimal support (Severe Deficiency)
2 - Basic support (Moderate Deficiency)
3 - Moderate support (Developing)
4 - Strong support (Effective)
5 - Exemplary support (Leading Practice)

Assessment

Recent changes to Queensland's renewable energy planning framework aim to improve consistency in community engagement and project approvals. While well-intentioned, their current implementation risks project delays right when delivery is critical, and as for their impact on implementation efficiency, only time will tell. These approvals processes score a **2**.

In June 2025, the Queensland Government passed new planning requirements for large-scale solar in the Planning (Social Impact and Community Benefit) and Other Legislation Amendment Act 2025, following earlier reforms to wind energy generation planning in February.[45] These changes consolidate both technologies as impact-assessable under the State Assessment and Referral Agency (SARA), requiring public consultation and granting third-party appeal rights.

Previously, wind farms were assessed through less detailed code assessment pathways, while solar approvals were managed by local governments. This resulted in inconsistent processes and limited transparency across the state's 77 councils.[140] Under this system, neither

community consultation nor benefit-sharing was required, despite both being widely recognised as essential to a socially legitimate energy transition.[141] Proponents must now complete social impact assessments (SIAs) – covering workforce, procurement, accommodation and community wellbeing – and sign community benefit agreements (CBAs) with local councils **before** submitting development applications.[46] These requirements apply retroactively to existing applicants.

The reforms introduce welcome consistency and formalise community benefit expectations. However, requiring finalised CBAs before lodgement is inconsistent with processes for other major projects and risks creating early-stage bottlenecks.[142] It may also result in community benefits going undelivered if projects fail to proceed, undermining the planning efforts of local communities and First Nations. These issues could be mitigated by making CBAs a condition of approval, rather than a pre-lodgement requirement, and by supporting the delivery of regional benefits programs, perhaps as part of REZ development.

These changes do not affect large-scale pumped hydro developments, which are typically assessed as Coordinated Projects by the Coordinator-General. This involves the preparation of either an Environmental Impact Statement (EIS) or Impact Assessment Report (IAR), and is intended to consolidate engagement across state government agencies through a single point of contact.[67] Key transmission infrastructure is assessed under Queensland's Priority Transmission Investment (PTI) framework, which embeds early engagement and benefit-sharing programs, unlike the national Regulatory Investment Test for Transmission process.[143] The Gladstone Project is currently progressing under this framework.[47]

3.2.4 State Policy – Investment framework

Indicator grading scale

1 - Minimal support (Severe Deficiency)
2 - Basic support (Moderate Deficiency)
3 - Moderate support (Developing)
4 - Strong support (Effective)
5 - Exemplary support (Leading Practice)

Assessment

The Queensland Government has deployed a diverse suite of funding mechanisms to support clean industry development. However, several key programs have been exhausted without renewal, and its overarching strategy remains unclear. We score the investment framework as a **3**.

Queensland has made significant public investments in the clean energy transition. Our analysis of the FY25-26 Budget finds that approximately $1.5 billion was allocated to government-owned corporations for utility-scale renewable generation and storage, including $79 million for the acquisition of the Big-T and Mt Rawdon pumped hydro projects following the cancellation of Pioneer-Burdekin.[132] The state has also committed over $4.4 billion toward major transmission projects in Gladstone and along the CopperString corridor.

The strategic coordination of these investment mechanisms was originally outlined in the Queensland Energy and Jobs Plan and the SuperGrid Infrastructure Blueprint – both of which are set to be superseded by the Energy Roadmap. Full details of the Roadmap have not yet been released. Our analysis shows that $870 million was allocated in the FY 2025-26 Budget to government-owned fossil fuel projects, which is inconsistent with Queensland's legislated climate targets. It is essential that the Roadmap delivers an updated investment framework that builds on existing progress and provides a credible path to net zero.

Several business-facing programs aimed at improving energy efficiency and industry competitiveness have seen strong uptake. For example, the $415 million Industry Partnership Program (IPP), aimed at catalysing private investment in new industries, including those crucial to decarbonisation, provided $21.7 million for Alpha HPA's HPA First Project in Gladstone.[144] However, funding for other successful programs such as the Manufacturing Energy Efficiency

Grant Program and the Queensland Business Energy Saving and Transformation (QBEST) scheme has been fully exhausted without extension.[72,145]

Queensland has also made notable regional investments, including the development of transmission training hubs in Gladstone and Townsville, the Queensland Microgrid Pilot Fund and Energy Queensland's work with isolated communities. Programs such as TAFE Queensland's Renewable Energy Training Hubs and Mobile Training Facilities are helping to grow this industry regionally, but their funding does not extend beyond FY 2025-26. At the same time, momentum has slowed in Renewable Energy Zone development. The removal of references to CS Energy's Clean Energy Hub and the cancellation of Stanwell's Future Energy Innovation and Training Hub raise concerns about how to ensure decarbonisation remains a clear priority for regional investment.

Greater public reporting on the delivery, outcomes and remaining budgets of these programs is needed to support transparency and track progress toward Queensland's decarbonisation goals.

3.2.5 State Policy – Research and development

Indicator grading scale

1 - Minimal support (Severe Deficiency)
2 - Basic support (Moderate Deficiency)
3 - Moderate support (Developing)
4 - Strong support (Effective)
5 - Exemplary support (Leading Practice)

Assessment

The Queensland State Government's support for research and development has been scored as a **2**, underpinned by uncertainty around financial commitments, shifting policy and a lack of published detail on exact funding.

The Queensland Decarbonisation Hub is the main research body connecting universities, industry and community.[146] It is funded under the $4 billion Queensland Climate Action Plan, although the Hub's exact budget is unclear. Queensland's climate targets are under

Productivity Commission review at the time of writing, contributing to broader uncertainty. Similarly, the Low Carbon Accelerator, designed to support commercialisation of climate tech and fund proof of concept projects, was connected to the Queensland Energy and Jobs Plan, and no longer exists.

The FY 2025-26 Queensland State Budget withdrew $105 million in funding from the Australian Battery Industrialisation Centre (ABIC) – part of the Queensland Battery Industry Strategy– which included research and development aspects.[147] The fund also included $92 million to support the build-out and integration of Queensland's battery supply chain to increase industry capabilities and enable greater local content; however, it is unclear if this still exists, given that any mentions of the Queensland Battery Industry Strategy have been removed from the government website.[148] However, it is unclear how the removal of the ABIC will impact the battery research and development ecosystem.

Advance Queensland's Industry Research Program, which offers $3 million per year, is spread across many sectors including health and agriculture. Although not specific to decarbonisation, it has funded some very relevant projects, for example James Cook University's Collaboration with Powerlink to optimise North Queensland's power grid for renewables.[149] Advance Queensland also provides $5 million in funding for post doctoral researchers across a range of sectors, some of which apply to decarbonisation.[150]

Finally, the Queensland Treasury Corporation has become an affiliate partner of the Heavy Industry Low-carbon Transition Cooperative Research Centre, HILT CRC.[151] This supports industry research that can help decarbonise hard-to-abate sectors relevant to Gladstone, such as the cement and alumina industries, and could provide guidance about what industry projects to fund with emerging technology.

Increased support for and transparency around renewable energy, cleantech and social acceptance research and deployment is needed.

3.2.6 State Policy – Local procurement policies

Indicator grading scale

1 - Minimal support (Severe Deficiency)
2 - Basic support (Moderate Deficiency)
3 - Moderate support (Developing)
4 - Strong support (Effective)
5 - Exemplary support (Leading Practice)

Assessment

The Queensland Renewable Energy and Procurement Policy (QREPP) mandates that CleanCo and Stanwell prioritise Queensland and local regional businesses, resulting in a score of **3** for local procurement policies. There is evidence of strong engagement with Queensland businesses, including SMEs. However, the QREPP policy is somewhat isolated without strong legislation reinforcing renewable energy pipeline support. Renewable energy projects that receive Queensland government funding are also obliged to prioritise local business.

The Queensland Renewable Energy and Procurement Policy (QREPP) was initially part of a suite of policies woven together to roll out renewable energy, and build a Queensland renewable energy supply chain industry.[152] QREPP still stands, but its impact is weakened in the absence of a supporting policy suite that provides the demand certainty of a secure pipeline of renewable energy projects. The Queensland Productivity Commission review may change renewable energy targets.[153]

Current policy around incentives for suppliers and availability of financial and non-financial support for local and low-emission suppliers is well-crafted with the inclusion of local benefits testing (LBT) and the requirement of up to 30% local procurement.[154] Low-emissions suppliers are encouraged by procurement-specific emissions reduction targets and QREPP alignment with Queensland's targets. However there is some uncertainty given the targets under review. Regular audit reporting on procurement across departments as part of the Buy Queensland policy enables the government to understand its impact on local business.[155]

There has been engagement and collaboration with SMEs to advance sustainable procurement. QREPP has targets that must be followed to increase government procurement

to 3% 'addressable spend' from First Nations businesses and at least 30% per cent of procurement by value from Queensland SMEs. The FY 2025-26 state budget allocated $44.7 million Small Business First funds to simplify small business procurement.[156]

The local benefits test prioritises suppliers with a workforce within a **125km radius**, but more broadly evaluates the economic and social benefits any supplier can bring to the local area, for example by using a local supply chain. Documentation of the rationale for how the local benefits test is applied and weighted is required for significant procurement activities. A local benefits test guide provides case studies to help government agencies and enterprises assess how suppliers can deliver local benefits, rather than strictly favoring local firms over non-local ones.[154]

Strong local engagement requirements include understanding the local markets, and taking actions to foster local participation. Examples of this are briefings sessions, publishing forward procurement pipelines, and a flexible outcomes-based approach to encourage process innovation.

Clear emissions targets and renewable energy policy will help provide local renewable pipeline support.

3.3 Local Government Policy

3.3 1 Local Government Area decarbonisation plans

Indicator grading scale

1 - Minimal Plan (Severe Deficiency)
2 - Basic Plan (Moderate Deficiency)
3 - Moderate Plan (Developing)
4 - Strong Plan (Effective)
5 - Exemplary Plan (Leading Practice)

Assessment

The Local Government Area's (LGA) decarbonisation plan for the Gladstone region is scored as **4**, indicating a strong and effective plan that is well-developed and progressing towards implementation. Gladstone Regional Council is the sole local government authority, simplifying

coordination and enabling focused strategic efforts. The existence of the Economic Transition Roadmap (2022-2032) focused on industrial and broader decarbonisation also contributes to this high score.

The Gladstone Regional Council has developed an ambitious Economic Transition Roadmap (2022-2032), which aims to guide the region's transition towards becoming a renewable energy powerhouse.[157] The roadmap outlines clear sector-specific strategies, particularly in renewable energy generation, hydrogen industry development, and sustainable waste management. Notably, the Council has implemented projects such as the Benaraby Landfill Gas-to-Energy facility, reducing local emissions equivalent to thousands of tonnes of CO_2-e per year.[158,159] The Council is actively promoting and enabling renewable energy and storage projects in its region (as part of its Economic Transition Roadmap), and has begun incorporating electric vehicles into its fleet.[160]

However, formal internal emissions reduction targets for council operations remain in development, highlighting an area needing urgent attention and clarity. To further strengthen Gladstone's decarbonisation initiatives, state and federal government support could focus on assisting the council in establishing clear and measurable emissions targets, particularly for council operations and community-wide emissions. Additional resources dedicated to implementation efforts and expanding existing pilot initiatives would enhance the effectiveness of these decarbonisation initiatives.

Enhanced stakeholder engagement, particularly ongoing collaboration with local industries, educational institutions, and community groups, will help align regional priorities, ensuring broad community support and economic inclusion in the transition. Improved monitoring and reporting mechanisms, including regular public updates and a formalised emissions inventory, will be essential for tracking progress, maintaining accountability and adapting strategies effectively.

By adopting these recommended measures, Gladstone Regional Council can further consolidate its already commendable efforts, positioning itself as a leading example of regional decarbonisation planning in Australia.

Key findings and recommendations for Policy and Governance (Federal, State and Local Government Policy)

Federal and state energy and climate policies provide meaningful support toward establishing a Renewable Energy Industrial Precinct in Gladstone. However, the simultaneous backing of renewables and fossil fuel expansion, combined with inconsistencies between levels of

government, send mixed signals to developers, industry and the public. As Queensland's policy landscape continues to evolve under the new government, it is crucial that new reforms are strongly aligned with key enablers needed to advance the region's renewable energy transition.

Federal policy indicators assessments have remained broadly consistent from our previous National Action Plan analysis of the Hunter, with one key exception: 3.1.1. Federal Emissions Reduction Commitment has been downgraded following approval of the North West Shelf gas extension. This reinforces our concern that ongoing fossil fuel support could divert investment and skilled labour from emerging industries and create policy uncertainty.

Federal support for Gladstone has been targeted through initiatives such as the Central Queensland Hydrogen Hub, the Hydrogen Centre of Excellence at Central Queensland University Gladstone, and ARENA funding for the Rio Tinto and Sumitomo's world-first hydrogen calcination pilot. This strong backing for hydrogen-related industry contrasts with recent signals from the state government, including the withdrawal of funding for the flagship Central Queensland Hydrogen Project (CQ-H2). Hydrogen remains an essential feedstock and fuel for powering high-temperature processes in energy-intensive Gladstone industries – including alumina, ammonia (for both export and explosives), and potentially green iron – which necessitates greater policy alignment across jurisdictions.

Queensland's approvals processes have been more efficient than in New South Wales, but there is still room for improvement. Federally, overdue Environment Protection and Biodiversity Conservation Act reform should include a climate trigger to help address the mixed signals created by continued support for fossil fuel expansion, and introduce a single 'front door' to streamline project timelines. Queensland's new requirements for community consultation and benefits agreements are welcome, but requiring community benefit agreements (CBAs) before development application can be lodged risks introducing early-stage bottlenecks and community disillusionment if projects do not proceed. As outlined in earlier sections of this report, these impacts could potentially be mitigated by making CBAs a condition of development approval rather than a pre-lodgement requirement.

Strong state commitments to decarbonisation, research and development, investment, procurement, and skills and training are diluted by a lack of current and consistent energy policy. In particular, ongoing reviews of the Clean Economy Jobs Act and Energy (Renewable Transformation and Jobs) Act throw into question interim emissions reduction targets needed to measure progress, and cast uncertainty on a number of investment pools for the infrastructure and workforce needed to guarantee a healthy transition. It is critical that the State Government's new Energy Roadmap, to be released later this year, continues to support decarbonisation, research and development, investment, procurement, and skills and training.

Gladstone Regional Council's Economic Transition Roadmap (2022-2032) provides a

coordinated approach to enabling decarbonisation and economic growth in the region. It is essential that state and federal commitments align and assist both this local planning as well as the Gladstone Regional Council's own decarbonisation.

4.2 Social Acceptance – Community Benefits & Impact

4.2.3 Strategic and nature-positive land use planning

Indicator grading scale

1 - Minimal level of planning (Severe Deficiency)
2 - Basic level of planning (Moderate Deficiency)
3 - Moderate level of planning (Developing)
4 - Strong level of planning (Effective)
5 - Exemplary level of planning (Leading Practice)

Assessment

This indicator for the Gladstone region is scored as **3**, determined on the basis that biodiversity prioritisation, agricultural land use and energy infrastructure data of useful quality are available for Central Queensland, with pilot projects to enable strategic bioregional land use planning in place though they are in early development. Nationally, research into land-use prioritisation methodologies shows promise but is hampered by the lack of comprehensive tools. A clearer understanding of the essential and most economical industry and infrastructure requirements to deliver renewable energy need to be incorporated to ensure full community buy-in.

Meaningful data of useful quality are publicly available for Central Queensland from the Queensland Government in the following areas:

- Biodiversity (for the state and for state bioregions), to assist identification of Matters of National and State Environmental Significance (MNES and MSES), and regional biodiversity values.[161]
- Agricultural land use across the state.[162]
- Energy infrastructure point data for proposed, progressing and operational sites.[163]

Existing transmission infrastructure is available nationally.[164]

Three pilot projects are underway as a collaboration between federal and Queensland governments. The most relevant pilot to the question of land-use triaging for renewable energy is in relation to wind farm and bioregional planning in North Queensland.[165]

Recent nationally and regionally focused research highlights potential ways to prioritise land use for high biodiversity, farming and First Nations values across Australia.[166,167] However, in order to ensure land-use mapping as a tool gains industry and general community buy-in, the economically viable requirements of renewable energy infrastructure need to be better understood and embedded in this land use planning. The specific impacts of renewable energy infrastructure on biodiversity such as essential habitat and ecological connectivity, also deserve further ongoing investigation, however the urgency of the renewable energy rollout requires decisions to be made now with the best available information and decision making tools.

Central Queensland has extensive land classed as high biodiversity value.[168,169]

This assessment focused on renewable energy infrastructure and does not include environmental impacts associated with specific existing and future manufacturing processes such as water desalination.

Key findings and recommendations for Social Acceptance (Strategic and nature-positive land use planning)

Strategic and nature-positive land-use planning allows efficient approvals for critical infrastructure and ensures that the renewable energy rollout incorporates best practice to protect and enhance natural, agricultural and other land use values. Fully leveraging these tools would help address the substantial Environment Protection and Biodiversity Conservation Act bottlenecks noted in the Enabling Infrastructure and Policy sections of this report, and support a more coordinated approach to critical infrastructure planning across Renewable Energy Zones.

Queensland's high-quality biodiversity, agricultural land, and energy infrastructure data, along with pilot projects, provide a strong foundation for such planning in Central Queensland. However, the preliminary stages of pilots and the lack of a clear operational framework for land use prioritisation, mean the score for strategic and nature-positive land-use planning is held to a 3.

Ongoing commitment for updating and sharing of databases of biodiversity, agricultural land use and energy systems infrastructure is commended. Support for pilot projects and, ideally, accelerated application of their findings will be needed to underpin strategic and nature-positive land-use planning in Central Queensland.

Coordination between biodiversity advocates and industry and government stakeholders, including Powerlink, the Queensland Renewable Energy Council, and renewable energy developers, will need to continue to understand the existing data, pilots, trade offs and limitations for protecting biodiversity, farmland, and developers' economic cases. Knowledge and dialogue can build partnerships and shared principles about how to develop renewable energy in a nature-positive way. Efforts to bring key perspectives together, by the Energy Charter and others in Australia, deserve ongoing support and buy-in.

First Nations community benefit sharing and perspectives on land-use prioritisation should be further considered in this or an alternative indicator. Public data sets are not readily available but conversations and pilot projects to incorporate First Nations perspectives are welcome and essential. It is important to spur progress towards ensuring First Nations communities have a say in and share the benefits of projects on the land that they have traditional connections to.

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