GLADSTONE REGION
ECONOMIC TRANSITION ROADMAP

10-YEAR ROADMAP 2022–2032

Prepared by The Next Economy
for Gladstone Regional Council

October 2022

Australian Government
GLADSTONE REGIONAL COUNCIL
The Next Economy

Acknowledgement of Country

We wish to acknowledge the Bailai, the Gurang, the Gooreng Gooreng and the Taribelang Bunda people as the traditional custodians of the land to which this report relates. We pay our respects to their Elders, past and present, and offer our solidarity and support to First Nations groups across the country working towards economic sovereignty and justice.

About The Next Economy

Change is inevitable, and with that comes great anxiety. But it also comes with great opportunities. The Next Economy works alongside communities, industries and governments to harness economic opportunities that ensure wellbeing for people and the planet on which we all depend.

Find out more at: www.nexteconomy.com.au

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Contents

Executive Summary

The Gladstone Region is facing a major economic transformation as industries grapple with the decarbonisation of the global economy. The challenges facing the region, and therefore the Gladstone Regional Council, emanate from the need to manage the shift away from fossil fuels and manage the impacts associated with new energy industries.

Despite these challenges, Gladstone's existing industrial base and growing availability of low-cost renewable energy means that the region is also well positioned to benefit from the energy transition. There are opportunities to expand and diversify the region's economic base and take advantage of opportunities such as 'green' manufacturing and hydrogen production. Change on the scale facing the Gladstone Region, and the likely impacts on the economy, workers and community makes transition planning and coordination an imperative for long-term resilience and prosperity.

In 2021, as per the operational and corporate plans, Gladstone Regional Council (Council) initiated a process to create a 10-Year Gladstone Region Economic Transition Roadmap. This initiative has been delivered in partnership with The Next Economy and funded by the Australian Government. The purpose of the Roadmap is to inform and guide Council on what is required to support the region to successfully adapt to a changing energy sector over the next decade, alongside other levels of government and industry.

In preparing the Roadmap, The Next Economy worked with Council to engage over 200 community and industry stakeholders to gather input into the work that needs to be undertaken across six key themes:

1. Energy Security, Reliability and Affordability.
2. Building the Hydrogen Industry.
3. Diversifying the Regional Economy.
4. Workforce Development.
5. Capturing Community Benefits.
6. Protecting and Regenerating the Environment.

This Roadmap provides a detailed account of the findings related to each of these themes in terms of:

- Stakeholder aspirations for 2032.
- The key issues to be addressed.
- Emerging economic opportunities.
- Council's role in managing change over time.

A summary Roadmap report is also accessible at https://www.gladstone.qld.gov.au/economic-information.

Energy Security, Reliability and Affordability

Stakeholders from the Gladstone Region and industry groups shared a common vision that by 2032, the Gladstone Region will have transitioned its source of energy generation to renewable energy while intensifying its position as an energy superpower. People understand the energy sector is changing and expect that by the end of the next decade, industries across the region will be using renewable energy that is firmed with some demand management and storage. This shift will require unprecedented development, as almost all energy needs will be electrified or met by the growing regional hydrogen industry. While participants understood that developments would include large-scale renewable energy and transmission projects, they expressed strong support for decentralised energy generation through increased household and community ownership of renewable energy generation.

Successfully transitioning the Gladstone Region to safe, reliable, and affordable energy, particularly heavy industries, requires the following actions:

- Building enough renewable energy, firming, storage, transmission and distribution to reliably and affordably meet current and future needs.
- Constructing and upgrading the infrastructure (e.g., transmission, transport) needed to support the renewable energy sector.
- Reducing the impacts of renewable energy developments on land use by ensuring that planning and development assessment avoids competing interests and generates stakeholder support by consulting, mitigating and compensating for infrastructure impacts.
- Developing and upgrading legislative and regulatory parameters to enable innovations such as microgrids, energy trading, and community-owned renewable energy projects to be deployed in the region.
- Undertaking more thorough and holistic planning to develop new policies and regulations to manage both the decline of the fossil fuel industry and the expansion of renewable energy developments.
- Addressing a range of financial challenges, particularly the cost of infrastructure, to ensure affordable and equitable access to energy, including the technologies that will enable residents and small businesses to take advantage of these changes.
- Establishing a Regional Transition Authority (supported by State and Federal Governments) to undertake planning that informs effective policies to improve coordination, improve clarity, and mitigate disruptions.

Building the Hydrogen Industry

Participants envisioned that by 2032, the hydrogen industry will play a crucial part in the Gladstone Region's ability to achieve net zero emissions while sustaining and expanding energy-intensive industries and economic prosperity. Included in the vision was the Gladstone Region becoming a 'Centre of Hydrogen Excellence' through coordinated efforts to develop resilient local supply chains, storage and production facilities, common user infrastructure, domestic demand and export capabilities. Importantly, participants expect that the industry will have developed responsibly over time, addressing community concerns about the safety and water resources required for hydrogen production.

Specific actions identified by industry stakeholders to create a viable, long-term green[1] hydrogen industry include:

- Developing domestic demand by using hydrogen across a range of local operations, for example, in heavy vehicle fleets.
- Developing an export market for hydrogen by working with Japan, South Korea, Germany and The European Union to support their ambitions to convert to low-emissions hydrogen.
- Ensuring sufficient availability of renewable energy to power the hydrogen industry.
- Increasing efficiencies and reducing production costs related to installation, electrolyser production, water supply, renewable energy generation and other processes and inputs.
- Investing in the infrastructure needed to develop the hydrogen supply chain, including the sustainable provisioning of water through desalination, renewable energy infrastructure, gas and water pipelines, storage facilities, port facilities and waste treatment facilities.
- Building community understanding of the industry, particularly around safety, viability and legacy issues.
- Developing effective policy and legislation and undertaking detailed planning. Examples included measures to encourage demand in areas such as transport, trusted certification schemes, and to enable common user infrastructure.

Diversifying the Regional Economy

Community and industry stakeholders across all engagement activities expressed pride in the Gladstone Region's industrial heritage. Overwhelmingly, participants wanted to see the region continue to be "a place where things are made and exported to the world" as the economy decarbonises over time. This transformation over the next decade – made possible by the supply of low-cost, low emissions energy – will underpin long-term investment and growth in existing and new energy-intensive industries such as manufacturing exports produced with renewable energy such as green steel, aluminium, electrolysers and batteries, as well as agricultural products (food and fibre production). Stakeholders also wanted to see greater investment in other sectors, including construction, professional services, housing, health, education and tourism.

1 Green hydrogen made from renewable energy and not fossil fuels.

If managed well, decarbonising existing industries could also lead to expanding a range of enterprises across the region, providing a diverse range of local employment and service opportunities. Addressing the challenges and realising the opportunities associated with economic diversification includes:

- Supporting existing industries to decarbonise so they can remain viable.
- Expanding the local manufacturing base by building on existing infrastructure, skills and inputs.
- Providing incentives to attract new industries and investment to the region.
- Building the capacity of local businesses to meet the needs of these new industries (e.g., hydrogen, renewable energy generation).
- Exploring innovation in areas like the circular economy, or creating an eco-industrial centre, such as the Renewable Energy Industry Precinct concept proposed by Beyond Zero Emissions.
- Developing local infrastructure to meet the needs of emerging industries.
- Engaging people that tend to be marginalised from mainstream employment opportunities (for example, First Nations people, women, young people, people living with a disability and older workers) and attract new workers to permanently migrate to the region.
- Taking advantage of locally available renewable energy and the need to decarbonise the economy to expand other sectors such as agriculture, tourism, and waste management.

Workforce Development

Participants in engagement activities overwhelming agreed that by 2032, they wanted to see the expansion of the renewable energy, hydrogen and manufacturing sectors resulting in long-term career opportunities with secure, well-paid positions that offer a range of benefits for existing and future workers.

They expect successful management of potential economic impacts as the population expands to meet industry needs, creating positive outcomes such as increased cultural diversity and equity. Participants also hope that new industries will support historically marginalised people to participate in the workforce, and a place-based approach to training will create multiple world-class facilities with Gladstone positioned as a “centre of excellence for training.”

Achieving the aspirations expressed by stakeholders will require a careful analysis of the existing workforce and future industry needs, as well as long-term coordination, participatory planning and immediate action. These actions include:

- Identifying current and future skills shortages and undertaking a thorough skills audit.
- Developing a place-based approach to local workforce training and development, including the development of new structures to support efficient coordination over time (for example, a Regional Transition Authority).
- Facilitating greater cooperation between State and Federal Governments and regional stakeholders to develop consistent and complementary legal and policy levers;.

- Incentives for industry to develop the regional workforce and strategies to capture local workforce opportunities presented by the development of Renewable Energy Zones;.
- Supporting fossil fuel workers to be redeployed to other energy operations, retrain for new careers or retire early.
- Developing a strategy and practical support to enable historically marginalised groups to join the local workforce. This includes increasing the number of apprenticeships and traineeships in the region that target women, First Nations people, young people and older workers.
- Improving services and facilities across the region to attract workers to migrate to the region and minimise reliance on fly-in fly-out (FIFO) workers.
- Strengthening the role of unions to support workers and inform workforce strategies to ensure good conditions and long-term security for workers.

Capturing Community Benefits

Participants across the community workshops agreed that everyone within the Gladstone Region should share in the revenues and benefits generated from being one of the nation's 'industrial engine rooms.' By 2032, participants expect economic changes brought about by the energy transition should extend beyond just increasing employment opportunities to also improve the region's liveability. Improvements include reductions in the cost of living, better health and wellbeing services and access to affordable housing for all.

Participants emphasised that the benefits of change should extend to everyone including First Nations, traditionally marginalised communities, and fossil fuel workers.

Capturing community benefits could be achieved by:

- Reinvesting economic windfalls (whether through taxation, royalties or community funds) to improve infrastructure such as roads, and augment access to essential services in areas such as health, aged care and childcare.
- Finding ways to develop affordable and accessible housing to meet the long-term needs of residents. For example, companies could invest in high-quality modular homes, 'rent to own' programs, or develop mobile tiny homes for transient workers.
- Ensuring social inclusion in employment and procurement opportunities by building the capacity of local enterprises and coordinating regional access to contracts with large projects.
- Capturing financial benefits for the region in a strategic, transparent, and equitable ways, such as through social infrastructure planning and the development of community benefit funds.
- Addressing the loss of fossil fuel royalty payments during the transition to renewable energy.

Protecting and Regenerating the Environment

Participants in engagement activities envisaged improvements to the management of Gladstone Region's diverse environments and natural resources over the next decade. There is substantial support for action to mitigate climate change, assist ecosystems in adapting, and protect the Great Barrier Reef and other precious water resources. Most participants saw a zero-waste future that uses circular economy principles. Participants also emphasised the importance of First Nations' traditional knowledge in guiding development, managing resources and biodiversity, mitigating natural hazards, and rehabilitating industrial sites (such as coal-fired power station assets).

By 2032, a suite of actions generated through the engagement activities would improve the balance between rapidly developing new energy industries and meeting community expectations to protect and restore environmental assets. Adopting a more holistic and comprehensive planning assessment process will help achieve these results if it considers, minimises, and, if required, changes how new developments and industries are built or operated to mitigate adverse impacts on land and water assets.

In summary, the priority areas for action include:

- Protecting water quality and supply in an already dry part of Australia.
- Protecting the Great Barrier Reef and marine ecosystems.
- Protecting, remediating, and regenerating existing land (includes repurposing fossil fuel infrastructure and minimising the impact of renewable energy on biodiversity).
- Ensuring changes lead to air quality improvements and emissions reductions.
- Adopting new approaches to reduce waste and impacts, including circular economy approaches.
- Improving environmental monitoring and reporting by industry and government.

Roles and Responsibilities

Managing a transitioning energy sector is a complex task, especially given the rapid pace of change. The myriad of stakeholders that need to participate in planning and decision-making processes extend across all sectors of the economy and society. Clarifying roles and responsibilities at all scales is required if the region's industries and businesses are to mitigate negative impacts and capture benefits to support a thriving community. While Local, State and Federal Governments have statutory roles to fulfil, they could make many strategic policy and regulatory moves to ensure everyone benefits from changing to a more secure, decarbonised and affordable energy system.

Suggestions for the roles Council can play in strengthening and diversifying the regional economy are summarised in Chapter Eight and listed at the end of each chapter. These roles typically fit into four categories:

1. Leading and advocating for the region's priorities.

2. Attracting new investment to the region.
3. Informing community and local businesses about programs that can support them to take action.
4. Ensuring new developments and industries meet community expectations and aspirations.

To do this effectively, Council must work collaboratively with industry and other levels of government, not only according to their statutory responsibilities, but to stand up for the needs of the region. The Gladstone Region Economic Transition Roadmap project demonstrates Council's foresight and willingness to play the role of facilitative leader.

Gladstone Harbour is home to the Port of Gladstone from where coal and LNG are exported overseas

CHAPTER 1:
Introduction

The Gladstone Region Economic Transition Roadmap[1] is an initiative of Gladstone Regional Council, delivered in partnership with The Next Economy and made possible with funding from the Australian Government. This report, prepared by The Next Economy, describes how Gladstone Regional Council can navigate changes in the energy sector that will transform the regional economy over the coming decade. The report is structured around six key questions that underpin the project:

1. What will it take to ensure energy security, stability and affordability as the energy sector changes?
2. How can the region work with stakeholders to develop the hydrogen industry in a sustainable way?
3. What opportunities exist to diversify and strengthen the regional economy and help existing industry to adapt?
4. How can Gladstone Regional Council work with others to support and develop the local workforce to take advantage of new opportunities?
5. How can communities benefit from changes in the energy sector, and how can negative impacts be avoided, mitigated or managed?
6. What are the potential environmental impacts associated with a changing energy sector? How can the local environment be protected and regenerated?

Each chapter explores one of these questions, identifying the region's key challenges and opportunities and highlighting the role Council and other key stakeholders can play in managing change.

1.1 Project background

Gladstone Regional Council's 2021–22 Operational Plan endorsed an initiative to "develop a Regional Transition Plan to secure a more diversified economy."[2] The initiative aims to understand how changes in the energy sector would impact the regional economy and how Council could support community and industry to adapt over time.

Council's Corporate Plan 2021–26 provides the organisation's strategic direction over a five-year timeframe. The initiative is linked to Objective 3.1.1: "Support a diverse economy of existing and emerging industries that includes advanced manufacturing and a low-carbon industrial hub."

1 The engagement phase of this project was advertised as "Energising the Gladstone Region's Economic Future".

2 Gladstone Regional Council's 2021–22 Operational Plan, p25. https://www.gladstone.qld.gov.au/downloads/file/3604/operational-plan-and-budget-2021-2022

Gladstone Regional Council engaged the services of The Next Economy to lead and progress an in-depth research and engagement process to develop a 10-year roadmap with recommended actions to support the diversification of the regional economy and management of the energy transition, building on existing and emerging industries.

The focus and timing of this work are significant, given the scale and pace of change occurring across the Gladstone Region as international trading partners and industry race to reach net zero emissions targets. Moves are already underway to reduce Australia's reliance on coal-fired electricity generation and accelerate the expansion of renewable energy generation, transmission and storage capacity. Fossil fuel exports are also facing an uncertain future as our major trading partners diversify their energy mix to reduce their national emissions as new tariffs and taxes emerge on high carbon products.[3] Recent research, as presented in the Australian Energy Market Operator's (AEMO) 2022 Integrated System Plan (ISP) suggests that the pace of change is likely to accelerate over the coming decade, predicting that the National Electricity Market (NEM) could have periods where the entire

3 Towards Net Zero: Implications for Australia of Energy Policies in East Asia, Reserve Bank of Australia, September 2021.

electricity demand is met through renewable energy by as early as 2025.[4] A timeline of energy changes over the next decade that will impact the region can be found in Appendix A.

While other regions are also experiencing these changes, the Gladstone Region is particularly vulnerable to the impacts of decarbonisation efforts. Gladstone Region has an economic dependence on a range of carbon-intensive industries, including the production of alumina and aluminium, Liquified Natural Gas (LNG), cement, ammonia and other chemicals. Regionally based coal-fired electricity generators power industries, such as NRG Gladstone Power Station and Callide B Power Station – both face potential closure over the next ten years. Furthermore, the region derives significant revenue from exporting fossil fuels (coal and LNG) through the Gladstone port.

Given the scale of revenue generation in the Gladstone Region, the impact of changes in the energy sector will be felt throughout Queensland. The region generates $15 billion in economic revenue annually, with over $9 billion of this economic value derived from international exports and over half of all export revenue (56.5%) generated through the energy intensive manufacturing sector.[5]

While the risks of a changing energy sector are significant given the region's economic ties to carbon-intensive industries, the Gladstone Region also enjoys several competitive advantages over other regions in the race to net zero emissions. The Gladstone Region and surrounding areas have dozens of renewable energy projects planned. The combination of an existing industrial base, strong supply chains, a skilled workforce, and access to lucrative Asian markets through the port makes the region attractive to a range of new investors and industries.

Given this context, many of the leading industrial players in the region are already starting to decarbonise their operations. The region is attracting significant investment in renewable energy generation, green hydrogen and biofuel production, and the manufacturing of renewable energy equipment (for example, batteries and electrolysers). Due to the scale of change facing the Gladstone Region and the likely impacts on the economy, workers and the community – transition planning and coordination are imperative for long term resilience.

1.2 Developing the Gladstone Economic Transition Roadmap

Discussing the changes in the energy sector has been a significant barrier to planning and coordination efforts over the past ten years. Given the region's high dependence on carbon-intensive industries and the political sensitivities associated with adopting a net zero emissions target nationally, one of Council's main roadmap objectives was to facilitate open and public

4 AEMO Integrated System Plan, 2022.

5 Australian Bureau of Statistics, 2022. https://www.abs.gov.au/census/find-census-data/quickstats/2021/LGA33360 (accessed June 2022)

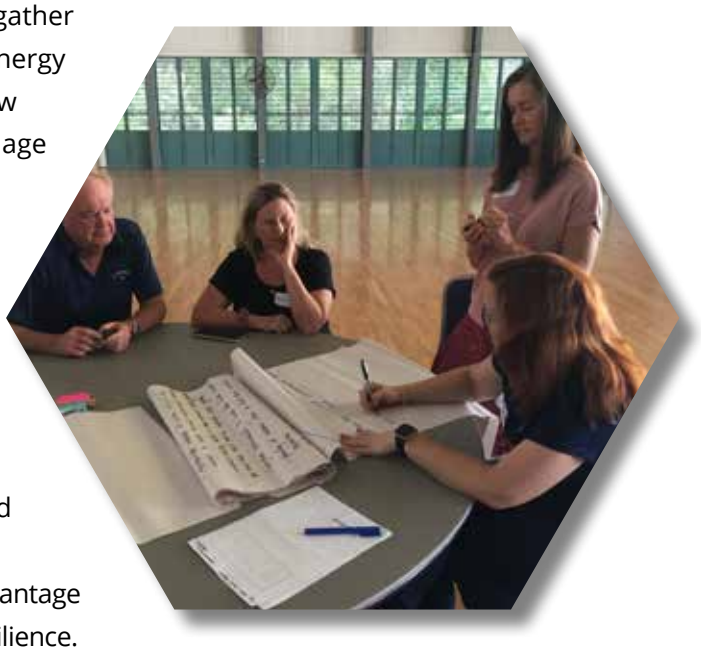
conversations about Gladstone Region's risks and opportunities as the energy sector changes.

To facilitate this type of conversation and to collect the most up-to-date information on how change was unfolding across the region, The Next Economy (in partnership with Gladstone Regional Council) hosted 12 engagement activities between March to April 2022 that targeted both community and industry stakeholders. These activities included:

- Five industry stakeholder workshops with representatives from the energy, hydrogen, manufacturing, logistics and education and training sectors.
- Six community forums with representatives of the general public, Council, unions and First Nations groups.
- A community survey that was open to all members of the public.

The focus of the community and industry workshops differed slightly.

The industry stakeholder workshops aimed to gather the latest information on how changes in the energy sector were impacting different sectors and how industry and government were working to manage risks and take advantage of opportunities to strengthen and diversify that sector and the regional economy.



By contrast, the community workshops (including the Workers' forum and First Nations forum) presented updates on how changes in the energy sector were impacting on the regional economy. Community input provided a starting point to create a vision for the region, including ideas on managing risks and taking advantage of opportunities to build long-term economic resilience.

Both workshops explored similar questions, including:

- What do you expect to see in 2032 if we have managed change well?
- How can we support industry and other local businesses to adapt?
- What is the role of different levels of government, industry and other stakeholders in managing change to strengthen and diversify the regional economy?
- What are the emerging opportunities for workers, and what sort of work arrangements and conditions do you want to see in 2032? How can we support existing workers and develop the future workforce?

- What are some of the actions you would like to see to avoid or mitigate adverse environmental impacts and regenerate land, air and water resources?
- How can communities share in the benefits as the energy sector changes, and what can be done to reduce and mitigate negative impacts?

Locals who did not participate in the forums had the opportunity to respond to an online survey containing questions generated from the community and industry forums. The survey was publicly available for four weeks from April to May 2022. As Deputy Mayor Goodluck noted:

> *"The online survey gave people a chance to have their say on how they want to see these energy changes managed, especially around jobs and opportunity across the community, so the Gladstone regional economy is prosperous into the future."*

The online survey method gathered a broader range of responses, particularly from people who were not comfortable or unable to participate in the forums.[6] As summarised below, 206 people participated in the consultation process in total, including representatives from 37 organisations and government departments that are listed separately in Appendix A.

Table 1.1: List of engagement activities, March–April 2022

Stakeholder	Engagement Activity	Participants
Community	Council workshop (for staff and Councillors)	23
	Agnes Water community forum (in person)	16
	Gladstone community forum (in person)	16
	First Nations forum (in person)	13
	Workers' forum (in person) including NRG and QAL workers, AMWU and ETU representatives and the Gladstone Industry Leadership Group	10
	Community forum (online)	6
	Community survey (online)	39
	Community Sub-Total	123
Industry	Energy sector workshop 1 (online)	24
	Energy sector workshop 2 (online)	16
	Hydrogen workshop (online)	21
	Manufacturing, heavy industry, supply chain and logistics workshop (online)	11
	Education and training providers workshop (online)	11
	Industry Sub-Total	83
Total:		**206**

After each workshop, participants could provide feedback via written evaluation forms and an online survey link. Feedback generated by the online survey was overwhelmingly positive, with a 4.4 star overall average event rating. People welcomed the chance to participate in the engagement

6 Note that the consultation activities were conducted during the COVID pandemic.

activities and to feed into Council planning processes. Many people remarked favourably on the leadership role that Council was playing in a difficult political context.

Samples of participant feedback included:

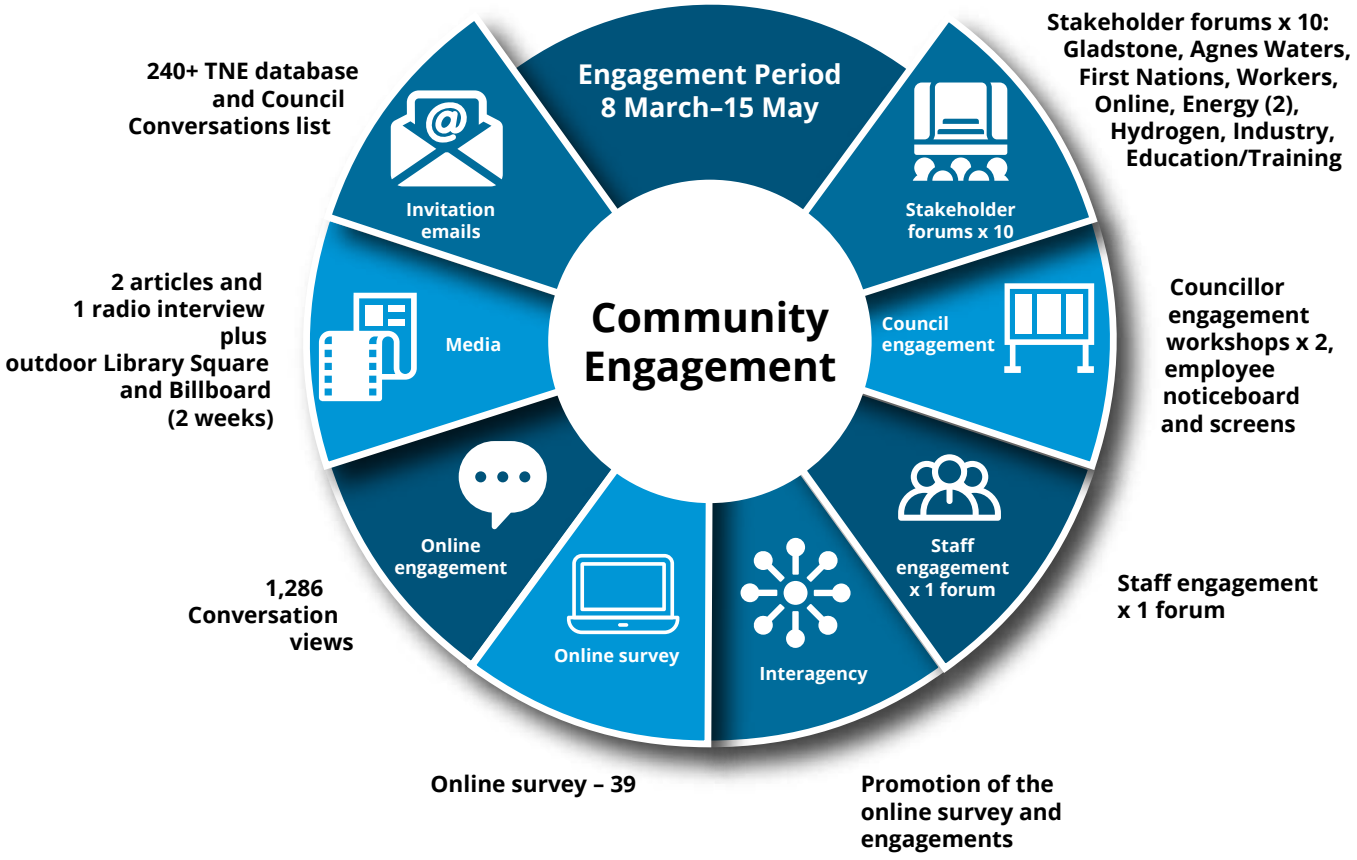
> *"I have a better understanding of local context and perspectives. Respectful discussion that brought in all voices."*

> *"There seems to be a strong commitment from Council to engaging early and learning from past experiences with new industries."*

The Next Economy also held three follow-up events in September 2022 to present the findings from the engagement activities to Council, the general public, and industry representatives. The events allowed for a process of verification and for participants to offer additional feedback and ideas.[7]

The ideas gathered from the initial engagement activities formed the basis for further analysis of the identified economic risks, opportunities and actions through a review of the latest research and available data. The synthesis of findings from the initial engagement activities, research results and feedback sessions forms the basis for this Roadmap.

Figure 1.1: Methods used to promote engagement activities



7 One final event will be held after the completion of the report in November to engage with potential investors on the findings and explore funding opportunities. The results of this discussion are not included in this report.

1.3 Summary of key findings

The specific findings in relation to the six key themes underpinning the project (energy security, hydrogen development, economic diversification, workforce development, community benefits and managing environmental impacts) are summarised in each of the following chapters. There are, however, some high-level findings that were consistent across all engagement activities and themes that are worth noting here, including:

Energy

- Most participants from the engagement activities understand that the energy sector is changing and that fossil fuels will be phased out over time and replaced by renewable energy.
- Participants want to see the expansion of renewable energy projects to result in lower power prices for homes and industry.

Hydrogen industry

- Participants across all workshops supported the development of a renewable energy powered hydrogen industry, particularly to boost export revenues as coal exports decline over time.
- Most people want to ensure the hydrogen industry is developed safely and sustainably, with a particular focus on water use.

Economic diversification

- Many people expressed concerns about the rapid pace of change in international markets that creates vulnerability because of the region's economic ties to carbon-intensive industries.
- Most people want Gladstone to build on its industrial heritage to develop green industries powered by renewable energy, including potential export commodities and products like hydrogen.

Workforce development

- More must be done to support workers in fossil fuel industries to transition into new jobs, including analysing the skills needed in new industries and developing on-the-job training support and other mechanisms to support workers.
- The Gladstone Region is facing a skills and labour shortage across several industries, including renewable energy, manufacturing, health, education, childcare and aged care. Innovative approaches are needed to support locals not actively engaged in the workforce to move into paid employment.

Social impacts and community benefits

- Many people have experienced the negative impacts of 'booms and busts' in the past. They want to avoid recurrent challenges such as negative impacts on housing availability and affordability, local infrastructure and services.
- People across all workshops wanted to see First Nations people benefit socially and economically from changes in the energy sector, including: land access payments or royalty schemes similar to those available through coal and gas, job and training opportunities, and other benefit sharing models.
- Many community participants want a more decentralised energy system so that more people can benefit from owning a share in electricity generation.
- Most participants want to build on the region's liveability by reinvesting a share of the profits derived from new developments back into the community.

Environmental impacts

- Many people see this as an opportunity to expand circular economy principles to reduce waste and generate new products and industries in the region.
- Many community members are concerned about the potential environmental impacts of projects, particularly the amount of land and water that new developments will use.

Gladstone Regional Council has undertaken regular sand dune restoration at Tannnum Sands' Wild Cattle Creek

There was a strong consensus across all activities that there is a need for much greater coordination across all levels of government, industry and community groups (including unions, First Nations and environment groups) to manage economic change better. Participants expressed strong support for the developing a Regional Transition Authority to lead planning, coordination and investment attraction activities.

1.4 Conclusion

This report aims to help Gladstone Regional Council navigate the many complex changes that are occurring across each of the six themes that underpin this project: energy security, hydrogen development, economic diversification, workforce development, community benefits and managing environmental impacts. Each chapter describes the work that needs to be undertaken for one of these themes by outlining in detail:

- The current context and trends impacting the region.
- The shared vision for 2032 as generated by participants in the community and industry engagement activities.
- Challenges to be addressed, as well as emerging opportunities.
- Ideas for managing risks and seizing opportunities.
- Possible actions Council could take relevant to the chapter's theme.

The final chapter summarises the role of Local Government, State Government, Federal Government and industry in managing change.

A summary of this report can be found at: https://www.gladstone.qld.gov.au/economic-information

Agnes Water Main Beach is the most northern surf beach on the east coast of Australia

CHAPTER 2:

Ensuring a Secure, Reliable & Affordable Energy System

2.1 Introduction

The energy system that supplies communities and industries across the Gladstone Region is undergoing a massive transformation. Renewable energy generation, transmission and storage solutions are expanding rapidly, while existing local power stations grapple with potential closures over the next decade.

Community and stakeholder engagement activities revealed that most people across the region understand that these changes are already occurring and that a rapid expansion of renewable energy is needed to power homes, businesses, and heavy industries. Nevertheless, many community members questioned how the renewable energy industry can be established in a way that not only ensures reliable and affordable energy, but also powers heavy industry and generates other local economic benefits. The main points of concern[1] included:

- How the energy system will be stabilised and strengthened to meet the needs of industry.
- The location and timing of establishing renewable energy projects and transmission infrastructure.
- The impact of new projects on land resources.
- How workers in existing power stations will be supported as they close or ramp down operations.
- A perceived lack of planning and coordination, particularly by government.
- Whether energy will become more affordable and accessible over time.

1 Other topics, including workforce development, training needs, small business support, community impacts and access and equity issues are addressed in later chapters.

2.2 2032 Vision for the energy sector

Participants across all stakeholder and community engagement activities expressed pride in the region being a leading energy generator and envisioned that it would remain an 'energy superpower' in 2032 through the growth of a diverse mix of renewable energy generation and storage solutions, including the growth of the hydrogen industry.

Most respondents emphasised that by 2032, all industries in Gladstone will be set up to use renewable energy that is firmed with some demand management and storage, and that energy generators can ramp up and down as required.

Most participants across the consultation activities expected Queensland to meet or exceed the State Government's 2030 Renewable Energy Target of 50 per cent[2] generation and Emissions Reduction Target of 30 per cent below 2005 levels, and that Gladstone will have played a significant role in achieving those goals. Some participants were more ambitious and hoped that Gladstone would lead the State and have "100 per cent clean and renewable energy" by 2032.

Nearly all participants across engagement activities wanted to see renewable energy developments reduce the financial pressures on households and businesses and boost manufacturing opportunities.

Direct access to electricity was also a theme throughout the engagement activities. Many community members supported a more decentralised energy sector by 2032 through increased household and community ownership of renewable energy generation. Some community members also expressed interest in local energy trading to generate additional sources of revenue.

> ***We'd like to see renewable energy opportunities spanning the nation.***
>
> **ENERGY SECTOR WORKSHOP PARTICIPANT**

Most respondents expect the region to manage the rapid construction of renewable energy generation and transmission infrastructure by 2032. Participants expect this to be achieved in a way that generates ongoing local jobs and leaves a positive economic legacy. Positive economic legacies include:

- Boosting local procurement and training opportunities.
- Improving local services (especially the health sector).
- Increasing access to quality housing.
- Capturing a share of profits from the increased economic activities.

2 The Queensland State Government has increased its renewable energy generation target since The Next Economy conducted the engagement activities to 60% by 2030 and 70% by 2032.

Participants highlighted five main challenges to be addressed to achieve this vision over the next decade:

1. Build renewable energy generation, transmission and storage solutions that ensure a secure, reliable and affordable energy supply.
2. Construct and upgrade the infrastructure needed to support the renewable energy sector.
3. Reduce the impacts of renewable energy developments on land use.
4. Undertake more thorough and holistic planning to develop new policies and regulations to manage the decline of the fossil fuel industry and the expansion of renewable energy developments.
5. Address various of financial challenges to ensure an affordable and accessible energy supply across the region.

Each of these challenges, as well as ideas to address them, are outlined below.

2.3 Ensuring energy security and reliability

> ***"Green-up" projects need to solve the energy trilemma – sustainable, affordable, and reliable; otherwise, businesses won't invest. It's society and business [that] are driving the change.***
>
> **ENERGY WORKSHOP PARTICIPANT**

Participants from all community and stakeholder engagement activities emphasised the importance of ensuring a stable and reliable electricity supply as the energy system changes. Some community members expressed concerns about whether solar and wind power could sufficiently provide for the region's current and future needs,[3] especially if not enough renewable energy generation, transmission and storage capacity is established before coal fired electricity generation is phased out. Many people shared concerns about blackouts and brownouts (temporary drops in voltage in the power supply). They questioned how an energy system would be developed to cope with the changes occurring amid ever-growing demands and stressors.

> ***Don't switch off coal power before we have enough renewable energy and stable hydrogen***
>
> **ENERGY SECTOR PARTICIPANT**

3 While professionals in the energy sector generally believed renewable energy could reliably meet current and future needs if the right planning was in place, some community members remained uncertain about the technology. In total 92% of survey respondents agreed that there is insufficient reliable and affordable energy to meet existing needs.

Control room, Callide Power Station, c 1967.
Photo credit: Queensland State Archives

The political implications and impacts of the war in Ukraine have further exacerbated concerns about energy security, given global coal and gas shortages have pushed up generation costs and, therefore, energy prices in Australia. Participants across all community forums (including the Worker Forum) and some of the energy stakeholder workshops openly acknowledged that they expect two of the main power stations that service the region – NRG Gladstone Power Station and Callide B Power Station (Callide B) – to close within the next decade. Some industry representatives disagreed, pointing to statements made by the Queensland Minister for Energy that no power stations would close over the next decade[4]. This statement contradicts AEMO forecasts, which list 2028 as the closure date for Callide B and 2031 for the Gladstone Power Station. Regardless of when they close, coal-fired electricity plants are generally expected to ramp down operations over the coming decade, given the scale of renewable energy and firming that is coming online. Given this context, it is unsurprising that stakeholders (particularly those working in the energy sector) reiterated a need to plan for the ramping down or closing of coal plants.

> ***As base load comes off, planning in the Central Renewable Energy Zone is important, as system security in the middle of the day will be a big issue.***
>
> **ENERGY FORUM PARTICIPANT**

Energy stakeholders also highlighted the importance of ensuring the grid is designed and built to take on additional capacity and deal with the dynamic nature of renewable energy generation. The current grid is not designed to handle fluctuations in energy supply. Energy stakeholders encouraged the government to consider new approaches to ensure system security, flexibility, and resilience to external shocks[5].

Suggestions included:

- Planning for a more diversified energy system with a mixture of wind and solar projects[6] across different locations.
- Expanding storage capacity.
- Using synchronous condensers.
- Building high voltage direct current (HVDC) transmission lines.

4 A recent announcement in the Queensland Government Energy and Jobs Plan (September 2022) is that all publicly owned coal-fired power stations will be converted to clean energy hubs by 2035, and a steep decline in coal fired capacity (GW) over the next decade. See: Queensland Energy and Jobs Plan (epw.qld.gov.au) (p. 12)

5 The Energy and Jobs Plan had not been released prior to the consultation process; this now includes a Queensland SuperGrid Infrastructure Blueprint.

6 While the majority of renewable energy generation projects planned for the region are wind and solar, there is at least 1080MWh of storage integrated into these generation projects.

The State and Federal Governments and key agencies are currently undertaking this planning by developing three new renewable energy zones across Queensland, including the Central Renewable Energy Zone[7]. A Renewable Energy Zone (or REZ) is an area designated to focus investment on new renewable energy projects and associated transmission and other infrastructure. The primary objectives of developing REZs are to lower the cost of the system to ensure affordable energy for communities and create enough secure, renewable energy to meet industry demand.

> ***There needs to be green firmed power for key industries in the region – e.g., aluminium, and electrification of alumina processing.***
>
> **SUPPLY CHAIN WORKSHOP PARTICIPANT**

The construction of a diversified energy system backed up by storage solutions is already underway[8], with dozens of large-scale wind and solar projects planned for the Central Queensland REZ and 2,884 MW of renewable energy projects planned in the Gladstone Region alone.[9]

Some community members raised concerns about the scale of proposed renewable energy projects, emphasising the need to increase the amount of small-scale generation through households and community-owned renewable energy projects. These concerns were linked to a general perception that a more decentralised generation was more resilient, with 79 per cent of online survey participants agreeing that having decentralised sources of energy, backed up with different forms of storage, will mean greater energy reliability in the region. Some participants advocated for legislation to facilitate the development of microgrids and energy trading to support decentralised energy systems.

Both energy sector stakeholders and community representatives identified the need to increase the range of energy storage solutions across the region, citing the need to subsidise household batteries and electric vehicles, build large-scale batteries and develop pumped hydro storage. Some community members raised concerns about the environmental and water impacts of pumped hydro storage,[10] as well as whether it was a viable option for the region because of the local topography.[11]

> ***Pumped hydro is greenfield, with too many operational and environmental issues for it to go ahead***
>
> **ENERGY WORKSHOP PARTICIPANT**

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7 Modelling from the Queensland Government Energy and Jobs Plan (September 2022) indicates the state will need 25GW of renewable energy by 2035. This is an additional 22GW of wind and solar on top of the current 3GW in the system.

8 The recent Queensland Government Energy and Jobs Plan (September 2022) includes $500 million for more large-scale and community batteries, a Queensland Battery Industry Strategy and two new pumped hydro projects that could deliver up to 7GW of long durations storage.

9 Appendix C provides a breakdown of renewable energy projects proposed in the Gladstone Region. For a map of the latest renewable energy projects planned for the region, see: https://electricity-generation-map.epw.qld.gov.au/

10 Pumped storage hydropower (PSH) requires two water reservoirs at different levels that can produce power as water moves from one level to the other and passes through a turbine.

11 Company Sunshine Hydro is proposing (May 2022) to build a new pumped hydro storage facility (including the ability to create and liquify green hydrogen) at Miriam Vale, south of Gladstone. This proposal plans to use a natural water catchment with a backup of desalinated water if required.

Gladstone's NRG Power Station began operating in 1976 and supplies electricity to aluminium producer, Boyne Smelters Ltd, under a long-term agreement

2.4 Energy infrastructure development

Several core pieces of infrastructure are needed to meet the growing energy requirements of the region.

Transmission and distribution infrastructure upgrades are urgently needed to transport the energy and increase the grid's capacity to take on more renewable energy to meet current and future needs. Transmission infrastructure upgrades will also help to improve the system's ability to deal with the fluctuations inherent in renewable energy generation.

Powerlink is currently undertaking detailed modelling and design work on the transmission infrastructure. However, AEMO modelling does not forecast significant transmission infrastructure work commencing until later this decade.[12] AEMO has prioritised projects in Victoria and New South Wales where power stations are likely to close earlier than Queensland. Questions remain as to how the renewable energy projects planned in the Gladstone Region over the next few years will be able to operate to their full potential if the transmission infrastructure is not already in place.

12 AEMO (2022). P.76.

While some of the community members expressed support for projects to upgrade transmission infrastructure, such as the HVDC link from Clark Creek to Gladstone and Callide to Gladstone[13], such projects are likely to generate opposition from landholders and others as construction expands over time. Energy sector stakeholders highlighted a need for careful planning and broader community engagement to ensure transmission is built where it makes sense, minimise opposition and increased future energy costs, and to avoid 'gold plating the grid'[14].

> ***The Queensland Government as owners need to lead the plan and be proactive and not reactive.***
>
> **ENERGY WORKSHOP PARTICIPANT**

In addition to transmission infrastructure projects, stakeholders identified the need to develop other enabling infrastructure to support the expansion of renewable energy such as roads, bridges, port facilities, and pipelines. Industry stakeholders identified transport infrastructure as critical, with one industry representative predicting that the region's road network will have to accommodate an additional 20,000 truck movements to get materials to renewable energy developments. Managing the volume, height, weight and turning capacity requirements, as well as congestion and maintenance will be challenging.

> ***Road infrastructure problem shows that State and Local Governments aren't coordinating projects well enough.***
>
> **ENERGY WORKSHOP PARTICIPANT**

2.5 Land-use considerations

Changes in the energy sector will significantly impact the regional landscape, given the land development requirements for new renewable energy projects and manufacturing industries.

It is unclear exactly how much land is required for the Gladstone Region's current and future renewable energy projects. The latest 2022 AEMO Integrated System Plan for the Fitzroy Renewable Energy Zone (REZ) provides limited insight, but based on what is currently known, the Gladstone Regional Council estimate it is likely to be between 160,000–180,000 hectares.

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13 The Queensland Government is supporting infrastructure development across the region with the $365 million Gladstone Grid Reinforcement to connect solar and wind projects to the grid, delivered by Powerlink as part of the Energy and Jobs Plan. See Queensland Energy and Jobs Plan (epw.qld.gov.au)

14 'Gold plating' refers to over-investment in infrastructure. It has been an issue in the NEM in the past for various reasons, including State Governments overvaluing assets before privatisation and asset owners being paid according to the value of the assets they manage.

Effective land-use planning is a critical enabler of renewable energy development. If land use planning is not done well, it can lead to significant opposition from landholders, stakeholders and community members, which causes costly project delays. Land use planning must factor in the amount of land directly required by wind and solar developments,[15] and the requirements of associated manufacturing, logistics, energy transmission and storage facilities.

Participants across all workshops raised the following land use considerations during the planning and development of new renewable energy projects:

- Using marginal land and Gladstone State Development Area (GSDA) as much as possible for new projects to reduce impacts on existing landholders.
- Cultural heritage impacts and the need to avoid sites significant to Traditional Owners.
- Ensuring existing agricultural uses can coexist with renewable energy.
- Protecting and regenerating biodiversity by providing sufficient wildlife corridors and use of local species to revegetate cleared areas.[16]
- Developing remediation and decommissioning plans before renewable energy projects are approved. One suggestion was for the State Government to establish a decommissioning bond system (like rehabilitation bonds in the mining sector) to clarify expectations and provide certainty for all stakeholders.
- Assessing alternative use of land assets currently used to support fossil fuel energy projects (e.g., Gladstone Power Station and Curtis Island LNG Plants).

Managing the land use impacts of renewable energy developments requires proponents and assessors to understand the context, risks, stakeholder interests, trade-offs and how these will change over the life of a project.

Community forum participants also consistently highlighted the need to avoid competing land use interests between industrial energy developments, agriculture, other industrial uses, and tourism. These tensions can play out in complex and unexpected ways; for example, accommodating new and existing workforces will impact housing availability and affordability. Therefore projects should be assessed in part by how they address this issue.[17]

Locating projects in the Gladstone State Development Area (GSDA) mitigates some of the competing land use issues. Still, it does not address concerns about the cumulative and, at times, complex impacts of energy development at the expected scale. Two of the region's proposed solar farms, totalling 678MW, are in the GSDA. Developing renewable generation in this area minimises impacts on private land, agricultural land, and areas of high conservation value. It also enables more efficient

15 A study conducted by the ANU Crawford School of Public Policy calculates that meeting Australia's current electricity demand with renewable energy: "would involve a land area of about 168,000 km^2 – about 2 per cent of Australia's land mass. By comparison, about 4 per cent of Australia's landmass is currently used for livestock grazing". https://reneweconomy.com.au/the-staggering-numbers-behind-australias-green-energy-opportunity/

16 For more information on the concerns raised in relation to environmental impacts of renewable energy projects, see Chapter 7.

17 For further discussion on housing concerns see Chapter 6, Community benefits

coordination of planning and approval processes. However, given the competition for GSDA land, the State Government recently decided to prioritise it for manufacturing and production rather than renewable energy developments.

Some landholders and community members who participated in workshops welcomed the opportunity to generate passive income from providing land for renewable energy developments and transmission lines. Landholders noted how this could help to diversify their income, making them less reliant on income from livestock in times of drought and more resilient to the impacts of climate change. Some landholders and community members were, however, concerned about the allocation of compensation and suggested processes could be better regulated. This would avoid some landholders (particularly those adjacent to renewable energy developments) not being compensated fairly for the impacts of projects on their land and visual amenity. Others questioned why it is not legislated that companies share profits with the broader community. Many community participants saw a need for more transparent community engagement processes and benefit-sharing schemes, to ensure an equitable roll-out of renewable energy and transmission infrastructure across the region.

Renewable energy stakeholders explained that the inconsistencies between how projects share benefits with landholders and communities stem partly from the variability in project resources and profitability. Because the cost of developing different sites varies, so does the proponents'

Renewable energy technologies need land presenting challenges for regional Australia's farming sector

financial resources. Therefore, renewable energy proponents argued that strict regulation would not necessarily be simple or desirable for landowners or communities for aspects of renewable development. Instead of 'top down' regulation, some renewable energy representatives argued for programs focused on 'levelling the playing field' of negotiations by developing guidelines for communities and renewable energy companies and upskilling communities and landholders to negotiate more effectively. Several renewable industry peak bodies (such as the Clean Energy Council) and government agencies are in the process of developing guidelines that set norms and expectations without mandating exactly what benefit sharing must entail. This approach allows all players to be responsive to the local context.[18] [19]

2.6 Appropriate planning and policy development

The most common theme across all stakeholder and community workshops was the need for better planning and coordination[20] to manage the rapid pace of change across the energy sector. There was widespread acknowledgement across all workshops that the divisive politics surrounding energy and climate policy over the past 10 years has stymied planning and coordination efforts. Some of the energy sector representatives emphasised the need to reduce the level of political interference in decision making. These stakeholders suggested technical experts within government departments (rather than politicians) should be leading planning and decision making. One participant even suggested that political reforms such as banning political donations would help to address the problems associated with political interference.

> ***No one's arguing the need to change, but we need to do more to understand what needs to happen, and we need analysis to be competent, to make decisions and understand impacts... and we need things put in place to mitigate any negative impacts.***
>
> **ENERGY WORKSHOP PARTICIPANT**

18 Queensland solar farm guidelines: practical guidance for communities, landowners, and project proponents (2018). Available at https://www.epw.qld.gov.au/__data/assets/pdf_file/0012/16122/solar-farm-guidelines-communities.pdf, accessed 01/08/2022.

19 For more detail, see: Lane, T. and Hicks, J. (2017). A guide to benefit sharing options for renewable energy projects, Clean Energy Council, available at https://www.re-alliance.org.au/benefitsharing

20 Consultation for the GRC Roadmap was undertaken before the change in Federal Government. Since taking office, the new Labor government has continued several initiatives and announced others that may facilitate greater planning and coordination. These include the Energy National Cabinet Reform Committee (ENCRC) and the Energy Ministers' Meeting (EMM), amendments to the National Energy Objective and the National Transition Plan which all Australian Governments will create in line with AEMO's Integrated System Plan (ISP).

Almost all the energy stakeholders expressed concerns that a lack of planning will lead to sudden and more severe disruptions to the energy system. They highlighted the current lack of coordination between different levels of government and the challenges of different energy players undertaking their own planning without sharing information in a transparent and timely way. This has led to different proponents trying to design and plan to mitigate project risks with limited information and policy certainty. Industry stakeholders reported this has, in turn, delayed decision-making regarding the development of common user assets needed by multiple stakeholders.

The full build out of renewable energy will span the next two decades and how the Central Queensland Renewable Energy Zone (CQREZ) is designed needs careful consideration, especially in a system with a mix of public and privately owned operators. Energy stakeholders emphasised the need for more detailed and transparent information, such as ensuring enough generation of renewable energy to meet industry and community needs.

Energy stakeholders also highlighted the need for much better planning at a federal level to ensure better coordination and consistent regulations across the National Energy Market as it adapts to high levels of renewable energy generation. The recent announcement made by the new Federal Labor Government that they will work with AEMO to develop a National Transition Plan[21] will help address this challenge but not necessarily resolve the greater need to coordinate within regions. Stakeholders noted the advantage Queensland has in coordinating changes because of the high level of government ownership in the energy sector.

> ***Establish a transition authority so we can make a plan and set targets and coordinate.***
>
> **ENERGY WORKSHOP PARTICIPANT**

Workshop participants across all sectors expressed high levels of support for the development of a Regional Transition Authority to coordinate efforts across government, industry and community as renewable energy expands and fossil fuel use declines. A Regional Authority could develop a more detailed regional plan for Central Queensland and work with all levels of government and industry to ensure that changes in the energy sector contribute to broader social, economic, and environmental benefits while minimising negative impacts. Important responsibilities of a Regional Transition Authority would include:

- **Providing support for long-term regional planning:** Ensuring that all stakeholders can meaningfully engage in decision-making processes and in the design of new plans and programs to support decarbonisation processes and that they remain informed and participate as change unfolds. This includes all levels of government, Traditional Owners, industry, farmers, landholders, workers, educational institutions, social services, environment, and other community groups.

21 The National Transition Plan was announced in June 2022 which will be developed by the Federal Government with the states and territories to help pave the way to clean energy future with agreement from every state and territory. See: https://www.minister.industry.gov.au/ministers/bowen/transcripts/press-conference-energy-ministers-meeting

- **Ensuring energy security, stability, and affordability:** Coordinate across the relevant agencies, technical experts, and industries to manage the phase-out of fossil fuels and expand renewable energy technologies to ensure energy security, stability, and accessibility. This means not only guaranteeing domestic energy supply but also expanding generation and storage to support the emergence of new industries.
- **Regional workforce support and planning:** Coordinate long-term support to workers in fossil fuel industries well in advance of closures, including overseeing the development of training programs, redeployment schemes, income support, and early retirement schemes. This also includes ensuring companies meet their responsibilities to workers for redundancy payments and entitlements and supporting educational institutions to train workers in the skills they need for current and future industries.
- **Economic diversification:** Support industry and SMEs to adapt to changes and build on and promote the strengths of different regions to attract new investment and jobs. This includes working with the State Government to develop markets, supply chains and local procurement policies.
- **Attracting investment:** Provide a vehicle to attract and channel public, private and philanthropic funds into initiatives designed to reduce negative impacts and build long-term resilience, wellbeing and prosperity across the regions most impacted by change.
- **Infrastructure planning:** Work with industry, Local Government and State Government to identify infrastructure needs and leverage investment.
- **Research and development:** Identify and commission research activities and expertise as needed to support decision-making processes and develop local technical capacity for emerging industries.
- **Land and water management:** Working with the Local and State Governments to oversee the decommissioning, rehabilitation and repurposing of power plants and mine sites, as well as liaising with agencies, industries, and other stakeholders to protect and regenerate land and water resources. This includes working closely with Traditional Owner groups to ensure the upholding of their land and cultural heritage rights, and to identify economic opportunities for First Nations people, including (but not limited to) paid work that supports the restoration and protection of Country.
- **Community benefits:** Mitigating the negative impacts of the transition on the community and ensuring that the benefits are shared widely, particularly with those already economically marginalised, such as young people, women, First Nations communities, the long-term unemployed, people with disabilities and those from linguistically and culturally diverse backgrounds.

Workshop participants emphasised that any regional authority would need to be supported in concept by the State and Federal Governments to provide access to funding and set the right policy frameworks and targets.[22]

22 For more information on the role of transition authorities and how they could operate across all levels of government, see: (https://nexteconomy.com.au/work/transforming-queensland-the-case-for-a-transition-authority/)

Boyne Island waste water treatment plant

Community members were vocal in their demands for meaningful and equitable representation in any planning process. Participants across the workshops saw a need for planning reform that ensures genuine and early consultation with communities and stakeholders to achieve holistic, inclusive and ongoing project outcomes.[23] Participants across several stakeholder workshops mentioned the need for more action to educate and update community members about changes in the energy sector, particularly about the scale of renewable energy build-out and associated infrastructure.[24] While deep and ongoing community engagement can slow the pace of development, research over many decades has demonstrated that participatory and inclusive planning leads to better long-term outcomes and aids in managing community expectations and support for new projects. Similarly, 85 per cent of survey respondents agreed that a lack of consultation could lead to community opposition for large-scale renewable energy projects which will slow down the energy transition.

One model that could strike a balance between the need for timely approvals and community input into planning is the Renewable Energy Industrial Precinct (REIP) concept proposed by groups

23 Having the opportunity for community members to provide meaningful input into planning processes was a very strong theme throughout all engagement activities and 100% of survey respondents agreed.

24 This is the combined responsibility of multiple Government, industry, and community support organisations. There is an opportunity for Council to play a facilitative role in helping stakeholders recognise the significance of the changes that are underway.

such as Beyond Zero Emissions (BZE). REIPS are industrial areas developed to support a cluster of manufacturers powered by renewable energy. They are developed near renewable energy generation and other important infrastructure to maximise efficiencies and attract a range of industries that can work collaboratively and in a more integrated way. BZE describes REIPs as:

> *"A tool to help recalibrate the true scale of opportunity and investment needed, driving conversations towards planning, coordination and collaboration between governments, communities, industry and investors."*[25]

A defined area and industrial ecosystem to be developed as a REIP in Gladstone would enable greater coordination and a more efficient use of resources. Council, State Government and/or a Regional Transition Authority could play a role in liaising with industry stakeholders and the community to ensure thorough input into the design of the REIP and benefit sharing arrangements to maximise the chance of good development outcomes.

2.7 Ensuring access to affordable energy

Building a new renewable energy-powered electricity system is a once-in-a-generation undertaking that requires unprecedented investment. For this opportunity to boost economic development, renewable energy costs must be low enough to create a competitive advantage for industry and equitable outcomes for domestic users. Participants across all engagement activities expressed concerns that if investments were not carefully managed and backed by public funding, consumers would not benefit from lower power prices, despite renewable energy being cheaper to generate. Two main challenges emerged from discussions: 1) the need to reduce the cost of production; and 2) providing equitable access to affordable energy.

a. Reducing the cost of production

The main financial concern was the cost of firming, transmission, distribution, and associated infrastructure as part of Powering Australia(Rewiring the Nation).[26] Many participants agreed costs need to be shared between government and renewable energy proponents but recognise that new cost sharing models are needed to create savings for energy consumers. Energy sector participants repeatedly pointed to the need for government to plan and deliver common user assets with project proponents collaboratively, noting that failure to do so would ultimately lead to higher power prices, a lesson learned during the LNG export hub build out.[27]

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25 Beyond Zero Emissions, Gladstone Renewable Energy Industrial Precinct briefing paper, April 2022. Available from https://bze.org.au/research_release/gladstone-briefing-paper/

26 The new Federal Government has committed $20 billion to build transmission lines and upgrade the grid as part of Powering Australia (Rewiring the Nation), but this commitment came after the consultation for this report. Available at: https://keystone-alp.s3-ap-southeast-2.amazonaws.com/prod/61a9693a3f3c53001f975017-PoweringAustralia.pdf

27 Different proponents constructed separate gas pipelines instead of just one pipeline that could have serviced all projects.

> ***We need to work out what the commercial model for infrastructure is. Is it the role of State, or Powerlink, or generators?***
>
> **ENERGY WORKSHOP PARTICIPANT**

Commercial interests can complicate how different players approach the changes facing the energy sector. One energy industry representative suggested that as a majority-owner of electricity generation assets, the Queensland Government must reduce its dependence on revenue from existing electricity generation and transmission.[28] Another participant suggested the State "needs to stop seeing electricity as a revenue generator and view it as an economic facilitator."

Several participants highlighted the role of government in supporting renewable energy finance. For example, stakeholders recognised the role agencies such as ARENA and the Clean Energy Finance Corporation have played in demonstrating to private investors how renewable energy developments can be viable in Australia. In addition to the provision of low-cost finance, industry stakeholders agreed that stronger emissions reduction targets by 2030[29] and the instigation of carbon pricing mechanisms would also help to accelerate efforts to decarbonise the grid and expand investment in renewable energy generation.

Some stakeholders questioned whether the market arrangements effectively prevent price manipulation, provide stability of supply,[30] and give effective signals and incentives to drive investment to where it is needed (for example, to increase investment in firmed renewable energy generation and storage options). Some energy sector representatives suggested changes to how the National Electricity Market operates, particularly in relation to the pricing and bidding system. One suggestion was to merge the Queensland, New South Wales and Victorian markets and enable bidding for an allotted amount of solar to increase competition and keep energy prices lower.

Other workshop participants went so far as to suggest electricity prices are susceptible to market failures meaning there is a need for more policy and regulatory

28 The Queensland government owns the majority of the state's existing electricity generation and transmission assets as well as a portion of the retail market.

29 The stakeholder consultations were conducted when the National Emissions Reduction Target was only 26–28 per cent below 2005 levels by 2030. It has since been increased to 43 per cent by 2030.

30 Note that these points were raised before the energy crisis in mid-June 2022 when AEMO had to step in to "keep the lights on" by capping prices and then suspending the market. AMEO took such unprecedented steps to be able to control (and compensate) generators that were not providing electricity at the capped price.

mechanisms to stabilise electricity prices in the face of volatile markets. The lack of an LNG domestic quota and how it has led to high Australian gas prices despite abundant supply was cited frequently as a learning opportunity.

b. Equitable access to affordable electricity

A core concern of participants across all engagement activities was the impact of rising energy costs on households. The recent energy crisis demonstrated that changes in the energy sector, directly and indirectly, impact Australian businesses and households, particularly low-income households.

Some suggestions for how renewable energy and firming could help to reduce energy costs and increase access to more affordable energy included:

- Low-cost solar options or rebates for residents and small businesses to install solar panels, batteries, and electric vehicles.[31]
- Offering low-cost solar installation to low-income households and rental properties to reduce energy bills and potentially generate income.[32]
- Establishing solar gardens[33] for households unable to install solar on their rooftops and support groups to start community owned renewable energy projects.
- Supporting low-income households to upgrade to energy-efficient appliances and reduce their energy use. Suggested activities include energy audits, mentoring, and education and gamification resources.
- Subsidising the cost of batteries for low-income households and/or establishing community batteries.[34]

31 The challenge facing State and Federal Governments is how to fund the transition to renewable energy while minimising the impost on individual consumers and sharing both the costs and benefits fairly by all Australians. For a good example of policy settings designed to do this, see the ACT government's approach to its 100 per cent Renewable Energy Target. Canberra's policy has demonstrated how to provide certainty for development proponents and buffer consumers against rising energy prices. It also has potential to shield vulnerable consumers (which would need to be combined with efficiency and energy saving programs). For more details see the report accessible at: https://www.abc.net.au/news/2022-06-06/why-arent-canberrans-paying-high-electricity-prices/101126274

32 For an example of a State Government program see, the Queensland Government's solar for renters' pilot program, accessible at: https://www.epw.qld.gov.au/about/initiatives/solar-rentals-trial. For an example of a Local Government initiative see strategic outcomes 4.1–4.5 in the Dubbo Regional Council Energy Strategy and Implementation Plan (p. 57–58), DRC (2020).

33 Solar gardens are like "allotment gardens" in that they enable people to benefit from investing in collectively owned solar without having to do it in their dwelling, hence overcoming various barriers, including the upfront cost that makes it inhibitive for low-income households.

34 Information on Federal Labor Government's commitment to community batteries is accessible at: https://www.alp.org.au/policies/power_to_the_people (accessed 23/08/22)

2.8 Recommendations for Council

There are four main ways that Local Government could contribute to ensuring secure, reliable and affordable energy for the Gladstone Region:

1. Leading and advocating for the region.
2. Attracting new investment to the region.
3. Supporting community members and businesses to find ways to access affordable and reliable energy.
4. Ensuring new energy developments meet community aspirations and expectations.

Suggested actions to commence over the next 6–12 months:

a. Leading and advocating for the region

Stakeholders repeatedly noted the importance of Council's role in advocating for the region. Suggestions included:

- Lead and encourage others by establishing targets to increase energy efficiency and reduce emissions across Council operations. This could include installing solar or signing a power purchasing agreement to power all Council operations with solar, installing batteries, continuing to replace the existing fleet with electric vehicles and undertaking energy efficiency programs.
- Publicly sharing and promoting the Economic Transition Roadmap and working with other stakeholders to put it into action.
- Staying abreast of significant changes in the energy sector and proactively putting forward the community's view to inform State and Federal policies as the energy system changes.
- Advocating for planning and land use assessment legislation that is evidence-based and consistent with current needs. For example, addressing the fact that local governments assess solar farms under the Planning Act (2016), but the State Government assesses wind farms. Council has a role in articulating how these (and other) planning arrangements could be improved to benefit the region's interests.
- Advocating to the State and Federal Government for programs and policies that support community owned energy and energy justice outcomes in the region.[35]

35 For examples, see the community power hub policy operating in Victoria: www.communitypowerhub.net.au and proposed Local Power Plan at a Federal level: www.localpowerplan.com/local-power-plan

b. Attracting new investment to the region

Council could play an important role in securing the region's energy system and making sure it is affordable for local consumers by attracting new resources and investment into the region. Ideas put forward for Council to consider include:

- Developing and publishing its own plan and vision for the energy sector in Gladstone and sharing it publicly through presentations and positive stories in the media.
- Collaborating with others (for example, Gladstone Engineering Alliance (GEA), Gladstone Industry Leadership Group (GILG) and Trade and Investment Queensland (TIQ)) to hold investment forums for the energy sector and the industries that service and supply it.
- Continuing to work with other councils in the Central Queensland region (through Central Queensland Regional Organisation of Councils and others) to learn and share how they are navigating common challenges. This could include work to set standards cooperatively and local expectations for energy projects around: procuring local products and services; engaging stakeholders; sharing benefits, and acting as good neighbours and corporate citizens.[36]

c. Supporting community and businesses

Council is well-placed to help households and businesses across the region to benefit from the approaching changes. Tangible ways Council can do this include:

- Raising community awareness about the changes that are underway in the energy system and educating communities to understand renewable energy development processes and how they can most productively participate, particularly in planning processes.
- Holding participatory planning and mapping exercises to identify the preferred areas for renewable energy development that can inform State Government and other planning processes.[37]
- Continuing to invest in and encourage Council employees to proactively build the capacity of their community (particularly marginalised) stakeholders to engage in planning and development processes.
- Encouraging local businesses to be ready to tender for renewable energy contracts and provide allied services by:
    - Supporting local networks and initiatives (e.g., Gladstone Engineering Alliance) to identify and respond to opportunities to provide services to renewable energy developments.
    - Provide advice on what support local vendors need to bid into project service tenders successfully.[38] Council could support other organisations to conduct workshops that improve

36 For more information, see Chapter 6 on Community Benefits.

37 Examples from Germany demonstrate how becoming informed can lead councils to take up the opportunities renewable projects pose. For more details see Hoppe et. al. (2015).

38 Developing local understanding of project timelines, when opportunities will arise and how they can position their enterprise – with qualifications, insurances etc. to successfully offer services.

the potential for local vendors to win work on new industry projects. For example, supporting cleaning and catering services to tender for contracts with construction projects.

- Supporting local peak bodies such as Gladstone Chamber of Commerce and Industry (GCCI) and Discovery Coast Tourism and Commerce (DCTC)) to create guides for how individual projects can 'plug into' the services offered by local providers.

d. Ensuring new developments meet community aspirations

Local government can develop guidelines that detail practices and principles they expect developers to adopt when operating in the region. Having established guidelines Council can then:

- Encourage proponents to operate to the standard of the guidelines.
- Help proponents to understand the local context, history, demographics, workforce, local procurement potential etc. to increase the effectiveness of proponents' engagement with stakeholders.
- Help proponents understand the strategic vision and aspirations of local communities and how renewable energy developments can contribute to them positively, for example linking benefit sharing to relevant plans (for example, the 2021–2026 Corporate Plan and 2022–2023 Operational Plan).
- Reduce stakeholder engagement fatigue by helping proponents to tailor their approach to what has already happened before they begin.
- Support communities to negotiate with developers to achieve benefit-sharing commitments. As a starting point Council can work to understand social needs in the community better and advocate for them.

Given that several projects will be rolled out across the region over coming years, Council can play a role in getting project proponents to cooperate on engagement, benefit sharing and procurement (among other things). Examples of the outcomes Council can encourage proponents to cooperate on include:

- Establishing a joint benefit-sharing fund at a regional scale.[39]
- Co-funding local engagement staff to expand the collective capacity of proponents to engage with communities and stakeholders about the multiple projects that are being developed.
- Setting up and managing a shop front to create a single point of contact for multiple projects.
- Sequencing project construction to ease pressure on workforce, housing and supply chains and maximise local procurement opportunities.

39 Council can engage with community stakeholders to develop a Social Needs Assessment that can then inform and guide decision making about how funds are dispersed.

Recommendations for Council to consider for the future:

- Collaborating with a renewable energy company to build a community-owned and/or Council-owned renewable energy project.
- Encouraging industry proponents to consult with local First Nations groups regardless of whether they have statutory obligation to do so.
- Collaborating with local industry, energy developers and education providers (e.g., CQU, TAFE and other institutions) to create programs that engage students and professionals in addressing the 'grand challenges' of transitioning the region's energy system and the industries that rely on it.
- Encouraging households and businesses to use energy more efficiently and generate their own electricity by proactively promoting:
  - Websites, social media feeds, and events that offer access to trusted information and services.
  - Initiatives that retrofit energy generation and efficiency technologies in low-income housing, community assets, businesses and council leased buildings.[40]
  - State and Federal Government funds and programs, such as the Queensland Government's "solar for rentals" trial.[41]
  - Examples where other councils have supported community owned energy groups by offering small grants for pre-feasibility and feasibility studies, venue hire, office space, access to Council land or buildings as sites for projects.

Gladstone CBD

40 Noting support can be provided in myriad ways. This could include support to access funding through grant programs, providing discounts on rates, low or no interest loans, or by establishing a rolling fund in collaboration with energy related industry or corporate entity and/or organisations that service potential local recipients. For one successful example, see the Moreland Council's 'Zero Carbon Moreland' program visit: https://morelandzerocarbon.org.au/

41 Note this program is not currently operating but is indicative of the opportunities Council can pursue.

Useful Resources

Beyond Zero Emissions (2022). Gladstone Renewable Energy Industrial Precinct. Accessible at: https://bze.org.au/wp-content/uploads/2022/04/Gladstone-REIP-Briefing-Paper-April-2022.pdf

Climate Council (2017). A guide for council's on how to engage in local initiatives as part of energy transition (as part of the Climate Council's cities power partnership program. https://www.climatecouncil.org.au/uploads/2512a5a5fe9480634afb91fac63e3f0f.pdf

Lane, T., Hicks, J., Thompson, B., & Memery, C. (2015). A Guide to Community-Owned Renewable Energy for Victorians. Department of Economic Development, Jobs, Transport and Resources. https://cpagency.org.au/wp-content/uploads/2019/07/Victorian-Guide-to-Community-Energy.pdf

Energy Matters (2022). List of Council and State Government 'bulk buying' initiatives to promote, facilitate and drive energy savings and other opportunities. https://www.energymatters.com.au/residential-solar/solar-bulk-buy-community-solar-directory/

Clean Energy Council (2019). Guide to benefit sharing from the Clean Energy Council. https://www.re-alliance.org.au/benefitsharing

Blakers, A., Stocks M., Lu, B. and Cheng C. (2021). Pumped hydro provides most long-term energy storage needed for renewable power. A review of pumped hydro energy storage. https://iopscience.iop.org/article/10.1088/2516-1083/abeb5b

RE-alliance (2021). Building Trust for Transmission Report. https://www.re-alliance.org.au/building_trust_for_transmission_report#:~:text=Our%20report%20outlines%20the%20actions,power%20at%20the%20same%20time

RE-alliance (2021). Community Benefits Handbook: How Regional Australia can Prosper from the Clean Energy Boom. https://www.re-alliance.org.au/community_benefits_handbook

CHAPTER 3: Establishing a Viable Hydrogen Industry

3.1 Introduction

As nations and large industries increasingly seek to decarbonise, low and zero-carbon hydrogen is emerging as a critical part of the future energy mix. The global demand for hydrogen is projected to exponentially grow over the coming decade as countries with a strong industrial and manufacturing base seek to reduce their emissions and look to low or zero-carbon hydrogen to replace fossil fuels. One forecast suggests the global hydrogen market will grow from US$150.20 billion in 2021 to US$220.37 billion by 2028.[1]

In Australia alone, the Australian Energy Market Operator (AEMO) estimates the annual domestic consumption of hydrogen will grow from 2TWh in 2030 to 132TWh in 2050, while hydrogen exports could grow from 49TWh in 2030 to 816TWh in 2050.[2] That equates to a 17-fold increase over 20 years.

The primary driver for potential growth in the global hydrogen market is the need to decarbonise industrial processes, and so future demand is predicted to be for hydrogen made from renewable energy (otherwise referred to as 'green hydrogen') rather than from fossil fuels.[3] Hence, most of the current investment in Australia is in developing "green" or renewable hydrogen production, although fossil fuel produced with gas[4] and other low-emissions hydrogen options may continue to appeal to international markets for years to come while countries and sectors transition towards zero emissions.[5]

The forms of hydrogen production (distinguished by designating a colour according to the source of energy) are outlined in Table 3.1 (overleaf).

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1 https://www.fortunebusinessinsights.com/industry-reports/hydrogen-generation-market-100745

2 AEMO (2022) P. 31– https://wa.aemo.com.au/-/media/files/major-publications/isp/2022/2022-documents/2022-integrated-system-plan-isp.pdf?la=en

3 Fossil gas reforming and coal gasification methods produce 80 per cent of global hydrogen. The rest is a by-product in the production of other fuels such as gasoline. Both processes create significant carbon emissions. More details accessible at: https://www.iea.org/reports/hydrogen

4 Note that although IEA (2022) reports there are at least fifty blue hydrogen projects under development globally, and capacity is set to increase more than tenfold by 2030, according to Collins (2022), there are only four currently operating blue hydrogen projects using carbon capture and storage techniques worldwide. The emissions removal rates of the four operational projects are between 29 per cent – 43 per cent, rather than the 95 per cent promoted by proponents of yet-to-be-built projects (Collin, 2022).

5 There will be a transition period in which fossil gas hydrogen retains a price point advantage while production costs of low to no emissions hydrogen are still declining. Once parity is reached, no-emissions hydrogen is expected to displace all other forms of emissions-intensive production. Cited in Advisian (2021, p14), Australian hydrogen market study sector analysis summary, commissioned by Clean Energy Finance Corporation, available at https://www.cefc.com.au/media/nhnhwlxu/australian-hydrogen-market-study.pdf (accessed 01/08/22)

Table 3.1: Types of Hydrogen production

Hydrogen Type	Energy Source	Production Method	Emissions Intensity
Green	Renewable energy	Electrolysis	Zero
Pink/Purple/Red	Nuclear	Electrolysis	Zero
Turquoise	Methane	Pyrolysis	Neutral
Blue	Fossil fuel (typically fossil gas) with CCS(U)	Multiple	Low
Grey	Fossil fuel (typically fossil gas)	Steam methane reforming	Medium
Brown/Black	Brown/black coal	Gasification	High

* CCS(U) is Carbon Capture and Storage (Utilisation)

Green hydrogen will substitute for LNG, coal, oil, and diesel in many energy-intensive industries over time. The industries most likely to adopt hydrogen first are hard-to-abate sectors such as remote power generation, heavy manufacturing (for example, steel and alumina production), heavy transport[6] and production of chemicals such as ammonia. Hydrogen could also provide a means to store electricity and provide grid-firming services and could be blended with domestic and commercial gas networks (for heating, cooktops, and hot water). However, its use in these areas is probably limited as it currently takes more energy to produce hydrogen than it provides.

> ***What is certain, is that most proponents want to 'go green', but the reality is that they may need to 'go blue' to start with. The end game is for 100 per cent green.***
>
> **HYDROGEN WORKSHOP PARTICIPANT**

6 For example, trucks, buses, trains, earthmoving equipment, shipping, aviation, and space travel.

Predicting the future demand for hydrogen is, however, a difficult task as it depends on a combination of the following factors:

- International and national political ambition to decarbonise the economy.
- The timeframe and the extent to which customers demand decarbonised products and accept hydrogen as an alternative.
- How quickly the cost of producing, transporting, and using hydrogen can be reduced to make it price competitive.
- Whether planning, supply chains and capacity to produce hydrogen at scale can keep pace with the demand to ensure availability, convenience, and reliability.
- The rate and extent to which the hydrogen conversion/ transformation of sectors and their supply chains occurs.
- The resolution of technological matters (e.g., safety and transportation).
- Whether the ecological limitations of water availability and land for renewable energy generation can meet production demand.

The Gladstone Region has an array of assets that make it well-suited to develop a hydrogen industry. These include pre-existing industrial networks, infrastructure, available industrial land, a deep seaport and proximity to electricity supply, a skilled workforce and an existing regional market demand.

> ***Closing the gap between the promise and the reality is the hardest bit now.***
>
> **HYDROGEN WORKSHOP PARTICIPANT**

Queensland is only second to Western Australia in terms of the number of hydrogen developments underway. As detailed in Table 2, the Gladstone Region is home to fourteen initiatives, including two of the six national hydrogen hub development projects gearing up to meet export demand.

Participants across all engagement activities expressed openness and some level of support for developing a hydrogen industry powered by renewable energy in the Gladstone Region. Given global trends towards decarbonisation, few saw the long-term market potential for carbon-intensive forms of hydrogen. Participants identified a range of potential economic benefits associated with the construction and operation of low to no-emissions hydrogen supply chain facilities, and manufacturing industries that can service and use hydrogen into the future.

Table 3.2: List of current hydrogen initiatives in the Gladstone Region[7]

Initiative Name (Start Date)	Proponent(s)	Project Type	Links
Gladstone Clean Hydrogen Industrial Hub (2020)	Federal Government	One of the seven priority Hydrogen Hub sites across Australia. This declaration focusses Federal and State government hydrogen policy and assistance programs.	https://research.csiro.au/hyresource/australian-clean-hydrogen-industrial-hubs-program/
CQH2 Alliance (Ongoing)	Australian Gas Infrastructure Group, Central Queensland University, Department of Education, Department of Energy and Public Works, Department of Regional Development, Manufacturing and Water, Department of State Development, Infrastructure, Local Government and Planning (DSDILGP), ENEOS Australia Pty Ltd., Gladstone Engineering Alliance, Gladstone Ports Corporation Limited, Gladstone Regional Council, Iwatani, Origin Energy Future Fuels Pty Ltd, Rio Tinto, Stanwell Corporation Limited, Sumitomo Corporation, Trade and Investment Queensland	CQH2 Alliance is a high-level collective of government, industry, education and supply chain organisations with a vision for Central Queensland (CQ) to be a major producer and exporter of renewable hydrogen energy and green chemicals, to the world and a major domestic renewable energy supplier for manufacturing and mobility. Facilitated by the Department of State Development.	Not Available
CQH2 Technology Cluster (Ongoing)	Gladstone Engineering Alliance (GEA), Regional Development Australia (RDA), Gladstone Ports Corporation, Gladstone Regional Council (GRC), CQUniversity (CQU), Start-up Gladstone	Mission is to support delivery of the Queensland Renewable Energy Target and ready the Central Queensland Region to secure its position in the global export market. Facilitated by the Gladstone Engineering Alliance.	https://www.cqh2.org.au/

7 Sourced from workshop participants and https://portal.ga.gov.au/persona/hydrogen, and verified by the links provided.

Initiative Name (Start Date)	Proponent(s)	Project Type	Links
CQ-H2 Renewable Hydrogen Project (also called Central Queensland Hydrogen Hub or CQ-H2 Hub) (Stage 1: 2026, Stage 2: 2031)	Stanwell Corporation Limited, Iwatani Corporation, Kawasaki Heavy Industries, Marubeni Corporation, Kansai Electric Power Company, APA Group	Liquid hydrogen production for export and domestic applications: Stage 1: ~100 tonnes of green hydrogen/ day (and scale upwards). Stage 2: ~800 tonnes/ day (3GW electrolyser capacity requiring 7GW of RE capacity).	https://research.csiro.au/hyresource/central-queensland-hydrogen-project/ https://www.stanwell.com/energy-assets/new-energy-initiatives/stanwell-hydrogen-project/stanwell-hydrogen-project/ https://statements.qld.gov.au/statements/95489
Gladstone H2 Ecosystem MoU (Signed 2021)	Sumitomo Australia, GPC, GRC, Australian Gas Networks (AGN), CQU	Domestic production and demand of multiple forms of hydrogen.	https://www.gladstone.qld.gov.au/news/article/410/mou-signing-sparks-commencement-of-gladstone-hydrogen-ecosystem-project
Yarwun Hydrogen Pilot Plant (2022)	Rio Tinto and Sumitomo Corporation	Feasibility study into hydrogen production and use in alumina refinery.	https://www.riotinto.com/news/releases/2021/Rio-Tinto-and-Sumitomo-to-assess-hydrogen-pilot-plant-at-Gladstones-Yarwun-alumina-refinery
Gladstone Renewable Energy Industrial Precinct (Ongoing)	Beyond Zero Emissions	Policy proposal for a renewable energy Industrial precinct including a green hydrogen supply chain and market.	https://bze.org.au/research_release/gladstone-briefing-paper/
H2-Hub Gladstone (2028)	Hydrogen Utility (H2U)	An industrial complex for the large-scale production of green hydrogen and ammonia on the Yarwun site within the Gladstone State Development Area.	https://www.hydrogenutility.com/projects https://www.statedevelopment.qld.gov.au/coordinator-general/assessments-and-approvals/coordinated-projects/current-projects/h2-hub-gladstone
Gladstone Energy & Ammonia Project (2026)	Australian Future Energy	'Blue hydrogen' from coal and biomass gas.	https://ausfutureenergy.com/project/gladstone-energy-and-ammonia-project/
Gladstone Renewable Hydrogen Facility (also called the Hydrogen Park Gladstone) (2022)	Australian Gas Network (subsidiary of Australian Gas Infrastructure Group)	A renewable hydrogen plant able to deliver up to 10% blended hydrogen across Gladstone's 770 residential, small commercial and industrial customer base.	https://www.agig.com.au/hydrogen-park-gladstone https://research.csiro.au/hyresource/hydrogen-park-gladstone/

Initiative Name (Start Date)	Proponent(s)	Project Type	Links
Sealink, Gladstone Port (2025)	Kelsian Group Limited	Hydrogen powered ferry pilot project whereby Sealink will design, construct and operate an Australian Maritime Safety Authority approved hydrogen fuel cell passenger ferry capable of carrying 200 passengers. The ferry will be used for contracted shuttle services between Gladstone and LNG facilities on Curtis Island.	https://statements.qld.gov.au/statements/95079 https://www.statedevelopment.qld.gov.au/industry/priority-industries/hydrogen-industry-development
Global Green Energy Manufacturing Centre (2023)	Fortescue Future Industries	Multi- gigawatt-scale electrolyser manufacturing facility produced with renewable power.	https://www.fmgl.com.au/in-the-news/media-releases/2021/11/17/fortescue-future-industries-(ffi)-first-global-green-energy-(gem)-manufacturing-centre-gets-green-light-on-planning-approval
Euroa Energy Project (2028)	Vena Energy	No information available, except they are a grant recipient of the Federal Government Clean Hydrogen Industrial Hubs Program.	https://www.venaenergy.com.au/our-projects/
Gladstone Project (unknown)	Origin Energy & ENEOS MCH	A grant recipient of the Federal Government Clean Hydrogen Industrial Hubs Program.	https://research.csiro.au/hyresource/australian-clean-hydrogen-industrial-hubs-program/

Some participants questioned "the hype" surrounding the potential of the industry, expressing concerns about its commercial viability and potential impacts on the region's energy and water resources. Other concerns included the long lead time it might take to establish the industry, whether it can offer career pathways for a local workforce, and whether governments will secure domestic hydrogen supply to ensure stable pricing. Managing the potential economic boom associated with hydrogen was also questioned, regarding how it could provide long-term benefits for the region.

3.2 2032 Vision

> ***The Port of Gladstone has the opportunity to be the Southern Hemisphere's equivalent of the Port of Rotterdam.***
>
> **HYDROGEN WORKSHOP PARTICIPANT**

Participants envisioned that by 2032, the Gladstone Region would have a rapidly developing green hydrogen industry that supplies both Australian and international markets. Australia's national hydrogen supply is protected from international price fluctuations so Australian residents, businesses and industry have greater certainty and a competitive advantage in decarbonised global markets, both of which attract global investment.

In the decade leading up to 2032, the Gladstone industry has focused on developing local capability by first meeting domestic demand. Locally, hydrogen is used to make green alumina and aluminium, cement products and chemicals at industrial scales. The new industry has expanded the region's industrial capability and reduced the need for imports. Increasingly, co-location and collaboration between industries enable the development of circular economy and symbiotic industrial 'ecosystem' models. Hydrogen from the Gladstone Region is powering Australian steelworks to make green steel. It is also injected into domestic gas networks, at varying blends, to power homes, businesses and industry equipped with compatible appliances. Gladstone and Central Queensland have a network of hydrogen refuelling stations for heavy transport vehicle fleets (trucks, buses, and trains) for all industries (e.g., mining, public transport, and freight).

The hydrogen and ammonia export markets are beginning to take off after years of planning and cooperation. The technical aspects of hydrogen storage and transportation have been resolved, and common user infrastructure (e.g., storage, pipelines, desalination plants, and port facilities) have been constructed. All investments are intentionally designed to be scaled up even further.

The Gladstone Region has become internationally recognised as a 'Centre of Hydrogen Excellence' because of its:

- Locally-based, highly skilled hydrogen industry workforce that has adapted and emerged from the region's manufacturing and industrial heritage.
- Reputation as 'the place to go' for the best and latest hydrogen know-how. World-renowned hydrogen education and training facilities offer hands-on industry experience and cutting-edge research projects.
- Well-formed local hydrogen supply chain, including regional renewable energy suppliers, a diverse and innovative field of local enterprises providing services and support across the industry and new and emerging downstream industries.
- Excellence in environmental impact minimisation and regenerative practices across the entire hydrogen supply chain.

Locals appreciate hydrogen because it is an exciting growth opportunity that could sustain the region's long-term economic prosperity. In the vision for 2032, current concerns about the safety of hydrogen production, storage and transportation have been resolved. Workers are proud of the industry and what it has achieved, including a community development fund that contributes to important local services and facilities to make Gladstone a great place to live.

Realising the vision outlined above requires the Gladstone Region to work through challenges and opportunities that will inevitably constrain, enable, and shape whether the burgeoning hydrogen industry can grow sustainably over time. The most influential factors to address, as identified by stakeholders in both community and industry workshops, include:

- Domestic and international demand trajectories.
- The availability of renewable energy.
- Production costs.
- Workforce development.[8]
- Investment in infrastructure and inputs.
- Community acceptance of the industry.
- Development of effective policy and legislation informed by planning.

The following sections delve into each of these factors, the issues and opportunities they present, and how to work through these to develop viable hydrogen markets.

3.3 Developing the hydrogen market

Hydrogen has its highest potential market opportunities in sectors where it is already near commercial viability, as well as sectors with no real alternative to abate emissions (i.e., hard-to-electrify sectors). Targeting these sectors to become early adopters of hydrogen to generate domestic demand is an important step in growing and sustaining the nascent industry.

Remote power and heavy transport sectors could have hydrogen at a rate that's competitively close to cost. Industries that could depend on hydrogen in the future to abate emissions include: aviation, shipping, ammonia production, methanol, metals processing (including steel, alumina[9], nickel, zinc) and any medium-high grade heat applications where electrification is difficult.[10] These are the industries that hydrogen-demand generating strategies need to target as potential partners in piloting conversion to hydrogen. One hydrogen workshop participant acknowledged

8 Workforce development issues and approaches are discussed in Chapter 5.

9 Note, hydrogen only provides a high-quality heat source in alumina production, therefore needs price parity with fossil gas to be competitive (which it is widely agreed would be achieved under carbon pricing).

10 Advisian (2021), P.41.

that, “trying to get the use of hydrogen into industrial applications is a major step.” The challenge is creating awareness amongst the target sectors and setting up projects to test the viability of locally produced and used hydrogen.

Industry participants pointed out that if it were available and there were incentives to do so, operators of local heavy vehicle fleets would trial hydrogen. Sealink is an exemplary demand-generating project that stimulates the local market as well as multiple parts of the hydrogen supply chain. By designing and building the ferry in Queensland, the project is reinvesting in local manufacturing, and when built, will utilise locally produced hydrogen. This kind of project demonstrates the potential of the hydrogen hub model, where the domestic market emerges with the local workforce developing skills and capabilities to produce and consume hydrogen, along with the enabling infrastructure, legislation and regulations needed. For taking the risk, the Sealink project proponent gains significant first mover advantage in designing, building, and operating the ferry as well as progressing towards powering their 8,000 plus heavy vehicle fleet with hydrogen. While participants from the hydrogen industry acknowledged the potential upshot of projects like Sealink, they also highlighted the need for more targeted policy to strategically develop domestic market opportunities.

One of the light industrial areas of Gladstone servicing major industry

As the Sealink project[11] illustrates, it makes sense to collaborate with local proponents to experiment and determine what factors and use cases would enable them to invest in hydrogen alternatives and stimulate the demand side of a regional market. The problem, according to some industry participants, is a lack of government attention being given to hydrogen conversion and market development. In frustration, one professional proposed:

> ***There's a lot of talk, and not a lot of doing. People scoff at small projects but nothing else is happening... The conversation is all about production, but not about off-take. No one is talking about it or developing it. The 'use case' for hydrogen is important. The secret to any good large-scale project is having domestic off take, and multiple markets need to be developed.***
>
> **HYDROGEN WORKSHOP PARTICIPANT**

Participants in professional workshops noted that whilst the regional hydrogen hub model aims to connect hydrogen producers with potential consumers, there needs to be more support in brokering deals and setting up projects that overcome barriers such as cost and risks. For example, it is expected to be a decade or more before hydrogen is cost-competitive in many sectors, so the industry will require direct support and/or decarbonisation pressures to generate demand earlier than the market alone would facilitate. The Queensland Government has made significant investments through the Hydrogen Industry Development Fund and other initiatives,[12] but industry participants seemed only partially aware of these initiatives and what they have achieved. This disconnect suggests the Queensland Government, as well as hydrogen network coordinators, could do more to communicate the different initiatives implemented, particularly in regional areas.

Participants debated how best to approach the challenge of establishing domestic and international hydrogen markets. Some participants argued that the strategy of growing the local market for hydrogen by driving sector conversion, developing the industry, and scaling up for export made most sense for Gladstone Region. Whereas others agreed with the Advisian report[13] and National Hydrogen Strategy, which suggests it's prudent to work towards developing capabilities in both domestic and export markets simultaneously.

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11 Emerald Coaches is another project example in Central Queensland. Emerald Coaches received investment to install a hydrogen refueller to supply fuel for a trial of two hydrogen fuel cell electric coaches, as part of round two of the Queensland Hydrogen Industry Development Fund. Details at: https://www.statedevelopment.qld.gov.au/industry/priority-industries/hydrogen-industry-development/hydrogen-industry-development-fund

12 Details about Queensland's hydrogen industry development initiatives can be accessed at: https://www.statedevelopment.qld.gov.au/industry/priority-industries/hydrogen-industry-development (accessed 24/08/22)

13 Advisian (2021).

Participants suggested that developing the domestic demand for hydrogen would involve:

- Collaboratively planning and implementing a strategy to generate demand at Local, State and Federal levels.
- Providing clear data on the commercial viability of hydrogen in different sectors, then using this data to help inform possible hydrogen users of the opportunities and what support is available to realise them.
- Facilitating events, activities and communications that promote hydrogen opportunities to near commercial and hard-to-electrify sectors.
- Federal and State Governments implementing policies to drive domestic production by incentivising sectors such as agriculture to source locally-produced 'green' ammonia and other low-emission chemicals produced from hydrogen.
- State Government supporting and incentivising Local Governments (and their contractors) to pilot hydrogen-powered heavy vehicles and convert fleets of return to base vehicles (such as garbage trucks and buses).
- Promoting the agreement between Queensland, NSW, and Victoria to build a "hydrogen superhighway" to increase general understanding of the concept, and how it could benefit regions and their industries.
- Industry working together with government to develop common user infrastructure to reduce overall capital cost. One option put forward was for Queensland to build on its hydrogen industry development fund to establish a state administered infrastructure development fund, or some other mechanism to de-risk and incentivise collaborative investment in common user infrastructure.[14]

The ultimate long-term goal of hydrogen proponents and State and Federal Governments is to develop international markets for hydrogen (and its derivatives). Three of Australia's key trading partners – Japan, South Korea, and The European Union – have been explicit about their ambitions to convert to low-emissions hydrogen and are already investing in developing the Australian hydrogen industry. Nurturing bilateral trade relationships through a shared strategy and bedding down a certification scheme will shape Australia's potential to become a hydrogen exporter.

Other factors that will shape international demand for hydrogen include:

- How much and how quickly the cost of battery technologies declines.[15]
- The introduction of carbon market mechanisms.
- The impact of net zero targets and decarbonisation pressure on global supply chains.
- Fossil fuel (particularly gas) prices.
- Increased volatility in the availability of fossil fuels due to global events such as the Ukraine/ Russian war and COVID-19 pandemic.

14 When making these suggestions, pundits point to South Australia, where the government has taken on the risk and reaped the benefits of building and operating common user infrastructure, such as ammonia and hydrogen pipelines.

15 Batteries directly compete with hydrogen in electricity grid firming, energy storage, transport, and low-quality heat applications such as cooking, heating, and hot water provision.

Workshop participants noted that with domestic market development, these factors must be leveraged to establish and then sustain export demand. Participants suggested governments could take many practical steps to develop global markets, but they will not emerge without proactive interventions. One participant suggested:

> ***It's about having the downstream applications ready to go, such as hydrogen-fired plants, chemical manufacturing and ammonia, particularly for markets like Southeast Asia that have young coal-fired plants.***
>
> **HYDROGEN WORKSHOP PARTICIPANT**

3.4 Powering a green hydrogen market

For the Gladstone Region, the prospect of generating enough energy to dedicate the amounts required to fuel a global hydrogen industry is challenging. Although there is significant fossil gas and coal-powered generating capacity in the region, these resources (particularly LNG) are expensive and have already been committed to export contracts.[16]

The alternative is to develop enough renewable-energy generating capacity to power green hydrogen production. Some participants questioned whether Australia could build enough renewable generation capacity in time to become a green-hydrogen exporting superpower.[17] Participants did, however, unanimously agree that access to readily available affordable zero-emissions energy will not only factor into the development of Gladstone Region's hydrogen industry, but it will also determine if it happens at all.

The AEMO ISP (2022) 'Hydrogen Superpower' scenario is predicated on global hydrogen demand ramping up from the mid-2030s. This will mean growing the annual energy consumption in the National Electricity Market from 243TWh in 2030 to 330 TWh in 2050. To become a Hydrogen Superpower on this scale, nearly quadruples NEM energy consumption to support a hydrogen export industry.[18]

The growth rate in renewable generation required to realise the AEMO Hydrogen Superpower scenario is daunting, considering the current pace of construction of renewable energy and transmission infrastructure in Central Queensland and the rest of Australia.

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16 More information is accessible at: https://www.rba.gov.au/publications/bulletin/2021/mar/understanding-the-east-coast-gas-market.html (accessed 26/08/22) and https://www.accc.gov.au/media-release/lng-exporters-must-divert-gas-to-the-domestic-market-to-avoid-shortfalls (accessed 26/08/22).

17 Figure given by Parkinson (2021), quoting the proportion of energy experts who did not see the Hydrogen Superpower as most Australia's most likely scenario, when contributing to the AEMO ISP process.

18 These figures are taken from page 31 of the ISP (2022). It is important to note that opinions vary on the likeliness of Australia realising the Hydrogen Superpower Scenario. The latest AEMO survey of experts found that only 17 per cent believe it is likely Australia will realise the Hydrogen Superpower scenario, compared to 50 per cent of experts who think the Step Change Scenario is likely, which has lower rates of hydrogen production and consumption.

3.5 Making green hydrogen 'cost competitive'

Industry participants identified cost competitiveness as a major factor in the feasibility and ongoing sustainability of domestic and global hydrogen markets, as the current price of renewable energy is too high to compete with LNG and other fossil fuels. Industry stakeholders emphasised the need for practical policies, incentives, collaborations, and demonstration projects that encourage production investment and stimulate demand in sectors where hydrogen can be cost competitive.

The challenge is that markets and supply chains for fossil fuels and carbon-intensive industrial products are already well established. One industry participant described the challenge as, "Our customers won't buy hydrogen until it is on parity with gas." According to most forecasts, low-emissions hydrogen will not achieve thermal cost parity with fossil gas (approximately $1.1/kg), before 2050[19].

Industry participants were still confident a viable global hydrogen market would emerge, but as one practitioner put it, "Hydrogen will be a 'loss leader' for a long time". This challenge is indicative of the broader problem facing government and industry unless governments create legislation, supportive policies and subsidises hydrogen's uptake across the Australian economy.

Hydrogen powering heavy vehicles such as trucks

19 Advisian (2021).

Industry stakeholders identified eight pathways to reduce the costs and improve the competitiveness of hydrogen:

a. Reduce hydrogen installation and commissioning costs

Installation and commissioning make up approximately 25 per cent of initial hydrogen plant costs. Pathways to drive installation and operational efficiencies were identified by industry as essential for industry growth.[20]

b. Reduce electrolyser costs

Electrolyser equipment costs currently constitute around approximately 50 per cent of hydrogen plant capital costs.[21] According to AEMO, the cost of electrolysers needs to be more than halved to achieve competitiveness.[22] Industry participants noted that apart from needing to develop mature electrolyser manufacturing at scale, high market demand and supply shortages inhibit any cost reduction. A participant in the hydrogen workshop stressed this by saying:

> *"The quantum step is the technology that will accelerate the expansion of the industry. It's the electrolyser size and cost of energy inputs that has previously been the constraining factor, the main challenge to producing renewable hydrogen at a scale and price point to meet this growing demand."*

c. Reduce renewable energy costs

Hydrogen competitiveness is reliant on affordable renewable energy supply. To achieve cost competitiveness, the current price[23] of renewable generated electricity needs to more than half. Considering the various challenges facing the renewable energy sector and the National Energy Market, achieving this cost reduction will be challenging.[24] Given the number of renewable energy projects proposed for the region, Gladstone enjoys a competitive advantage over other regions.

d. Reduce water costs

Water costs are rarely made explicit in hydrogen cost calculations, thus making it difficult to calculate the impact of variable water costs. In a water resource constrained context such as the Gladstone Region, it is assumed hydrogen production facilities will desalinate water, which will add to both energy inputs and costs.

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20 Accessible at: https://www.cefc.com.au/media/media-release/cost-competitiveness-of-green-hydrogen-on-the-horizon-cefc-market-study/ (accessed 26/08/22)

21 The cost is approximately $1.1 million/megawatt (MW) of capacity, hence a typical 10MW sized electrolyser cost around $11 million dollars. Sourced from: https://www.cefc.com.au/media/media-release/cost-competitiveness-of-green-hydrogen-on-the-horizon-cefc-market-study/ (accessed 20/07/22)

22 More details accessible at: https://arena.gov.au/blog/australias-pathway-to-2-per-kg-hydrogen/ (accessed 26/08/22)

23 An efficient plant will consume 50–55 kWh of electricity to produce 1kg of hydrogen (Mehmeti et al. 2018). At the 2021 average Queensland renewable energy wholesale market price ($55.38/ MWh), 1 kg of hydrogen requires $2.77–$3 of renewable energy.

24 For more details on these issues and what to do about them, see Chapter 2.

e. Improve production efficiencies

Efficiency improvements can be made in technologies such as electrolysers, fuel cells and carbon capture storage and use. Investment in research and development in partnership with (ideally) local or international manufacturers is needed to achieve these cost reductions.

> ***High quality and low-cost renewable resources provide a comparative advantage which will be a key driver in achieving competitive hydrogen production costs.***
>
> **HYDROGEN WORKSHOP PARTICIPANT**

f. Advance transport and storage technologies

Hydrogen's low density and molecular properties present technical (and cost) challenges for transportation and storage. Although existing gas infrastructure may be used, leakage and safety issues will need to be resolved. One way to reduce transport and storage costs is to convert hydrogen into ammonia or methanol, which can utilise existing transport and storage infrastructures.[25]

g. Targeted government investment

Institutions such as the Clean Energy Finance Corporation (CEFC) and ARENA have demonstrated how government investment in collaborative or consortia approaches, such as the Future Energy Exports Cooperative Research Centre,[26] can attract diverse interests, compensate early adopters, and offset innovation risks. When projects are set up effectively, government can recoup financial and a broader economic return on these investments.

h. Achieve circular economies of scale

Growing industry supply chains and clustering synergistic industries can create economies of scale, leading to cost reductions. Mutually beneficial production efficiencies can be implemented through cooperation, eliminating unnecessary costs .[27] Participants agreed that a systematic approach to expanding circular economy practices across the Gladstone Region is an essential step in integrating hydrogen into industrial processes across sectors, increasing demand and further reducing costs.

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25 Note that ammonia and methanol each have challenges related to decomposition losses, toxic compound production and access to carbon neutral components.

26 For more information on the FEE-CRC is accessible at: https://www.fenex.org.au/ (accessed 16/08/22)

27 For more details see: Golev et. al. (2014) and Van Beers et. al. (2007).

3.6 Infrastructure and supply chain development

Infrastructure is another critical enabling factor for the nascent hydrogen industry. The infrastructure needs of the hydrogen supply chain are complicated and expensive, particularly at the scales required for mass production and transportation. For instance, sustainable water provisioning will require desalination, pipelines, storage, and waste treatment facilities. Because these build out costs multiply throughout the supply chain, hydrogen industry representatives consulted during the engagement activities insisted that a coordinated approach to common user infrastructure is critical to developing a viable hydrogen industry in the Gladstone Region. Participants were unanimous in proposing the State and Federal Governments are best placed to coordinate stakeholders to develop and utilise common user infrastructure such as transmission lines, pipelines, rail, roads, port and loading facilities. Workshop participants saw it as the State and Federal Government's role to determine (with industry) what infrastructure is needed, who will pay for and benefit from owning it.

> ***Currently no-one is owning the solution or working out how to solve the [infrastructure] challenge. There needs to be the ability to collaborate across industry, at all government levels and in the academic sector.***
>
> **HYDROGEN WORKSHOP PARTICIPANT**

> ***Coordination needs to be done in a sharp and smart way. Need to future proof infrastructure and build it in a way to build the 2040 and 2050 targets – so thinking globally significant market from early on.***
>
> **HYDROGEN WORKSHOP PARTICIPANT**

Having recognised the importance of infrastructure development on a national level, the 2019 National Hydrogen Strategy[28] provides a framework for regional hubs to simultaneously develop their power generation, production and processing, transport and distribution, demand, markets, and workforce capabilities. As a "Clean Hydrogen Industrial Hub," Gladstone Regional Council and its partners in the Central Queensland Hydrogen Technology Cluster and Alliance are already taking advantage of government and private investment. Together they are piloting projects that demonstrate hydrogen's industrial, heavy transport, gas network blending and other possible uses. For example, in early May 2022 the Queensland Government awarded $5 million to the $20.5 million Gladstone Sealink project, which aims to design, construct and operate a hydrogen powered ferry[29] as part of its fleet servicing Curtis Island.

28 Accessible at: https://www.industry.gov.au/sites/default/files/2019-11/australias-national-hydrogen-strategy.pdf (accessed 12/08/22)

29 The world's first hydrogen powered ferry according to the proponent (for more details see https://statements.qld.gov.au/statements/95079 & https://www.statedevelopment.qld.gov.au/industry/priority-industries/hydrogen-industry-development/hydrogen-industry-development-fund (accessed 12/08/22)

Infrastructure priorities as identified by industry participants included:

a. Port infrastructure

There was a consensus amongst industry participants that while the port capacity was suitable to service the growing hydrogen industry in the short term, these facilities will need to expand if the industry grows at predicted rates. Works will likely include, building new berths, dredging and associated management.[30]

b. Water infrastructure

The hydrogen industry will require significant investment in water infrastructure. Whether this is built infrastructure that operates in isolation (such as desalination plant) or integrated into natural assets (such as water recycling plants that utilise ecosystem treatment services) is yet to be determined. Either way, planning early to meet water requirements is critical.

Sourcing water to meet the demands of new industries, such as hydrogen, needs to be considered within a regional integrated water planning framework. Integrated approaches have proven effective for balancing competing uses and adaptively managing water resources. Integrated and adaptive management will identify opportunities for system wide improvements that benefit multiple users, for example, recycling water by treating and using the (waste) outputs from one industrial process as feedstock for another user. Identifying these options can lead to shared benefits such as proponents co-investing in the required infrastructure as well as providing land for ecological treatment and storage options that have positive environmental and biodiversity impacts. Recycling and generating alternative water sources – such as desalination – has potential, if done well, to increase the region's overall water resiliency.

c. Energy infrastructure

As mentioned above, participants recognise the need for affordable low emissions energy to create a viable hydrogen industry in the Gladstone Region. Current renewable energy project registrations could generate up to 23 GW of capacity across solar, wind, bioenergy and storage technologies. This projected capacity would be sufficient for the 10–11 GW of energy Gladstone industry (including new hydrogen production) will require,[31] but as explored in Chapter 2, much more needs to be done to ensure a rapid and smooth role out of energy infrastructure across the region.

30 The Gladstone Port Corporation has already begun working with proponents to develop common user infrastructure.

31 Personal comms, Beyond Zero Emissions 2022.

3.7 Access to key inputs and components

The ability to source key inputs is another factor that affects a proponent's decision to invest in a region such as Gladstone. Sourcing the materials and components and the expertise needed to assemble, operate, and maintain the infrastructure and equipment across the supply chain can significantly constrain project feasibility and sustainability. Participants noted that hydrogen projects are already delayed by global supply challenges including long lead times and inconsistent ability to get parts; shipping costs; and excessive global demand for materials and components like electrolysers.

During workshop discussions, participants raised questions as to whether industry players will continue to respond to supply chain challenges by trying to out compete each other, or whether investment in cooperation and networking to achieve shared ambitions will lead to better coordination within and across regions. By cooperating, proponents improve their purchasing power and can support the development of local content and manufacturing services.

Multiple manufacturing opportunities are emerging to service a hydrogen market in the Gladstone Region. For example, the Central Queensland Hydrogen Technology Cluster has conceptually mapped the 'green' chemical industry opportunities that could utilise brine waste streams from a desalination plant.[32] Workshop participants recognised these opportunities. Several suggested government and peak bodies expand their thinking about what hydrogen could mean for a regional economy like Gladstone. For instance, when discussing the comparison between previous industrial booms and the prospect of hydrogen, one participant suggested:

> ***[This is] not an LNG boom – it was extractive – but hydrogen is a manufacturing industry with evolving tech and market.***
>
> **HYDROGEN WORKSHOP PARTICIPANT**

3.8 Addressing community concerns

Participants in community workshops affirmed a high level of interest and support for a hydrogen industry development in the Gladstone Region. Respondents particularly noted hydrogen's potential to replace traditional industries, create new jobs, and generate revenue for the region well into the future. But there was some scepticism and community concerns that need to be addressed if the industry is to grow sustainably and quickly enough to become competitive at a global scale. Community members expressed three main concerns: 1) Safety, 2) Whether the industry will leave a positive legacy, and 3) Access to water.

32 The Hydrogen Ecosystem map is accessible at: https://www.cqh2.org.au/cqh2-ecosystem-map/. (Accessed 12/08/22)

a. Safety concerns

Proving the safety of hydrogen will enable or constrain the hydrogen industry's social licence to operate and its industrial productivity and viability.

When discussing the vision for the hydrogen industry in 2032, one industry respondent stated: "The community is aware of effective safety measures for using and producing hydrogen and feels safe with industry." This view contrasts with concerns raised by participants in community workshops about whether it was safe to develop the industry locally. Some participants questioned whether there is enough sound international evidence to ensure the hydrogen industry can be developed and operate safely, acknowledging that they did not know much about hydrogen.

Community concerns about safety are already impacting decision making processes in the region, with a recent proposal to build a small pilot hydrogen production plant in South Gladstone testing community acceptance of hydrogen technology. When assessing the project, the Gladstone Regional Council went against the advice of Council officers and did not approve the development. During their deliberations, Councillors cited safety concerns as a decisive factor in denying the project at that location, because of proximity to residences and a school.[33]

In the six months before the Council decision, a group of residents had campaigned against the project, predominantly on the grounds of safety concerns. This group repeatedly expressed their support for the hydrogen industry, but remained adamant that risk of explosion meant the proposal was the "right project" just in the "wrong place," and hydrogen projects should be developed in separate industrial precincts.

This example highlights the importance of effective stakeholder engagement and community education early in the development of projects, to find mutually agreeable ways forward, stop the escalation of opposition where it is not warranted, and/or stop inappropriate developments from proceeding. Some industry and community workshop participants suggested Council could help to educate communities and stop the spread of misinformation through its multiple communication channels.[34]

> ***Council could reach out to community to communicate where things are going, reduce community concerns/ inhibitions and be a point of contact.***
>
> **COMMUNITY FORUM PARTICIPANT**

b. Viability concerns

Community participants also expressed doubts about the long-term economic viability of the hydrogen industry. Even though there has been a functioning, albeit small, hydrogen industry

33 A recording of the council meeting is accessible at: https://www.youtube.com/watch?v=H4g5XV1Xyag (accessed 20/08/22)

34 Note that Council must balance any educational activities with its regulatory and other statutory roles.

in Gladstone for decades, the public perceives hydrogen as failing to fulfill past expectations of becoming a major industry, and is only now being promoted as a replacement for fossil fuels for political reasons.

> ***Concern is that people think hydrogen will save us, be the next boom… but also others think it is pie in the sky. The industry needs clear messaging, timelines, and an explanation of what it means for the community (even if it is still fuzzy around timelines).***
>
> **ENERGY WORKSHOP PARTICIPANT**

c. Legacy issues

Community and industry stakeholders also questioned the impact the industry will have on the region in terms of:

- Water supply.
- Transport and other infrastructure.
- Whether it will create good local jobs or only lead to FIFO workforce opportunities.
- Housing affordability and availability.
- Whether profits will be reinvested in the region to improve services and infrastructure.

3.9 Policy, legislation, and regulation

Like all nascent industries, hydrogen's success in the Gladstone Region depends on workable policy, legislative and regulatory settings that give players the confidence to take risks and invest. Whether a global corporation deciding to build a multibillion-dollar electrolysis manufacturing plant or a high school student choosing which subjects to pursue, government policy will influence decisions that have long-term impacts.

Industry workshop participants emphasised that the hydrogen industry's growth potential is constrained by a general lack of policy and regulation. This was surprising, given that both the Federal and Queensland State Governments have taken significant steps to support the hydrogen industry's growth. Since the Federal Government's National Hydrogen Strategy was released in 2019, both Federal and State Governments have produced many reviews, policies, plans and strategies to nurture investment, supply chains, workforce development and emerging markets. To illustrate, Appendix D lists a selection of State and Federal Government initiatives to develop the hydrogen industry in Australia in 2022. The broad scope of these initiatives reveals a key challenge inherent in building a hydrogen industry from scratch – the fact that success depends on integrating the industry, its supply chains and product into numerous sectors of the economy at regional, state,

national and international scales. For example, government leadership and support are needed to create demand for hydrogen in the transport sector and build the common user infrastructure to enable this. These types of challenges multiply across the hydrogen supply chain, thus complicating the role of each level of government.

While most industry participants recognised the investments Federal, State and Local Governments have made in the hydrogen industry and agreed with the direction set by the National Hydrogen Strategy, they questioned the current implementation. They suggested the messy reality of Australian energy politics over the last decade has hindered progress. Although opinions varied, a theme emerged that government is not doing enough to support proponents to develop local production, supply chains, skills, and demand quickly enough.

Stakeholder responses point to three main challenges that government need to address through appropriate policy and regulation:

- Moving past policy and leadership failures towards transitioning to zero emissions.
- Facilitating greater collaboration and planning.
- Establishing appropriate incentives to invest and government support for early movers.

a) Exercising leadership through policies to support the transition

As mentioned earlier, the commercial viability of hydrogen is predicated on Australia and our trading partners recognising the need to decarbonise their economies. Industry and community stakeholders participating in the workshops acutely recognised the need for coherent political, policy and regulatory leadership from all levels of government to move beyond the "climate wars" and get on with managing the changes needed, otherwise Australia risks lagging further behind our trading partners and being forced into tough compromises. A representative from a prominent Gladstone enterprise noted:

> ***Policy is lacking, enterprises are creating their own destiny – we haven't been directed to do one thing or another and are navigating as best as we can. There are climate strategies [from government] but no legislation.***
>
> **HYDROGEN WORKSHOP PARTICIPANT**

Another hydrogen workshop participant summarised the issue as, "Consistent industry policy is required, and hydrogen needs to be included as part of the Federal Government energy policy."

The persistent message from all stakeholders was for governments to take practical steps towards what many considered the inevitable target of a net zero emissions economy by 2050. In addition to securing a stable energy and climate policy, many urgent and specific regulatory interventions are required to set

the hydrogen industry up for success. For instance, a 2021 Advisian report[35] commissioned by the CEFC found that clarifying the definition of hydrogen 'type' and establishing industry standards and certification processes were critical to ensuring commercial viability of Australian hydrogen in the global market.

This need to establish a certifying standard so that hydrogen produced in Australia can be sold into global markets was repeated by multiple industry representatives. These proponents questioned the current "guarantee of origin" certifying scheme pursued by the Federal Government. The common concern is that the government's proposed certifying protocol may not meet international market requirements, the result being "green" hydrogen produced in Australia would be unacceptable in European and potentially other markets. Thus, an alternative certifying scheme would need to be setup and managed for green hydrogen producers to meet the customers' demands. Workshop participants suggested a more facilitative and collaborative approach to working with industry would help avoid a potential regulatory failure such as this, whilst also offering opportunities to overcome other challenges facing the industry more broadly.

b) Facilitating collaboration and planning

The need to improve government and industry collaboration was identified by numerous participants in the hydrogen workshop. Proponents indicated the region's hydrogen industry has a collaborative culture and high level of cooperation. Still, there is scope for government to play a greater role in facilitating, coordinating, planning, and bringing stakeholders together at a regional scale. More collaborative planning would facilitate more coordinated investments in much-needed common user infrastructure and reduce the potential for unproductive regional and inter-regional competition.

The hydrogen industry is grappling with competition and collusion laws that stifle proponents' ability to work cooperatively when becoming established. There was real concern amongst proponents that without State and Federal Government support to find ways for the industry to collaboratively plan for and build the infrastructure it requires, without burdening first movers with these costs, then Gladstone Region may miss the window of opportunity to attract international investment and secure contracts. These concerns escalated when industry participants reflected on the tendency among state and territory governments to compete rather than cooperate when trying to attract investment and establish their region's infrastructure, brand, supply chains and workforce. One energy workshop participant recognised the need to shift away from this mindset as it is 'cannibalising' the industry and consequently 'not in the national interest'.

35 Advisian (2021).

Several workshop participants suggested that because regulatory issues sit with state governments, they are best placed to solve them. This is being done within Queensland Government departments to an extent, with hydrogen a priority industry within the Department of State Development, Infrastructure, Local Government and Planning, and as such the department has conducted opportunity studies, developed an investor toolkit, has funded capability mapping and safety simulation modelling. Similarly, the Department of Employment, Small Business and Training recently released a Hydrogen Workforce Development Roadmap.[36] The Coordinator General's office has a hydrogen technical working group and oversight of planning and assessment of multiple projects. The Department of Energy and Public Works has created the Hydrogen Task Force[37] and Hydrogen Coordination Unit.[38]

Industry participants did not appear to appreciate the extent of coordination the Queensland Government is undertaking in the state and beyond. Based on this lack of recognition and perhaps confusion amongst industry participants, efforts by the Queensland Government would benefit from more targeted engagement with industry stakeholders. Meaningful engagement at the regional level, through participation in events and outreach to networks such as the CQH2 Technology Cluster, CQH2 Alliance, and the Gladstone Engineering Alliance (GEA) would promote and strengthen these coordination efforts.

Participants also suggested an increased coordination and cooperation across different states and departments. To collaborate in regulatory working groups effectively, states and their departments need to find ways for their staff "doing the work on the ground" to cross jurisdictional boundaries. Participants pointed to the success of initiatives such as National Energy Resources Australia's CQH2 – Technology Cluster (H2TCA) which facilitates connections and knowledge sharing and providing partnership funding to help build capability in the industry.

Participants raised concerns that limited internal expertise and lack of collaboration restrict all levels of government's capabilities to handle project planning assessments and adequately address the industry's complex challenges. Several respondents suggested that there should be a regional master plan for Central Queensland rather than reacting to individual planning applications.

c) Establishing incentives for early adopters

Governments can improve the viability of the Gladstone Region's hydrogen industry by providing more and greater direct incentives. There are many ways to structure incentives, and they should be tactically used to induce behaviour, such as:

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36 Queensland Government (2022).

37 The taskforce is responsible for producing and enacting an action plan to establish a sustainable Queensland hydrogen industry (members from government departments, industry, and academia).

38 The coordination unit is responsible for coordinating the implementation of the Queensland government's Hydrogen Industry Development Strategy 2019–22, project development, stakeholder engagement and collaboration with other jurisdictions.

- Encouraging investment.
- Attracting suppliers to develop offerings for the hydrogen supply chain.
- Motivating the future workforce to choose a hydrogen career path or closing for price gap so potential hydrogen users test its practicability.

Well-designed incentives prompt positive feedback loops. For example, one participant pointed out, in the post-COVID-19 context, capital costs are ballooning, the cost of hydrogen technology is high, partly because demand for technology is high. Therefore support to establish local suppliers should help reduce upfront capital costs and stimulate local content providers. The results of which are far greater than governments merely providing financial support to reduce proponents' costs. Other examples of what governments are doing or could do include:

- Introduce tax levers to incentivise industry as a whole instead of, as one Hydrogen Industry representative put it, "picking a winner – pick the industry as the winner rather than individual players."
- Provide more support to projects in the feasibility stage, particularly during the front-end engineering design stage.
- Collate, publish and promote access to quality data relating to technology and commercial viability.
- Open access to the Queensland Government's $2 billion Renewables and Hydrogen Energy Jobs Fund. It can then support more pilot projects to develop hydrogen production efficiencies, reduce/remove barriers for near economic opportunities,[39] and fund innovative policy or regulatory initiatives such as the Gladstone REIP concept.
- Develop policy levers to reduce the risk of increasing electricity costs in the short term to keep projects feasible for long-term return on investment.

3.10 Recommendations for Council

Stakeholders identified various roles and opportunities that Council could fulfill in establishing a viable regional hydrogen industry. Most participants felt that beyond its statutory obligations, Council is well placed to ensure the industry develops appropriately and sustainably, and that it contributes to the region's prosperity.

Three main responsibilities were identified in discussions during the Hydrogen Stakeholder Workshop:

a. Planning approvals.

b. Advocacy on behalf of the region to ensure good, safe, sustainable development.

c. Helping test and demonstrate the advantages of converting to hydrogen.

39 Page 16–17, Advisian (2021). Australian hydrogen market study Sector analysis summary, commissioned by Clean Energy Finance Corporation, available at https://www.cefc.com.au/media/nhnhwlxu/australian-hydrogen-market-study.pdf. (Accessed 01/08/22)

A B-double truck along Hanson Road with Mount Larcom in the background

Suggested actions for Council to commence over the next six to twelve months:

a. Planning and assessment

Participants in the Hydrogen Workshop expressed some confusion about the extent to which Council should play a role in approving projects. It was noted that a proportion of hydrogen development is taking place in the Gladstone State Development Area (GSDA) and therefore, State Government departments (i.e., the Coordinator General) are assessing these projects. Industry proponents commented that having their development assessed by the Coordinator General is advantageous (over having it assessed by council) because it expedites the process and avoids additional costs.

Some industry representatives believed Council is struggling to stay up to date with the complexity and pace of hydrogen developments and that this had contributed to the recent decision by Council to deny the Hydrogen Park Development. Whether this perception is warranted or not, Council should be properly resourced by State and Federal Governments to ensure that it has enough staff and training to:

- Consider the cumulative impact of the hydrogen industry in planning decisions. Rather than take a project-by-project approach, Council can continue to work with industry and other stakeholders to create dialogue and common understanding about what the issues and opportunities will be if hydrogen developments build out as expected.
- Work with other stakeholders to engage with and educate the community so they understand proposed developments and can provide appropriate and timely feedback. Recent experience has shown that safety education is important.
- Collate some of the lessons learned from past experiences of rapid industrial change (for example the expansion of the LNG industry) to identify ways to improve approaches to planning and engagement, infrastructure development, and access to housing, training and services.
- Stay abreast of developments and the range of hydrogen initiatives and proposals.
- Approve projects in a way that gives all stakeholders confidence in decision-making processes.
- Set clear expectations of project proponents. Support them to understand the existing context, history of engagement and what local stakeholders' aspirations are for their community.
- Engage with the Queensland Government and continually connect them to local opportunities for more targeted and meaningful engagement with industry stakeholders through participation in events and outreach to networks such as the CQH2 Technology Cluster, CQH2 Alliance, and the Gladstone Engineering Alliance (GEA).
- Advocate at all levels of government for what the region needs to manage change.

Further work is also needed to clarify Council's role in planning and assessment processes in contrast with other levels of government.

> ***Council needs to understand and be able to process these [approvals]. Otherwise, they are a real barrier and can hold up development.***
>
> **HYDROGEN WORKSHOP PARTICIPANT**

b. Advocacy on behalf of community to ensure good, sustainable development

The Council's primary role is to represent the region's interests and ensure the region's voice is articulated to other levels of government, industry, and investors. In a progressively competitive funding and investment environment, Council can play an active role in ensuring the hydrogen industry develops in a way that benefits the Gladstone Region as a whole. This includes activities such as:

- Conducting a program to engage diverse community stakeholders to determine their concerns and aspirations for a hydrogen industry. The results could be used to develop guides for proponents and investors. Guides articulate community expectations regarding the design and operations of the industry including safety, as well as the types of investments and benefits that people want to see flow back to the region.
- Continuing to participate in initiatives such as the CQH2 Technology Cluster, CQH2 Alliance and the Hydrogen Ecosystem (among others). Council can then represent the needs and aspirations of the region's diverse communities and stakeholders (including a coordinated approach to common user infrastructure), and stay informed of the latest developments to keep community and other stakeholders updated.

Engaging with DSDILGP and other relevant government departments to address needs related to infrastructure and service upgrades (for example: trade waste, roads, and sewage development) in the GSDA and beyond.

- Implementing communication strategies that enable the public to engage with the industry to, learn about, and share their view of, the industry and what it could mean for the region. This could include collaborating with other organisations to host events, forums, open days and tours of industrial sites so that the public can engage directly with industry and decision makers.
- Understanding and communicating the risks and opportunities of hydrogen for the Gladstone Region. This could be done through Council's existing communications (eg: Conversations page), local media and social media (e.g., Facebook, YouTube).
- In the next few years, supporting a school and/or university-based science and technology challenge in which teams of students compete to come up with solutions to address industry challenges.
- Using the results from engagement activities to inform industry and other levels of government, as well as financiers, technical and other services of what it takes to generate hydrogen effectively in Gladstone.

Council's proximity to community, particularly vulnerable and marginalised groups, puts it in a position of responsibility when representing the region in industry forums and negotiations. To effectively manage the scale and pace of change, Council must be resourced accordingly by State and Federal Governments. This includes additional investment in the human and material resources needed in community engagement and outreach; economic development and planning; and cultural liaison.

c. Testing and demonstrating the advantages of hydrogen

Council could play a role in expanding the domestic demand for hydrogen and demonstrating the safe use of hydrogen by utilising the resource across its operations. This could include negotiating offtake agreements and powering heavy vehicles such as trucks, buses and waste collection vehicles.

This is a good start, what Gladstone Regional Council is doing. Becoming informed and informing community will help. Other conversations with Central Queensland Regional Organisation of Councils will enable collaboration. This will help to manage concerns about how to transition from fossil fuel to a renewable economy.

HYDROGEN WORKSHOP PARTICIPANT

Useful Resources

Cleaner Energy Finance Corporation (2021). Australian hydrogen market study Sector analysis summary, commissioned by Clean Energy Finance Corporation and conducted by Advisian. Accessible at: https://www.cefc.com.au/media/nhnhwlxu/australian-hydrogen-market-study.pdf

CSIRO (2022). Hydrogen initiative (mapping) database. Includes the most comprehensive set of detailed descriptions and link for hydrogen projects, policies and developments, accessible at: https://research.csiro.au/hyresource/policy/australia-and-new-zealand/queensland/ (note this particular page links to the summary of Queensland Hydrogen Strategy)

CSIRO (2022). Summary of Federal Government policies related to Hydrogen, accessible at: https://research.csiro.au/hyresource/policy/australia-and-new-zealand/australia/

Federal Energy Department (2021). Summary of Hydrogen initiatives, accessible at: https://www.dcceew.gov.au/energy/hydrogen#toc_5

Federal Government online mapping tool. Provides many datasets, particularly hydrogen related overlays and point data. Accessible at: https://www.nationalmap.gov.au/

Federal Government AusH2, Australia's Hydrogen Opportunities Tool. Mapping portal for locating and analysing data relevant to hydrogen sector. Accessible at: https://portal.ga.gov.au/persona/hydrogen

Power stations of Queensland interactive mapping tool. Provides details on diverse power stations, relevant for Renewable Energy locations and other infrastructure. Accessible at: https://electricity-generation-map.epw.qld.gov.au/#results

CHAPTER 4:
Diversifying the Regional Economy

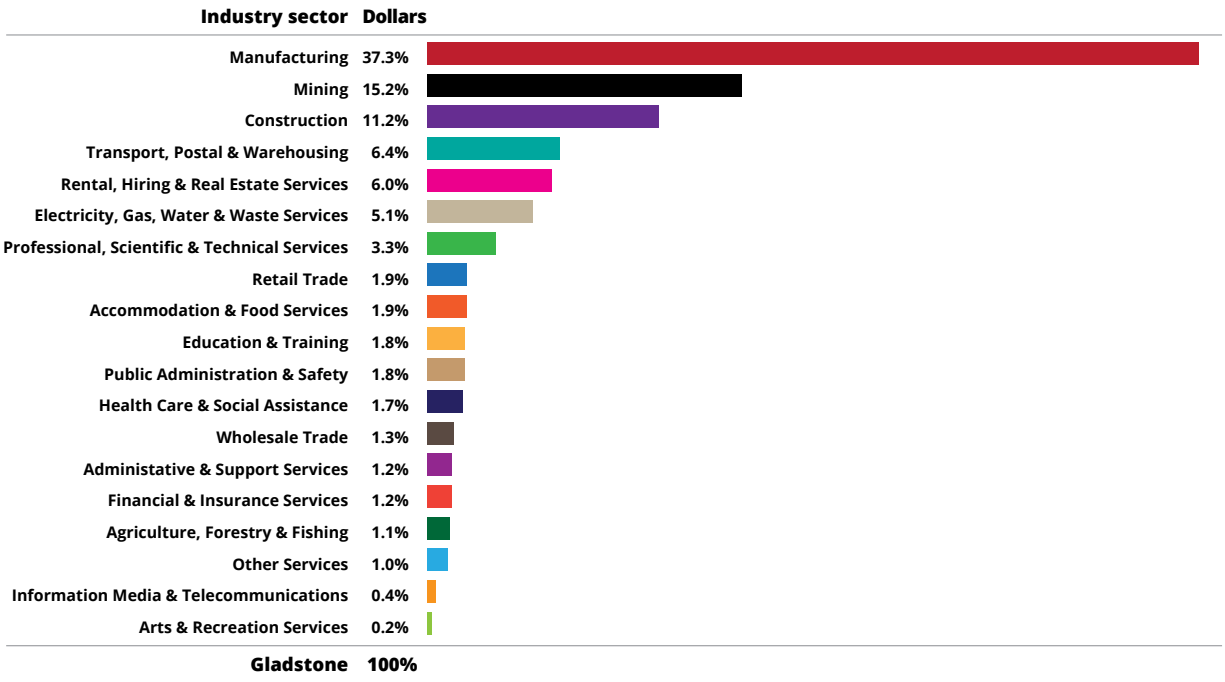
4.1 Introduction

The Gladstone Region is well positioned to take advantage of changes in the energy sector to diversify and strengthen its economic base. Given the industrial capacity and the number of renewable energy projects planned across the region, Gladstone holds the potential to expand the manufacturing sector greatly and simultaneously boost related industries across the supply chain. The potential influx of workers to the region, as well as the additional work needed to decarbonise existing industries, could also mean the expansion of a range of other businesses across the region if development is well-planned and supported.

Gladstone already boasts a strong manufacturing base and compared to some regions, is already diversified. As delineated in Figure 4.1 overleaf, manufacturing is the biggest industry sector with 37.3 per cent of total output. The second largest sector is mining (15.2 per cent) closing followed by construction (residential, non-residential, heavy and civil engineering services) which constitutes 11.2 per cent of total output. The figure overleaf represents the total income generated by organisations in each of the industry sectors in Gladstone from REMPLAN ABS data.

The Gladstone Marina bridge (foreground) links the central business district to the marina parklands and RG Tanna Coal Terminal

Figure 4.1: Gladstone Economic Output Data, by Industry[1]



The main opportunities to diversify the regional economy as identified by participants across the engagement activities include:

- Expanding the manufacturing base by building on existing infrastructure and taking advantage of lower energy costs.
- Decarbonising heavy industry.
- Building on economic sectors other than energy.

4.2 2032 Vision

Community and industry representatives across all engagement activities emphasised the pride residents have in Gladstone's industrial heritage and want to see the region continue to be, in the words of one community member, 'an area that makes things and exports to the world.'

By 2032, participants across all engagement activities said they wanted to see lower energy costs resulting in an expansion of manufacturing and other industries (including retail, food production, agriculture, and tourism) across the region. Most expected that industry (including large companies such as Rio Tinto, Orica and QAL) will have made significant progress towards decarbonising operations. And Gladstone would be well on its way to becoming an 'eco-industrial hub' or 'showcase of green industry and manufacturing'. This

1 Output, Industries, Economy, Jobs and Business Insights, REMPLAN. Accessed August 29, 2022. Note, data is a culmination of latest data available: ABS 2016 Census Place of Work Employment (Scaled), ABS 2018 / 2019 National Input Output Tables, and ABS June 2021 Gross State Product.

will have included investments to reduce the emissions of existing heavy industries (not just offsets), and meeting or beating the Queensland Government's goal of reducing emissions by 30 per cent below 2005 levels by 2030 to secure a liveable future.

Given the ongoing global supply chain issues caused by COVID-19 and increasing global political instability, along with a growing supply of lower cost renewable energy generation, many participants agreed the region could manufacture a wider array of goods to reduce Australia's reliance on imports.

Many people believe that by 2032 Gladstone will become a 'green' exporter of products such as green hydrogen, aluminium, steel, chemicals, cement and lime, electrolysers, batteries, and renewable energy parts. Respondents were also keen to see the development of technology for new manufacturing industries such as green plastics and other packaging for agricultural produce. It was envisioned that Gladstone's capacity for manufacturing and heavy industry would help leverage other opportunities such as "AgTech" which uses agriculture and horticulture technology to improve growers' yield and efficiency.

Participants identified six main tasks related to diversifying and strengthening the regional economy:

- Expanding local manufacturing by building on existing infrastructure, skills, and inputs.
- Supporting existing industries to decarbonise so they can remain viable into the future.
- Taking advantage of locally available renewable energy and the need to decarbonise the economy to expand other sectors such as agriculture, tourism, and waste management.
- Developing local infrastructure to meet the needs of emerging industries.
- Offering incentives to attract new investment.
- Undertaking planning to inform the development of new policies and regulations.

4.3 Expanding local manufacturing

The key to replacing permanent, well-paid jobs in the electricity sector is not in the generation of renewable energy, but in expanding industries capable of using lower cost energy to manufacture and process goods and materials. The Gladstone Region is uniquely placed to alleviate current global supply challenges and establish new industries that meet domestic and international demand given its industrial base, infrastructure, skilled workforce, and access to rapidly expanding renewable energy generation.

> ***Let us make renewable energy components such as solar panels and batteries locally, including development, manufacturing and distribution so that we can support the growth in renewable energy.***
>
> **ENERGY WORKSHOP PARTICIPANT**

The range of 'green' products that could be produced using renewable energy includes hydrogen, ammonia and other chemicals, explosives, batteries, electrolysers, biofuels, metals (including green and recycled aluminium and steel) and renewable energy componentry. Recent announcements related to the development of new products include Fortescue Future Industries commitment to building a $1 billion electrolyser factory in Gladstone,[2] and Oceania Biofuel's plan to build a $500 million renewable diesel and sustainable aviation fuel biorefinery which will create 60 new direct jobs and 500 indirect jobs during construction and operation.[3]

Given the current supply chain constraints facing every industry, the region has a rare opportunity to scale production quickly by first meeting the domestic demand for products to build export capacity.[4] Developing the supply chain to support a range of new industries will require a high degree of planning, coordination, investment, and commitment from all levels of government, industry, and investors. This is particularly important given the need to develop common user infrastructure (such as transmission lines, roads, port infrastructure, pipelines, and water infrastructure) that minimises operating and distribution costs across various manufacturing initiatives. As one energy industry representative commented, "If everyone does their own thing it's more expensive. We need shared infrastructure."

The role of government (particularly the Departments of State Development, Treasury and the Coordinator General) in supporting coordination to develop shared infrastructure is crucial, as is the role of public finance to attract private investment.

> ***We need a diversified supply chain where there is a range of suppliers to choose from, focusing on different projects such as metals and electrical componentry, and they are able to connect into different sectors.***
>
> **HEAVY INDUSTRY WORKSHOP PARTICIPANT**

> ***We should make electrolysers locally for hydrogen instead of importing.***
>
> **EDUCATION AND TRAINING WORKSHOP PARTICIPANT**

2 Australia Financial Review 11 October 2022 Forrest commits to $1b hydrogen-equipment factory in Gladstone (afr.com)

3 Queensland Government 13 April 2022 New $500 million biorefinery planned for Gladstone – Ministerial Media Statements

4 This is the approach being adopted by Ark Energy in Townsville, where they are producing hydrogen from their solar farm for fuel cells to power their long-haul truck to build their capacity to export as markets mature gradually.

Most people engaged through the community and industry workshops were supportive of the range of new manufacturing opportunities. However, many still shared concerns and doubts about the scale of development and whether projects would come to fruition. Some raised questions about whether Australia could compete globally in terms of scale, quality and price, and whether we could move quickly enough to corner new markets. Some believed it safer for Australia to focus primarily on exporting raw commodities rather than onshore manufacturing and processing. Others expressed concerns about the long-term sustainability and impacts of new projects and questioned their capacity to generate lasting economic benefits. Most agreed, however, that diversifying and increasing the industrial base would help to stabilise economic ebbs and flows and help the region capitalise on renewable energy expansion for long-term economic gain.

4.4 Decarbonising heavy industry

Significant economic opportunities lie not only in expanding and diversifying the regional manufacturing base but also in the work to decarbonise existing businesses and industrial processes.

Traditional industries in the Gladstone Region produce carbon-intensive products such as alumina and aluminium, ammonia and ammonium nitrate production, cement and processed LNG. These industries will need to decarbonise and switch to renewable energy sources quickly[5] to remain globally competitive, given the increased international demand for low-carbon products and international tariffs being imposed on high-carbon products. Decarbonising heavy industry involves electrifying production where possible and switching to renewable energy sources, replacing the use of fossil fuels (including LNG) with renewable fuels (such as hydrogen or biofuels), and increasing energy efficiency and the use of heat exchange technologies.[6] According to the Australian Industry Energy Transitions Initiative, the emissions from these industries in Gladstone could be reduced by around 27 per cent, with a total abatement potential of 6.1MtCO2e through mature and commercially available technologies such as renewable energy powered electric boilers for alumina production.[7]

Realising these opportunities requires a large-scale transformation of the energy system so that sufficient renewable energy is generated and available through storage technologies. Current estimates from the Australian Industry Energy Transitions Initiative suggest Gladstone industries alone will require around 14.8–37.5 TWh of renewable energy to decarbonise.[8] Meeting this

5 In June 2022, the Queensland Government released the Queensland Resource and Industry Development Plan which includes plans to require resources companies to provide decarbonisation plans by no later than 2027.

6 Carbon capture and storage (CCS) technologies are often cited as means to meet net zero goals, however, they are not included here as they do not reduce emissions. Efforts to operationalise carbon capture and reuse (CCR) technologies are in the early stages of development in Australia. For example, see MCi: https://www.mineralcarbonation.com/

7 Climateworks Centre and Climate-Kic Australia. Australian Industry Energy Transitions Initiative, June 2022. Setting up industrial regions for net zero. Phase 2 report: A guide to decarbonisation opportunities in regional Australia.

8 Climateworks Centre and Climate-Kic Australia. Australian Industry Energy Transitions Initiative, June 2022. Setting up industrial regions for net zero. Phase 2 report: A guide to decarbonisation opportunities in regional Australia.

demand for renewable energy quickly to ensure competition with green industries in the rest of the world is a serious challenge. Not only for industry but also for the government and the impacted communities.

Major industry players operating in Gladstone are, however, already taking steps to decarbonise their operations. Rio Tinto has committed to achieving a 15 per cent emissions reduction target by 2025 and 50 per cent by 2030 across their operations. Specifically, in Gladstone, this includes a study with Sumitomo Corporation to reduce emissions in alumina refining through a pilot hydrogen plant at the Yarwun alumina refinery.[9] Orica is also taking steps to decarbonise and has signed an agreement with AlphaHPA in November 2021 to achieve net zero emission by 2050.

Looking towards the Port of Gladstone's RG Tanna Coal Terminal where four wharves are used to export coking coal to Japan, South Korea, Taiwan, India, Italy and France

9 Rio Tinto and Sumitomo Corporation to assess hydrogen pilot plant at Gladstone's Yarwun alumina refinery. When this goes ahead this project would produce hydrogen for the Gladstone Hydrogen Ecosystem (see Chapter 3 for more information).

4.5 Diversifying other sectors of the economy

Current media commentary emphasises manufacturing as the key to strengthening and diversifying Gladstone's regional economy. Participants in the roadmap engagement workshop did, however, identify a range of additional opportunities including:

a. Recycling and processing opportunities

A strong theme across both industry and community workshops was the high level of support for developing local businesses that could operationalise circular economy principles. Principles include recycling, re-using and repurposing a range of waste products, including agricultural waste, metals, oil and diesel[10], construction materials, fly ash, red mud, rubber, glass, plastics, electronics and textiles. Efficient processing of waste products could help to address some of the supply issues faced by local industry. Some community members also suggested establishing repair cafes, with volunteers that repair electronic items that would normally be discarded, reducing landfill and cost of living pressures.

b. Expanding businesses and services to improve health and wellbeing

As explained in more detail in Chapter 6, new jobs and businesses could be created by addressing significant gaps in essential services, including health, mental health, childcare, aged care, housing and education. Developing and expanding the range of health services and university courses offered regionally underpinned economic diversification strategies in both the Ruhr Valley in Germany and the Latrobe Valley.[11]

c. Agriculture and land use

Agriculture was also mentioned by some community members as a sector with the potential to grow and develop by embracing decarbonisation efforts, renewable energy generation, and building climate resilience, particularly through:

- Supporting the remediation of industrial sites, including the reforestation on cleared sites and under new transmission lines.
- Establishing easier access to carbon farming and credit schemes to support landholders to be

10 The Northern Oil Refinery at Yarwun is recycling waste lube oil back into base lube oil and can re-refine up to 100 million tonnes a year. The plant is also trialling biofuel from sugar cane and acacia as feedstock for kerosene and diesel products. For more information, visit Southern Oil at: www.sor.com.au.

11 Just Transition for Regions and Generations: Experiences from structural change in the Ruhr area. WWF Germany. wwf-studie-englisch.pdf (iat.eu) and After the Hazelwood coal fired power station closure: Latrobe Valley regional transition policies and outcomes 2017–2020. Crawford School of Public Policy, Australian National University.

paid to drawdown carbon through nature-based solutions.[12]

- Installing small and large-scale renewable energy on land to diversify income streams and/or reduce energy costs.
- On-farm processing enterprises (e.g. food processing).
- Producing biofuels from agricultural produce.
- Establishing local nurseries to cultivate native and endangered species as part of land rehabilitation programs.

d. Tourism

The Gladstone Region has numerous cultural and entertainment assets to leverage and attract visitors as well as residents. Growing tourism creates demand for services and place-based investment that, when done well, improve the liveability of a region. For instance, many examples demonstrate how First Nations enterprises can contribute to tourism opportunities and the cultural economy of a place. The region's environmental assets (including many national parks, coastal areas and the Great Barrier Reef) also present opportunities to further develop nature-based tourism. According to the region's Coastal Strategic Plan:

> *"Tourism contributes approximately $77 million annually to the local economy. Direct and indirect employment from the tourism and hospitality sector is estimated at 864 full-time equivalent jobs."*[13]

There is still unrealised potential to market the region as a tourist destination and to look at building on the strengths of different parts of the Gladstone Region, not just the city of Gladstone. There is a dichotomy between the industrial heritage and other areas in the region that want to focus on tourism, namely, Agnes Water region.

Community members who participated in workshops and the survey agreed that the region could further develop tourism opportunities focused on the natural and industrial heritage of the region, as well as showcase new green initiatives.

Some community members emphasised that careful planning is needed to ensure that the emphasis on industry does not undermine the existing natural appeal of some locations in the region (eg: Seventeen Seventy and Agnes Water, and Gladstone as a gateway to the Great Barrier Reef and Heron Island).

e. Transport

12 Cattle farmers with an interest in regenerative farming have participated in numerous community forums hosted by The Next Economy in Gladstone over the past few years. Some of them are supported by RCS Australia, based in Yeppoon. For more information see: www.rcsaustralia.com.au.

13 Source Our Coast Our Future, 2021 Gladstone Regional Council pg.11 https://www.gladstone.qld.gov.au/downloads/file/4140/our-coast-our-future-strategic-plan

Another area participants identified as a source of potential economic growth was supporting the transport and mobility sector to decarbonise over time. This will require the construction of new infrastructure and services to support electrification (e.g., fast charging stations for electric vehicles) and to retrofit cars, boats, and rail with electric motors. There is also the potential to produce hydrogen fuel cells to power heavy vehicle fleets.

f. First Nations enterprise opportunities

A range of new enterprise and employment opportunities for First Nations people were identified in community workshops and the First Nations workshop. These included:

- Establishing an Indigenous-owned nursery to cultivate native plants used for medicine and food. The nursery could also supply plants for rehabilitation efforts.
- Processing of bush foods and medicine.
- Expanding land and sea ranger programs.
- Reef restoration and coastal protection programs.
- Expanding the Aboriginal Controlled Health Service (Nhulundu Health Service Gladstone).
- Expanding the number of Indigenous training organisations to support young people and other First Nations people to participate in both existing and new industries.

Some First Nations participants emphasised that these initiatives would require additional investment in the form of incubator programs/business development support. It was also suggested that any new developments (e.g., renewable energy projects) are required to pay Traditional Owners for access to land.

g. Training and education services

Some industry and education sector representatives identified the opportunity to expand the range of training and education services across the region to support the development of the local workforce. Specific ideas included:

- Developing innovative approaches to training workers in renewable energy skills.[14]
- Building on the work of the CQH2 Alliance and CQ University to become a training Centre of Excellence for hydrogen.
- Developing incubator programs and business development skills for small and medium-sized enterprises, start-ups and social enterprises.

14 For more information, see Chapter 5 on Workforce Development.

- Training to meet existing skills shortages in health, aged care, and childcare, tourism and hospitality training, and community engagement and negotiation skills to support planning efforts across the region.

Ideas and opportunities to expand and diversify the existing economic base of the Gladstone Region abound. However, these ideas will not be realised without concerted action by all levels of government and industry to develop local infrastructure, market the region as an attractive place to invest, provide financial and training support to develop local capacity and develop the right policy and regulatory frameworks.[15]

Gladstone Regional Council has recognised the importance of cultural land management with the employment of a First Nations Fire Officer

4.6 Infrastructure development

One of the strongest consultation themes was the level of support for a coordinated approach to infrastructure upgrades and ensuring that new developments build on and strengthen existing infrastructure. The infrastructure pathways are already in place but will need more investment and careful planning to ensure that, as many community and industry representatives emphasised: "we don't have redundant assets."

15 The Queensland Government Energy and Jobs plan (September 2022) announced a new $200 million Regional Economic Futures Fund to support economic and community development initiatives. The guidelines for this fund will be established in 2023.

The main types of infrastructure identified for development were:

a. Energy infrastructure

As outlined in earlier chapters, the region will require significant upgrades to energy infrastructure to support the growing renewable energy and hydrogen industries. This includes transmission infrastructure, battery storage, gas pipelines and potentially a desalination plant to support the water requirements for hydrogen production.

b. Transport infrastructure

Transport infrastructure was a consistent theme raised by industry representatives, particularly those involved in the development of the LNG industry. Transport infrastructure is key to enabling all industries and suggestions included investment to upgrade roads, bridges, and port facilities (including changes to enable the port to handle containers), as well as completion of the Inland Rail[16] project to enable the transportation of goods from the port to Southern Queensland. Also mentioned was the need to invest in infrastructure to support electric vehicles transport (particularly cars and boats), as well as hydrogen powered vehicles (eg: long haul trucks).

> ***Decisions made now about ports and roads determine the manufacturing opportunities going forward.***
>
> **MANUFACTURING WORKSHOP PARTICIPANT**

c. Water infrastructure

If the region is able to meet the water needs of both existing and new industries, local water infrastructure will need to be upgraded. A number of industry representatives expressed support for the Fitzroy River to Gladstone Pipeline project. This involves the development of a 116km pipeline, water treatment plant, reservoirs, and pumping stations to address the single source water supply from Awoonga Dam. The project's purpose is to ensure long-term water security for Gladstone's urban and industrial water users, and according to the Gladstone Area Water Board, provide water for the emerging hydrogen industry in the Gladstone Region.

> ***Planning for the infrastructure needs to be in place first, not the reverse.***
>
> **MANUFACTURING AND SUPPLY CHAIN WORKSHOP PARTICIPANT**

16 Inland Rail is a 1,700km freight rail line that connects Melbourne and Brisbane through regional Victoria, New South Wales and Queensland, visit: https://ourinlandrail.com.au/

d. Digital infrastructure

The expansion of manufacturing and new energy industries necessitates expanded digital capacity. This unlocks new opportunities for local producers to connect directly with global markets (e.g., through block chain technology), enables energy trading to support decentralised energy systems, and makes the region more attractive to industries with high energy needs (e.g., data centres).

4.7 Incentives to attract new industries and investment

Workshop participants identified a range of ways to attract new industries and investment to the region, including:

- Council working with Trade and Investment Queensland and Austrade to develop a business attraction strategy, prospectus, and a marketing campaign to promote the region as an eco-industrial centre and connect with potential investors and companies.
- Working with key industry players to develop new domestic and international markets for services and products made in the region.
- Providing a local business 'concierge' service to link new investors and industry to local opportunities.
- All levels of government working towards consistent targets (eg: 2030 Emissions Reduction Target) and harmonising legislation to provide a higher level of certainty to potential investors and the business community.
- Large industrial players and other institutions (eg: CQUniversity and Council) committing to off-take agreements to support the development of new renewable energy generation and storage solutions, as well as provide a market for other goods produced in the region.
- Reviewing the range of financial incentives provided by government (eg: grants, loans, tax concessions, subsidies, etc) to ensure that they are geared to supporting a smooth and equitable transition to net zero.
- Developing guides and other resources to help establish new businesses in ways that support community aspirations (e.g., local business directories that can help companies meet procurement targets, community benefit guides, support to connect with Traditional Owners).
- Providing targeted support for SMEs and social enterprises to take advantage of the changes across each sector. This includes:
    - Identifying the range of opportunities for SMEs to fill gaps in the local supply chain (e.g., transport, catering, cleaning, training, engineering services, project management, community engagement) and build their capacity to win procurement contracts.
    - Programs to help local SMEs understand the significance of changes in the energy sector and the emergence of new industries and how they can take advantage of changes to grow.

- Working with local universities, social enterprise programs, business incubators and impact investors to support pilots and start-ups and attract new entrepreneurs to the region.
- Investigating new ways to support SMEs to connect directly with global markets (e.g., supporting farmers to use blockchain technology).
- Reviewing the local requirements and regulations relating to SMEs and finding ways to make it easier for people to start new enterprises.

The secret to any good large-scale project is having domestic off-take, but multiple markets need to be developed.

INDUSTRY WORKSHOP REPRESENTATIVE

Gladstone could turn its hand to anything. The trades and ability to create careers out of new opportunities such as food processing, car industry etc.

WORKERS FORUM PARTICIPANT[17]

Don't do everything just for new industry, build the existing up as well.

MANUFACTURING AND SUPPLY CHAIN WORKSHOP PARTICIPANT

Members of Gladstone's First Nations community visit the Reg Tanna Park duck pond in the city's Green Belt zone

17 The major opportunity for the car industry is not manufacturing cars in Australia, but in converting petrol cars to electric. One Townsville based business has grown by up to 500% in the last year. https://www.abc.net.au/news/2022-03-10/electric-vehicle-conversions-take-off-amid-soaring-petrol-prices/100896286

4.8 Policy, planning and regulation

Participants across all the engagement activities strongly agreed that greater policy certainty and legislated targets would help drive industry to support manufacturing and achieve economies of scale. International investment in the region will come if the right policies and regulations are in place to support new industry. This will require all levels of government working in collaboration with industry and bodies such as the Gladstone Industry Leadership Group and Gladstone Engineering Alliance, the CSIRO and civil society groups such as environmental organisations and unions to review existing requirements and planning laws to ensure they are fit for purpose.

Given the scale and complexity of change, efforts to diversify the economy will require a new, more holistic approach to planning that brings all stakeholders and sectors together to identify what they need to grow and develop over time. As mentioned in Chapter 2, a Regional Transition Authority could help with the high level of coordination needed over the next ten years and assist with a range of planning and other necessary measures to diversify the economy.

Some participants suggested that a Renewable Energy Industrial Precinct (REIP), as proposed by Beyond Zero Emissions[18] (BZE) and discussed in Chapter 2, is a useful concept for Council and State Government to explore. They could explore it with industry and potentially Federal Government to bring new energy generation, infrastructure, and digital capacity together to boost and attract manufacturing. According to BZE, the Gladstone Region is well suited to a REIP because of the existing industrial area and development land that is zoned industrial, a skilled workforce, training facilities and excellent supporting infrastructure, including the Gladstone Port. The development of adequate renewable energy and other common user infrastructure, including transmission, roads and port upgrades to support a REIP will be fundamental to progress this concept. This may require co-investment and coordination with Federal Government programs.

> ***A Gladstone REIP will foster a homegrown community of renewable-energy-powered innovators. By nurturing partnerships between research institutions, industry, and investors, REIPs become the space where powerful players collaborate towards decarbonisation***
>
> **BEYOND ZERO EMISSIONS**

18 Beyond Zero Emissions, Gladstone Renewable Energy Industrial Precinct, Briefing Paper, April 2022.

State and Federal Government support for local planning and coordination is essential. Many Gladstone residents hoped the pending Queensland Government's Ten-Year Energy Plan[19] will provide clear targets, timeframes, incentives and accountability measures for the roll-out of renewable energy generation, storage and transmission projects.

Participants also highlighted the role government can play in supporting new manufacturing initiatives, some highlighting the former Federal Government's Modern Manufacturing Initiative,[20] designed to support manufacturers to scale up, become competitive on the global market and create jobs. The Commercialisation Fund and the Certain Inputs to Manufacture program are still open, which support manufacturers who import chemical, plastics, paper goods, metal materials and food packaging. In June 2022, the Queensland Government committed to continue the Manufacturing Hub Grant Program with $10 million of funding for an additional two years over five regions, and this includes the Gladstone Region.[21]

4.9 Recommendations for Council

Participants identified four main roles Council can play to support the diversification of the regional economy, including planning, marketing the region to attract new industries and investment, advocating for local priorities, and keeping the community informed as the economy changes.

Suggested actions for Council to commence over the next six to twelve months included:

a. Planning

Given the speed of development, significant planning is already occurring at a State and Federal level that will impact the region. It is also important that Council continues to facilitate processes to develop and update its own planning scheme with the input of community and other key stakeholders. Some of the areas raised by participants for the attention of Council included: planning for appropriate areas to be available for development, awareness of what industries require (particularly around new technology), improving the speed of planning approvals, and generally knowing what's coming so Council can be well prepared.

> ***Council need to be ahead of the game***
>
> **WORKSHOP PARTICIPANT**

There is also an opportunity to provide a concierge service to new project proponents for planning and approval processes with responsive turnaround times.

19 The Queensland Government Energy and Jobs Plan was released in September 2022, which was after the community engagement phase of this Roadmap. https://www.epw.qld.gov.au/energyandjobsplan

20 For further information on grants through the Modern Manufacturing Initiative visit: Manufacturing funding | Department of Industry, Science and Resources

21 The $18.5 million Manufacturing Hub Grant Program encourages manufacturers to adopt new technology, skills and training, business development and advanced robotic manufacturing. At the time of writing, Round 3 of grants was due to open shortly. Manufacturing Hubs Grant Program | Department of Regional Development, Manufacturing and Water (rdmw.qld.gov.au)

b. Marketing the region

Council can play a greater role in attracting new projects to the region. New opportunities include strategically marketing the competitive advantages of the Gladstone Region to investors and companies, including the availability of a deep-water port, state development land and a skilled workforce. The region is also an ideal place to invest as it is open to innovation (for example, the way businesses are already embracing the circular economy) and is prioritised in planning efforts by the Queensland Government through the roll-out of Renewable Energy Zones.

In collaboration with relevant stakeholders, Council can take steps to promote the region by:

- Sharing the portfolio of investment opportunities developed by Trade and Investment Queensland with interested investors.
- Developing guiding principles on local expectations of industry (for example, what the community expect in terms of community benefits).
- Work with Gladstone Engineering Alliance, Gladstone Industry Leadership Group, Central Queensland Regional Organisation of Councils, and the Queensland Local Content Leaders Network on guides for companies around local procurement expectations and showcase where companies can source dependable local suppliers.

Support the work of the Gladstone Chamber of Commerce and Industry to encourage communities to shop locally.

In collaboration with Gladstone Area Promotion and Development Ltd, produce a strategic marketing plan and invest more resources to promote the Gladstone Region as an attractive place to visit[22] and live, to attract new professionals and workers and encourage people stay in the region.

c. Advocacy

- Council needs to advocate for high-quality infrastructure in the region from the State Government so that Council can maintain roads and bridges to meet community needs withstanding additional impacts from industry use.
- As the region diversifies, Council needs to advocate for new market entrants to uphold environmental standards and ensure community benefits.

d. Keeping the community informed

Council should move from being merely an advice agency, to instead being responsible for preparing the community for changes that come from major projects. In terms of diversifying the economy, this includes raising awareness of the range of economic opportunities that are emerging, likely impacts, and how people can participate and benefit.

22 A summary of the five-year tourism strategy for the region can be found here: https://www.gladstone.qld.gov.au/downloads/file/2449/attach-04-gladstone-visitor-economy-2025-infographic

Activities to raise awareness and address concerns could include regular Council forums, dedicated community meetings, and online sharing through the Conversations platform. Any concerns raised by the community then need to be responded to by Council, industry or State Government as relevant.

Additional recommendations that Council could consider for the future includes:

e. Supporting small to medium enterprises (SMEs)

Council needs to understand how small to medium enterprises, especially those servicing fossil fuel industries, will need to adapt as the energy system changes. Council may be able to leverage the work of existing partnerships such as Gladstone Area Promotion and Development Ltd (GAPDL), Gladstone Engineering Alliance (GEA) and Gladstone Chamber of Commerce and Industry (GCCI) that can engage with local SMEs to:

- Analyse what they need and connect them to programs that offer training, finance and business development services.
- Host training and other support programs to develop local SMEs' capacity to meet new industry tendering requirements in areas such as administration, catering, cleaning, accommodation, community engagement and maintenance services. This includes proactively supporting the development of social enterprises across the region.

Stand up for the town and be proactive.

COMMUNITY FORUM PARTICIPANT

Useful Resources

Planet Ark (2020). Australian Circular Economy hub provides companies, individuals and communities with tools and advice to help implement a circular economy. https://planetark.org/programs/australian-circular-economy-hub

Climateworks Centre and Climate KIC, Australia (2022). Australian Industry Energy Transitions Initiative. Accessible at: https://energytransitionsinitiative.org/wp-content/uploads/2022/06/Setting-up-industrial-regions-for-net-zero-Australian-Industry-ETI-report-JUNE-2022.pdf

Townsville Enterprise (2022). Townsville North Queensland Destination Marketing Portal. Showcases regions attractions and current information shared with industry to 'connect, grow and promote Townsville'. https://www.townsvilleenterprise.com.au/tourism/destination-marketing/

Queensland Government, State Development, Infrastructure, Local Government and Planning. Regional and Remote Recycling Modernisation Fund, funding now closed but Council could advocate for this type of support to continue. https://www.statedevelopment.qld.gov.au/industry/priority-industries/resource-recovery/regional-and-remote-recycling-modernisation-fund

Beyond Zero Emissions (2022). Renewable Energy Industrial Precinct briefing paper. https://bze.org.au/research_release/gladstone-briefing-paper/

Beyond Zero Emissions (2022). NSW small and medium enterprise regional procurement policy (included as an option for Council to advocate for Qld State Government to offer a similar opportunity, currently the state government has a 30% SME procurement target, but there is no distinction between regional and metro). https://buy.nsw.gov.au/policy-library/policies/sme-and-regional-procurement-policy

Stride Renewables. Navigating regulatory, commercial, and technical challenges to unlock growth in the renewable energy industry. https://striderenewables.com/

Queensland Government (2019). Queensland Resource Recovery Industries 10-year roadmap and action plan. https://www.statedevelopment.qld.gov.au/__data/assets/pdf_file/0014/17204/resource-recovery-roadmap.pdf

CHAPTER 5:
Workforce Support and Development

5.1 Introduction

The energy workforce will undergo a significant transformation over the next decade as work in fossil fuel industries starts to decline, and the number of jobs in renewable energy and green manufacturing expands.

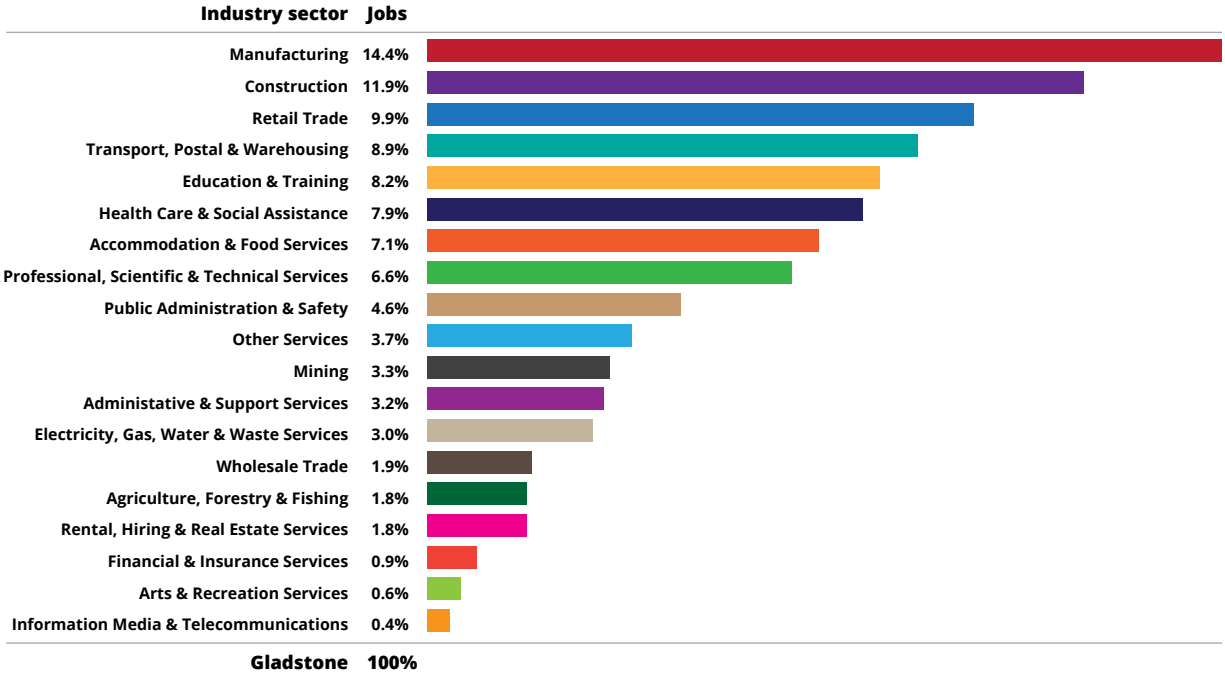
Estimates of the number of new jobs created as Australia transitions to renewable energy vary. According to modelling by Accenture, Queensland could require as many as 19,000 construction and 8,000 ongoing renewable energy jobs by 2030. [1, 2] Approximately 60% or more of these jobs will be located in regional areas. Even more jobs will be created through the development of associated supply chains and the manufacturing of green products such as hydrogen, renewable energy parts and green chemicals and metals.[3]

Gladstone waste water planned maintenance

1 Accenture (2022).
2 The Queensland Government Energy and Jobs Plan (2022) estimates 64,000 jobs to build the SuperGrid.
3 Briggs, et.al. (2020), Construction Skills Queensland (2022).

The Gladstone Region's current workforce totals around 27,800 people.[4] As outlined in Figure 5.1 below, many of the skills that emerging industries will require already exist across the region. Manufacturing (particularly metal production) currently employs approximately 4,500 people and composes 14.4 per cent of the regional workforce. The second largest industry is construction (residential, non-residential, heavy and civil engineering and services) which constitutes 11.9 per cent of the regional workforce, followed by retail trade (10 per cent) and transport and warehousing (9 per cent).[5]

Figure 5.1: Employment by Industry Sector – Gladstone Region[6]



Data sourced from ABS 2016 Census Place of Work Employment (Scaled), ABS 2018 / 2019 National Input Output Tables, and ABS June 2021 Gross State Product

While the skills needed for emerging industries already exist, the region does not have enough workers to service all proposed projects. Industries across the region are already struggling to access the staff they need. Attracting new workers while ensuring that locals benefit from the emerging opportunities will require careful planning. Industries already facing labour shortages will need to develop a range of incentives to attract workers to the region, and transition fossil fuel workers as industries decline. They also need to bring in new workers from groups largely marginalised from formal employment opportunities such as women, young people, First Nations people, those living with disabilities and older workers. Addressing skills and labour shortages is not a challenge unique to the Gladstone Region, but whether it can be addressed will determine the pace and scope of development of new industries.

4 Approximately 5 per cent of this workforce does not live in the region.

5 Employment Page, Economy, Jobs and Business Insights, Economy Tab – Gladstone, REMPLAN – (accessed Aug 23, 2022) https://app.remplan.com.au/gladstone/economy/industries/employment?state=EAJOiv!eX8NFxJAos4k8BnsGOx5wi0iZIZM9fdQ4QkTRMGMYH1IBwU3I9h22JdhAe7

6 REMPLAN (2022b) Gladstone Regional Council – Economy, Jobs and Business Insights. Data as at August, 2022. Available at: https://app.remplan.com.au/gladstone/economy/ summary?state=n8MjfBE3vsOVWzxFwKpRYWIwIpIQEr

5.2 2032 Vision

Most community and industry stakeholders who participated in the engagement activities had only a limited understanding of the types of jobs and skills needed by emerging industries. They were, however, able to paint a clear picture of what they would like to see by 2032.

Participants envisaged the 2032 regional workforce responding dynamically to the impacts of changes in the energy sector on the regional economy. Workers in fossil fuel industries will have been supported to find similar work in other sectors, redeployed to other sites as local operations shut down, or have retired. Workers will have been able to build on their existing skills base in new industries because of innovative approaches to skills recognition (for example micro-credentialling) and on-the-job training. Young people who entered the fossil fuel industry during the decline phase will have been trained from the outset of their career to make the transition into new energy industries and the sectors that support decarbonisation.

By 2032, the expansion of the renewable energy, hydrogen, manufacturing, technology development, technical services, training, and supply chain industries has created good, secure, well-paid positions that offer a range of benefits and career development opportunities. These industries, along with existing employers, have realised the value of providing more inclusive and flexible working conditions. The twelve-hour work shift is now an optional model, mixed with other variations that match worker and community needs. As a result, greater levels of employment opportunities exist for groups previously excluded from industrial work opportunities (for example, women, young people, First Nations people, older workers, and people living with a disability).

By coordinating and supporting high levels of local employment and the retention of young people, the need for a FIFO workforce has been limited compared to previous periods of rapid industrial expansion. The impacts on the local economy and social fabric of the region have been planned for and well managed, creating positive outcomes such as improved local services and increased cultural diversity and equity. Traditional and new energy industries have been supported by successive State and Federal Governments to develop the region, including additional investment in housing, healthcare, childcare, schooling, and retirement facilities. This has improved the region's attractiveness as a place to live and retire, contributing to worker recruitment and retention.

A decade of collaboration between industry, all levels of government, universities and other training providers has delivered many benefits for the workforce. Skills shortages were identified early and a place-based approach to local workforce training has

created multiple world-class facilities. This positions the Gladstone Region as a Centre of Excellence in Training for a range of different industries including renewable energy generation and storage, hydrogen production, decarbonised metal processing and other forms of manufacturing. Local training and education institutions, such as Central Queensland University, are integrated with industry and other sectors to present people with multiple recognised career pathways into the region's rapidly diversifying economy.

Achieving this vision will require concerted effort and targeted investment to:

1. Facilitate place-based workforce planning, coordination and policy development.
2. Support fossil fuel workers to transition to other industries.
3. Ensure new jobs are good jobs.
4. Identify the jobs and skills needed by emerging industries.
5. Invest heavily in education and training in the region.
6. Expand the local workforce through measures designed to increase inclusion.
7. Develop targeted training support for small and medium-sized enterprises.
8. Strengthen the role of unions to support workforce development.

5.3 Facilitating place-based workforce planning, coordination and policy development

Greater workforce planning, coordination and policy development is needed to support existing and new workers to meet the region's rapidly changing labour needs. Participants believed all stakeholders should be involved in workforce development and planning, and multiple approaches at a national, state, regional and local level would be required.

Workforce coordination is complicated, given the number of stakeholders across industry, education and training institutions, unions, First Nations groups, employment services and all levels of government. Overlapping roles and responsibilities further compound this. One workshop participant described the sector as "really messy, especially in VET" (Vocational Education and Training),[7] however long-term efficiency gains can be made if stakeholders manage to coordinate around local procurement and staffing across all stages of the project cycle.

> ***Federal and State [Governments are] in different silos and are not working together.***
>
> **EDUCATION AND TRAINING WORKSHOP PARTICIPANT**

7 Quote from manufacturing and supply chain workshop participant

The predominant view was that State and Federal Governments need to work cooperatively to:

- Develop consistent and complementary legal and policy levers.
- Create incentives for industry to adopt best practice workforce development policies and practices.
- Develop strategies to capture the localised workforce development opportunities presented by Renewable Energy Zone development.

> ***It's important as the workforce transitions that collaboration has happened between industry, government, universities, and councils in identifying skills shortages and setting up training programs to support re-skilling, upskilling and training of the new workforce...***
>
> **ENERGY WORKSHOP PARTICIPANT**

From a practical perspective, participants saw effective workforce coordination most likely to emerge from proactive local proponents and Local Government. This would lead to collective benefits to recruitment and retention, productivity and cost savings. Gladstone hydrogen proponents are already starting to recognise these benefits, with many hydrogen workshop participants commenting on the collegial way in which multiple local companies share and collaborate to get the industry off the ground.

Whether Council, industry, State and/or Federal Governments or a Regional Transition Authority lead coordination efforts[8] workshop participants emphasised the need to design, implement, measure and report on multiple workforce goals, including skills audits; project schedules; worker transition training; workforce diversity; and early career training and apprenticeships.

Participants also believed the Queensland Government could do more to work with existing regional industry bodies, such as the Gladstone Industry Leadership Group (GILG) and Gladstone Engineering Alliance (GEA), to pilot

8 Regardless of who leads coordination and planning efforts, strategies need to be informed by a range of stakeholders including government and industry and business stakeholders (such as GILG and GEA), economic development agencies, training providers, employment service organisations, First Nations groups, community members and welfare services, as each group offers different knowledge and ideas.

industry-wide coordinated workforce planning and training. This pilot would invariably include education institutions and thus have scope for co-designed training and programs that meet emerging workforce requirements.

Workshop participants expected governments to work with industry to learn from previous experiences in the Gladstone Region and elsewhere. One example offered was to learn from the LNG build in Gladstone to find ways to sequence construction projects to help ensure enough construction workers are available to meet the demand whilst also maximising local workforce participation and procurement and minimising housing market strain.[9]

5.4 Supporting fossil fuel workers to transition

The most common concern raised by participants in both community and industry stakeholder workshops was the need to support workers in fossil fuel industries as things change. There was strong agreement across all the engagement activities that workers can see that change is already happening or is not far away. Instead of more 'climate wars,' participants want to see clear plans and options available to workers whose livelihoods will be most impacted by changes in the energy sector.

Workers can make effective employment decisions with clear information from employers, industry, and governments. Information should include their options for available training and assistance, new careers their skills will be most suited to, and when those roles are likely to become available. However, participants across all workshops emphasised that workers currently employed in fossil fuel industries will need additional support as changes in the energy sector accelerate over coming years.

As demonstrated in Germany, the Latrobe Valley and elsewhere, the kinds of support workers need in regions facing a decline in fossil fuel industries include:

a. Redeployment Assistance

- Providing a range of employment services to help workers identify new career pathways and prepare for and find work well before any closures.[10]
- Deploying workers from plants due to close to other power stations[11] or into renewable energy jobs as they become available.[12]
- Offering pooled redundancies and early retirement packages to workers across the entire industry can free up spaces for younger workers who want to remain in the industry.

9 See Chapter 6 for a discussion on housing.

10 The Queensland Government Energy and Jobs Plan (2022) has announced that workers at Queensland's publicly owned coal-fired power stations will have a Job Security Guarantee and have developed an Energy Charter agreed upon by the Queensland Government, unions and employers.

11 Offering workers the opportunity to redeploy to other plants or into renewable energy projects or retire early has enabled an orderly reduction of 130,300 coal mining jobs in Germany in 1990 to around 12,100 in 2014. (ACTU 2016)

12 ACTU 2016; Galgóczi 2014; Schultz et al 2016

b. Training and Education

- Supporting the current workforce to re-train or up-skill to take on opportunities in associated fields, such as high-voltage renewable energy and transmission line developments.
- Enabling workers to undertake training for future roles while still employed.

c. Financial Assistance

- Establishing one-stop shops to facilitate easy access to financial assistance, employment assistance and other services. For example, the Latrobe Worker Transition Service.[13]
- Ensuring workers are offered a range of financial assistance options including voluntary redundancy packages or early retirement packages for older workers.
- Offering additional financial assistance payments, such as travel subsidies or relocation allowances, or superannuation 'top-up' payments for those choosing early retirement.
- Offering a range of business start-up loans, business training, incubator support and investment to workers wanting to start their own businesses.

d. Personal Support for Workers and their Families

- Providing access to both financial and psychological counselling to individuals and families.[14]
- Create paid positions for fossil fuel workers transitioning to act as champions, role models and mentors for other workers considering or beginning to look at options outside the fossil fuel industry.

Experience demonstrates that these actions and mechanisms can and do support workforce transition, but only if they are developed and implemented well in advance of plant closures. This requires long-term planning. For example, redeployment schemes must be established to upskill people in advance, so they are ready when their existing job ends. Some of the roles workers move into, like new economy minerals and hydrogen, may require different and new skills that need to be developed early, even if the transition is not for some time.

Mechanisms also need to be put in place to hold employers accountable for ensuring they provide retraining and deployment opportunities, as well as decent redundancy and retirement packages. There also needs to be diversity in how training is offered and supported, such as financial or employer support for workers to undertake on-the-job training while on secondment to other plants or even other industries.

Participants pointed out that more stakeholder engagement is needed, including with workers. Skills audits can help identify fossil-fuel workers prospects as well as match the existing workforce

13 Latrobe Valley Authority. Accessible at: https://lva.vic.gov.au/business-and-worker-support/worker-support-services

14 Note that 87 per cent of respondents to the online survey agreed with this provision.

capabilities to emerging industry needs. For example, hydrogen industry stakeholders suggested that workers in the LNG industry are already skilled in processing, liquefication, storage, pipeline distribution and other gas processes that will be needed in the growing hydrogen industry. Ensuring existing workers can transition to other sectors will require planning and support well in advance of any closures, as well as coordination across and between industries, unions, government departments and training providers.

5.5 Ensuring new jobs are good jobs

While most participants focused on how workers might transition to jobs in the renewable energy and manufacturing sectors, those with close ties to fossil fuel industries and union representatives emphasised the need for like-for-like roles with similar pay, conditions, and job security.

> ***How do we transition our skilled workers to 'like-for-like' jobs?***
>
> **WORKERS FORUM PARTICIPANT**

The general view held by workers, community members and unions participating in the engagement activities was that jobs in the renewable energy sector are lower paid, insecure, casualised, temporary, involve constantly changing drive-in drive-out (DIDO) and FIFO locations, are less safe and do not come with the same benefits as current jobs in the fossil fuel sector.[15]

This perception seems to stem from the project delivery model used by many renewable energy proponents (i.e. the outsourcing of engineering procurement, construction, operations and maintenance contracts to different entities). The tight margins of privately owned companies also contribute to this perception, because such companies have obligations to achieve shareholder profits. Plus, they are competing with fossil-fuel generators constructed with public money decades ago.[16] This intense commercial pressure creates a fundamental recruitment and retention barrier that undermines the entire future of the renewable energy industry.

Some evidence suggests this is changing with greater certainty and investment across the renewable energy industry and competition for workers. This leads to significant increases in wages, better conditions, longer-term contracts and investment in worker retention and development. Conversely, jobs in the mining and energy sectors have been increasingly outsourced in recent years, becoming more casualised, insecure and less well paid than were benchmarked in the last millennium.[17] [18]

15 For more details see ACTU (2020)

16 ACTU (2020)

17 Australian Parliament House – select committee inquiry into impact of insecure or precarious employment, chapter 3. Accessible at: https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Job_Security/JobSecurity/Third_Interim_Report/section?id=committees%2Freportsen%2F024778%2F78275

18 Mineral council of Australia, page 32. Accessible at: https://www.minerals.org.au/sites/default/files/DAE%20-%20MCA%20-%20Labour%20Hire%20Final%20Report%204%20June%202019.pdf

Regardless of whether this disparity in conditions between industries is real and/or persists, the commonly held perceptions about jobs in the renewable energy industry (particularly construction jobs) make them a comparatively undesirable career path, and this requires urgent attention.

Workers, union representatives, and community participants expressed a strong desire to see new energy-related industries (particularly renewable energy sector) become a long-term career option, offering suggestions to improve the sector, including:

- Designing systems for work continuity and security during the build out, operation, maintenance of the decarbonised industries, and the associated manufacturing careers.
- Government and industry working together to develop pathways to long-term stable employment for those in the energy sector.
- Sequencing projects to enable construction workers and local businesses with procurement contracts to have a pipeline of work over a longer period of time.[19]

In addition to these steps, employers will need to offer the right incentives to attract and retain workers, especially given that worker incomes in the Gladstone Region are higher than the Queensland average. Over 22 per cent of workers earn over $2,000 per week, compared with 11.7 per cent across the state, noting they also work much longer hours, with 37 per cent of employees working more than 41 hours per week, compared to 26.1 per cent across the rest of Queensland.[20]

5.6 Identifying the jobs and skills needed by emerging industries

Most of the community and industry participants across both community and industry stakeholder workshops were unsure as to the specific types of jobs and skills that the emerging industries will need. This ambiguity includes uncertainty about the volume and specific types of jobs, when they will be required and additional training requirements needed to fulfill them.

While some work has been done to identify the types of jobs that will be required as Australia

19 As Construction Skills Queensland points out in their recent report (2022), the transition to renewables is not a sharp boom like those experienced in the mining industry instead it is a long-term upswing in demand for the construction sector.

20 Hours Worked, Workers Page, Jobs and Business Insights, Economy Tab – Gladstone, REMPLAN – (accessed Aug 23, 2022) https://app.remplan.com.au/gladstone/economy/workers/hours-worked?state=ZJK6Fy!rvgEfGQp3FkJnx6C9LdQYFyi0IA2qs3HvINKXHnI5hyGIEhbbe4hKmx

decarbonises,[21] further work is needed to establish the current skill profiles within the Gladstone Region. Specifically, determining any gaps and the timeline required for filling them.

The types of new jobs that industry workshop participants were able to identify include:

- Hydrogen production, transport, storage and ancillary services, including roles in derivative supply chains (such as green chemicals). These roles include engineering, project management, first responders, emergency services and safety roles.
- Renewable energy construction, maintenance and operations roles. Examples of ongoing roles exist in the areas of renewable energy system integration, system optimisation, hi-tech battery chemistries, HVDC and superconducting cable to transmit electricity and wind blade inspection plus other operational, typically technician roles.
- Manufacturing roles to make key components such as electrolysers or wind turbines or towers.
- Service industry roles in information, communication and technology, electronics, piping, maintenance, and operations.
- Roles outside the traditional energy sector, including artificial intelligence, new technology (such as drones and remote operations of renewable plants), data science, SCADA software monitoring, and community engagement, planning and environmental and water management.

In addition to the needs of new industries, participants also highlighted existing skills shortages in other sectors of the Gladstone Region's economy. These are related to workforce liveability and also need to be addressed, particularly in the areas of childcare, aged care, health care and accounting.

New modelling on the range of skills required across a range of emerging industries has emerged in the months since the engagement activities, including the Queensland Government's Hydrogen Workforce Roadmap,[22] Queensland's Renewable Future report from Construction Skills Queensland,[23] and the Queensland Climate Action plan (Accenture, commissioned by WWF, ACF and QCC).[24] The key trades required to service renewable energy generation and storage, hydrogen and other manufacturing opportunities include construction workers, electrical, plumbing, gas technicians, boiler making, and professional skills in engineering, planning and project management, will be in high demand. More learning opportunities exist to further complement this work by observing the experience of other countries that are further ahead in terms of developing the renewable energy, manufacturing, and hydrogen sectors.

Participants across all workshops expressed overwhelming support for government to conduct a robust regional skills audit to match the existing workforce capabilities in the Gladstone Region with future needs. This is consistent with recommendations made in Council's Gladstone Region Economic

21 Briggs et al, 2020. Renewable Energy Jobs in Australia, University of Technology Sydney.

22 Accessible at: https://www.publications.qld.gov.au/dataset/hydrogen-industry-workforce-development-roadmap-2022-2032

23 Construction Skills Queensland (2022). Accessible at: https://www.csq.org.au/renewables/

24 Accenture (2022). Accessible at: https://www.wwf.org.au/what-we-do/climate/renewables/resources/queensland-climate-action-plan#gs.9384zh

Development Strategy (2021–2025) which call for a Gladstone Region Future Employment Review. Such an audit could identify current skills, capabilities and future requirements in the region, and develop recommendations on interventions and upskilling to fill gaps over time. Some participants emphasised that a credible, independent body should undertake a skills audit (rather than by industry) and results should be shared publicly for use in economy-wide strategy and planning.

> ***80% or more of the skills needed in hydrogen are existing skills that plumbers, gas workers, electricians and others already have. Workers will need safety training, but there are not a lot of new skills needed.***
>
> **HYDROGEN WORKSHOP PARTICIPANT**

> ***Gas workers are used to dealing with gases – hydrogen just another gas and already produced in region – so only additional training around safety and awareness.***
>
> **HYDROGEN WORKSHOP PARTICIPANT**

5.7 Invest in regional education and training

Participants across all workshops agreed that the regional education and training system needs to be better resourced to prepare the workforce to participate in the evolving economic opportunities.

Training and education providers such as the CQUniversity have already begun identifying the numbers and types of jobs and skills future energy industries will need, to develop and deliver courses to meet these needs.[25] For example, CQUniversity undertook a 'hydrogen economic capabilities statement,' in consultation with industry and others in 2020[26] and the Gladstone campus is already delivering a hydrogen production foundation skills[27] course and is preparing to deliver others in electrolyser operation, instrumentation and process control and advanced manufacturing.[28] These offerings will contribute to meeting workers' needs regarding the decarbonisation process of existing industries, for example, how to design, build and operate hydrogen production to replace fossil fuel use in industrial processes such as alumina production.

25 CQU Capability statement referenced in media release accessible at: https://www.cqu.edu.au/cquninews/stories/general-category/2021-general/cquniversity-research-set-to-drive-regional-hydrogen-industry (accessed 20/08/22)

26 This statement was referenced on the CQU website, accessible at: https://www.cqu.edu.au/cquninews/stories/general-category/2021-general/cquniversity-research-set-to-drive-regional-hydrogen-industry (accessed 20/08/22)

27 For more details on foundational courses such as: "Hydrogen Production: An Introduction", see https://handbook.cqu.edu.au/vet/courses/view/NACC100493/3091 (accessed 20/08/22)

28 CQU (2022).

Efforts such as these are helping, in the words of one community member, to "future-proof people for future jobs." However, training providers emphasised that further investment is needed to develop courses for jobs that currently don't exist and have no current demand. Such offerings are "ahead of their time" and therefore tend to operate at a loss. Greater investment by government, industry and other stakeholders is needed to ensure the Gladstone Region's training and education sector can collaborate to innovate and develop new offerings.

Roles and responsibilities within education and training sector:

- Training governance: State Government is responsible for school and VET, Federal Government for universities and tertiary education.
- Federal Government should coordinate a national upskilling accreditation scheme.
- Industry plays vital but non-statutory roles, e.g. partner with education providers in workplace integrated learning, management of apprenticeships and traineeships, on-the-job training and skills development.
- Private training providers increasingly offer micro-credentialing, industry specific inductions and upskilling, and supporting inward migrants.

Regional players could learn from and contextualise examples of how training and retraining have been done well in other places. One example offered during workshops included the Kwinana Industries Council (KIC)[29] successful approach to place-based workforce coordination to develop industry synergies on a regional scale, highlighting the potential for mutual benefits. KIC members work together to support a high school outreach program and workforce development, as well as encourage workers to move between employers to maintain a skilled workforce within the region.[30]

Another innovative example of workforce development is the six-month Solar Industry Career Pathway program that involved a renewable energy company partnering with a local TAFE to create ongoing apprenticeships and employment across a range of solar farms in Victoria.[31]

Suggestions offered by participants during industry workshops to strengthen and adapt the current education and training sector included:

- Standardise renewable energy training to ensure consistency across the industry. According to one participant, this would improve expectations, conditions and outcomes for workers and industry.

29 The KIC is an incorporated not-for-profit business association that improves cost efficiencies and members interests by coordinating community and stakeholder engagement in relation to environmental, public health, safety and industrial development (amongst other objectives). For more details about Kwinana Industries Council see: https://kic.org.au/about/ (accessed 14/08/2022)

30 For more details on KIC's employlink service see: https://kic.org.au/kic-employlink/ (accessed 14/08/2022)

31 See Beon energy solutions Karadoc solar farm example, outline accessible at: https://beon-es.com.au/latest-news/new-program-offers-job-pathway-into-sunraysias-solar-industry/

- Establishing the minimum training requirements for emerging workforce roles.
- Collaborating with industry to develop and deliver training.
- Undertaking high-calibre trials and internationally significant research projects, linked to hands-on learning.
- Government providing funding specifically designed to encourage the innovation needed to develop new programs, courses and approaches to training workers needed for future industries.

Workshop participants also highlighted the need to address the current shortage of trainers, suggesting measures including:

- Enabling (and encouraging) subject matter experts to deliver training in a Registered Training Organisation (RTO) whilst working in the field (rather than requiring dedicated trainers to RTOs).
- Reviewing Vocational Education Training (VET) legislation to expand who is legally allowed to train people to meet the industry's emerging needs.
- Increasing remuneration and other value propositions to attract and retrain trainers on a full-time, part-time or 'as needs' basis.
- Bringing experts from overseas to 'train-the-trainer' where specific capacity-building needs cannot be met domestically.[32]
- Consolidating the number of training providers servicing new industries to ensure operators are specialised and can sustainably deliver outcome excellence.

> ***At the moment, there are 400 school leavers in Gladstone, but only 14 apprenticeships available for them to take up trades in industry.***
>
> **TRAINING AND EDUCATION WORKSHOP PARTICIPANT**

Another strong theme in the workshops was the need for government and training providers to work closely with industry to increase the number of apprenticeships and traineeships in partnership with the VET sector.[33] Participants reflected on how older trade workers were trained on the job through cadetships, apprenticeships, and other schemes, where the training costs were largely or wholly borne by employers.[34] The casualisation and fragmentation of the labour market have changed the way employers think about training and staff development, with many not confident they will get the return on investment required to justify training expenses associated with apprenticeships and traineeships. Hence, workers today are generally expected to support themselves whilst training, pay the training costs and apply 'job ready.'

32 For example, when local gas technicians partnered with the Federal Government to bring trainers from the UK to Queensland to 'train the trainer' and adapt local skills to meet the needs of the LNG industry.

33 The Queensland Minerals Academy (QMEA) was mentioned by one participant to have successfully generated a demand for apprenticeships whilst meeting industry needs.

34 Noting various government policies and programs have partially subsidised employers to offset this form of investment.

Suggestions to reverse the decline in apprenticeships and traineeships in the industrial sector in the Gladstone Region included:

- Establishing an apprenticeship framework that allows the worker to move between projects, employers or even industries during their training. This would enable apprentices to work across multiple sites and with multiple employers during the qualification, who each mark off specific competencies. Mining companies like BHP have facilitated this type of broad training for many years. In the decentralised and transitioning energy context, this kind of scheme would mean people working towards an electrical trade could work in fossil fuel, renewable energy and other industrial processes within the same apprenticeship.
- The Queensland Government influencing the proportion of apprentices in the workforce by broadening the reach of policies that require a set proportion of total hours worked on eligible government projects be undertaken by apprentices and/or trainees and through other workforce training.[35]
- Encourage and incentivise businesses to hire 'mature apprentices' looking to redirect their career path towards new industries.
- Consider the approach adopted by Germany, where they passed the 'Qualification Opportunities Act' to give employees the right to access continuing vocational education and training funding "if they are affected by structural changes or desire further training to access an occupation lacking employees."[36] [37]

> ***It is important to review apprenticeship schemes as they have potential to address worker shortages and future workforce needs.***
>
> **HYDROGEN WORKSHOP PARTICIPANT**

In addition to the need to offer more apprenticeships and traineeships, participants also suggested that training needs to be tailored for specific cohorts by:

- Developing micro-credentials (e.g. hydrogen fundamentals) for emerging industries so that workers can leverage their existing skill sets (such as those in coal and gas). These micro-credentials or 'bridging training' would best be delivered as part of 'on-the-job' training.

35 Details about eligible project criteria and other information are accessible at: https://desbt.qld.gov.au/training/employers/trainingpolicy (accessed 10/08/22)

36 This empowers workers, reduces the financial 'risks' borne by employers and the minimises time delays involved in retraining or upskilling new employees.

37 Cedefop (2020). Page 5. Vocational education and training in Germany: short description. Luxembourg: Publications Office of the European Union. http://data.europa.eu/doi/10.2801/32993

- Developing specifically tailored courses for retraining experienced 'mature' workers. For example, Queensland University of Technology trained professional power engineers in the different systems of power generation. This tailored worker training would also enable a network of 'energy transition alumni' to develop, offering shared experiences and psychological support through the changes.
- Support workers through inter-employer agreements to work across multiple sectors as one role declines and another role emerges. For example, a group of plumbers and gas workers might work in the LNG industry but progressively transfer across to hydrogen or associated process industries.
- Offer people who've been out (or never part) of the industrial workforce opportunities to gain foundational skills through varied and flexible avenues. This could include offering fundamental skills training to people from diverse backgrounds in informal and familiar places, like a community centre. This approach typically provides mentorship and multifaceted capacity-building outcomes.

With the right investment, the Gladstone Region could become a Centre of Excellence in training for people working to decarbonise a range of industries. This aspiration may already be coming to fruition. CQUniversity has recently built a School of Manufacturing, through the Federal Government's Regional Research Collaboration (RRC) Program, and is planning a Hydrogen and Renewable Energy Precinct at the Gladstone Marina Campus. [38] The Queensland Government has also recently funded upgrades to the Gladstone State High School's science and engineering workshops, and is working with local industry to position students to enter the hydrogen industry.[39] [40]These kinds of investments build industry confidence to invest in developing workforce and research capabilities in Gladstone, well into the future.

Initiatives such as these help attract students, trainees, industry partners and international talent to the region to learn and contribute to the development of emerging industries. [41] Participants recognised the broad regional advantages of combining a training centre with local hands-on, 'on-the-job' industry immersion and scientific links, which in turn would generate the skilled workforce the region needs. The value of real industry experiences were made evident when one participant described an excursion:

> *"The hydrogen sector has provided an external excursion for students to see this new industry emerging. Students from low-income and high-unemployment areas went. The teachers involved said the site visits were the best thing they have seen in their teaching experience."*

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38 "To determine research and innovations required to drive the adoption of green hydrogen for export in Gladstone and to develop the zero emissions technologies required by industry." More details accessible at: https://www.cqu.edu.au/cquninews/stories/general-category/2021-general/cquniversity-research-set-to-drive-regional-hydrogen-industry (accessed 22/08/22)

39 Queensland Government (2022), Queensland Cabinet and Ministerial Directory, media statement, Published 28/06/22. Retrieved from, https://statements.qld.gov.au/statements/95508 (accessed 10/08/22)

40 Albeit the State Government's multiple recent investments to build hydrogen and associated industry training facilities in other regions – e.g. Townsville and Beenleigh.

41 Details of State Government investments are accessible at: https://www.statedevelopment.qld.gov.au/industry/priority-industries/hydrogen-industry-development (accessed 22/08/22) & https://www.statedevelopment.qld.gov.au/queensland-jobs-fund (accessed 22/08/22)

5.8 Expanding the local workforce

Participants across all workshops were adamant that more needs to be done to ensure jobs create benefits for locals over the long term. Some people cited concerns that the new energy industries could exacerbate the trend to fulfill workforce needs with FIFO or DIDO workers. Participants supported the view that new industries, such as hydrogen, should adopt a 'locals first' approach to employment and procurement. [42] This was most pronounced when considering the need for fossil fuel workers to secure alternative work once the fossil fuel industries begin declining.

> ***Specialist industrial skills have been lost in the Gladstone Region. Shutdowns often use fly-in fly-out workforce now.***
>
> **WORKERS FORUM PARTICIPANT**

Industry participants pointed out there is an alarmingly narrow window of opportunity to develop the workforce pathways, otherwise proponents will fall back on recruitment strategies that provide them least cost and immediate results. This approach leaves no lasting contribution to the social and economic fabric of the Gladstone Region.

Participants suggested two main strategies to expand the local workforce: increasing efforts to include local people not currently engaged in the workforce, and developing strategies to encourage workers to migrate to the region.

a. Expanding the local workforce through greater inclusion

While Australia is currently experiencing record-low unemployment rates, there are many groups who continue to be under-represented in workforce participation rates including, women, young people, First Nations people, older people and those living with a disability.

Workshop discussions highlighted the potential for interventions to improve inclusivity at every step of specific workplace experiences and career pathways and included:

- Workplaces and industries employing diversity advocates/consultants to review recruitment processes and recommend changes that make them accessible to people from different backgrounds.
- Ensuring adequate access to services such as school, childcare and aged care facilities to increase women's and carers' opportunities to enter paid employment opportunities.
- Setting quotas to increase diversity in the workforce and training courses.
- Tailoring approaches to training to meet the needs of different groups (for example, offering courses after hours).

42 Note that while ensuring local workers have opportunities to participate in new industries was a priority in industry and other workshops, it was also acknowledged by many in the industry workshops, that additional workers will need to be sourced from outside the region to address current and future skills shortages. These workers could migrate in and become established or become FIFO/DIDO.

- Provide incentives such as scholarships, work-integrated learning and mentorship.
- Engaging school-aged students[43], so they understand the opportunities that are emerging in new industries and offering scholarships and traineeships to support a clear pathway to employment.
- Ensuring work arrangements are flexible enough to cater for the needs of those with caring responsibilities. This included reviewing the need for 12-hour shifts. As one participant from the workers workshop noted, "it's not conducive to a good lifestyle or community health."
- Ensuring workplaces are accessible for differently abled people.
- State and Federal Governments to collaborate with the community, workforce services and industry to better analyse rates of underemployment and numbers of long-term unemployed people that may not be captured in the unemployment statistics because they are no longer actively seeking work.[44]

> ***How can we attract youth into industry now if they believe it's going to end?***
>
> **WORKERS FORUM PARTICIPANT**

> ***Disability participation in the workforce can occur more, businesses can engage people with different abilities with support from local and state governments. Coordinating this at the local context would help with this.***
>
> **MANUFACTURING WORKSHOP PARTICIPANT**

Queensland could learn from the NSW Government's attempts to increase diversity through training and apprenticeship mandates. The Infrastructure Skills Legacy Program adopted by NSW Government in 2020[45] requires eligible government projects worth over $10 million to have:

- Applied the relevant Aboriginal Procurement Policy.
- 20% apprentices in the trade workforce.
- 20% of the project's workforce be learning workers.
- 2% of the trades workforce be women.
- 8% of the project's workforce be under 25 years of age.
- Report on local employment outcomes.

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43 A recent example includes the Australian National Hydrogen Grand Prix (H2GP) competition launching in Gladstone in late 2022 to give students a hands-on experience designing and racing a miniature hybrid RC vehicle.

44 The State Government Energy and Jobs Plan (2022) includes a principle to increase local jobs and secure work by prioritising employment of local people wherever possible including development of training opportunities and promoting greater workforce diversity.

45 Details accessible at: https://arp.nsw.gov.au/pbd-2020-03-skills-training-and-diversity-in-construction (accessed 18/08/22)

By extending the current Building and Construction Training Policy,[46] the Queensland Government could boost the number of skilled construction workers as well as the diversity of workers within the industry.

a. Expanding the local workforce through inward migration

The scale of new jobs that will be created through the changes in the energy sector, particularly in relation to the construction, operation and maintenance of new renewable energy and other projects means the current local workforce will be unable to meet all the needs of emerging industries. In fact, multiple industries will no doubt have to compete for skilled workers, not just from across the region, but across Australia and the world. While there will be a need from some temporary workers (FIFO or DIDO) during the construction phases of projects, there is scope to attract workers to migrate permanently to the region.

A key factor to attracting and retaining new workers in the Gladstone Region will be broader liveability factors, explored in Chapter 6 on Community Benefits. Factors such as quality health and education services, affordable housing and childcare, attractive open spaces, social networks, welcoming clubs and societies, restaurants and places to visit.

5.9 Targeted support for small and medium sized enterprises

Small to Medium Enterprises (SMEs) require specific forms of support to manage changes in their operating environment. Often SMEs do not have equivalent levels of auxiliary support or scope for their workers to specialise, and therefore require more broad-based skill sets from employees. Combining this with proportionally tighter budgets makes it clear that SMEs may not afford to adapt to changing technologies, train staff and increase their capacity to meet procurement contracts and address supply chain needs.

Local businesses struggle to tender for large-scale renewable energy projects because they must show they have the capacity, scale and qualifications to complete the job. However, they can't afford to risk investing in the specialist workforce recruitment and training required to service the contract until they are certain they have the contract. They have the added dilemma of weighing up whether the one-off contract is worth jeopardising their ability to service their regular customer base.[47]

46 Details accessible at: https://desbt.qld.gov.au/training/employers/trainingpolicy (accessed 18/08/22)

47 For a more detailed discussion of initiatives to build the capacity of SMEs, see Chapter 4 on Economic Diversification.

5.10 Strengthening the role of unions to support workforce development

Participants across community workshops noted that the unions and worker representative groups could be contributing more to industry and workforce development. The work of unions advocating for, and maintaining the rights of workers and their communities, was seen by some community members and workers participating in workshops as critical to ensure fairness and justice are central to managing the impacts of changes in the energy sector. This perception is supported by global experiences of structural adjustment that have illustrated the important role unions can play in providing grounded, practical worker-based perspectives that can help workers and employers navigate the energy transition.

For instance, unions are pivotal in identifying existing workforce skills and how they might be adapted to meet emerging industry needs (e.g. hydrogen, ammonia, batteries). Unions can also play a role in supporting their members to retrain, upskill and take on other employment opportunities. As highlighted by one participant:

> *"Unions have much more to offer than merely negotiating Enterprise Bargaining Agreements."*

The final and perhaps most critical role participants identified for unions going forward was for unions to work with government, regulators, industry and educational stakeholders to ensure industries, such as renewable energy and hydrogen, invest in mutually beneficial enterprise bargain agreements, as well as training and development for their workforce.

5.11 Recommendations for Council

Council's main responsibilities for supporting regional workforce development fall into the categories of advocacy and planning activities.

a. Advocacy

There are numerous advocacy roles Council can play in ensuring the region's workforce is developed and sustained for broader social and economic outcomes. These include:

- Articulating community expectations of development proponents with regard to workforce development, training, and working conditions.
- Advocating for more resources to ensure Council can play its role in bringing different stakeholders together to coordinate efforts in workforce planning and development. As a representative of the region, Council is uniquely placed to advocate on behalf of the community. Fulfilling this responsibility recognises that even if Council is not well-resourced to do so, it has a moral obligation, and has enshrined this in its policies and vision statements. For example, Council is best placed to articulate the kinds of services and infrastructure that are needed to help attract workers, i.e. through local procurement and employment networks and schemes.[48]

> ***Advocate for policy, regulation and funding to manage the transition well.[49] Take advantage of the political focus on Gladstone.***
>
> **WORKERS FORUM PARTICIPANT**

- Encouraging State and Federal Governments to build clear employment pathways for locals and advocating for more inclusive employment and workforce ratios.
- Working with State Government, CQUniversity and other training providers to shape policy development and engage in public discourses related to workforce issues. This could include Council putting forward submissions to inquiries and sharing local stories that humanise and ground state or national discussions about what is actually happening in communities.

b. Planning and strategy

Suggested actions Council could commence over the next six to twelve months:

Council has a minor but important role to play in ensuring workforce planning is undertaken well to produce results that have a real impact. As one professional participant put it:

> *"Council is close to the action and know what is going on. They can facilitate relationships between local institutions to work together first, then attract the outside relationships."*

48 Details of regional examples of this are accessible at: https://www.qlcln.com.au/ (accessed 22/08/22)

49 Note Gladstone Regional Council, regional peak bodies and the Union movement are all responsible for this.

Because of Council's proximity and influence in relation to local issues, it could co-develop a training and workforce development strategy in collaboration with other regional stakeholders. Specific elements of Council's input to a regional workforce strategy could include building on existing initiatives such as the Connecting Council Curriculum Program.[50] There is scope to expand this program to include topics such as energy and economic transition, hydrogen and future economy, amongst others. Council could collaborate with industry and government players to expand the program's offering into more technical topics as well as its scope, reach, delivery and technical expertise. Upgrading the Connecting Council Curriculum Program would make it accessible to many cohorts beyond high schools to include interested residents, marginalised groups, TAFE and university students, and those enrolled in other training programs.

Council could also develop a communication strategy to attract new workers to live in the region. Additional funding could be sought to expand Council's existing marketing materials, for instance, videos promoting the region to attract investment and people with the skills needed to realise the transition.

Other suggestions for how Council could progress workforce development as part of a regional strategy included:

- Work with the Federal Government to attract new migrants to the region from interstate and internationally to address skills shortages.
- Identifying and facilitating the development of land for training facilities and accommodation.

Recommendations for Council to consider for the future

- With over 700+ employees, Council has the potential to 'walk the walk' by extending their existing apprenticeships and traineeship offerings, demonstrating how to be a good employer and what good employer-worker relations look like.
- Work with local health service providers to establish a Gladstone Health Professional Recruitment and Retention Taskforce strategy.
- Council could use its position and connections within multiple networks to improve coordination between workforce training and development stakeholders. For instance, Council could play a convening role in a mapping exercise to determine if the region has the right employment services, Registered Training Organisations (RTOs) and VET sector in place.

50 For more details on the connecting council curriculum program, see: https://www.gladstone.qld.gov.au/connecting-council-curriculum, accessed 19/08/22

Useful Resources

Accenture (2022). Queensland Climate Action Plan: Laying the foundation for a successful climate transformation. Commissioned by Australian Conservation Foundation, World Wide Fund for Nature, Queensland Conservation. Accessible at: https://www.wwf.org.au/what-we-do/climate/renewables/resources/queensland-climate-action-plan

Briggs, C, Rutovitz, J, Dominish, E, Nagrath, K, (2020) Renewable Energy Jobs in Australia – Stage 1, Institute for Sustainable Futures, University of Technology. Prepared for the Clean Energy Council by the Institute for Sustainable Futures, University of Technology Sydney, Australia. Available at: https://opus.lib.uts.edu.au/handle/10453/159902

Construction Skills Queensland (2022). Queensland's Renewable Future: investment, jobs and skills. CSQ, Brisbane, Australia. Accessible at: https://www.csq.org.au/renewables/ (accessed 04/08/2022)

Department of Employment, Small Business and Training (2021). Accessible at: Funded programs | Department of Employment, Small Business and Training (desbt.qld.gov.au)

Rutovitz, J., Visser, D., Sharpe, S., Taylor, H., Jennings, K., Atherton, A., Briggs, C., Mey, F., Niklas, S., Bos, A., Ferraro, S., Mahmoudi, F., Dwyer, S., Sharp, D., and Mortimer, G. (2021). Developing the future energy workforce. Opportunity assessment for RACE for 2030.

CHAPTER 6:
Capturing Community Benefits

6.1 Introduction

Gladstone is a region familiar with the impacts industrial change can have on community health, wealth and well-being. While the rapid expansion of industries such as the LNG boom has generated employment opportunities and wealth for some, it has also contributed to housing shortages, higher costs of living, pressure on existing services, deterioration of local infrastructure, and a lack of long-term employment opportunities.

With the region potentially facing another period of rapid economic growth, participants in both community and industry workshops identified a need to find new ways to ensure that people from across the region can share the benefits of economic change well into the future.

Phillip Street Communities and Families Precinct

The key areas where most people wanted to see improvements included: improved liveability through increased access to health services, housing, infrastructure and other amenities; local job creation and procurement opportunities;[1] financial benefits shared across the community[2]; and a stronger sense of identity and social cohesion.

6.2 2032 Vision

Participants across all engagement activities shared a vision for a future where Gladstone has successfully built on its industrial heritage in ways that enhance the liveability of the region, primarily through increased investment in services that improve the physical and mental health of people of all ages.

As one participant put it:

> *"Gladstone is a place that can support people from the cradle to the grave."*

Local people expect that as industries grow, profits are reinvested (whether through taxation, royalties or community funds) in a range of services (including health, education, childcare and aged care facilities) and community infrastructure such as roads, rail, bridges and waste facilities.

Participants across all the engagement activities also envisage that by 2032 the population will have increased, but that the influx of workers to meet the needs of new industries will have led to government and industry proactively addressing the housing shortages and affordability across the region, so no-one is left homeless or priced out of the housing market.

Workshop participants also expect that new investments and an increased population will lead to an expansion of retail businesses, entertainment services, restaurants and tourism and leisure destinations, making the region a more attractive place for all people to live, work and stay, especially professionals and their families.

Ensuring that local people benefit financially from the economic change was also a common theme in visioning activities across the workshops. Not only did most people want to see the cost of living improved (particularly in relation to housing and energy prices), they also wanted corporate profits shared more equitably than in the past through prescribed local employment and procurement, payments to landowners and First Nations groups, and community funds to support local development initiatives.

Some participants wanted to see community-owned energy projects, social enterprises and community-directed health and social services in 2032, perceiving these models to be more equitable.

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1 Measures to ensure local job creation and procurement opportunities, as well as points regarding how workers are not only protected but can benefit from economic changes are discussed in Chapter 4: Development and Economic Diversification and Chapter 5: Workforce Development.

2 The release of the Queensland Government Energy and Jobs Plan (September 2022) includes a principle (#2): Shared benefits with communities to deliver on opportunities to share the financial and other benefits of energy development with local communities.

Finally, participants across most workshops wanted to see changes over the coming decade to strengthen the local sense of cohesion, identity, pride and belonging. By 2032, people hoped for a future where everyone felt included, empowered and positive about their future, with special mention made to current fossil fuel workers and First Nations people.

6.3 Services to improve health and wellbeing

Most local people who participated in the consultation activities expressed pride in their region as an industrial hub and yet also highlighted the need for further investment to increase the region's 'liveability' to make it a place where people want to, and can, live their entire lives, not just their working years.

> ***If a worker has a broken arm, they have to fly up to Townsville or Rockhampton to get medical help.***
>
> **WORKERS FORUM PARTICIPANT**

Access to health care services remains a real challenge for people across the Gladstone Region, with many needing to travel to Rockhampton, Bundaberg or Brisbane for a range of health services. Many highlighted a dire need to resource a range of essential local health services including maternity, paediatric, mental health, emergency and imaging services, plus options for community aged care facilities, which would enable older generations to stay in the region. This perception is validated by the 2022 'District of Workforce Data Shortage' (WDS) statistics for the Gladstone Region.[3] Questions were often raised as to how the Department of Health determines regional health funding, why the Gladstone Region seems to be so under-resourced and understaffed, and what is being done to improve the situation.

Access to health and other basic services will continue to be a fundamental issue over the next decade and will determine whether families move to and stay in the region as they age. Without an improvement to existing health and social services, many community members engaged through the workshops believed that workers and companies would instead opt for FIFO or DIDO working arrangements and that this would feed a vicious cycle of the region not being able to meet the population requirements needed to attract additional investment in services. A lack of services (particularly childcare, maternity, paediatric and aged care services) also contributes to lower female participation in the local workforce.

> ***We need to meet basic needs for expecting mothers, injuries, elderly and mental health.***
>
> **GLADSTONE RESIDENT**

3 2022 Gladstone region medical shortages were identified in 7 out of 8 medical specialties (Anaesthetics, Cardiology, Diagnostic Radiology, Medical Oncology, Obstetrics & Gynaecology, Opthalmology, Psychiatry) and a partial shortage in the remaining one (General Surgery). https://www.health.gov.au/resources/publications/dws-classifications-for-specialists-2022

Participants emphasised the need to resource mental health services across the region, from acute psychiatric beds to community therapy and counselling services, especially for young people and First Nations people. They also anticipated the need to provide mental health support as things change, particularly for workers in fossil fuel industries.

As reflected in the above statements, one of the key challenges that needs to be addressed is the region's ability to attract healthcare professionals, particularly doctors (especially female doctors), specialists, mental health professionals and Indigenous health workers. While some suggested a need to pay health professionals more, others suggested that Council could coordinate a campaign promoting the region to attract professionals to come and stay in the region. One participant suggested that where vacancies exist, real estate agents, schools and health services could collaborate to develop and market a 'lifestyle package' for specific professions.

Extensive policy and research efforts have been made to address regional health professional recruitment and retention issues. There is no magic bullet – it tends to involve multiple short and long-term collaborative efforts across health, education, community and government sectors. Addressing the Gladstone situation is likely to require a tailored and multi-pronged approach led by Queensland Health and informed by national and international research.

Some participants advocated for a more decentralised healthcare model so that more decisions about requirements are handled locally. Others highlighted the Rural Area Community Controlled Health Organisations (RACCHOs) as a model of place-based healthcare that has been designed to attract more health professionals to rural areas.[4]

Some participants raised questions about whether the industry should help fund upgrades to health and wellbeing services as the workforce expands. One suggestion was that renewable energy companies not only pay landowners but also contribute to community funds in the nearby service centres to support essential services (on top of existing government support).

The idea of industry co-funding or owning/operating basic health services ignited philosophical conversations about the role of government during some workshops. While there was also some disagreement among participants about what new industries should and could be expected to contribute, it was agreed that at the very least, industry could join with Council, regional development associations and chambers of commerce to advocate in a coordinated way for improved local services. One industry participant explained how they could use their contacts and influence within government to raise the issues, but they needed backing from Council, community and local businesses.

4 National Rural Health Alliance, A Proposal For A New Model Of Care For Rural And Remote Australia Primary Health Care – Rural Area Community Controlled Health Organisations (RACCHOS), 2021.

6.4 Affordable and accessible housing for all

The need to invest in more affordable housing across the region was a very strong theme amongst all stakeholder and community workshops. The cost of housing is directly tied to the cost of living in the region, with the costs of a mortgage and rental payments impacting how much money households have left to meet other expenses.[5]

> ***Lots of people are couch surfing, living with friends and family because they can't secure any housing.***
>
> **RESIDENT SPEAKING ABOUT CURRENT HOUSING SHORTAGE**

Across all the workshop, people expressed concern that the region was facing a housing shortage, with people undergoing intense competition to secure tenancies. Workshop participants therefore saw the prospect of a further influx of workers to meet the needs of emerging energy related industries as further exacerbating the current problems. Multiple people reflected on the housing crisis experienced during the LNG boom and how that needs to be strategically avoided.[6] It made sense to people that new industry investments in the region also needed to be accompanied by an investment in more housing.

Gladstone housing

5 Australia has one of the worst rates of housing affordability, with our mortgage to income ratio ranking second worst among OECD countries (https://www.oecd.org/housing/policy-toolkit/country-snapshots/housing-policy-australia.pdf)

6 Not only did the influx of workers during the LNG boom lead to housing shortages and a sharp rise in property and rental prices, but then also led to a drastic drop in property values after the boom ended, plunging many people who had purchased properties during the boom into significant debt.

At the time of the 2021 Census, the Gladstone Region had considerably cheaper housing and greater housing affordability compared to other regions.[7] However, in the 2021–2022 financial year, sale prices have increased 17.37 per cent and rental prices have increased 7.1 per cent.[8] While housing prices now appear to be in decline,[9] more planning is needed to deal with this level of volatility, particularly given the projections of economic growth in new sectors over coming years, as well as projected interest rates rises.

Addressing housing needs is complex and there are no easy solutions, however suggestions generated by workshop participants included:

- Government building additional social and/or housing options across the region.
- Council facilitating access to land or property for specific types of housing and social outcomes.
- Convert existing underutilised accommodation facilities into housing or emergency accommodation.
- Making 'rent to own' or shared equity programs easier and more accessible to more people.
- Establishing land trust options to enable people on lower incomes to buy their house and build equity without having to pay high land prices and rates.
- Providing low-income households with access to energy efficiency programs and incentives for rental properties to do energy efficiency upgrades to reduce running costs.
- Ensure that any new accommodation constructed is designed to have a high energy rating (eg: a 7+ star energy efficiency rating), which enables residents access to both cheaper mortgage products and lower long-term running costs.[10]
- Ensuring that any new permanent accommodation constructed to house FIFO workers is designed to meet the needs of families and others after the boom. For example, consider how worker accommodation could be adapted as community housing.
- Instead of building accommodation for FIFO workers that will only be in the area to complete short-term construction projects, companies invest in high-quality tiny homes/ modular homes[11] or recreational vehicles that can be moved to the next construction site or repurposed in the community post construction.

Whatever approaches are adopted by government, industry and the finance sector to address the housing crisis, better collaboration, planning and community input is essential to identify solutions appropriate to the local context. Furthermore, the additional accommodation needs of new workers must be planned and budgeted for during the early phases of project development and not be left as an afterthought.

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7 26.5 per cent of renters used more than 30 per cent of household income on housing expenses (well below state and national rates). 9.6 per cent of mortgage holders used more than 30 per cent of household income on housing expenses, 4.9 per cent lower than the national rate. https://www.abs.gov.au/census/find-census-data/quickstats/2021/LGA33360 (accessed June 2022)

8 HTAG (Higher Than Average Growth), July 2022

9 Gladstone News, 2 June, 2022. Gladstone's real estate: Winter

10 One example is 'The Cape' eco-development in Victoria, which has been recognised as the national leader in efficient housing design construction and is saving households an average of $5,000/ year with their 8-star efficiency-rated homes. See: https://www.domain.com.au/news/the-cape-ecodevelopment-should-be-the-national-standard-for-a-zero-carbon-climate-resilient-future-experts-say-922298/

11 The number of companies specialising in tiny/small homes and modular homes is expanding across Australia because of an increased demand for smaller houses that can be relocated if necessary. For a few examples, see: https://www.mybellacasa.com.au or https://www.westbuilt.com.au/relocatable-homes/bexhill-mk1-v2022

6.5 Capturing financial benefits for the region

Another strong theme mentioned across many of the workshops was the need to establish transparent mechanisms to enable a more equitable sharing of financial benefits generated by existing and new industries.

Often the discussion about financial benefits is limited to a focus on job numbers and local procurement opportunities,[12] or in the case of the renewable energy industry, on payments to landowners. Given the impact new industries can have on the broader community, further consideration regarding how profits and other legacy benefits can be created and shared locally is warranted.

This point is strengthened by statements offered by some workshop participants that the socio-economic gap between 'the haves and the have-nots' in the region is increasing and tends to worsen during and after periods of rapid industrial expansion. 2021 Census data showed 18.8% of Gladstone regional households are living on less than $650/ week[13], even though the average median weekly household income is $1639/ week.[14] The widening gap is attributed to the high wages of some workers as well as the increased costs of living, all of which is intensified during boom periods.

Suggestions from community and industry workshops for how this disparity can be addressed and financial benefits shared more equitably included:

- Develop a Social Infrastructure Plan so that when funds become available there is a strategic plan with long-term priorities identified.
- Develop a Community Benefit Fund that industries can contribute to, governed by the community.[15] Invest in governance training (for example, AICD training) and participatory decision-making processes (for example, participatory budgeting) to ensure inclusive and transparent decision-making processes.[16]
- Either legislate or develop guidelines for profit sharing by new renewable energy projects.
- Require all major new businesses, including renewable energy companies and manufacturing projects in the region to offer locals the opportunity to become shareholders.[17]

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12 For more insights into generating more local employment and procurement opportunities please refer to Chapter 5: Workforce Development.

13 Compared with 16.4% across Queensland and 16.5% across Australia.

14 https://www.abs.gov.au/census/find-census-data/quickstats/2021/LGA33360 (accessed June 2022)

15 A community fund called the Gladstone Foundation was established to capture some of the profits generated by the LNG industry. This fund is managed by the Public Trustee instead of Council or a committee directly answerable to the community.

16 There was debate in one workshop as to whether community funds should be managed by the local council or by a committee of community representatives. There was, however, consensus that decision-making should involve broad community input and decisions should be made by local representatives, rather than by a committee appointed by the State Government. Other models include Here for Gladstone www.here4gladstone.com.au that represents the community contributions of Rio Tinto Yarwun, Boyne Smelters Limited and Queensland Alumina, and includes community leaders on the board.

17 The example of Denmark was offered as a model, where they legislated in 2011 that 20% of the shares in all wind projects are offered to the local community.

- Ensure that neighbouring landowners and Native Title holders impacted by renewable energy projects are paid on an annual basis.
- Invest in apprenticeships and traineeships to build the local workforce.[18]
- Invest in strategies, training and support programs to ensure that those already marginalised from the workforce (e.g. long-term unemployed, women, young people and First Nations people) have a genuine opportunity to be employed in new industries.
- Mandate local content and employment for marginalised groups in new projects and establish programs to build the capacity of local businesses to be able to meet procurement requirements.[19]
- Mandate that a certain percentage of ongoing jobs (maintenance, operations) be local jobs and build the skills to be able to meet this need.
- Monitor and annually benchmark the data relating to regional expenditure on regionally supplied inputs (otherwise known as 'backward linkages', 'local sales value' and 'local expenditure').[20]
- Monitor the average household income data, including data on wages and salaries, and the 'per worker gross regional product' data, as these provide insight into how much of the locally generated wealth is being shared with locals via salaries.[21]
- Ensure industry pays a reasonable amount of taxes and royalties.
- Support communities and First Nations people to develop their own 'Expectations Plan' that clearly outlines their benefit-sharing preferences and the processes and expectations around communication and negotiation.
- Require companies to fund genuine consultation and negotiations with communities, marginalised groups and First Nations people during the early stage of planning to establish the ways locals want to benefit throughout the life of the project, for example, traineeships, employment, shares, royalty payments, procurement services, land restoration services, education scholarships, entrepreneurial/ business support. Formalise these agreements through the development application process so they are not lost when projects change ownership. [22]
- Ensure companies are required to engage in a transparent way with communities throughout all phases of project development[23] and that negotiations about benefit sharing are facilitated by skilled independent facilitators rather than company contractors/ employees.

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18 See the Chapter 5 on Workforce Development for more details.

19 This is explored further in the Chapter 5: Workforce Development.

20 This is currently valued at $3.27 billion. Currently, local expenditure represents 21% of regional economic output. For more information, see REMPLAN – (accessed July 4, 2022).

21 REMPLAN (2022b) Gladstone Regional Council – Economy, Jobs and Business Insights. Data as at August, 2022. Available at: https://app.remplan.com.au/gladstone/economy/ summary?state=n8MjfBE3vsOVWzxFwKpRYWIwIpIQEr

22 Refer to resources produced by the Community Power Agency for more detail.

23 For further discussion on community engagement expectations, see Chapter 6.

- Address benefit sharing with the immediate neighbours of a renewable energy project to recognise the impacts and changes at a neighbourhood level. This seeks to share the benefits of a project fairly and can overcome existing tensions when host landowners receive rent payments and neighbours get nothing (particularly important for acceptance of wind farms). Examples include annual payments, gift of shares or energy bill contributions.
- Invest in services to improve financial literacy and provide financial support to community members and businesses likely to be heavily impacted by the decline of fossil fuel industries.

While most participants agreed that industry should do more to share profits by investing in the community, there were considerable levels of disagreement as to whether profit sharing should be legislated or left up to industry to negotiate on a case-by-case basis. Industries are under increasing pressure from shareholders and communities to establish strong Environmental, Social and Governance (ESG) criteria. However, the level and type of commitments remain largely voluntary, and expectations vary across different regions and states. If communities are to benefit over the long term, expectations regarding profit sharing needs to become much more transparent through regulatory frameworks, especially in Queensland, where there are no formal requirements on renewable energy companies to undertake social impact assessments or community engagement.[24]

The Gladstone Aquatic Centre is in the Green Belt that runs through the centre of the city, adjacent to the Central Business District

24 In Queensland, there is no formal requirement that companies consult with communities. The Code-assessable development in the State doesn't require wind or solar farm projects to undertake community consultation as part of their project, meaning the only official engagement period is around the EPBC referral, which may only be open for 10 days (RE-alliance, 2022).

6.6 Addressing changes in royalty payments

The existing energy sector has and continues to contribute substantial income to all Queenslanders, especially to the State Government and Native Title holders affected by developments on their traditional lands and waters. Annually the resources sector pays billions of dollars in royalties to the State for the right to exploit resources such as coal and gas, but no such royalty schemes exist to exploit renewable energy resources. The loss of royalties from the resources sector due to the transition away from fossil fuels was a concern raised in multiple workshops, as it is seen as critical to the State budget.

These issues around state dependence on fossil fuel royalties are further heightened by the recent (and controversial) Queensland Government rule changes to increase coal and gas royalties during a period of sky rocketing coal and gas prices.[25]

> ***...how do we substitute for coal royalties in the transition? When does renewable energy start to pay royalties?***
>
> **WORKERS FORUM PARTICIPANT**

Renewable energy proponents are unlikely to fill the void created by an inevitable decline in fossil fuel royalties over time, and so new streams of income will need to be found. How and when the State Government plans to address this could impact the roll-out of renewable energy projects and the expansion of industrial and manufacturing sectors in the Gladstone Region, especially if it has significant consequences for the price of electricity.

Native Title holders and affected First Nations communities also raised concerns about the decline or potential loss of royalties and other economic benefits (e.g. training and employment opportunities) generated through fossil fuel developments on their lands and waters. They also raised concerns about the differing, confusing and sometimes contradictory requirements on renewable energy proponents to negotiate and reach agreements with Native Title holders to access and use land[26]. This legislative anomaly must be addressed by Federal and/or State Governments to ensure renewable energy proponents effectively engage and compensate Native Title holders as well as share the benefits of these developments with the broader First Nations communities in the area.

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25 https://www.theguardian.com/australia-news/2022/jun/24/pandoras-box-experts-say-queenslands-windfall-from-coal-royalties-could-set-a-precedent

26 O'Neill et. al. (2019) note that the Native Title Act specifically sets out the rights of traditional owners in relation to renewable energy developments. For more details see pg. 10, O'Neill, L., Thorburn, K. and Hunt, J. (2019), Ensuring Indigenous benefit from large-scale renewable energy projects: Drawing on experience from extractive industry agreement making, Working Paper No. 127, Centre for Aboriginal Economic Policy Research, Australian National University, Canberra.

6.7 Recommendations for Council

a. Suggested actions for Council to commence over the next six to twelve months

- Explore ownership models, options and feasibility for the provision of aged care facilities in Gladstone. Decide what models suit the Gladstone Region and promote the business case widely to attract interest from specialised aged care providers.
- Review town planning mechanisms to accommodate and encourage the construction of more affordable housing, in the context of long-term housing needs in the community.
- Work with relevant stakeholders to develop a Regional Housing Taskforce for the purpose of planning, overseeing, coordinating and advising on housing supply within the region. The taskforce could follow construction timelines of all new projects, monitor market trends and anticipate housing demand and supply needs in close collaboration with industry. The group could also advocate for specific housing needs and advise industry and community when projected housing supply issues may arise. Membership might consist of Council representatives (including a town planner), public housing managers, real estate experts, community housing providers, a loan broker, local Centrelink manager, representatives of the Regional Development Authority and community members. The taskforce could also champion initiatives to encourage more innovation in the housing sector (e.g. tiny homes and shared equity models).
- Develop a Social Infrastructure Plan to clarify local priorities and guide decision making about funding by government and industry.
- Support the Port Curtis Coral Coast Trust to facilitate processes for First Nations groups to create their own 'Local Expectations Guide' for project developers in the Gladstone Region, including benefit-sharing preferences and the expected process around conduct, communication and negotiation.
- Support productive and informed community involvement, negotiation and communication with industry (e.g. increasing access to community and providing training on negotiating skills).
- Promote the work of the regional development associations, Gladstone Engineering Alliance and the local chamber of commerce who support local businesses to prepare for new industry tendering requirements.

b. Suggested actions to commence over the next two years

- Work with relevant stakeholders to produce an annual report of the range of community benefits distributed in the Gladstone Region by various industries and companies to acknowledge the contributions they make and keep benefit expectations on the public agenda. This could include showcasing community contributions, backward linkages and salaries data. It could also include instigating an annual Corporate Citizenship Award.
- Review the role the Gladstone Foundation has played in investing funds generated during the

expansion of the LNG industry. If appropriate, develop a separate community-benefit fund that industries contribute to and communities manage to develop services and infrastructure across the region.[27] In developing the fund, invest in governance and participatory decision making and AICD training for those managing the new fund.[28]

- Work with regional development organisations and chambers of commerce to strategically foster interest and training in community ownership and social enterprise business models.

c. Suggested actions to commence over the next three or more years

- Work with local health service providers to establish a Gladstone Health Professional Recruitment and Retention Taskforce, with membership from across public and private health providers, community sectors, medical and allied health professions, training providers, rural health recruitment services, academics, and community members.
- Devise and implement a regional recruitment and retention strategy suited to the local context and based on international best practice research. This could include community suggestions like the development of 'a lifestyle package', a coordinated campaign to promote the regional opportunities, or a raft of other short- and long- term strategies.

d. Advocacy

Council has an important role to play in advocating for better health services, affordable housing and community benefits. Suggestions include:

- Coordinate with Regional Development Australia, the local chamber of commerce, industry, health, housing and community service sectors to advocate for better services in a collaborative and strategic way. This could include:
  - Developing a joint 'Statement of Community Needs'.
  - Advocating to the State Government for improved health services; particularly the resourcing of maternity, paediatric, psychiatric and mental health services, plus the general recruitment and retention of health professionals.

27 A community fund called the Gladstone Foundation was established for the LNG industry to contribute funds via an agreement with Government to mitigate social impacts. This fund is managed by a committee that reports to Queensland Treasury, instead of Council or a committee directly answerable to the community.

28 There was debate in one workshop as to whether community funds should be managed by the local council or by a committee of community representatives. There was however consensus that decision making should involve broad community input and decisions should be made by local representatives, rather than by a committee appointed by the State Government.

  - Advocating for the construction of more social / affordable housing and innovative financing models, such as rent-to-own, shared equity models and land trusts.
  - Advocating and promoting the recommendations included in this Roadmap.

- Encourage major project proponents to:
  - Prioritise local procurement and employment for marginalised groups during project construction and operation and create transparent reporting mechanisms that are publicly accessible.
  - Conduct a 'social feasibility study[29]' as part of the application and demonstrate they have conducted independently facilitated community benefit negotiations with communities and First Nations people.
  - Make benefit commitments that must be honoured regardless of changes in project ownership.
  - Develop a local housing plan to meet growing demands during the construction, commissioning and ongoing operation of projects.
- Advocate for requirements to be changed to enable greater involvement of Council and community in development negotiations on Gladstone State Development land.
- Advocate for State and Federal Governments to standardise industry guidelines for corporate profit and benefit sharing, encouraging companies to contribute to the communities they operate in. Council could advocate for these standards be legislated as the 'minimum requirement.'
- Advocate for legislative anomalies be resolved, ensuring renewable energy proponents effectively engage and compensate First Nations communities (not just Native Title holders) for the impact of new energy, transmission and other projects have on land.
- Advocate for adequate financial literacy and financial management support services to be provided, especially where forced redundancies occur, and to general community members to reduce the gap between the 'haves and have-nots'.

Recommendations for Council to consider for the future

- Investigate whether it is possible and appropriate for Council to leverage its buying power (or partner with other Central Queensland local governments or other medium-sized companies) to negotiate a power purchase agreement with a local renewable energy company or build a community/Council-owned renewable energy project so the community/Council can benefit from their cost efficiencies, project management and lower cost construction contracts.

29 Detailed guidance is available in the Community Engagement and Benefit Sharing for Renewable Energy Development in Victoria (2021). https://www.energy.vic.gov.au/__data/assets/pdf_file/0036/536787/Community-Engagement-and-Benefit-Sharing-Guide.pdf

Useful Resources

Australian Energy Infrastructure Commissioner (2021). Annual Report to the Parliament of Australia. This report includes a summary of complaints handling and resolutions for renewable energy projects. Accessible at: https://www.aeic.gov.au/sites/default/files/documents/2022-07/aeic-2021-Annual-Report.pdf

Community Power Agency: A not-for-profit consultancy that supports communities to define their own terms and draw the greatest benefits from renewable energy. They have extensive resources, have worked with multiple State Governments to develop policies, offer a new online course for those working in the community and renewable energy space, and offer on-the-ground community engagement and project management services around this topic. https://cpagency.org.au

Socially Responsible Renewable Energy Development course run by Community Power Agency and the Yunus Centre (Griffith University) is an 8-week online professional development course that equips renewable energy practitioners and allied stakeholders with training in best-practice community engagement and benefit-sharing concepts and methods. For more information or to register see: https://cpagency.org.au/our-work/workshops-training/social_redev_course/

Clean Energy Council (2019). A guide to benefit sharing options for renewable energy projects. Accessible at: guide-to-benefit-sharing-options-for-renewable-energy-projects.pdf (cleanenergycouncil.org.au)

Domain, The Cape: Ecodevelopment should be the national standard for a zero-carbon, climate-resilient future, 22 January 2020. Accessible at: https://www.domain.com.au/news/the-cape-ecodevelopment-should-be-the-national-standard-for-a-zero-carbon-climate-resilient-future-experts-say-922298/

Hicks, J., Lane, T., Wood, E., & Hall, N. (2018). Enhancing Positive Social Outcomes from Wind Farm Development: Evaluating community engagement and benefit-sharing in Australia. Clean Energy Council. Accessible at: https://assets.cleanenergycouncil.org.au/documents/resources/reports/enhancing-positive-social-outcomes-from-wind-farm-development.pdf

Lane, T., & Hicks, J. (2017). Community Engagement and Benefit Sharing in Renewable Energy Development. Victorian Government Department of Environment, Land, Water and Planning. https://www.planning.vic.gov.au/__data/assets/pdf_file/0022/126418/Community-Engagement-and-Benefit-Sharing-in-Renewable-Energy-Development1.pdf

Lane, T., & Hicks, J. (2019). A Guide to Benefit Sharing Options for Renewable Energy Projects. Clean Energy Council. https://cpagency.org.au/wp-content/uploads/2021/04/Guide-to-Benefit-Sharing-Options-for-Renewable-Energy-Projects.pdf

National Rural Health Alliance – Advocacy and Policy: The Health Services and Workforce section provides a repository of information on this topic. A good place to start when exploring rural health workforce recruitment and retention matters. https://www.ruralhealth.org.au/advocacy/health-services-and-workforce

RE-Alliance – a not-for-profit advocacy organisation working to secure an energy transformation that delivers long-term benefits and prosperity to regional Australia. They have lots of resources and offer support and advice around communities, large scale renewable energy and transmission lines. https://www.re-alliance.org.au Notably: Community Benefits Handbook: https://www.re-alliance.org.au/community_benefits_handbook

RE-Alliance (2021). Building Trust For Transmission Report: https://www.re-alliance.org.au/building_trust_for_transmission_report

CHAPTER 7:
Protecting and Regenerating the Environment

7.1 Introduction

The rapid expansion of renewable energy holds the potential to address some of the most pressing global environmental challenges including climate change, the impacts of fossil fuel extraction and improving air quality. The scale and pace of renewable energy developments could, however, lead to a range of detrimental impacts on biodiversity and waterways if not managed well. This section explores how environmental impacts can be avoided and minimised across the Gladstone Region during the transition phase through careful planning, regulation, monitoring and remediation.

As an already heavily industrialised area, environmental impacts are already monitored across the Gladstone Region,[1] however stakeholders across all workshops agreed that additional efforts would be needed to not only rehabilitate and regenerate some areas, but also to protect the environment as renewable energy and other industries expand over time.

The main environmental issues identified by participants as requiring attention were:

- Protecting water quality and supply in an already dry part of Australia.
- Protecting the Great Barrier Reef and marine ecosystems.
- Protecting, remediating and regenerating existing land.
- Ensuring changes lead to air quality improvements and emissions reduction; and,
- Adopting new approaches to reduce waste.

1 For example, in addition to State and Federal Government environment monitoring, local environmental health assessments are integrated in the 'Gladstone Harbour Report Card', a document produced annually by the Gladstone Healthy Harbour Partnership, utilising scientific data collected by the Port Curtis Integrated Monitoring Program. More information about these can be found at http://ghhp.org.au and https://pcimp.aims.gov.au/charts/index.html

7.2 2032 Vision

Participants across all community and stakeholder workshops shared a common goal to protect and improve the natural environment as change unfolds over the next decade.

Despite concerns about the impacts of phasing out fossil fuel use on the economy, the vast majority of respondents expressed a very high level of support for climate action to reduce emissions and protect the Great Barrier Reef from climate change.

There was strong agreement across all workshops and forums that water resources need to be well managed to ensure sufficient supply to meet community, industrial, agricultural and environmental requirements. Over the next decade, participants expect the government to establish and reinforce measures to monitor and protect the waterways and harbour from inappropriate development. This includes protecting the Great Barrier Reef by minimising the impacts of run-off, new construction, coastal dune erosion, and wetland and mangrove habitat loss.

Participants envisioned a future in which First Nations people apply Traditional Knowledge to rehabilitate industrial sites and manage biodiversity of the regions land and waterways.

By 2032, most participants expected to see the decommissioning and repurposing of coal-fired electricity station assets, with one participant suggesting that turbine halls be repurposed to support energy storage or become workshops for wind tower and blade construction.

Participants also emphasised a vision for a zero-waste future and the importance of using a circular economy approach to inform planning for manufacturing industries, fossil fuel energy assets at the end of their life, and new renewable energy projects.

Four of the world's seven species of turtles nest on beaches in the Gladstone Region from November to March

7.3 Ensuring healthy waterways

The main environmental concern participants raised across all workshops was the impact of new and existing industrial developments on water supply and quality (particularly hydrogen). It is unsurprising that this issue was raised as a concern across all stakeholder groups, given the region's pre-existing water security challenges.

The health and management of the waterways in the Gladstone Region operates within a complex scheme of jurisdictions, involving all levels of government and government owned corporations.

The Gladstone Area Water Board (GAWB) is responsible for delivering a sustainable water management plan and coordinating with stakeholders to balance industry, community and environmental needs. This extends to the ownership and management of the Awoonga Dam on the Boyne River and a network of pipelines, pump stations, reservoirs and treatment plants.[2]

One-fifth of the bulk raw and potable water supplied by GAWB goes to the Gladstone Regional Council for distribution to the communities of Boyne Island, Tannum Sands, Benaraby, Wurdong Heights, Beecher, Calliope and Mount Larcom. The remaining 80 per cent is contracted to meet the Gladstone Region's industry demands[3] which are considered to have a "high sensitivity to water restrictions."[4] The agriculture industry in the region draws on the Boyne River catchments but does not significantly impact water supplies from Awoonga Dam.[5]

Agnes Water and Seventeen Seventy have their own independent water supply, and in 2010, a saltwater desalination plant was commissioned to replace their reliance on insufficient local bore water.[6] The Miriam Vale township sources water from the nearby Baffle Creek, and in 2019 experienced water restrictions requiring water to be trucked in.[7] Similarly, water challenges in the Boyne Valley in 2020 saw the Builyan community takeover ownership of the water supply assets via their community-operated Builyan Water Supply Association.[8] Other settlements in the Gladstone Region, such as Bororen, rely entirely on bore or rainwater. Council also manages wastewater treatment plants that supply recycled water to local industries and sporting groups.

Gladstone has been a 'fully drought declared' region since 2019,[9] so it is unsurprising that participants across all the engagement activities highlighted the need for planning and regular water assessments to consider competing uses (including environmental needs) to ensure healthy waterways and biodiversity. The most recent regional water supply security assessment was

2 GAWB is a commercialised statutory authority. In addition to developing, operating, and maintaining the infrastructure GAWB is also tasked with protecting the quantity and quality of present and future water supplies. More about GAWB can be found here: https://www.gawb.qld.gov.au/about-gawb/ and https://governmentbodies.premiers.qld.gov.au/BodyDisplay.aspx?Parameter=186

3 Department of Energy and Water Supply, Gladstone regional water supply security assessment, State of Queensland, 2017, p.2&7.

4 Gladstone Area Water Board Annual Report 2020–2021, p. 10.

5 Gladstone regional water supply security assessment, 2017, p.7.

6 Environment a key priority at Agnes Water desalination plant, Website: Osmoflo.

7 2019–20 Gladstone Regional Council Annual Report – pg. 22–23

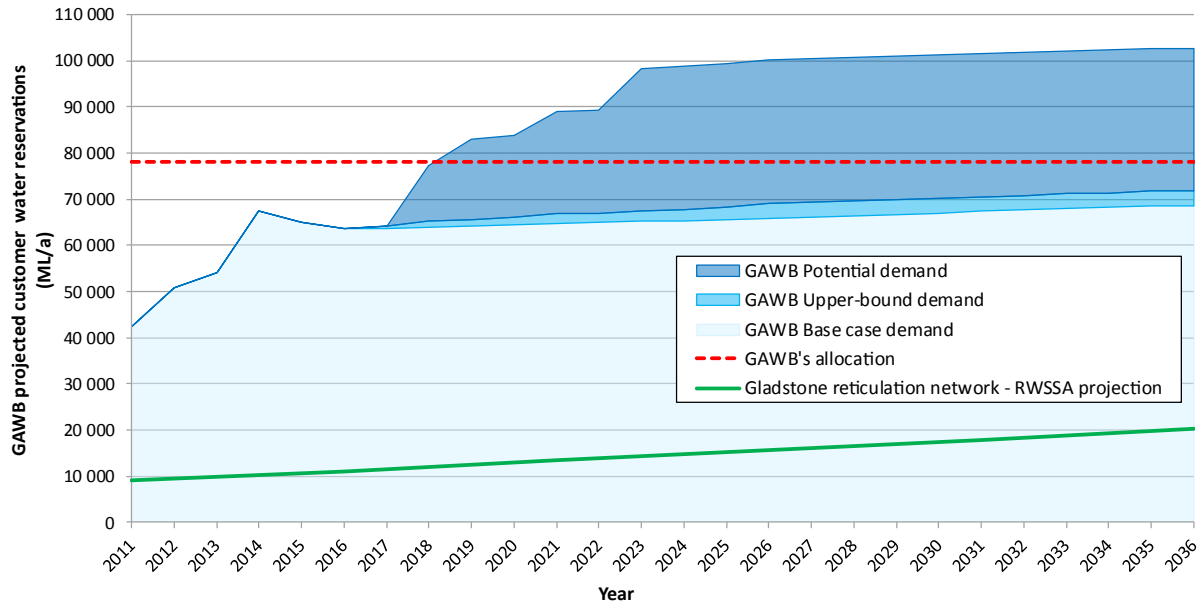
8 Builyan to manage own water supply, Courier Mail, 2009.

9 Drought Declarations Archive, The Long Paddock, Queensland Government

undertaken by the Department of Energy and Water (representing GAWB) and the Gladstone Regional Council in 2017. It explored projected water demand growth scenarios through to 2036. As shown in the above graph, these forecasts predicted a population of 106,000 by 2036 (around 40,000 more than today) requiring considerably more potable water, as well as a range of industrial demand scenarios. Given this assessment is already five years old, and the water requirements of current and future energy related industries (including multiple hydrogen projects) will have changed demand forecasts considerably, updated modelling should be undertaken.

Following successive years of drought, GAWB, in partnership with the Queensland Government, is advancing their Water Security Strategy by pursuing the Gladstone Fitzroy Pipeline (GFP) project. This project seeks to de-risk Awoonga Dam by developing an alternative water supply drawn from the Lower Fitzroy River (Rookwood Weir). The GFP is also intended to "provide water for the emerging hydrogen industry in the Gladstone Region," indicating that preparations are underway for the GAWB to meet some extent of the hydrogen water needs from surface water.[10]

Figure 7.1: Total water reservation demands for Awoonga Dam[11]



NB: (excludes 4% loses)

Participants across the engagement activities shared a high level of consensus that industry needs to secure sustainable sources of water without compromising community and environmental needs. Most community members and some industry representatives emphasised that water management systems need to maintain healthy environmental flows.[12]

10 Gladstone Area Water Board, Webpage: Fitzroy to Gladstone Pipeline project.

11 State of Queensland, Department of Energy and Water Supply, Gladstone regional water supply security assessment, 2017, p10.

12 The Queensland Government has jurisdiction over environmental matters including water via the Qld Environment Protection (Water and Wetland Biodiversity) Policy 2019.

Opinions differed on the definition of 'sustainable water sources.' While some in community forums referred to the need to expand dam capacity, others suggested industry expands its use of recycled water as much as possible. Hydrogen proponents cited desalination as a viable option to reduce the pressure on existing water sources, however, some industry and community members questioned the cost of desalination and how the brine produced through the process would be managed. Others expressed concern about the impact of constructing and operating a desalination plant on the Great Barrier Reef.[13]

Other reef-related concerns included the impact of dredging and port expansion, as well as the potential for increased ship movements as hydrogen and other industries expand over time. Based on forecast demand, the Gladstone Ports Corporation have progressed the Gatcombe and Golding Cutting Channel Duplication project.[14] Considerable planning processes are completed but further remain. Dredging activity will need to comply with 'National Assessment Guidelines for Dredging' (NAGD)[15] and the 'Maintenance Dredging Strategy for the Great Barrier Reef World Heritage Area Ports'.[16]

The Queensland and Australian Governments' joint 'Reef 2050 Water Quality Improvement Plan 2017– 22'[17] also offers a guide for how industry, government and the community can work together to improve the quality of water flowing to the Great Barrier Reef. This plan is currently under review,[18] however, the new plan will be of relevance to many, including Council, industry and the energy sector.

Suggested actions raised by workshop participants in relation to water planning and management included:

- Continue to monitor water quality and impacts of development on waterways and water quality.
- Undertake an updated and detailed assessment of current water allocations/licenses for industry, residential and agricultural uses. This includes a review of the water assets of coal plants and other industries that can be redirected over time to meet the growing demands of the hydrogen industry.
- Undertake a detailed assessment of the potential impacts of desalination on the Great Barrier Reef and surrounding waterways.
- That the State and Federal governments update the 'Reef 2050 – Water Quality Improvement Plan 2017–2022' within the context of the associated 'report cards',[19] the 'Reef 2050 Long Term Sustainability Plan 2021–25'[20] and in light of the potential increased activity at the Gladstone Port.

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13 At the highest level the Commonwealth Department of Agriculture, Water and the Environment (DAWE) is tasked to assess relevant matter of environmental significance in accordance with the EPBC Act including water resources, wetlands, marine areas including the Great Barrier Reef Marine Park. https://www.legislation.qld.gov.au/view/whole/html/asmade/sl-2019-0156

14 Channel Duplication Project, Gladstone Ports Corporation.

15 National Assessment Guidelines for Dredging 2009, Department of Climate Change, Energy, the Environment and Water, Australian Government.

16 Maintenance dredging strategy, Department of Transport and Main Roads, Queensland Government.

17 Reef 2050 Water Quality Improvement Plan 2017–2022, State of Queensland, 2018.

18 Review, Reef 2050 Water Quality Improvement Plan, Australian Government and Queensland Government.

19 The latest report card is from 2020, accessible here: https://www.reefplan.qld.gov.au/tracking-progress/reef-report-card/2020

20 The Reef 2050 Plan, Department of Climate Change, Energy, the Environment and Water, Australian Government.

- Balance industry needs against environmental impacts in decisions about water allocations, and do not leave the decision-making up to the market.
- Government ownership and control of desalination plant/s and water allocation (if desalination is deemed a safe and appropriate option).
- Upgrade the Gladstone Region's ageing wastewater infrastructure, including treatment plants and distribution networks.
- Industry using recycled water.
- Consider the impacts of climate change on water resources across the region in any planning and forecasting.
- Involve First Nations people in water planning and monitoring activities.

> ***It should be a requirement to publicise the water requirements for industry to have clear guidelines about the regulations.***
>
> **SUPPLY CHAIN AND MANUFACTURING WORKSHOP PARTICIPANT**

7.4 Protecting and regenerating land

The second most common environmental concern raised during the engagement activities is the need to protect land assets from the potential impacts of a changing energy system. This included the need to both rehabilitate fossil-fuel related infrastructure sites as well as minimise the impact of new renewable energy, manufacturing and infrastructure developments on land, particularly in relation to vegetation and biodiversity.

The Gladstone Region's natural vegetation ecosystem consists of mangroves, saltmarsh and dune vegetation, open eucalypt woodlands and forests, vine scrubs and rainforests. Currently, these provide a home to eight critically endangered animals[21] and three critically endangered plants[22], 23 endangered animals[23] and 11 endangered plants.[24] [25] According to the Council Biodiversity Conservation Plan: 2016–2025, the top three threats to Gladstone's biodiversity are:

21 Southern Snapping Turtle, Kroombit Treefrog, Kroombit Tinkerfrog, Yellow Chat (Dawson), Curlew Sandpiper, Great Knot, Eastern Curlew.

22 Narrow-leaved Malletwood, Macadamia Jansenii, Mt Larcom Stink Bush.

23 Koala, loggerhead turtle, hawksbill turtle, olive ridley turtle, leatherback turtle, northern quoll, spotted-tailed quoll (southern subspecies), Semon`s leaf-nosed bat, ghost bat, central greater glider, Red goshawk, Australasian bittern, lesser sand plover, shy albatross, black-throated finch (white-rumped subspecies), New Caledonian fairy tern, yellow chat (Dawson), southern giant-petrel, Coxen's fig-parrot, Australian painted-snipe, red knot, eastern curlew, silver-headed antechinus.

24 Apatophyllum olsenii, Cycas megacarpa, Fimbristylis vagans, Myrsine serpenticola, rib-fruited malletwood, Macadamia jansenii, Triunia robusta, Scleromitrion gibsonii, Murraya crenulate, Atalaya Collina, Cossinia australiana

25 WildNet Species List – Gladstone Regional Council Area, WildNet Database, Queensland Government. As of July 5, 2022.

- Clearing for agriculture, urban or other uses (45% of the region is currently defined as cleared land).
- Population growth, urban and industrial development.
- Habitat fragmentation and isolation.[26]

To avoid or minimise impacts on vegetation and biodiversity, suggestions from workshop participants included:

- Using marginal and cleared land for new projects wherever possible to minimise the need for additional land clearing.
- The State Government developing 'nature and renewables guidelines' to inform best practice during new renewable energy project development. This could include guidelines to:
  - Protect and enhance biodiversity by avoiding sensitive ecological zones, conducting thorough environmental impact assessments and instigating ongoing monitoring for all new projects.
  - Planning and budgeting for measures to restore natural environments after construction and increase biodiversity, such as establishing wildlife corridors and revegetating areas with species native to the local area.
  - Reducing the bushfire risks related to new transmission infrastructure.

Community members can be relied on to participate in environmental restoration programs, such as Pandanus planting, throughout the Gladstone Region

26 Biodiversity Conservation Plan 2016–25, Gladstone Regional Council and AEC Group.

- Proper rehabilitation of existing industrial sites (including the land surrounding coal-fired electricity plants) and finding alternative uses for fly ash and other industrial waste products.
- Supporting farmers to learn and apply regenerative principles in agriculture to improve soil health and biodiversity.
- Continuing the expansion of programs such as the Indigenous Land and Sea Ranger program to employ First Nations people in protecting and rehabilitating the environment.[27]
- Instigating and supporting ecotourism and education initiatives such as walking trails and renewable energy tours.
- Ensuring that regulations are fit for purpose and upheld to hold all industries to account for their environmental impacts, as well as their remediation and rehabilitation responsibilities.[28]
- Establishing a local environmental benefit fund that all industries (including renewable energy companies) are required to contribute to.

> ***There should be an environmental benefit fund that large industry collectively contributes to, playing their part in helping fund this.***
>
> **WORKERS FORUM PARTICIPANT**

7.5 Improving air quality and reducing emissions

While representatives of existing industries emphasised that they had applied significant measures to reduce pollution and improve and monitor air quality over the years,[29] some participants in the community and worker forums commented that phasing out fossil fuels would improve air quality and make the region more attractive and healthier as a place to live, and in many cases, work. As one participant in the workers forum noted, "It would be nice coming home and not being covered in black soot."

In a similar vein, some participants advocated for all industries and sectors to implement decarbonisation plans to mitigate the impacts of climate change. There was positive support for initiatives being undertaken by Rio Tinto, Orica and others to reduce their fossil fuel use and transition to renewable energy, although many people did not know much about these initiatives and wanted to know more.

Some remained sceptical about how much these industry decarbonisation initiatives, including the switch to renewable energy, would actually reduce carbon emissions and emphasised the need to monitor and reduce the embodied carbon in renewable energy products and infrastructure.

27 Indigenous Land and Sea Ranger Program, Queensland Government. Website accessed August 25, 2022.

28 To our knowledge, this is not any environmental fund or decommissioning bond system for renewable energy in Queensland. The environmental requirements differ across states and need to be aligned. Most renewable energy projects are assessed in Queensland under the Planning Act 2016 framework.

29 Queensland Department of Environment and Science (DES) is responsible for monitoring air quality (dust), airborne metals and organics in the Gladstone Region.

Others expressed interest in the potential opportunities for farmers and land managers to draw down carbon from the atmosphere through revegetation and other natural sequestration measures, and wanted more information about government and industry schemes, such as carbon credits.

7.6 Reducing and managing waste

Reducing and managing waste was another strong theme that emerged throughout the stakeholder and community consultation activities.

Domestic resource recovery from many different waste streams is already being undertaken in the region – diverting materials such as clean fill, green waste, paper and cardboard, timber, metals, concrete and glass. Council targets include aspirations for zero waste to landfill, increasing the recycling rate by 20 per cent, and reducing carbon dioxide emissions. These goals underpin the 2019 Gladstone Waste Management and Resource Recovery Strategy, which was developed in line with all relevant legislation and outlines clear priorities and actions for Council to implement. One of the actions includes resourcing a position to implement the strategy.[30]

Participants across many workshops advocated for the application of circular economy approaches to reduce the amount of waste produced and sent to landfill. People wanted to explore new approaches to making waste management and circular economies viable.

Suggestions for improving action on waste management included:

- Develop more robust environmental policies in relation to industry minimising and treating waste.
- Supporting existing local recycling/circular economy businesses to expand operations. This would include supporting initiatives like the Northern Oil Refinery that recycles waste lube oil at the Yarwun facility.[31]
- Apply best practice household waste systems, including management of green waste and expanded recycling facilities in the region.
- Develop end-of-life plans and funds to manage the decommissioning of both fossil fuel and renewable energy assets.
- Industry applying circular economy principles to recover outputs as resources for use as an input in other areas. Examples included:
    - The HPA First Project[32], which involves a mutual supply exchange of process reagents and offtake by-products between Alpha HPA and Orica.[33]

30 2019 Waste Management and Resource Recovery Strategy, Gladstone Regional Council and GHD.

31 Southern Oil; Re-refining waste oil into as-new lubricants, Southern Oil.

32 HPA First Project, Alpha HPA.

33 Alpha HPA signs reagent and offtake deal with Orica, International Mining, August 19, 2021.

- Converting fly ash from power stations or red mud from bauxite into construction materials.
- Developing salt reactors to create power from the brine generated through desalination processes.

- Policy levers to increase diversion rates away from landfill, such as higher landfill levies, which can help fund and incentivise circular economy initiatives.
- Establishing local 'repair cafes', especially given the supply chain issues in accessing electrical goods since the start of the COVID-19 pandemic.

7.7 Recommendations for Council

The main recommendations relating to the role of Council in protecting and regenerating the environment are primarily to work with other authorities and the State and Federal Government departments to assist in assessment, planning, and monitoring activities.

Suggested actions to commence over the next six to twelve months include:

- Working with the Department of Environment and Sciences, Department of Energy and Public Works, Department of Manufacturing, Regional Development and Water, and the Gladstone Area Water Board to update the Gladstone Regional Water Supply Security Assessment and incorporate the latest industry water demands and potential supply impacts. This needs to include a vision for water security that considers future climate projections.
- Working with the Department of Environment and Science (DES) to review and update processes to monitor and mitigate the impacts of new developments on air quality, the Great Barrier Reef, vegetation and management of organic and metal waste in the Gladstone Region.

Suggested actions to commence over the next two years include:

- Set internal emission reduction targets across Council operations.
- Implement measures to improve energy efficiency and increase the use of renewable energy across Council operations.

Some recommended actions Council could initiate to improve environmental outcomes include:

- Where appropriate, work with relevant environment groups, community groups and specialist agencies[34] to develop a 'Renewables and Nature' guide and best practice resources that articulate local expectations for new renewable energy and green manufacturing developments. Once developed, use the guidelines to advocate for the State Government to legislate similar expectations via wider planning systems.
- Increase the resources and funding available to implement the '2019 Gladstone Waste Management and Resource Recovery Strategy.'

34 Such as Community Power Agency or RE-Alliance

Recommendations for Council to consider for the future:

- Encourage the Gladstone Chamber of Commerce and Industry to develop a new certification process to highlight good environmental practices across local business and industry operating in the region. E.g., providing a 'Green Tick'.
- Expand the community's understanding and capacity to support positive environmental outcomes (e.g., expanding the citizen science program and support for local environmental projects, training more people in environmental monitoring).
- Advocate for the State Government and industry to establish an independent 'Regional Environmental Benefit Fund', that all industries (including renewable energy companies) are encouraged to contribute to during their operations to support environmental conservation and regeneration projects in the area.[35]

The Boyne River separating Boyne Island and Tannum Sands

35 The State Government Energy and Jobs Plan (September 2022) includes a principle (#6) to Preserve Queensland's environment. The government will ensure the development of clean energy maximises opportunities for co-existence, preserve the local environment and promote greater biodiversity. See: Queensland Energy and Jobs Plan (epw.qld.gov.au)

Useful Resources

Australian Institute of Marine Science (2021/22). Annual summary report of coral reef condition. Available at: https://www.aims.gov.au/sites/default/files/2022-08/AIMS_LTMP_Report_on%20GBR_coral_status_2021_2022_040822F3.pdf

ACS Energy Lett. (2021). 6, 9, 3167–3169, Publication Date: 17 August, 2021. Available at: https://doi.org/10.1021/acsenergylett.1c01375

AEMO (2022). Integrated System Plan. Accessible at: https://aemo.com.au/energy-systems/major-publications/integrated-system-plan-isp/2022-integrated-system-plan-isp

IUCN (2021). Mitigating biodiversity impacts associated with solar and wind energy development. Available at: https://portals.iucn.org/library/sites/library/files/documents/2021-004-En.pdf

CHAPTER 8:
Roles and Responsibilities

8.1 Introduction

Managing a changing energy sector is a complex task, especially given the pace of change. Engaging with different stakeholders throughout the Gladstone Region Economic Transition Roadmap project emphasised that one of the most significant barriers to well-managed change outcomes is the continued confusion regarding the various roles and responsibilities of different levels of government, industry and other stakeholders. This confusion has been exacerbated by the politicisation of the energy system and climate change over the past decade.

The roles that Gladstone Regional Council can play in relation to managing specific aspects of the energy transition are listed at the end of each chapter. This chapter aims to delineate the different roles all stakeholders can play in supporting the region as the energy sector changes, starting with a summary of local government responsibilities.

8.2 Local Government – Gladstone Regional Council

Gladstone Regional Council can help facilitate a transition in the Gladstone Region in four ways: leading by example, advocating for local priorities, local planning and supporting regional economic diversification.

a. Leading by example

One of the most effective ways Council can support the economic transition is to demonstrate the range of ways individuals and businesses can reduce their own emissions by developing and enacting their own action plan. This includes measures to install renewable energy generation or entering into a power purchasing agreement to buy 100 per cent renewable energy, as well as installing batteries and energy-efficient appliances and measures. It also includes replacing Council's existing transportation fleet with electric or hydrogen-powered vehicles (for buses, garbage trucks and other heavy vehicles) and developing the infrastructure needed to support the electrification of transport across the region by taking advantage of schemes like the Queensland Government's Electric Vehicle Charging Infrastructure Co-fund. For a more complete list of actions the Gladstone Regional Council could adopt to reduce its own and community emissions, please refer to Appendix E at the end of this report.

b. Advocate for regional priorities

The role of Council is to educate and prepare the community for the changes that are to come as the region transitions from a traditional fossil fuel economy to one powered by renewable energy. The engagement activities undertaken to develop this Roadmap is one step in helping to prepare communities for these changes, but ongoing efforts will be needed as changes accelerate over the coming decade.

As the economy transitions to renewable energy, Council needs to engage and align with community interests and advocate to create change that meets community's priorities. Council is the voice of the people and a conduit between the community, industry and other levels of government. Council's role is to take action to influence stakeholders to implement positive change in the community and build system resilience. This may take the form of shaping public policy to manage the transition well. Successful transition could include advocating for the establishment of a Regional Transition Authority or a Sovereign Wealth Fund to provide long-term support for regions transitioning to a net zero carbon economy.[1] Another role may be to influence the Queensland Government to regulate and mandate industry to rehabilitate areas impacted by closures or industrial waste.

Council can also advocate for community priorities by raising the visibility of issues. This is particularly evident in health and housing requirements. Council can work on behalf of residents to secure State and Federal funding to deliver infrastructure and services beyond Council's responsibility. Clear outcomes in these areas will help Council to improve liveability in the region by improving transport, housing, health and services. This can help to attract and retain industries, as well as new workers and their families.

c. Local planning

Council has a role to play in relation to local planning and approvals of new renewable energy projects. Council provides development approval for solar farms and needs to ensure sufficient internal knowledge of local regulations and expertise in planning to facilitate this process. Council can do this by maintaining and developing local intelligence about each project and working with the Queensland Government on how this aligns with the development of the Central Queensland Renewable Energy Zone. Council also needs to consult and engage with the community on any concerns regarding new developments.

Council also has a role in planning and developing services and infrastructure for the Gladstone Region. This includes plans to address trade waste, maintain roads and sewage development in the

1 At the 2022 Local Government Association Queensland Conference in October this year, councils across Central Queensland asked the State Government to provide resources and mechanisms, such as Transition Authorities, to help manage and coordinate the opportunities and impacts of energy transition at the local level. Gladstone Regional Council proposed the creation of a Sovereign Wealth Fund to provide long-term support for regions to transition to net-zero carbon economies, support regional economic development opportunities, provide fiscal stability and long-term sustainability to support inter-generational equity in the regions.

Gladstone State Development Area and engagement with the Department of State Development, Infrastructure, Local Government and Planning. This could involve developing new financial incentives such as rebates or charges to encourage the development of shared infrastructure.[2]

d. Supporting regional economic diversification

Council has a role in marketing the region as an area open to innovation and economic diversification. This includes promoting the liveability of the region to attract and retain workers as the region grows, and showcasing the assets of the region to establish new industry.[3]

Council plays a key role in managing community assets and waste. There are opportunities to diversify and partner in this space. New circular economy opportunities are already being seen in the region with collaboration between Boyne Smelters Limited (BSL) and Containers Exchange – Queensland's Containers for Change scheme to increase the recycling of aluminium cans. Council can share information about funding from different departments at a state and federal level to pilot and support initiatives and attract them to the region.

Council needs to stay informed of the changes in the energy and other sectors and share information about the potential opportunities and impacts these changes may have on small and medium enterprises. Examples of how Council can approach this include promoting models such as the 'Go Local, Grow Local' recovery campaigns that were used by regions impacted by recent flooding. These campaigns provide tailored resources for businesses to help them recover. Another opportunity is partnering with Tourism and Events Queensland on initiatives such as travel vouchers to increase tourism in the coastal areas of the region.

8.3 State Government – Queensland Government

The Queensland Government can support a smooth and equitable transition in the Gladstone Region in seven main ways:

1. Guiding the transition to a new energy system.
2. Funding the establishment of a Regional Transition Authority.
3. Supporting regional manufacturing and infrastructure.
4. Ensuring the natural environment is protected.
5. Ensuring climate change targets are met.
6. Managing water and land use planning.
7. Establishing regulations and standards to improve community engagement and benefit sharing by industry.

2 Infrastructure charges | Planning (statedevelopment.qld.gov.au)

3 This is outlined further in Chapter 4, Economic Diversification.

a. Guiding the transition to a new energy system

The Queensland Government, through the Department of Energy and Public Works, has a planning obligation in terms of sharing its vision for the energy system as we head toward 2030. The department released this vision for 'clean, reliable and affordable energy providing power for generations' as the Energy and Jobs Plan[4] in September 2022. It's backed by a $62 billion investment and has a target to have no regular reliance on coal-fired generation by 2035. This will help inform investors and provide the vision for the transition to renewable energy in regional Queensland.

The Queensland Government plays a more central role in managing the energy transition than other states. As over 60 per cent of energy generation, transmission assets and some electricity retailers are owned by the State Government (through the government owned corporations Stanwell, CS Energy, CleanCo, Powerlink and Energy Queensland). In 2018, the State Government formed CleanCo, a wholly owned Queensland Government corporation, as part of a reform to build publicly owned renewable energy solutions. The long-term aim is to improve competition, increase security and reliability in the electricity market, and lower electricity prices.

The State Government is responsible for managing the Central Queensland Renewable Energy Zone. This is where the State Government will focus on investment in infrastructure and encourage new renewable energy projects. The primary objectives are lowering the cost of the system to ensure affordable energy for communities and creating enough secure, renewable energy to meet industry demand. The State Government will work alongside the Federal Government on the rollout of transmission upgrades required to accommodate increasing renewable energy generation.

The new energy system includes the management of critical mineral and metal resources in Queensland that are integral to low-emission technologies, including utility-scale battery storage solutions. To support this the Queensland Department of Resources released in June 2022 the Queensland Resource Industry Development Plan[5] which sets out key areas of focus and actions for a resilient, sustainable resource industry that will continue to grow as the energy mix changes.

b. Funding regional transition authorities

There are high levels of support across the region for the Queensland Government to form a Regional Transition Authority to coordinate all aspects of the resources and energy transition. This will ensure that:

- Energy security and affordability is maintained as things change.
- The existing workforce is supported well and that new skills are developed for future industries.

4 Queensland Government Energy and Jobs Plan. See: Queensland Energy and Jobs Plan (epw.qld.gov.au)

5 Queensland Resource Industry Development Plan, June 2022. Home | Queensland Resources Industry Development Plan

- Industry is supported to adapt to changes.
- Land and water resources are protected and regenerated.
- The regional economy is diversified to ensure that the whole region benefits from new industries.
- Groups that are already economically marginalised benefit from the changes.

It is essential that funding for the establishment of a Regional Transition Authority is sourced primarily from government. There is a precedent for this funding in other jurisdictions across Australia. The Victorian Government committed $335 million in initial funding to support the Latrobe Valley in the wake of the Hazelwood Power Station closure. The Western Australian Government has also committed $100 million to support the Collie region to manage the impacts of energy transition on the region.

c. Supporting regional economic growth and diversification

The State Government also plays an important role in supporting the growth of industry and manufacturing and driving infrastructure investment needed to support manufacturing and existing industries. Recent examples of regional investment include the $3.34 billion Queensland Jobs Fund, and the $4.5 billion Renewable Energy and Hydrogen Jobs Fund[6] to help the State Government achieve net zero emissions by 2050. Its purpose is to see an increase in jobs in industries like manufacturing and the processing of minerals, made possible with affordable renewable energy. Other positive initiatives may include the support for the development of a Renewable Energy Industrial Precinct proposed by Beyond Zero Emissions in Gladstone to further local manufacturing initiatives.

d. Ensuring benefits are shared with communities and workers

It is the responsibility of the State Government to provide the right framework and incentives to attract investment that will ensure the best possible outcomes for workers and communities. This may include improving access to much-needed services such as health, aged care, childcare and housing; developing the right frameworks to encourage companies to share profits and other benefits with communities[7]; and developing opportunities to diversify the regional economy outside of the traditional industry for long term prosperity; and protecting the rights of First Nations communities.[8]

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6 This fund includes a recent $2.5 billion injection from coal royalties as part the Queensland Government Energy and Jobs Plan. See: Queensland Energy and Jobs Plan (epw.qld.gov.au)

7 The Queensland Government Energy and Jobs plan includes a principle (#2) to share the financial and other benefits of energy development with local communities.

8 The First Nations Clean Energy Network supports policy reform to remove State and Federal regulatory barriers to ensure laws and systems allow First Nations communities receive the benefits of clean, reliable and cheap power. For information visit: Policy Reform – First Nations Clean Energy Network

Gladstone regional library community garden

Governments can also encourage innovative approaches to development that build on the strengths of existing sectors and new industries to meet community needs while generating economic benefits. A good example in the Latrobe Valley was the Latrobe Valley Home Energy Upgrade Program, a $5 million Victorian Government solar and energy efficiency initiative. The program provided alternative forms of employment through assessments and delivering energy upgrades to up to 1000 households in the region in 2018.

e. Protecting the natural environment

The Queensland Department of Environment and Science holds the responsibility to protect and manage the environment, and to insist on conditions to avoid impacts from development.

The State Government is currently undertaking an independent review into the adequacy of existing powers and penalties under the Environmental Protection Act 1994, to deal with emerging issues and to hold people to account for environmental harm. This may result in the strengthening of legislative powers.[9]

The State Government has recently committed to investigating the establishment of an independent Environmental Protection Agency (EPA). This will allow for greater integrity in environmental regulation and environmental justice if the EPA is well-resourced and remains

9 Further information is available here: https://environment.des.qld.gov.au/management/policy-regulation/independent-review

independent. This may oversee measures to protect biodiversity when establishing new renewable energy projects and transmission lines, as well as the use of water resources by new industry such as hydrogen. The establishment of an independent EPA needs to include meaningful consultation with First Nations groups due to the relationship between environmental regulation of developments and the interests of First Nations people and their land.

f. Mitigating climate impacts

The State Government also has a mandate to mitigate the impact of climate change by lowering emissions. The Queensland Government's Climate Action Plan[10] and Climate Transition Strategy[11] outline the pathway for Queensland to transition towards a zero-net emissions economy. The strategy includes the goal for Queensland to achieve zero net emissions by 2050 as well as an interim target of 30 per cent emissions reduction by 2030. The Department of Energy and Public Works has recently announced a target to generate 70 per cent of Queensland's energy from renewable sources such as sun, wind and water by 2032.[12] These strategies provide the framework to advocate for national policies that will reduce carbon pollution.

The Queensland Government's Land Restoration Fund (LRF) is expanding carbon farming across the state by supporting land-sector carbon projects that deliver additional environmental, socio-economic and First Nations co-benefits. The LRF supports landholders, farmers and First Nations peoples to generate new, regular income streams through carbon farming projects whilst providing valuable co-benefits such as healthier waterways, increased habitat for threatened species, and more resilient landscapes.

The State Government also partnered with the Local Government Association of Queensland (LGAQ) to help local governments to support resilience and manage climate risks. This Queensland Climate Resilient Councils program[13] finished in June 2022, however, it is likely to continue in some form.

g. Water and land use

The State Government Department of Regional Development, Manufacturing and Water is responsible for forecasting future water requirements. This department supports regions through programs such as Building our Regions[14] to develop regional infrastructure and allow local governments to improve their water supply and sewerage systems. The recent round will see local government development projects of $70 million over three years.

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10 Queensland Climate Action (des.qld.gov.au)

11 Queensland Climate Transition Strategy – Pathways to a clean growth economy (www.qld.gov.au)

12 Currently only 21.4% of Queensland's energy is sourced from renewable energy, as of 1 July 2022. Source Department of Energy and Public Works. The new target of 70 per cent renewable energy by 2032 and 80 per cent by 2035 will be legislated as part of the Energy and Jobs plan released in September 2022. Queensland Energy and Jobs Plan (epw.qld.gov.au)

13 Home – Queensland Climate Resilient Councils (lgaq.asn.au)

14 Building our Regions Round 6 | Department of Regional Development, Manufacturing and Water (rdmw.qld.gov.au)

The State Government is responsible for planning and development of the industry precincts within the Gladstone State Development Area of approximately 16,800 hectares. This includes the port, high and medium-impact industry, materials transportation and a services corridor. Environmental management is also under the State's remit, with approximately 1620 hectares of Gladstone SDA on Curtis Island now set aside as an environmental management precinct under the responsibility of the Department of Environment and Science.

8.4 Federal Government

The role of the Federal Government differs somewhat from that of the Queensland Government, mostly in terms of where its responsibilities lie in setting national targets, policy frameworks and regulations and funding responsibilities. Some of the loudest advocates for greater national government leadership during The Next Economy workshops and meetings have been industry players and investors. They argued for the right policy settings, targets, regulations and incentives to be put in place to send the right signals to the market that the government is supportive of efforts to decarbonise the economy to de-risk investment in new industries.[15]

a. A national plan with targets, policies and regulations

The role of the Federal Government is to provide leadership and policy certainty at a national level to encourage investment and new industries to develop. This leadership includes national targets to decarbonise the entire economy, policy settings and regulatory frameworks to guide investment and action to ensure a positive long-term legacy for development.

The failure to develop appropriate regulations and standards over the last decade is already becoming evident in the renewable energy sector, with companies having to work out how to develop the new industry while dealing with outdated and sometimes contradictory regulatory requirements.

In June 2022, the recently elected Federal Government demonstrated their commitment to national targets by announcing an increase to the emissions reduction target to 43 per cent below 2005 levels by 2030.

They have also announced that they will develop a National Transition Plan[16] to coordinate the transition from fossil fuel-based energy system to net-zero emissions. It will fund projects to increase the security of the energy system and create a plan in line with AEMO's Integrated System Plan (ISP). This will provide the necessary transmission and generation infrastructure required to

15 These calls for greater leadership at a National level and what industry and regional leaders are wanting from the Federal Government are detailed in the What Regions Need on the Path to Net Zero report: https://nexteconomy.com.au/work/what-regions-need-on-the-path-to-net-zero-2/

16 https://www.smh.com.au/politics/federal/state-federal-governments-to-create-australia-s-first-clean-energy-transition-plan-20220608-p5as3z.html

meet the demand needed in the National Electricity Market. Future scenarios may consider regional energy independence and how this can be done through distributed energy resources to support energy demand effectively. Additionally, consumer advocates are increasingly requesting that the ISP considers the social issues of large grid-scale development.

There are three policy areas under the remit of the Federal Government that are currently being reviewed and will have an impact on the region as the energy system changes include:

- The Federal Government's has renewed focus on developing a **Capacity Mechanism** to manage energy demand because of the recent energy crisis. This priorities storage and renewable energy across the nation.
- The **Rewiring the Nation Policy** outlined a $20 billion investment commitment to a national roll-out of transmission lines to connect renewable energy to the grid. This will be implemented by CEFC and AEMO. This policy is designed to ease financial and planning barriers to allow development of utility scale renewable energy and will support the target of 82 per cent renewable energy by 2030 and contribute to the national emission reduction target.
- Establishing the **National Reconstruction Fund**. This is a new initiative of the current Federal Government to support the growth of Australian industry. The initiative finances investment that is aimed to foster regional economic development via a $15 billion fund, including loans for projects that create jobs, increase regional capability, and diversify the economy.[17]
- The **Safeguard Mechanism** was established in 2016 as part of the Emissions Reduction Fund. While the way the Safeguard Mechanism is set up is facing criticism from many climate advocates,[18] it is designed to provide an incentive for Australia's largest industry emitters to avoid increases in emissions beyond their baseline emission limits. The industries in this scheme make up around 50 per cent of Australia's emissions and range from electricity generation, mining, oil and gas to manufacturing, transport, construction and waste. The scheme applies to operations with Scope 1 emissions of equivalent to 100,000 tonnes of CO_2-e per year.

b. National Transition Authority

While transition coordination is required at a regional level, a National Transition Authority[19] would bolster regional efforts by ensuring:

- Highly technical decision making (decisions about energy infrastructure such as managing the electricity grid) are managed by experts at a state or national level with direct input and feedback from regional staff to tailor solutions to the needs of each region.
- A more efficient and consistent flow of information and resources to aid decision making at all levels.

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17 National Reconstruction Fund | Policies | Australian Labor Party (alp.org.au)

18 For a summary of the criticisms of the Safeguard Mechanism see Australian Conservation Foundation (2022) What is the safeguard mechanism?, August 22, 2022. Available at: https://www.acf.org.au/what-is-the-safeguard-mechanism#:~:text=The%20safeguard%20mechanism%20provides%20a%20baseline%20limit%20on,of%20ACF's%20investigation%29%20often%20does%20 exceed%20the%20threshold

19 For more detail on the role of National Transition Authority, see the What Regions Need on the Path to Net Zero report, which can be found at: What Regions Need on the Path to Net Zero – The Next Economy

- Increased cooperation between regions to attract investors and better manage resources by building on each region's comparative strengths.
- Ensuring lessons learned at a regional level are incorporated into the development of new national policies, regulations and programs.

8.5 Industry Responsibilities

Companies are facing increasing pressure to act responsibly and develop and implement transparent Environmental, Social and Governance policies from shareholders, investors, governments, communities and insurers. Specific responsibilities for industry, as identified through the engagement activities undertaken to develop the Gladstone Region Roadmap, included:

- Taking steps to lower emissions in line with 2050 net zero emissions targets;
- Rehabilitating sites impacted by development; and,
- Supporting workers to transition; and investing in the development of regions for long term resilience and prosperity.

Gladstone Harbour and Bridge

a. Lowering emissions

The industry's role is to ensure they act responsibly by operating within sound Environmental Social and Governance (ESG) policies and reporting and measuring properly. The greatest challenge facing industry across all sectors is how they will decarbonise their operations while remaining competitive and viable in the future. This includes adapting existing operations to lower carbon-intensive industries' emissions to support the State's renewable energy targets and to source renewable energy sources for their assets. Companies will also need to establish their own decarbonisation plans, with the resources sector required to by 2027 under the current Resources Industry Development Plan. Industry can also play a role in advocating for policies that reduce carbon emissions and deliver the more carbon-efficient economy that increasingly their investors are demanding.[20]

b. Site rehabilitation

Industry has a responsibility to fully remediate sites and find ways to repurpose assets and infrastructure. While there are no mines in the Gladstone Region, consideration needs to be given to the future use of the NRG Gladstone Power Station. Some workshop participants also raised the region's chemical manufacturing and water contamination issues that need to be addressed.

c. Support workers transitioning

Industry is responsible for working with government to develop transition plans to manage the shift in domestic energy production from coal to renewable energy generation and support workers and others in the community with training, new employment opportunities, financial support and redeployment.

A theme throughout the workshops was the need for companies to be more open and honest with communities and workers about the changes that are happening. This will build trust and facilitate good communication and conversations, alleviate anxiety points and minimise division across the community.

d. Investing in regions

Resource and energy companies need to consult appropriately and share economic benefits with impacted communities. Although the community recognises the benefits to their region from increased economic activity, the community also live with the negative impacts of the resources industry. They want to see the industry take additional steps to reduce its impact on local infrastructure, services, housing, the environment and, in particular, climate change. Industry needs to look beyond setting up operations in regions to how they can support the economic development of regions in the longer term.

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20 One example of a company operating in the region taking steps to decarbonise its operations is Rio Tinto: Rio Tinto seeks proposals for renewable energy plants to power Queensland projects | Reuters. Available at: https://www.riotinto.com/news/releases/2022/Rio-Tinto-calls-for-proposals-for-large-scale-wind-and-solar-power-in-Queensland

Additional measures that industry can adopt include exploring innovative models for sharing ownership,[21] or investing a share of profits into local development funds that are managed by the community.

Enabling a smooth transition from a fossil fuel-based economy to one powered by renewable energy will require leadership and a committed investment of time and resources at all levels of government. There is also a need for coordination between government and industry groups to find the best pathway for transition that lowers industry emissions, protects the natural environment, benefits the community and supports a thriving economy.

People are at the centre of economic transition and need to be supported by the government, whether through establishing a transition authority to support existing workers or providing essential social services as industry investment in the region grows. Change needs to be proactively managed by all stakeholders so the community benefits from an equitable transition that provides a positive legacy for the region over the next decade.

Change managed well will benefit future generations

21 Community Power Agency with government funding and a solar developer is helping establish Australia's first large-scale Solar Garden that allows over 300 people to purchase 3kW solar garden plots and receive credits on their electricity bill. For more information on Community Power Agency solar gardens visit: https://cpagency.org.au/

CHAPTER 9:
Conclusion

The pace and scale of changes in the global energy sector are unprecedented. The impacts of these changes are already being felt in energy-intensive regional economies and will no doubt accelerate in complex ways over the coming decades. Gladstone Regional Council embarked on the Gladstone Region Economic Transition Roadmap project with The Next Economy. The Roadmap aims at engaging with stakeholders and articulating a vision that will diversify the region's economy for long sustainable prosperity and determine what needs to be done to realise this vision.

The timing and significance of this work demonstrates Council's leadership and willingness to listen and collaborate. Drawing on responses from over 200 stakeholders, including representatives from over 37 industry, business, government, and community-based organisations, this report comprehensively outlines the actions required to ensure everyone in the Gladstone Region benefits from the region's economic transformation as it decarbonises.

The Roadmap presented in this report covers six key themes and multiple challenges and opportunities that emerged in the consultation. These are summarised as:

- Ensuring the transition to a zero-emissions energy system provides equitable access to **secure, reliable and affordable energy**, whilst supporting communities and the people currently working in fossil fuel industries. This must provide vulnerable (carbon intensive) industries and individuals access to technologies and the means to make the most of new energy opportunities, such as the potential to benefit from distributed energy generation.
- **Building a hydrogen industry** through effective policy, regulation and incentives that mitigate negative impacts on local communities, environmental assets (particularly water resources) and local economies. Developing all elements of the regional, national, and international hydrogen value chains simultaneously by building local economic opportunities in the upstream supply chain and the end use of hydrogen. Hydrogen has a definitive role in 'difficult to abate' sectors achieving net-zero emissions.
- **Diversifying the regional economy** by building on its industrial heritage. Attract new industries to the region that can support existing industries to decarbonise. Develop local manufacturing, construction, health, tourim and educational capabilities in ways that contribute to the region's economic and social fabric over the long term.
- Develop existing **workforce and training capabilities** to re-train and include marginalised groups in new industries. Strengthen the capacity of unions and employers to collaborate and strategise, with support from government, to take immediate practical action for long-term outcomes at the regional scale.

- Engage communities and diverse stakeholders on an ongoing basis to innovatively **share the benefits** and opportunities posed by change. Improving access to services (particularly healthcare), whilst improving liveability and reducing the cost of living in the region.
- Managing development to mitigate negative **environmental impacts.** Development should be informed by First Nations knowledge and circular economy principles to eliminate waste, regenerate environmental assets and repurpose industrial sites.

Within these six themes, multiple cross-cutting challenges were identified and need to be addressed in a coordinated and strategic manner. The primary challenge stems from the need to clarify role responsibility and how the different roles of government and industry fit together. The second challenge is to improve planning and development consent processes, so they factor in the complex and cumulative impacts that economy-wide changes have (especially on existing land and water users). A common refrain in workshops called for new industries to do more than merely secure social licence. Communities and stakeholders expect economic and industrial changes to improve the region's prospects and quality of life for those who call it home.

There is a pressing need to coordinate and plan for long-term changes so all stakeholders can take effective action now. While it is important to recognise the need for and potential of a Regional Transition Authority to manage changes related to each of the priorities presented in this report, all stakeholders must contribute to planning for and acting on the challenges ahead.

Amongst the recommendations for how Council can support the transition generally, there are roles in advocating for the region, supporting its stakeholders, and ensuring new developments and industries meet community expectations and aspirations.

Ratification of this Roadmap demonstrates Gladstone Regional Council's leadership in encouraging affirmative action in the region's interests. This leadership has been widely praised, particularly Council's proactive and pragmatic approach to working cooperatively with other levels of government according to their statutory and strategic responsibilities. Collaborating effectively gives the region's stakeholders the chance to convert uncertainty about the energy sector's future into opportunities to establish resilient long-term economic prosperity.

Appendices

Timeline of Energy Changes
Gladstone Region 2022

Markers relate to:

- **International, national, state and local government activities relevant to energy change in the Gladstone Region**
- **Confirmed energy, industry, educational and infrastructure project dates, expected grid capacity and commercial notes relevant to energy change in the Gladstone Region**
- **Gladstone Region specific projects highlighted in BLUE**

In 2022

- Total NEM capacity is over 65GW; including 39% coal, 17% gas, 15% wind, 15% hydro, 11% solar
- 21% of Queensland's power generation is sourced from renewable energy
- **Yarwun Hydrogen Pilot Plant feasibility study in Gladstone – expected completion**

May

Federal Election – Labor win Government with 43% national emissions reduction and 82% renewables targets by 2030, plus a 'Rewiring the Nation' plan including 10,000km of new transmission over 20 years

June

- Australian Government updates the Paris Agreement with more ambitious Nationally Determined Contributions – 43% emissions reduction by 2030
- AEMO suspends wholesale spot market due to NEM 'energy crisis'

July

- AEMO releases 2022 Integrated System Plan (ISP) identifying the 'Step Change' scenario to be most likely
- Federal 'State of the Environment' report released showing a poor trajectory
- Treasury Laws Amendment (Electric Car Discount) Bill introduced to Federal Parliament to incentivise electric vehicle uptake
- Australian Renewable Energy Agency (ARENA) priorities updated to focus on funding renewable energy technologies, electrification and energy efficiency
- Australia – United States Net Zero Technology Acceleration Partnership signed to stimulate technology solutions, collaboration and co-investment

August

- Federal Climate Change Act legislates 43% emissions reductions by 2030, net zero by 2050 and an 'annual climate change statement' to Parliament
- State Energy Ministers agree to include emissions reduction in the National Energy Objective

September

- Queensland Energy and Jobs Plan released announcing a range of initiatives including legislating a 70% renewables target by 2032 and 80% by 2035, 22GW of new renewables, building a 'SuperGrid', $500m in battery storage, $270m in pumped hydro and investing in; hydrogen; EV charging infrastructure; regional economic development and supply chains; **two transmission and training hubs (one in Gladstone) and; multiple manufacturing precincts (one in Gladstone)**
- Queensland Energy Workers Charter signed between Queensland Government and unions, securing worker pathways for existing state coal power workforce

October

Safeguard Mechanism (Crediting) Amendment Bill 2022 public consultation

November

COP27 – Egypt

December (to January 2023)

Consultation on AEMO *Draft* Input, Assumptions and Scenarios Report (IASR)

Late 2022

- **CQUniversity School of Manufacturing at the Gladstone Marina campus expected to open**
- Federal Government expected response to 'Samuel Review' outlining changes to the Environmental Protection Biodiversity and Conservation (EPBC) Act
- Expected completion of the Australian Carbon Credit Units review

Timeline is not exhaustive. Markers are current as of 20 October 2022 and prospective only, therefore it is possible that dates may change. 2022 ISP data references are based on the 'Step Change' scenario.

Timeline of Energy Changes
Gladstone Region 2023–25

Markers relate to:

- **International, national, state and local government activities relevant to energy change in the Gladstone Region**
- **Confirmed energy, industry, educational and infrastructure project dates, expected grid capacity and commercial notes relevant to energy change in the Gladstone Region**
- **Gladstone Region specific projects highlighted in BLUE**

2023

January
Europe's Carbon Border Adjustment Mechanism requires suppliers to begin monitoring and reporting obligations, including cement, aluminium and fertilizer products imported into the EU

February
Federal Environment and Communications Legislation Committee expected release of inquiry report regarding EPBC Amendment (Climate Trigger) Bill

May
Federal Budget

June

- Review and expected updated release of 'Reef 2050 Water Quality Improvement Plan' (Qld and Federal Gov) Amendment
- AEMO requires Queensland - NSW Interconnector project (500kV option) to publish preparatory activities report (Climate Trigger) Bill

July
AEMO publish 2023 Input, Assumptions and Scenarios Report (IASR)

August
Annual Summary Report of Coral Reef Condition release (AIMS long term monitoring project)

In 2023

- Renewable Transformation Bill presented to State Parliament to legislate Qld Energy and Jobs Plan initiatives
- **Global Green Energy Manufacturing Centre expected to commence production in Gladstone**
- Federal Government expected to investigate legislating stronger Environmental, Social and Governance (ESG) definitions

November
COP27 – Dubai, UAE

2024

In 2024

- Queensland Hydrogen Taskforce and Hydrogen Industry Strategy, 2019–2024 expires
- Callide B power station to provide 3 year notice to AEMO for expected 2028 closure

March
Queensland Local Government Elections

July
AEMO releases 2024 Integrated System Plan (ISP)

October
Queensland Government Election

November
COP28

2025

In 2025

- Queensland Energy System Advisory Board to conduct first scheduled review of the 2022 Queensland Energy and Jobs Plan
- **CQ-H2 Renewable Hydrogen Project in Gladstone commences production of ~100 tonnes of green hydrogen/ day**
- **Expected completion of Aldoga Solar Farm within the Gladstone Region (600MW)**
- **Sealink hydrogen powered ferry pilot project between Gladstone and Curtis Island expected to be operational**

Also in 2025

- AEMO anticipates periods of demand met by 100% renewable energy in the National Electricity Market (2022 ISP)
- Rio Tinto expects to achieve their 15% emissions reduction target across their group
- **Gladstone Fitzroy Pipeline (GFP) construction completed and expected to supply water to the nearby hydrogen industry**
- Federal Elections held

July
AEMO publish 2025 Input, Assumptions and Scenarios Report (IASR)

November
COP29

Timeline is not exhaustive. Markers are current as of 20 October 2022 and prospective only, therefore it is possible that dates may change. 2022 ISP data references are based on the 'Step Change' scenario.

Timeline of Energy Changes
Gladstone Region 2026–29

Markers relate to:

- **International, national, state and local government activities relevant to energy change in the Gladstone Region**
- **Confirmed energy, industry, educational and infrastructure project dates, expected grid capacity and commercial notes relevant to energy change in the Gladstone Region**
- **Gladstone Region specific projects highlighted in BLUE**

2026

January
Europe's Carbon Border Adjustment Mechanism commences – includes charging an import levy on cement, aluminium and fertilizer products based on emissions content

July
AEMO releases 2026 Integrated System Plan (ISP)

November
COP30

2027

In 2027
- 2022 Queensland Resources Industry Development Plan requires that industry provide decarbonisation plans
- **Raglan Solar Farm (240MW) in the Gladstone Region expected to be operational**
- **AEMO anticipates the Gladstone Grid Reinforcement project to be completed (2022 ISP)**

July
AEMO publish 2027 Input, Assumptions and Scenarios Report (IASR)

Also in 2027
Queensland Energy System Advisory Board to conduct a scheduled review of the Queensland Energy and Jobs Plan

November
COP31

2028

In 2028
- **Flavian Super Hybrid Project (600MW hydro and 300MW green hydrogen electrolyser) in the Gladstone Region expected to be operational**
- **H2-Hub Gladstone expected to begin green hydrogen and ammonia production from the Yarwun site**

March
Queensland Local Government Elections

July
AEMO releases 2028 Integrated System Plan (ISP)

November
COP32

2029

In 2029
Queensland Energy System Advisory Board to conduct a scheduled review of the Queensland Energy and Jobs Plan

March
ACCC approved Gladstone Power Station supply agreement with Boyne Island Aluminium Smelter expires

July
AEMO publish 2029 Input, Assumptions and Scenarios Report (IASR)

November
COP33

Timeline is not exhaustive. Markers are current as of 20 October 2022 and prospective only, therefore it is possible that dates may change. 2022 ISP data references are based on the 'Step Change' scenario.

Timeline of Energy Changes
Gladstone Region 2030–32+

Markers relate to:

- **International, national, state and local government activities relevant to energy change in the Gladstone Region**
- **Confirmed energy, industry, educational and infrastructure project dates, expected grid capacity and commercial notes relevant to energy change in the Gladstone Region**
- **Gladstone Region specific projects highlighted in BLUE**

2030

In 2030

- Federal Government expects to achieve 43% emissions reduction and 82% renewables targets
- Queensland Government expects to achieve emissions reduction target of 30% by 2030 and 60% renewable energy
- Queensland Government led 2GW Borumba Pumped Hydro expected completion
- **Gladstone H2 Ecosystem export production commences**
- Rio Tinto expect to achieve a 50% emissions reduction target across their group

November
COP34

Also in 2030

- AEMO anticipates 14GW of national coal power generation will have retired, and renewable energy development/ production has tripled 2021 levels (2022 ISP)
- AEMO anticipates 7.1GW of new renewable energy capacity will have entered the Queensland grid (2022 ISP)

July
AEMO releases 2030 Integrated System Plan (ISP)

2031

In 2031

AEMO anticipate 3GW of variable renewables to have been constructed in the Fitzroy REZ around the Gladstone Region (2022 ISP)

November
COP35

July
AEMO publish 2031 Input, Assumptions and Scenarios Report (IASR)

Also in 2031
Queensland Energy System Advisory Board to conduct a scheduled review of the Queensland Energy and Jobs Plan

2032

In 2032

- Queensland Government 70% renewables target expected to be achieved
- **CQ-H2 Renewable Hydrogen Project in Gladstone increases production: ~800 tonnes/ day with 3GW electrolyser, requiring 7GW of RE capacity**
- AEMO anticipate more than 50% of homes in the NEM have rooftop solar (2022 ISP)
- Queensland Government led 5GW Pioneer-Burdekin pumped hydro project, the 'Battery of the North'- expected completion

November
COP36

March
Queensland Local Government Elections

July
AEMO releases 2032 Integrated System Plan (ISP)

July–August
First ever 'climate positive' Olympics and Para-Olympics held in Brisbane

October
Queensland Government Election

2035

2035
Queensland Government 80% renewables target expected to be achieved

2035–36
Queensland Government 90% reduction in electricity emissions (Qld. Energy and Jobs Plan)

2036–37
No coal fired power generation in Queensland projected beyond 2036–37 (Qld. Energy and Jobs Plan)

2035
Public coal power stations across Queensland expected to have been converted to clean energy hubs, including Stanwell, Tarong, and Tarong North, and Kogan Creek

2036
Gladstone Power Station scheduled closure

2041–42
AEMO anticipate 10GW of variable renewable energy capacity in the Fitzroy QREZ around the Gladstone Region (2022 ISP)

Timeline is not exhaustive. Markers are current as of 20 October 2022 and prospective only, therefore it is possible that dates may change. 2022 ISP data references are based on the 'Step Change' scenario.

Appendix B

Organisations represented in the industry stakeholder workshops

83 people from the following industry organisations participated in the industry consultation process:

Aurizon

Australian Gas Infrastructure Group

Beyond Zero Emissions

CQUniversity Australia

Clean Co

Clean Energy Council

Clean Energy Finance Corporation

Contract Resources

CS Energy

CSIRO

Department of Agriculture and Fisheries

Department of Employment, Small Business and Training

Department of Energy and Public Works

Department of State Development, Infrastructure and Local Government

DP Energy

Energy Estate

Energy Skills Queensland

Fortescue Future Industries

Gladstone Ports Corporation

GPA Engineering

Hughes et al

Hydrogen Skills Australia

InterPort Global

National Energy Resources Australia

NRG Gladstone Power Station

Orica

Origin Energy

Powerlink

Queensland Alumina Limited

Queensland Department of Energy and Public Works

Queensland Resource Council

Stanwell

Sumitomo

TAFE Queensland

The Hydrogen Utility

Appendix C

Proposed Renewable Energy Projects in the Gladstone Region

Name	Type	Proponent	Capacity (MW)
Aldoga Solar Farm	Solar	Acciona Energy	600
Gladstone Abattoir Solar Farm	Solar	Asia Pacific Agri-corp	78
Raglan Solar Farm	Solar	Eco Energy World	240
Rodds Bay Solar Farm	Solar	Renew Estate	300
Rodds Bay Solar Farm	Storage	Renew Estate	82 (storage)
Iveragh renewable energy project	Wind, solar and storage	Renew Estate	340MW (wind) 200MW (solar) 100MW (storage)
Wooderson renewable energy project	Wind, solar and storage	Renew Estate	816.2MW (Wind), 300MW (Solar), 300MW (Storage)
Flavian Super hybrid project	Pumped Hydro, (green hydrogen)	Sunshine Hydro	600MW (Pumped Hydro) 300MW (Electrolyser)

Appendix D

Federal and State Government initiatives to develop hydrogen industry[1]

Level of government	Initiative
Federal Government	Future Fuels Strategy and Fund
Federal Government	Regional Hydrogen Hub Development program[2]
Federal Government	Hydrogen Ready Provision[3]
Federal Government	A roadmap for hydrogen in the aviation industry[4]
Federal Government	National Energy Resources Australia (NERA) national hydrogen technology clusters program
Federal Government	Investments in Regional Hydrogen Hub Development.
Federal Government	In April 2021, low emissions international technology partnerships and initiatives with key trading and strategic partners
Federal Government	Clean Hydrogen Industrial Hub Grants program
Federal Government	Energy Exports Cooperative Research Centre
Federal Government	Hydrogen Technology Marketplace tool[5]
Federal Government	Australian hydrogen market study – Sector analysis summary
Federal Government	ARENA Renewable Hydrogen Deployment Funding Rounds
Federal Government	ARENA funding for trial projects
Queensland Government	An overview of investments made to date is accessible at: https://www.epw.qld.gov.au/about/initiatives/hydrogen/investment-funding
Queensland Government	Queensland Hydrogen Industry Strategy – 2019–2024[6]
Queensland Government	Trade and Investment Queensland – Japan office, regularly monitor and attend events to build relationships in this growing sector.[7]
Queensland Government	Fleet Trial of Hydrogen Fuel Cell Vehicles[8]
Queensland Government	Queensland Hydrogen Super-highway
Qld, NSW, Victoria	East Coast Renewable Hydrogen Refuelling Network[9]
Queensland Government	Hydrogen Industry Development Fund[10]
Queensland Government	Hydrogen Taskforce[11]
Queensland Government	Queensland Renewable Energy and Hydrogen Jobs Fund[12]
Queensland Government	Queensland Hydrogen Investor Toolkit[13]
Queensland Government	Hydrogen release simulation modelling[14]

1 Most of these initiatives are a catalogued in the CSIRO HyResource database, accessible at: https://research.csiro.au/hyresource/

2 https://business.gov.au/grants-and-programs/hydrogen-hubs-implementation-grants-round-1 &. https://business.gov.au/grants-and-programs/hydrogen-hubs-development-grants

3 https://research.csiro.au/hyresource/policy/australia-and-new-zealand/australia/

4 https://www.csiro.au/en/work-with-us/services/consultancy-strategic-advice-services/CSIRO-futures/Energy-and-Resources/hydrogen-commercial-aviation

5 https://www.csiro.au/en/work-with-us/ip-commercialisation/hydrogen-technology-marketplace?start=0&count=12

6 https://www.statedevelopment.qld.gov.au/__data/assets/pdf_file/0018/12195/queensland-hydrogen-strategy.pdf

7 Page 18 – https://www.statedevelopment.qld.gov.au/__data/assets/pdf_file/0018/12195/queensland-hydrogen-strategy.pdf

8 https://www.epw.qld.gov.au/about/initiatives/hydrogen/hydrogen-super-highway

9 https://www.epw.qld.gov.au/__data/assets/pdf_file/0012/20460/east-coast-renewable-hydrogen-refuelling-network.pdf

10 https://www.epw.qld.gov.au/about/initiatives/hydrogen/hydrogen-super-highway

11 https://www.epw.qld.gov.au/about/initiatives/hydrogen/taskforce

12 https://www.treasury.qld.gov.au/programs-and-policies/queensland-renewable-energy-and-hydrogen-jobs-fund/

13 https://www.statedevelopment.qld.gov.au/__data/assets/pdf_file/0023/17843/queensland-hydrogen-investor-toolkit.pdf

14 https://www.statedevelopment.qld.gov.au/industry/priority-industries/hydrogen-industry-development

Appendix E

How Council can reduce their own emissions and support residents and businesses

The following table is adapted from the 'Communities Power Partnership', an initiative of the Climate Council[1] that is now Australia's largest network of councils committed to a thriving, zero emissions future. The table contains a list of actions Councils can take to reduce their emissions.

Renewable Energy

- Develop supportive planning laws to encourage residents and industry to adopt renewable energy.
- Use council resources to support the uptake of renewable energy.
- Install renewable energy (solar PV and battery storage) on council buildings.
- Support community facilities to access renewable energy through incentives, support or grants.
- Power council operations by renewable energy, and set targets to increase the level of renewable power for council operations over time.
- Provide incentives and/ or remove barriers to encourage local businesses to take up solar power and battery storage.
- Support local community renewable energy projects, and encourage investment in community energy.
- Opening up unused council managed land for renewable energy.
- Facilitate large energy users collectively tendering and purchasing renewable energy at a low cost.
- Set minimum renewable energy benchmarks for new developments.
- Electrify public transport systems and fleet vehicles and power these by 100% renewable energy.
- Lobby electricity providers and state government to address barriers to local renewable energy uptake.
- Identify opportunities to turn organic waste into electricity.
- Implement landfill gas methane flaring or capture for electricity generation.
- Create a revolving green energy fund to finance renewable energy projects.

Energy Efficiency

- Set minimum energy efficiency benchmarks for all planning applications.
- Adopt best practice energy efficiency measures across all council buildings, and support community facilities to adopt these measures.
- Roll out energy efficient lighting across the municipality.
- Provide incentives for energy efficient developments and upgrades to existing buildings.
- Incentivise use of energy efficient heating and cooling technologies.
- Create a green revolving energy fund to finance energy efficiency projects.

1 https://citiespowerpartnership.org.au/

Sustainable Transport

- Ensure Council fleet purchases meet strict greenhouse gas emissions requirements and support the uptake of electric vehicles.
- Provide fast-charging infrastructure throughout the city at key locations for electric vehicles.
- Encourage sustainable transport use such as public transport, walking and cycling through council transport planning and design.
- Ensure that new developments are designed to maximise public and active transport use, and support electric vehicle uptake.
- Support cycling through provision of adequate cycle lanes, bike parking and end-of-ride facilities.
- Reduce or remove minimum car parking requirements for new housing and commercial developments where suitable public transport alternatives exist.
- Lobby state and federal governments to increase sustainable transport options
- Create disincentives for driving high emitting vehicles.
- Convert council waste collection fleet to hydrogen or electric power.

Work Together and Influence

- Set city-level renewable energy or emissions reduction targets.
- Lobby state and federal government to address barriers to the take up of renewable energy, energy efficiency and/or sustainable transport.
- Set up meetings and attend events to work with other cities on tackling climate change.
- Develop education and behaviour-change programs to support local residents and businesses to tackle climate change through clean energy, energy efficiency and sustainable transport.
- Lobby for state and federal support for a just transition away from coal-driven industry for local workers and the community.
- Develop procurement policy to ensure that the practices of contractors and financers align with council's renewable energy, energy efficiency and sustainable transport goals.
- Support the local community to develop capacity and skills to tackle climate change.
- Support local community energy groups with their community energy initiatives.
- Achieve 100% divestment from fossil fuel aligned investments as soon as possible.

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