A Queensland zero net emissions economy: Energy

Climate change and the transition to a low carbon global economy will drive demand for clean energy technologies and decentralisation of the electricity grid. Queensland's energy sector can lead the transition to a zero net emissions economy, supported by government policy and regulatory certainty.

Socio-economic trends are transforming the Queensland energy sector and contributing to the transition to a zero net emissions economy. Decreasing cost of renewable energy technology is accelerating uptake of wind and solar photovoltaics. Technological advancements in renewables and battery storage are providing opportunities for consumers to reduce their reliance on the electricity grid, which presents challenges for system stability and reliability. Electric vehicles are changing patterns of electricity demand. Extreme weather events threaten transmission and distribution infrastructure. These socio-economic trends are driving changes in investment within the energy sector, and shaping energy markets.

Capital is shifting from emissions intensive energy sources to renewables. Queensland's gas industry continues to grow, but gas for domestic electricity generation faces competition from advancements in renewable energy and global demand for LNG. Alternative fuels including biogas, hydrogen fuel, and liquid biofuels are receiving policy attention and investment. Hydrogen fuel has been of recent focus, with its viability as an alternative fuel growing with technological advancements. Technological developments and economic viability of renewables and battery storage continue to grow. The energy sector can continue to build competitive economic advantage through proactively adapting to these changes in energy markets, products, and investors.

Megatrends

Displaced fossil fuel energy sources as a result of growing global demand for renewables, clean energy sources and energy-efficient appliances

Technology and innovation disrupting the power and utilities sector, including generators and transmission and distribution infrastructure

Emerging markets and innovation enabling uptake of decentralised energy resources, rooftop solar and batteries

"Many companies we supply are looking at reducing their exposure to future carbon pricing, including through taking up substantial solar PV and batteries. Two big challenges they are facing are vehicle electrification and connecting large scale renewables to the network."
Energy industry stakeholder

With a large portion of Queensland's emissions coming from stationary energy generation, the energy sector will play an essential role in the transition to a zero net emissions Queensland. Energy underpins economic activity in all sectors across Queensland, and contributes significantly to operational costs for industries such as manufacturing.

Sector overview

Gross Value Added (GVA) by sub-sector in the Queensland energy sector in 2015-16

$9bn

82% Electricity transmission and distribution (T&D)

16% Electricity generation

2% Gas supply

1% of total employment in Queensland is in the energy sector

43% of Queensland's GHG emissions come from stationary energy

#14 contributor to total GVA in Queensland

60% of energy activity (GVA and employment) is concentrated in Brisbane, Central Queensland and Darling Downs-Maranoa & Toowoomba

Source: REMPLAN (2015-16)

EY analysis shows that the transition to a zero net emissions economy presents significant opportunities. There are significant investment opportunities to realise these benefits and to effectively manage transitional risks.

Risks in a zero net emissions economy

- Extreme weather events damaging T&D infrastructure.
- Divestment from fossil fuels and reduced demand for thermal coal as a result of carbon and energy policies.

Opportunities zero net emissions economy

- Uptake of clean energy such as solar and wind power.
- Distributed energy resources including rooftop solar/battery storage.
- Greater opportunities with hydrogen fuel production.
- Production of hydrogen fuel using energy from renewables.

Ernst & Young (EY) was engaged by the Department of Environment and Science (DES) to undertake a qualitative climate change risk and opportunity assessment for 8 sectors and 13 regions of the Queensland economy, under both a low carbon (2°C) and a business as usual scenario out to 2050. The assessment used the framework developed by the Task Force on Climate-related Financial Disclosures, which demarcates physical and transitional risk, as well as categories of opportunities and their implications.

The current Queensland context

Transmission and distribution (T&D)

- Electricity T&D contributes 82% of energy sector GVA and 78% of energy sector jobs across the State.
- The T&D network is exposed to extreme weather events, as experienced during Cyclone Debbie in 2017, which left 270,000 customers without power.

Electricity generation

- The Queensland government owns half of total installed capacity across the state (i.e. approximately 11.5 GW).
- In 2018, electricity capacity in Queensland was made up of 63% coal, 25% gas, 8% renewables and 4% diesel and kerosene.
- Gladstone Power Station, Callide B and Callide C have the highest emission intensity among coal-fired power stations in Queensland.
- Queensland is the fourth most emission intense electricity supply in Australia after New South Wales, Australian Capital Territory and Victoria.

Queensland in a zero net emissions economy

Transmission and distribution

- Decentralisation of electricity grids is expected to increase.
- Extreme weather events including cyclones and very hot days are projected to become more intense, with consequent impacts for T&D infrastructure.
- Decommissioning of large coal and gas power generators at the end of their technical lives may reduce the value and purpose of T&D assets without prior planning.

Electricity generation

- Based on the age of electricity generators, nearly 50% of total installed capacity in Queensland is predicted to be decommissioned between 2029 and 2039.
- There will be a substantial increase in demand for clean energy as other sectors also move to reduce emissions.

How can Queensland position itself for the transition?

	Attract investment	Facilitate growth
Government	To attract investment in the energy sector, the Queensland government can: ► Establish long-term climate and energy policy to provide certainty to investors. ► Seek domestic or international funding through different financial instruments (such as grants, green bonds and venture capital) to support education, innovation and deployment of renewable energy sources and low-carbon technologies. ► Develop and maintain robust and reliable infrastructure for renewables, both large-scale and micro-grids. ► Invest in the strength and operation of electricity grid systems to manage increasing loads of distributed energy resources, including the provision of training. ► Invest and explore risk mitigation options against extreme weather events and climate change. ► Support the readiness of the workforce to transition to other industries as large power generators reach the end of their technical life, through future needs assessments and training.	To facilitate growth of the energy sector, the Queensland government can: ► Set regulatory frameworks and policies that support the growth of renewables, which may include power purchase agreements and feed-in tariffs. ► Engage with public and private stakeholders from the energy sector to set out transition strategies and policies ► Build capacity within the public sector in relation to decentralised energy, for example through establishing public private partnerships to deploy microgrids, which could create a revenue stream through generating and selling low-carbon energy. ► Explore new opportunities to provide financial support to support innovation focused on renewables, energy efficiency, decentralised energy and energy storage systems. ► Plan for an orderly transition as large power generators reach the end of their technical life.
Industry	To attract investment in the energy sector, the industry can: ► Invest in training, research and education to transfer the skilled and adaptable workforce from fossil-fuel based electricity generation to emerging markets and new products including batteries, wind turbines and electronics. ► Explore co-investment opportunities with other industry sectors to promote the uptake and use of clean energy.	To facilitate growth of the energy sector, the industry can: ► Assist the current labour force to transition into new positions that are required in a zero net emissions economy. ► Support government policies oriented to renewables through providing opportunity and accessibility to clean energy. ► Participate in domestic and international emerging markets, such as the generation of carbon offsets through clean energy sources and energy efficient alternatives.

A future-focused Queensland energy sector begins with undertaking technical and economic assessments that prioritise options to transition the sector to zero net emissions and that support the development and uptake of clean energy.