

As the global transition to a low carbon economy progresses, and extreme weather events worsen, demand for resilient and energy efficient buildings and infrastructure will grow. Using resilient materials and emerging financing options that support infrastructure sustainability can assist Queensland's construction sector to adapt to these changes and mitigate risk.

Megatrends are influencing the characteristics and operations of Queensland's construction activity and built environment. Advancements in robotics and automation have stimulated development of low carbon, resilient construction materials. Emerging financial instruments such as green bonds are providing new funding options for the development of energy efficient buildings. Extreme weather events will damage infrastructure and interrupt construction activity, yet also create opportunities in reconstruction. These megatrends are shaping infrastructure needs, and global financial markets and insurance products more broadly.

Financial institutions are incorporating climate change risk into their investment and insurance profiles, encouraging more energy efficient and resilient construction. Carbon markets have created opportunities for the construction sector to contribute to renewable energy development and energy efficiency measures. Further, accreditation schemes that recognise sustainability and efficiency, such as NABERS and the IS Rating Scheme, provide the industry with options for product differentiation.

Megatrends

Transition to a low carbon construction sector through sustainable materials and more efficient operations

The urban world is continuously growing and developing, with public-private partnerships in urban areas and mature cities needing to upgrade or replace infrastructure

Infrastructure, businesses and consumers are increasingly physically and digitally connected - e.g. smart cities

"The transition to a low carbon economy is underway and moving quickly. The weight of money, pushed by commercial imperatives such as investment, innovation and reputational factors, is increasingly driving that shift, rather than scientists or policymakers."
Geoff Summerhayes (APRA)

More than half of the buildings standing in 2050 will be built from 2019 onwards, requiring every building constructed from 2019 to incorporate the design and materials required to exist in a low carbon economy. Other sectors require water and energy efficient infrastructure that are resilient to climate change impacts. This will present opportunities for the construction sector through exploring technological developments that support a resilient and sustainable built environment. Sustainable transport infrastructure, including new infrastructure for electric vehicles, will support the transition to a zero net emissions economy.

Sector overview

Gross Value Added (GVA) by sub-sector in Queensland's construction sector in 2015-16

- 38% Construction services (e.g. plumbing, landscaping)
- 37% Infrastructure (heavy and civil engineering)
- 13% Residential buildings
- 12% Non-residential buildings

7% of the state's employment

60% of total GVA associated with construction activities is concentrated in South East Queensland

Heavy and civil engineering operations rely on the **resources** and **transport** sectors

#3 contributor to total GVA in Queensland

Source: REMPLAN (2015-16)

EY analysis shows that the transition to zero net emissions presents significant opportunities for the construction sector. There are investment opportunities to realise these benefits and to effectively manage risks in the transition.

Key risks in a zero net emissions economy

- ▶ Severe impacts on roads and coastal infrastructure from cyclones, storm surge, heavy wind and flooding.
- ▶ Safety risks, project delays, and increased costs for reconstruction and insurance.

Key opportunities in a zero net emissions economy

- ▶ Access to emerging financial instruments (e.g. green bonds) to construct more resilient and efficient buildings and infrastructure.
- ▶ Supporting climate adaptation in vulnerable areas and sectors.
- ▶ Reduction of building life cycle carbon emissions through energy efficiency initiatives and upgrades.

The current Queensland context

Infrastructure

- ▶ Roads, bridges, tunnels, water supplies, electricity grids and telecommunication infrastructure are exposed to extreme weather events including flooding, extreme temperatures and cyclones.
- ▶ Brisbane, the Gold Coast and Central Queensland provide 50% of the heavy and civil engineering labour force in Queensland.
- ▶ Transport, agriculture, energy and tourism sectors drive construction activities and rely on resilient infrastructure.

Residential, commercial and industrial buildings

- ▶ Southeast Queensland contributes approximately 59% of the gross value added (GVA) by the State's construction sector.
- ▶ Over 65% of total employment in construction services is in Southeast Queensland.
- ▶ Construction services, including concreting, bricklaying, plumbing, electrical, and tiling are strongly correlated with residential, commercial and industrial buildings.
- ▶ Heatwaves and wet days have a negative impact on construction services.



Queensland in a zero net emissions economy

Infrastructure

- ▶ Financial institutions to increasingly consider climate-related risks when assessing potential investments in large infrastructure projects.
- ▶ Transport and resources infrastructure requirements may change to align for zero net emissions.
- ▶ More severe extreme weather events will affect infrastructure and supply chains, particularly in coastal regions.

Residential, commercial and industrial buildings

- ▶ Insurance companies to increasingly consider climate risk when assessing eligibility and premiums for residential and non-residential building insurance.
- ▶ Robotics and prefabrication in construction is likely to improve efficiency and reduce labour costs.
- ▶ Growth in climate resilient design services, including retrofitting options, would improve physical resilience.
- ▶ Use of sustainable materials and low-carbon technologies are predicted to increase, including microgrids, low carbon cement and steel, and water and energy efficient appliances.
- ▶ Low carbon technologies would be considered for new construction, contributing to a zero net emissions Queensland.

How can Queensland position itself for the transition?

Attract Investment

To attract investment in the construction sector, the Queensland government can:

- ▶ Invest in resilient infrastructure to reduce public expenditure on reconstruction required following extreme weather events
- ▶ Explore different mechanisms such as green bonds to provide financial support to green innovation, research and development (R&D)
- ▶ Support climate adaptation and carbon mitigation measures in other sectors, particularly where construction is involved. Examples include construction of water storage infrastructure, renewable energy, and electric vehicle infrastructure.
- ▶ Develop private and public-sector partnerships which invest in climate adaptation solutions to reduce physical risks for residential and commercial and industrial developments against sea level rise, storm surge, cyclones, bushfires and heavy winds.
- ▶ Implement adaptation strategies for physical climate risk to improve certainty and information available to investors and financial institutions to make property investment decisions.

Government

Facilitate Growth

To facilitate growth of the construction sector, the Queensland government can:

- ▶ Update and advocate for regulatory frameworks which support the construction of resilient and resource efficient buildings and infrastructure.
- ▶ Engage with stakeholders to build market capacity to implement energy efficiency measures, and use low-carbon technologies and sustainable materials for retrofitting existing buildings and new developments in coastal areas.
- ▶ Develop plans in advance for infrastructure requiring reconstruction following extreme weather events to be rebuilt to withstand future climate change risks.
- ▶ Undertake technical and economic assessments to prioritise potential options to transition the construction sector to zero net emissions through water and energy efficient products, sustainable materials and renewable energy. The analysis may consider the costs of delaying action, including stranded assets and economic losses due to inadequate infrastructure for extreme weather events.
- ▶ Invest in low-carbon technology associated with construction operations, including automation, low carbon materials, large scale renewables and digital infrastructure.

To attract investment in the construction sector, industry can:

- ▶ Develop Queensland's reputation as a global leader through innovation, skilled workforce, automation and reliable supply chains.
- ▶ Seek domestic or international funding through different financial instruments such as grants, green bonds, and venture capital. This can be used to develop resilient infrastructure or test innovative construction materials and approaches.

Industry

To facilitate growth of the construction sector, industry can:

- ▶ Increase training of the current labour force to ensure they are equipped to transition to work with new construction materials and techniques required for zero net emissions.
- ▶ Work with industry growth centres to support development of new resilient and resource efficient construction materials.

A future-focused Queensland construction sector supports the development and use of resilient and resource efficient buildings and infrastructure through construction practices, training and green financing options.