

TRANSPORT ENERGY WATER TELECOMMUNICATIONS

infrastructure report card 2010

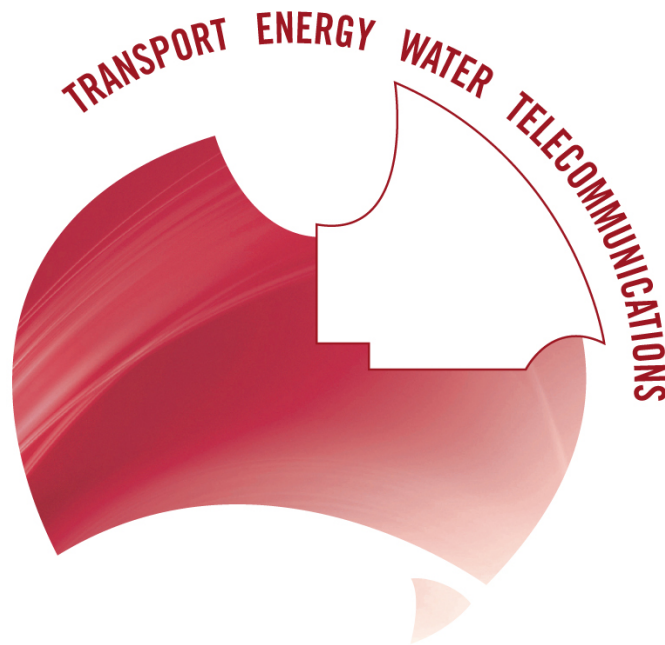
*Queensland*



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# infrastructure report card 2010

## *Queensland*



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## Queensland Infrastructure Report Card 2010

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# COMMUNIQUÉ

In a State that has grown from 3.8 to 4.5 million people (15%) since 2004 and is driven by the resources sector, Queensland's infrastructure continues to underpin the delivery of essential services, drives economic growth, support social needs and remains crucial to the economic performance and development of the State now and into the future.

This 2010 Infrastructure Report Card examines the current state of Queensland's infrastructure to determine whether it meets current and anticipated future needs. In this Report Card, Queensland's infrastructure has mostly been rated as 'adequate', with a small number of infrastructure sectors being assessed as 'good'.

However, there are still major improvements in all infrastructure sectors that need to be addressed as a matter of urgency, including:

- *The under-investment in maintenance and renewals for Queensland's infrastructure.* This must be clearly identified in all future budgets at all levels of government. Infrastructure plans must be fully funded and implemented in a timely manner. As well, forward estimates for government spending on infrastructure must be maintained at a high level, rather than reduced on the expectation of an elevated take up by the private sector.
- *The quality of rural/regional infrastructure.* The quality of all infrastructure sectors in rural/regional Queensland is still significantly lower than south-east Queensland. This disparity must be addressed if all Queensland communities are to have the infrastructure they require to remain economically, socially and environmentally sustainable. Local government needs additional funding assistance to deliver at the local level.
- *The efficient utilisation of recycled water.* Given that direct potable water reuse is available in south-east Queensland, it should be fully utilised. There is no technical or health reason why this water cannot be used for all potable purposes.

Ratings are given below for the current and past Queensland and National Infrastructure Report Cards.

Infrastructure Type	Queensland 2010	Queensland 2004	National 2005	National 2001
Roads Overall	C-	Not rated	C	Not rated
National roads	C-	C+	C+	C
State roads	C-	C	C	C-
Local roads	C-	C	C-	D
Rail	C-	C+	C-	D-
Ports	B	B-	C+	B
Airports	B-	B	B	B
Potable water	B-	B Urban treatment B- Urban reticulation	B-	C
Wastewater	B-	B Urban treatment C- Urban reticulation	C+	C-
Stormwater	C	C	C-	D
Irrigation	C+	C+	C-	D-

Infrastructure Type	Queensland 2010	Queensland 2004	National 2005	National 2001
Electricity	C	D+	C+	B-
Gas	C+	C	C+	C
Telecommunications	B	B	Not rated	B

Queensland has seen improvements in planning and coordination and there has been significant spending on many major infrastructure projects.

There have been continual major road developments, including the Ipswich Motorway upgrade, the Gateway Bridge duplication and the TransApex projects including the Clem7 Tunnel, the Go Between Bridge and commencement of Airport Link and Northern Link in south-east Queensland. There have also been some improvements to segments of the regional road networks. However, this has been accompanied by a faster growth of road usage, resulting in road traffic congestion and a deterioration in infrastructure quality for national, State and local roads due to increased traffic volumes and inadequate maintenance and renewal, particularly in regional areas.

There has been significant improvement in Queensland coal rail networks, but rail infrastructure overall has deteriorated since the last assessment despite significant works being undertaken. The development of new rail corridors, planning for new stations and networks, increased patronage due to smart ticketing and zonal fare structures, and attention to level crossing safety are all welcome developments. Unfortunately, rail infrastructure improvements have not kept pace with demand, which has resulted in cross river rail traffic congestion in Brisbane, congestion due to shared freight and passenger lines and a lack of rail infrastructure in rapidly growing residential and business areas. As well, the quality of regional freight lines has remained static.

Queensland’s major airports are in good condition with significant expansion of international and domestic airports, and road connections to Brisbane airport are being improved. Regional airports have not fared as well. Though some are currently being upgraded, others are in need of upgrades, which will not occur without additional funding to local governments.

The water sector has experienced positive structural and regulatory reforms that, together with the commencement of the SEQ water grid, and demand management measures have resulted in improvements in bulk potable water supply in SEQ since the 2000 to 2007 drought. Direct potable water reuse is available in south-east Queensland and should be fully utilised. There is no technical or health reason why this water cannot be used for all potable purposes, but community education must be undertaken.

There have been numerous wastewater upgrade projects, advanced water treatment projects and water recycling projects that have resulted in a reduction in the environmental impact of wastewater disposal, and an increase in the production and use of recycled water. Issues that will need to be addressed include capacity to accommodate population growth, changes to attitudes about direct and indirect potable reuse and further development of recycled water projects outside SEQ.

Progress has been made in Queensland’s approach to stormwater management, with an increased focus on water quality, reuse and waterway stability, in addition to drainage and flood management. While water sensitive urban design in residential developments such as those at Coomera Waters, Bellvista estate and North Lakes are welcomed, more of

these projects need to be implemented across the State. However, stormwater infrastructure is suffering from a lack of maintenance and renewal, and insufficient asset management information. A major challenge will be changes to stormwater volume due to increased urban density.

Despite ongoing incremental improvements and water resource planning, major changes are required for irrigation infrastructure. Given the contribution of irrigated agriculture to the Queensland economy, it is essential that the uncertainty around future water availability be resolved so that long-term infrastructure investment will occur.

Energy policy in Queensland has seen the diversification of the State's energy mix, that generation, transmission and distribution systems are able to service the needs of the growing population. Since the last report card, electricity transmission and distribution infrastructure has improved and new generation plants have been constructed. Challenges remain to implement demand management measures, constrain peak demand growth and to capture opportunities for smart network technology. There will continue to be difficulty in providing reliable supply in the face of extreme weather events.

Gas infrastructure, such as the QSN Link, and the pipelines from Berwyndale to Wallumbilla and Wallumbilla to the Darling Downs power station have increased capacity. Infrastructure investment to support the export market for LNG natural gas is also expected. Challenges for gas include the low demand for reticulated gas affecting the future viability of distribution networks and the uncertainty around the future price of gas for domestic markets.

Telecommunications infrastructure in Queensland is robust for the majority of the State's population in south-east Queensland and along the east coast. Coverage, capability and pricing across the State have improved. But this is offset by limited and expensive services in rural and remote areas.

Many infrastructure sectors are facing problems, which if not addressed, will lead to a substantial reduction in their future performance and quality. Population growth has imposed enormous demand for infrastructure, which will continue for the foreseeable future. Queensland will be facing between 65% to 140% population increase by 2051, and the challenge will be to not only meet current demand, but also provide capacity for growth and introduce demand management measures to provide for future needs. Rising sea levels from climate change will need to be dealt with, as will more severe temperature variations that will impact on energy demand. Water supply will continue to be a critical issue.

## Recommendations

Engineers Australia makes the following recommendations to the Queensland and Australian governments that are aimed at ensuring that Queensland's infrastructure meets the current and future requirements of the community and industry.

1. Address the large and growing gap between the funds provided for maintenance and renewals of infrastructure and what is actually required to maintain asset quality and performance. Funding must be accompanied by placing a high priority on strategic asset management within all infrastructure sectors and information on this must be publically available.

2. Address the imbalance between urban and rural and remote communities regarding access to high quality, reliable infrastructure through additional funding, particularly to regional and remote local governments.
  3. Increase the utilisation of recycled water for direct and indirect potable purposes.
  4. Ensure that the proposed projects in State infrastructure plans are implemented as currently planned.
  5. Develop plans and implement projects in all sectors in advance of need, and build in capacity for growth in all infrastructure sectors, but particularly for ports, airports and transport corridors.
  6. Introduce programs to facilitate demand reduction rather than demand management, and increase the rate of asset utilisation.
  7. Create certainty for investors by introducing clear policies to reduce carbon emissions, increase energy efficiency and address uncertainties around coal and gas use for future electricity generation.
  8. Recognise the limited ability of the community to fund infrastructure from rates and charges when delivering future infrastructure programs. Local governments in particular require a significant increase in funding assistance from the Australian and Queensland governments.
  9. Give greater consideration to the impact that the resources sector has in Queensland's two-tiered economy, particularly on local communities and future long-term infrastructure strategies and plans.
  10. While encouraging high levels of private sector investment in future public infrastructure programs, governments must concurrently increase their level of investment to meet future growth demands.
-

# RATINGS SUMMARY

The following summarises the Queensland Infrastructure Report Card ratings.

Infrastructure Type	Grade	Comment
Roads Overall National roads State roads Local roads	C- C- C- C-	These ratings recognise that while there has been significant investment in Queensland's road infrastructure, the overall quality of the road network has deteriorated due to the increase in traffic volumes exceeding infrastructure improvements, and under-investment in maintenance and renewals. Regional roads in particular have worsened significantly, resulting in an ever increasing backlog of road work.
Rail	C-	This rating recognises that coal networks have improved substantially. However, rail infrastructure improvements in SEQ have not kept pace with demand, and the quality of regional freight rail lines has remained static. In SEQ, the major problems include capacity constraints, including cross river rail traffic congestion and other key locations within the network, consequences of shared freight and passenger lines, and the failure to provide new rail lines to rapidly growing residential and employment areas. Whilst announcements and planning indicates that preliminary steps are in place as at the date of this report, this infrastructure has yet to be realised.
Ports	B	This rating recognises the current capacity of most Queensland's ports is adequate and capacity will increase in line with customer demand. However, it is recognised that the expansions may lag due to demand outpacing the speed of infrastructure construction. Road and rail connections to several ports are becoming stressed, and concerns about port-related traffic appear to be rising.
Airports	B-	This rating recognises that Queensland's major airports are of a good quality, although the expansion of connecting road infrastructure has generally lagged airport growth. Many regional and remote airports are owned by local government and the number requiring substantial infrastructure upgrades is increasing due to demands from the resources sector. Local governments do not necessarily have the funds to meet these needs and require additional support from the Australian and State government.
Potable water	B-	This rating reflects the positive reforms to the institutional arrangements of the SEQ water sector, the significant improvements in reliability of bulk water supply in SEQ, albeit at a very high cost due to the lack of pre-drought planning, and ongoing improvements in SEQ's distribution infrastructure. The condition of most of the potable water infrastructure outside the SEQ is not of this quality and significant expenditure is required to address the existing backlog of work and expand systems to cope with a growing population.
Wastewater	B-	This rating reflects the improvements that have occurred in the SEQ in terms of wastewater treatment plant upgrades, quality of discharge effluent, system upgrades and maintenance and recycled water capacity through the Western Corridor Recycled Water Scheme. However, the failure to fully utilise recycled water is a waste of a valuable resource. While across the State there has been an improvement in wastewater systems, in many areas major expansions and upgrades are required to accommodate growth and new environmental requirements.

## Ratings Summary

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Infrastructure Type	Grade	Comment
Stormwater	C	This rating reflects the increased effort given to developing stormwater policy and plans designed to improve its quality, to reduce its environmental impact on receiving waters, and to increase its reuse. However the actual impact of these activities have been limited to date, although there have been a small number of projects in SEQ that illustrate improved stormwater outcomes. Generally, stormwater management is slowly improving across the State, but the actual asset condition continues to deteriorate due to a lack of maintenance and renewals.
Irrigation	C+	This rating recognises there have been some improvements in irrigation infrastructure and water resource planning relevant to irrigation. However, there are major problems with irrigation including the uncertainty over future water allocations, the under-pricing of irrigation water, which inhibits the ability of the bulk water suppliers to upgrade its infrastructure, and the poor quality of irrigation infrastructure in many areas.
Electricity	C	This rating recognises that there have been improvements in transmission assets, and new generation plant commissioned. There has been a general improvement in the performance of SEQ distribution networks, but the non-SEQ networks are not improving as fast due to the rapidly rising demand and the significant cost to modify the existing electricity infrastructure to provide more power quality. The ageing of the transmission and distribution infrastructure network has not been arrested, and the proportion of energy generated from renewable sources has declined.
Gas	C+	This rating recognises that there has been a growth in conventional and CSG natural gas production and transmission infrastructure servicing the domestic market, and it is highly likely that a massive increase in new infrastructure will occur so as to serve the export LNG sector. However, the current uncertainty about the future price of gas and its availability for the domestic market following the development of an export LNG industry has discouraged investment in pipelines by large customers that use gas.
Telecommunications	B	This rating recognises that the vast majority of Queensland's population has access to good quality mobile and broadband, and that the backhaul network along the State's east coast is robust. However, there is a large disparity between the State's east coast and rural and regional Queensland and for the population spread over a large area of the State, telecommunication infrastructure provides limited and expensive services.

# OVERVIEW

## Rating process and description

The objective of the Report Card is to rate the quality of economic infrastructure throughout the State of Queensland. Engineers Australia has been rating infrastructure since 1999. In 1999, 2001 and 2005, national report cards were published. Report Cards on other Australian States and Territories have also recently been published. This Report Card revises and expands on the 2004 edition of the Queensland Infrastructure Report Card.

The purposes of the Report Cards are to:

- ▶ Raise awareness of politicians, media, business and the public that infrastructure underpins the community's quality of life and that inadequate infrastructure impedes economic and social growth, and reduces environmental and societal sustainability
- ▶ Generate debate on the adequacy of the infrastructure (including condition, distribution, funding and timing) required to meet society's needs
- ▶ Increase appreciation of the value of developing an integrated and strategic approach to the provision of infrastructure
- ▶ Raise awareness of the new challenges facing Australia's infrastructure due to climate change, change in demographics, demand increases, resilience and sustainability
- ▶ Improve the policy, regulation, planning, provision, operation and maintenance of infrastructure.

This Report Card provides a strategic overview of Queensland infrastructure that other organisations can use when they undertake detailed analysis of particular infrastructures. It also provides a benchmark that the community can use to identify need and evaluate alternative infrastructure priorities over time.

Ratings have been based on an assessment of asset condition, asset availability and reliability, asset management, sustainability (including economic, environmental and social issues) and resilience. The assessment includes evaluating infrastructure policy, regulation, planning, provision, operation and maintenance. (See *Appendix A: Rating methodology* for details.)

Performance is analysed by assessing the infrastructures':

- ▶ Strategic policy, integrated planning frameworks, and institutional arrangements
- ▶ Strategic planning outcomes
- ▶ Funding of expansions
- ▶ Operational performance
- ▶ Funding of maintenance and renewals.

The assessment was carried out through research and consultation. Interviews were held with relevant stakeholders and documents were analysed. The assessment has relied on publicly-available information and has, in line with its aims, focused on strategic issues, supplemented by quantitative performance measures where these were readily available.

A number of industry associations were consulted and Engineers Australia provided input through its experts. Ratings used are comparable with those of past Report Cards. The rating scale is detailed below.

**Rating scale**

Letter grade	Designation	Definition*
A	Very good	Infrastructure is fit for its current and anticipated future purposes
B	Good	Minor changes required to enable infrastructure to be fit for its current and anticipated future purposes
C	Adequate	Major changes required to enable infrastructure to be fit for its current and anticipated future purposes
D	Poor	Critical changes required to enable infrastructure to be fit for its current and anticipated future purposes
F	Inadequate	Inadequate for current and anticipated future purposes

\* Fitness for purpose is evaluated in terms of the needs of the community, economy and environment using criteria of sustainability, effectiveness, efficiency and equity.

**State-wide issues**

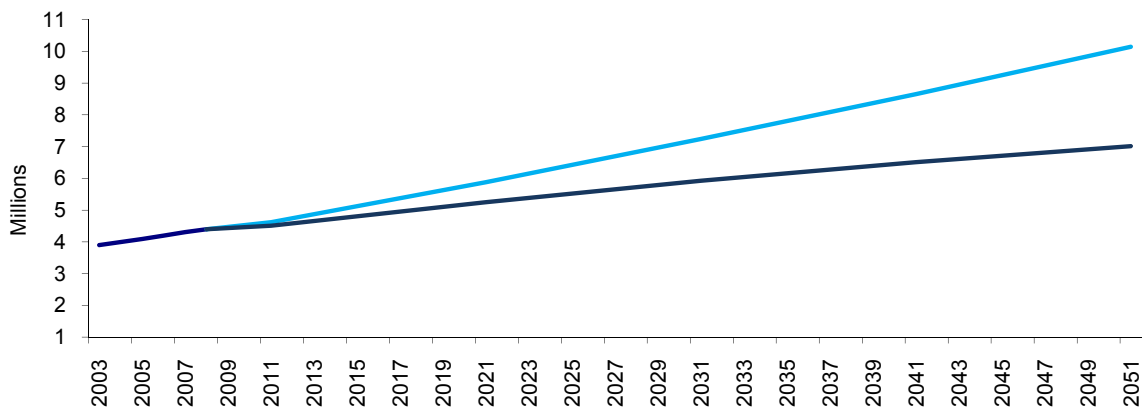
**Major factors influencing Queensland’s infrastructure demand and supply**

Both population and economic growth are key drivers of infrastructure demand.

**Population**

The figure below shows Queensland’s population projections along a high and low future growth path. It shows that Queensland’s population will expand from nearly 4.2 million in 2007 to 7 million (67% increase) in 2051 under low growth assumptions, or 10.1 million (140% increase) under high growth assumptions. A growing population will accelerate the demand for all water, electricity, transport and telecommunication services.

*Queensland’s recent and projected population using high and low growth assumptions<sup>1</sup>*



**Gross State Product**

The table below shows Queensland’s projected Gross State Product. Economic growth increases demand directly by businesses for infrastructure services, and indirectly by consumers due to their raised standard of living.

*Queensland’s Gross State Product<sup>2</sup>*

Gross State Product	2008/09 Outcome	2009/10 Est. Act.	2010/11 Forecast	2011/12 Forecast	2012/13 Projection
Percentage change	1.4%	3%	3.75%	4.5%	4%

### Climate change

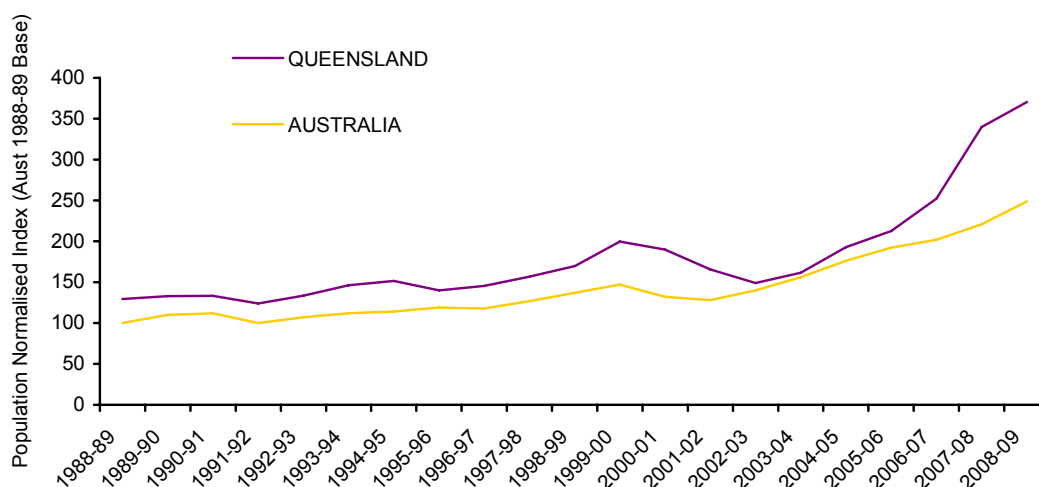
CSIRO climate change forecasts indicate that impacts in Queensland include:

- ▶ By 2100, between 35,900 and 56,900 homes in Queensland may be threatened by rising sea levels of up to 1.1 metres. The value of these homes is between \$10 billion and \$16 billion.
- ▶ Queensland's highly developed and populated coastal areas such as Cairns and the Gold and Sunshine Coasts would be particularly affected by rising sea levels.
- ▶ As the number of very hot days (above 35°C) increases, more people are vulnerable to heat-related illnesses and death, particularly the elderly.
- ▶ The average number of very hot days could increase from 1 to 21 by 2070. Annual heat-related deaths in Brisbane for those over 65 could grow from the current figure of 134, to 10 times that number by 2050.
- ▶ Droughts are more likely to become more frequent as a result of climate change and have the potential to disrupt electricity generation capacity, affecting the reliability of electricity suppliers.
- ▶ Increases in temperatures, particularly in the summer months will increase energy demand.
- ▶ Increased extreme storm events may cause significant damage to coastal infrastructure, including ports, airports and stormwater and sewerage infrastructure.<sup>3</sup>

### Infrastructure investment

The supply of infrastructure is heavily influenced by the amount of investment. The figure below illustrates the investment in infrastructure over a 25-year period and shows that Queensland's investment levels have tracked roughly parallel to the national levels.

*Index of economic infrastructure expenditure in Queensland and nationally<sup>4</sup>*



*Real prices, base year index is 1988/89, base is 100 for national expenditure.*

## Cross sector challenges

While each chapter identifies sector-specific challenges to the future provision of individual infrastructures, below are those that cross multiple infrastructure sectors.

- ▶ **Managing growth in demand.** Population and consumption growth per person continues to increase in South East Queensland (SEQ) and most coastal areas and communities within the resources belt. This is increasing the demand on existing infrastructure. While the techniques of efficiency improvements to infrastructure operation, targeted infrastructure enhancements and demand management have provided increased capacity in the recent past, in many areas there is limited additional output to be derived from this approach. Consequently, the main way to increase infrastructure services is to duplicate or build new infrastructure. This is extremely expensive. However, the longer it is delayed, the more costly it becomes to both the asset provider and the functioning of the economy.

- ▶ **Provision of infrastructure prior to developing new areas and preserving corridors for infrastructure expansion.** The lowest cost infrastructure provision occurs on greenfield sites where development has yet to occur, or inside corridors in developed areas that have been set aside in decades past. Developments in existing areas are not only expensive and disruptive, but are also politically difficult. Consequently, greater effort should be given to ensuring that infrastructure is in place early in an area's development, as well as preserving corridors for future infrastructure enhancement.
- ▶ **Managing expectations.** Political, business and community expectations about new or improved infrastructure are often raised to unrealistic levels, resulting in unnecessary public criticism and blame when projects do not achieve their expected outcomes. New projects are often described in transformative terms and claimed that they can be delivered in short time frames. However, in reality, the vast majority of these projects provide only incremental improvements and all have lengthy design, construct and commissioning phases. An example of the problems caused by creating unrealistic expectations can be seen with respect to the Gold Coast Desalination Plant. The expectation was created that the plant would be fully operational in a relatively short time. This ignores the fact that complex projects of this nature require a period of time to resolve problems that are identified during commissioning. Consequently, when the project did not achieve the operational time table, it was characterised as a problem project. In addition, the expectation has been created that the plant is essential to SEQ's water supply and as such, will be operating continuously. However, it is likely that it will not be required when dam levels are high, and consequently may become characterised as a white elephant because of these unrealistic expectations.
- ▶ **Managing the simultaneous delivery of numerous large infrastructure projects.** The next decade will see a number of very large infrastructure projects being simultaneously designed, constructed and commissioned. This unprecedented program of works will require large skilled workforces in both the public and private sectors. A significant risk to the project developers and to the reputation of the State is that due to skill shortages, projects will be delayed and costs will be far more than anticipated.
- ▶ **Improving long-term planning.** The State Government has imposed a requirement that local governments produce 10-year asset management plans and associated financial plans. A similar requirement should be imposed on State and Australian Government agencies and GOCs and be available for public scrutiny.
- ▶ **Maintaining community affordability.** All levels of government need to be cognisant of the ability of consumers to pay for increases in charges. The way infrastructure is funded will have an impact on the ability of individuals and communities to pay.
- ▶ **Maintaining the balance in infrastructure provision between resource and non-resource regions.** The benefits to Queensland from the resource projects in central Queensland are enormous. The Queensland Government and infrastructure providers need to play a major role in facilitating these projects by being involved in planning and funding the enabling infrastructure. However, in doing so, it is important that the attention and resources given to non-resource areas are not neglected. Otherwise, the problems in these areas will grow, as will the backlog of work.
- ▶ **Providing funding as per asset management plans.** Infrastructure has a typical lifecycle of between 10 and 100 years, and is designed to be continuously maintained and undergo refurbishments before it is replaced. To achieve lowest whole of life cost for infrastructure, the required level of funding must be available to undertake the necessary activity in accordance with the asset management plan.
- ▶ **Providing infrastructure in resource development areas.** Resource development brings economic development to regions, but also imposes increased costs arising from demand on roads, water and wastewater infrastructure. This cost is often borne by local governments but they are not compensated fully for this. The Local Government Association of Queensland estimates that for eight councils in mining areas, they will need to spend \$770 million over four years on mining-related infrastructure and maintenance, but will recover just \$376 million.

Resource developers need to compensate local governments for additional infrastructure costs that they impose.<sup>5</sup>

**Conclusion**

Queensland's infrastructure has mostly been rated as still requiring major improvements, with a smaller number of infrastructure sectors being assessed as good. The assessment notes that many infrastructure sectors are facing significant problems, which, if not addressed, will lead to a substantial reduction in their future performance and quality. The challenges in addressing these problems are considerable, given the scale of under-investment in maintenance and renewals and the ongoing increase in demand driven by population growth and the impact of climate change.

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