



QUEENSLAND MAJOR
CONTRACTORS ASSOCIATION

A joint initiative of the Queensland Major Contractors Association and Construction Skills Queensland

2014

Major Projects Report

Queensland Engineering Construction Outlook



© February 2014 QMCA & CSQ

The copyright of this document belongs to the Queensland Major Contractors Association (QMCA) and Construction Skills Queensland (CSQ).

All rights reserved.

No part of this document may be reproduced or transmitted in any form or by any means, including photocopying, without the prior written permission of the QMCA. All requests to be directed to the QMCA.

Exclusion of Liability

This document is strictly provided on the basis that, to the extent permissible by law, neither the QMCA, CSQ or BIS Shrapnel nor any person involved in the production of this document: (1) warrants in any way the reliability or accuracy of any representation herein; (2) assumes any duty of care or other legal duty to any person who may use or rely on this document and persons using or relying on this document do so entirely at their own risk; (3) shall have any liability to any person with respect to any loss or damage howsoever arising, including in contract, tort or under statute, or otherwise from the use of or reliance upon this document.

Acknowledgement

This report has been prepared by Tony Hackett, James Schirmer, Jemina Dunn (QMCA); Brett Schimming, Kylie Long, Jo Mason-Smith (CSQ); and Adrian Hart, Alek Schoevers (BIS Shrapnel).

Note: Although great care has been taken to ensure accuracy and completeness of this report, BIS Shrapnel Pty Ltd does not accept responsibility for the completeness and accuracy of the factual information on which its opinions and assumptions are based.

QMCA contact:

Queensland Major Contractors Association
GPO Box 3254
Brisbane QLD 4001
Australia
T: +61 (0)7 3900 9005
F: +61 (0)7 3211 4900
E: policy@qmca.com.au

CSQ contact:

Construction Skills Queensland
PO Box 3294
South Brisbane QLD 4101
Australia
T: 1800 798 488
F: +61 (0)7 3846 5067
E: info@csq.org.au

BIS Shrapnel contact:

Adrian Hart
Senior Manager – Infrastructure & Mining
BIS Shrapnel Pty Limited
Level 8, 99 Walker Street
North Sydney NSW 2060
Australia
T: +61 (0)2 8458 4200
F: +61 (0)2 9959 5795
E: ahart@bis.com.au

Contents

Foreword	4
Executive Summary	6
1. Queensland Major Projects	10
2. International & Domestic Economy	19
3. Queensland Economy	23
4. Queensland Construction Outlook	27
5. Key Implications, Challenges and Risks	32
Appendix – 2014 Major Projects List.....	44

Foreword

We are proud to introduce the 2014 Major Projects Report – an important partnership between the Queensland Major Contractors Association and Construction Skills Queensland.

This is the sixth edition of the Major Projects Report. With each passing year, it has become a more powerful strategic policy document for the Queensland construction industry and its stakeholders, and an important bellwether for the broader Queensland economy. This year's Report is no exception.

Within these pages you will find not only a detailed outlook for major project work across the state, but a thoughtful and authoritative discussion of the strategic implications of the outlook for contracting businesses, government policy, skilling and the broader Queensland economy.

The construction industry continues to be a powerful driver of the Queensland economy. Over the past decade, annual construction work in Queensland has grown from \$21 billion to \$53 billion in real terms, and the industry now directly employs nearly a quarter of a million people.

Within this, engineering construction activity has undergone an unprecedented expansion, booming fivefold from \$7.5 billion in 2003 to over \$38 billion in 2013.

This boom has been driven by global demand for Queensland's high quality natural resources, particularly gas and coal, as well as the need to invest in new social and economic infrastructure as more and more

people have made Queensland their home. In turn, this investment is making Queensland's economy more diverse and productive.

The sheer scale of the resources investment boom has provided a stern test for the construction industry, skilling agencies, governments and the broader economy. Soaring commodity prices and massive capital inflows which accompanied the boom pushed the Australian dollar to uncomfortably high levels, squeezing profitability and investment in other sectors of the Queensland economy.

Strong demand for construction skills, equipment and technical expertise, particularly in remote and regional areas, has affected costs and competitiveness.

Responding to natural disasters across the state has provided additional unique challenges. In delivering growth in this environment, the engineering construction industry has had to demonstrate flexibility, resilience and innovation in project and skills planning, and delivery.

Now Queensland faces a whole new set of challenges. While this year's Major Projects Report confirms that a significant fall in activity is now underway, the upside is that activity should remain high in a historical sense, with the prospect of further substantial cycles in investment and construction in the near future.

Consequently, it is important that plans are put into place to not only deal effectively with the current downturn, but to seize this once in a generation opportunity to deliver longer term, transformative outcomes for the Queensland construction industry which will put it on a more sustainable footing to meet the growing demands of public and private investment in the decades ahead.

As detailed in this Report, this includes, amongst other objectives:

- Preparing industry to meet strong growth in operations, maintenance and facilities management.
- Providing industry with greater certainty regarding the funding and delivery of infrastructure plans.
- Tackling uncompetitive practices and regulations.

This will require a coordinated and consultative approach between industry, government and labour.

Queensland's dynamic economy requires a healthy, competitive and highly skilled engineering construction sector. The Queensland Major Contractors Association and Construction Skills Queensland look forward to working with you as we meet the challenges and opportunities ahead.

Tony Hackett,
President

Queensland Major Contractors Association

Graham Carpenter,
Chairman

Construction Skills Queensland

February 2014

Executive Summary

This is the 6th Major Projects Report, with earlier reports published between 2006 and 2013. During this period, Queensland has experienced a substantial boom cycle in construction activity and major project work. The boom was driven by a simultaneous phase of public infrastructure and resources investment. Interrupted by the global financial crisis over 2009 and 2010, a renewed wave of investment then drove major project work to new heights. At every stage, the Queensland major contracting industry has been faced with new challenges and opportunities, affected by rapid increases in construction demand, regional skilling, logistical and infrastructure demands, volatile shifts in global economic conditions, commodity prices and exchange rates, and natural disasters, with threats to industry productivity and competitiveness. In catering for growth, the industry has shown innovation in project and skills planning, and project delivery, with varying degrees of success.

With the boom now fading, Queensland faces a new series of challenges and opportunities. This report highlights the outlook for major engineering construction activity in Queensland, the workforce resourcing requirements this necessitates for contractors and government agencies, and the implications for the industry as a result of these findings.

The report focuses on major engineering construction projects – funded and unfunded – defined as those exceeding \$100 million.

A complete list of major projects considered for this analysis, and the explicit assumptions for each project regarding work done and construction workforces employed each year, are provided in the Appendix.

Key Findings

The key findings from the 2014 Major Projects Report are:

- **Global economic growth is expected to gradually recover through 2014, but the Australian and Queensland economies are likely to experience weaker growth** as the resources investment boom transitions to the production and export phase. While this will see a rebalancing of Queensland's diversified economy, the timing and magnitude of change remains uncertain.
- **A sharper decline – and an earlier and lower trough – in major project work is now expected**

compared to the 2013 Report, as both public and private investment unwinds from unusually high levels – as shown in Figure A. Major project work done is forecast to contract nearly 50% over the three years to 2015/16, to a trough of \$9.5 billion, in what is arguably the biggest challenge facing the contracting industry, and the broader Queensland economy.

- **The outlook for major project work is now much weaker than the previous Report.** In the near term, this is due to both weaker levels of funded and unfunded work (with now almost all unfunded work in 2013/14 not expected to proceed). Later on, a much sharper decline is expected as projects previously included (but unfunded) are no longer included in the major projects list. Mining and heavy industry construction projects are most affected as shown in **Figure B**, with a 45% decline in work done expected, displacing over 8,000 workers. But there are also significant declines in other engineering construction segments, both publicly and privately funded.
- **An upswing in major project work is now expected from 2016/17, rising further over 2017/18.** To some extent, this represents the impact of shifting some of the projects delayed in 2012/13 and 2013/14 to recommence later in the forecast period. It also represents changes in the outlook for some very large (and very risky) private and public projects.

Figure A

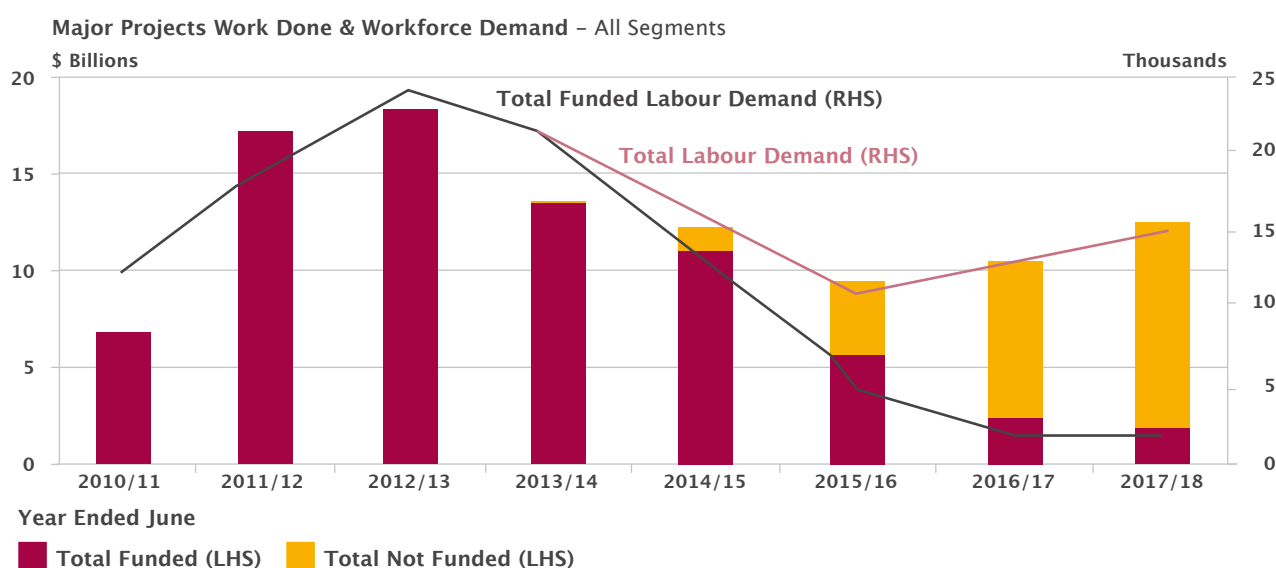
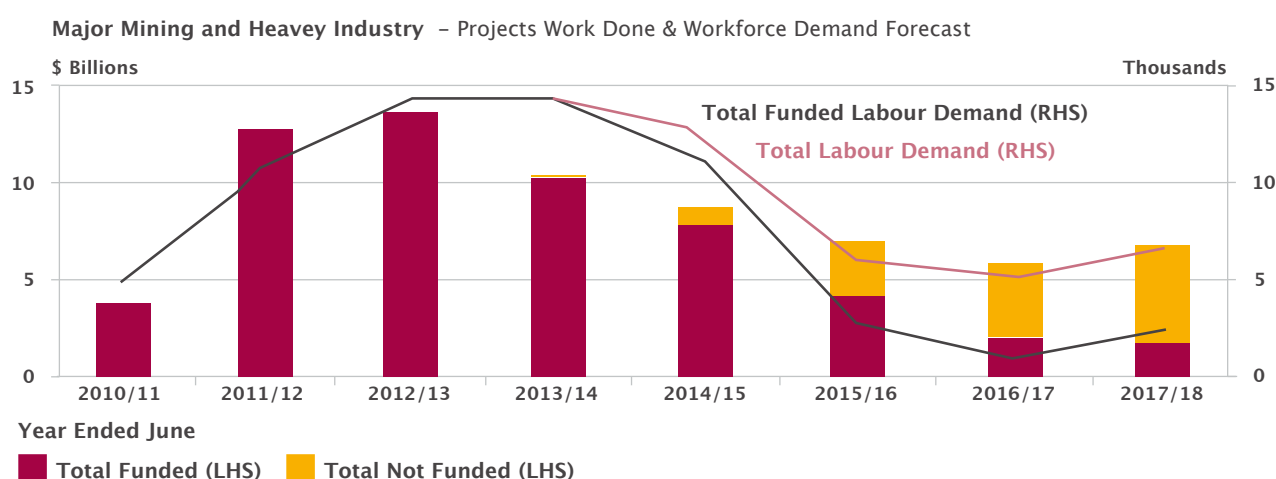
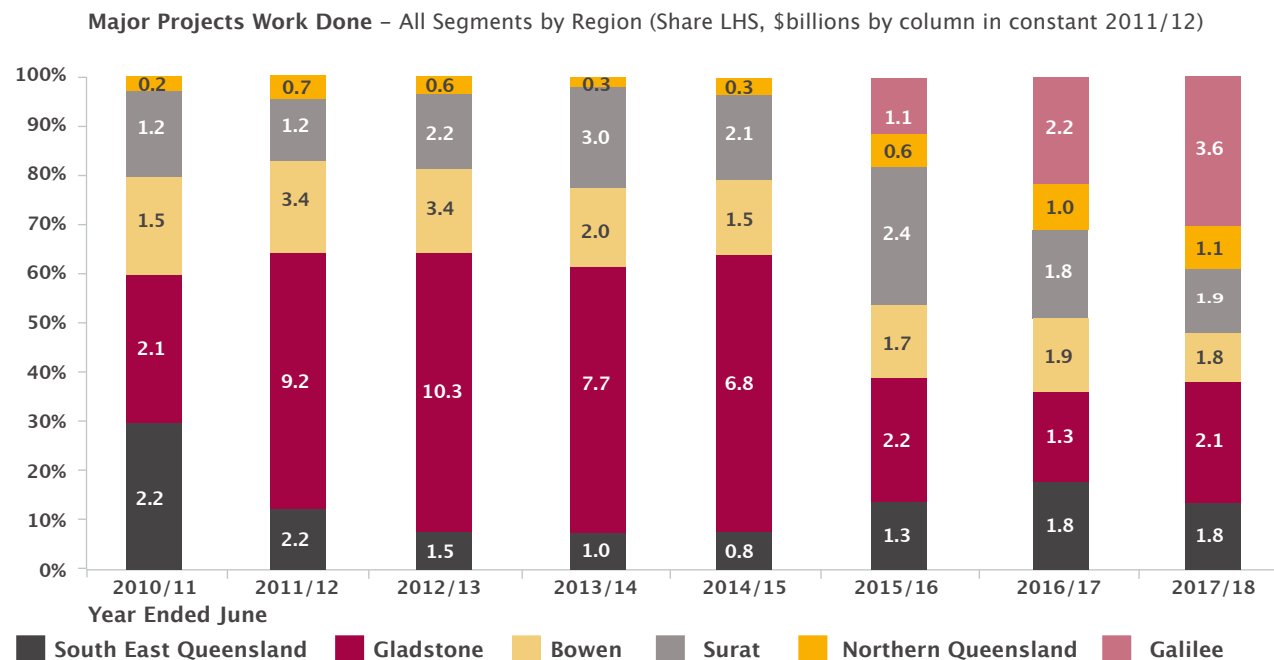


Figure B



- **Substantial regional shifts in major project activity continue to take place.** Once construction is complete on the three major Liquefied Natural Gas (LNG) projects at Curtis Island and in the Surat Basin, the share of major project work is expected to shift towards South East Queensland and the Galilee Basin, as shown in **Figure C**.
- **There is a significant difference between total major project activity (and outlook) and the addressable market for domestic contractors.** Importing engineering design and fabrication skills, and the use of labour hire agreements by EPCMs, meant that domestic contractors only represented a small portion of booming LNG work. These strategies

Figure C



will not completely disappear over the next five years, but are likely to evolve and find use in other segments.

Implications and Challenges

The extent of the downturn in major project work depends crucially on how industry and government react from here; how the causes of the downturn are interpreted, how issues are identified and prioritised, and whether long term solutions are put into place. While negative external factors, such as weaker growth in global demand and a high exchange rate, are beyond the direct control of industry participants, there remains much that can be done to improve the prospects for major project activity, and secure the longer term health of the Queensland contracting industry, the construction market and the broader economy.

This Report identifies three distinct causes of the coming downturn in major project work, each with their implications for industry strategy and government policy:

1. **Completion of an unusually high phase of investment**, with public and private investment likely to revert to more “normal” levels from here. For a contracting industry used to double digit rates of growth, moving to this “new normal” is a significant shift, with the following implications for industry and government:
 - **Volatility in resources investment places a greater onus on governments to develop – and stick to – sensible long term infrastructure plans** which provide industry certainty and avoid damaging phases of under and overinvestment.

- **Public sector infrastructure strategies should encompass not just engineering construction major projects, but also other major projects and programs that will drive more balanced economic growth and employment.**
 - **A lower profile for engineering construction major project work may not necessarily be accompanied by equivalently lower demand for labour, skills, materials or services across the construction industry.** Competition for resources, both within the construction industry in Queensland, as well as across different regions and other Australian states, may keep demand – and prices – for services relatively high in the medium to long term.
 - **For contractors, strategies should be put into place to address appropriate operations and maintenance of the large asset base installed (including facilities management), rather than focusing exclusively on new investment.**
2. **Moderation in global demand growth (and prices) for resources**, which may be temporarily or permanently affecting the feasibility of the next round of projects. This implies:
 - Further cycles in resources investment require careful planning to ensure the Queensland construction industry is competitive, retains appropriate skills to undertake new projects effectively and efficiently, and that key regions are supported by industry and government to encourage sustainable communities.
 - Government and industry should develop alternative growth strategies for the state now, such as in agriculture, niche manufacturing, services and tourism, and the appropriate skills and industrial mix to achieve this.

3. Relatively high costs and lower competitiveness

which is affecting Queensland's share of major project work. This includes the impact of the high Australian dollar, but also cost factors which may be more specific and addressable by government, labour and industry, including regulation, productivity, costs associated with the bidding and procurement process, and the treatment of risk. Positive changes aimed at reducing local costs may include:

- Ensuring against risks to productivity through skills and training reforms, better management and planning of the major project pipeline, and developing policies that encourage industry investment.
- Encouraging industry innovation in design and delivery through competition, procurement strategies and the use of performance or outcome based (rather than prescriptive based) regulations.
- Streamlining regulatory approvals and accelerate decision timeframes (which is already underway in Queensland).
- Lowering costs at the tendering stage. This may include simple measures such as committing to published decision timeframes, using fewer bid stages, lowering the quantum of design detail required and reimbursing bid costs (amongst other measures).
- Adjusting decision criteria to encourage greater competition (and new entrants) at the tendering phase.
- Placing a greater importance on quality scoping, engineering design and a more appropriate allocation of risks before the construction phase of projects to avoid costly variations and overruns.

Risks to the Outlook

Since last year, the outlook for major project work has become even more uncertain, and remains subject to risks and revisions as new information becomes available. Key risks identified in the Report include:

- **The economic outlook for Queensland's key trading partners**, such as China and India, the strategic decisions they make in achieving sustainable growth, and how this will impact on the global trade of resources.
- **Decisions made specifically regarding the development of substantial Galilee Basin coal projects and related infrastructure**. One Galilee thermal coal project has been assumed here (including related port and rail), but this could easily be one or more than one utilising either shared or multiple infrastructure.
- **Upside and downside risks to the forecast regarding public investment**, which hinge on decisions taken by State and Federal Governments.
- **Upside and downside risks to Queensland LNG**

investment, particularly in upstream gasfield development which is more likely to be undertaken by local contractors (and may technically not be considered as major projects if they are less than \$100 million individually).

- **Potential constraints to industrial development in Queensland due to energy shortages or supply disruptions** have not been assumed, but could have upside and downside implications for major project work.

1. Queensland Major Projects

The 2014 Major Projects List is presented in the Appendix of this report. The Major Projects List is for projects in excess of \$100 million and was developed by BIS Shrapnel in coordination with QMCA member input though November and December 2013.

Total Major Projects Outlook and Employment Demand

Figure 1.1 highlights the current activity and projections for major project work and employment demand for the period 2012/13 to 2017/18 based on the 2014 Major Projects List, as well as historical data to 2010/11. Key points from this analysis are:

- **Sharp slowdown in growth in major project work in 2012/13, although workforce demand continued to rise in aggregate.** Queensland engineering construction for major projects reached a record \$18 billion in 2012/13. However, growth slowed sharply compared to the previous year with work done edging only 2% higher compared to the 130% surge in 2011/12. That said, workforce demand continued to strengthen, with construction employment increasing 23% to a record 23,500 positions – however it is doubtful that this increase was completely absorbed by the local contractor industry, with many positions likely taken through off-shoring of work or the use of specific labour hire contracts.

Mining and heavy industry remained in the driver's seat in 2012/13, commanding 75% of the growth in work done and 60% of the workforce growth.

- **Severe contraction in major project work expected over the next three years.** In aggregate, major project work done is forecast to decline nearly 50% to a trough of \$9.5 billion in 2015/16. However, major project activity will still be higher than in 2010/11 if currently unfunded works proceed.
- **Most engineering segments are expected to contribute to declining activity, but mining and heavy industry construction will dominate the overall shape of activity going forward.** The completion of three major LNG projects on Curtis Island and in the Surat Basin, and the substantial retreat in coal and coal related works, will drive a 45% decline in major project work done. In terms of the construction workforce, mining and heavy industry alone is anticipated to shed over 8,000 full time workers.
- **An upswing in major project work expected over the latter years of the forecast period,** with work done forecast to rise back above \$12 billion by 2017/18. However, this recovery is predicated on currently unfunded projects proceeding, including large public sector road and rail projects, as well as another round of resources investment focused on Galilee Basin coal. As such, the outlook is highly susceptible to risk.

Figure 1.1. (Figure A in the Executive Summary)

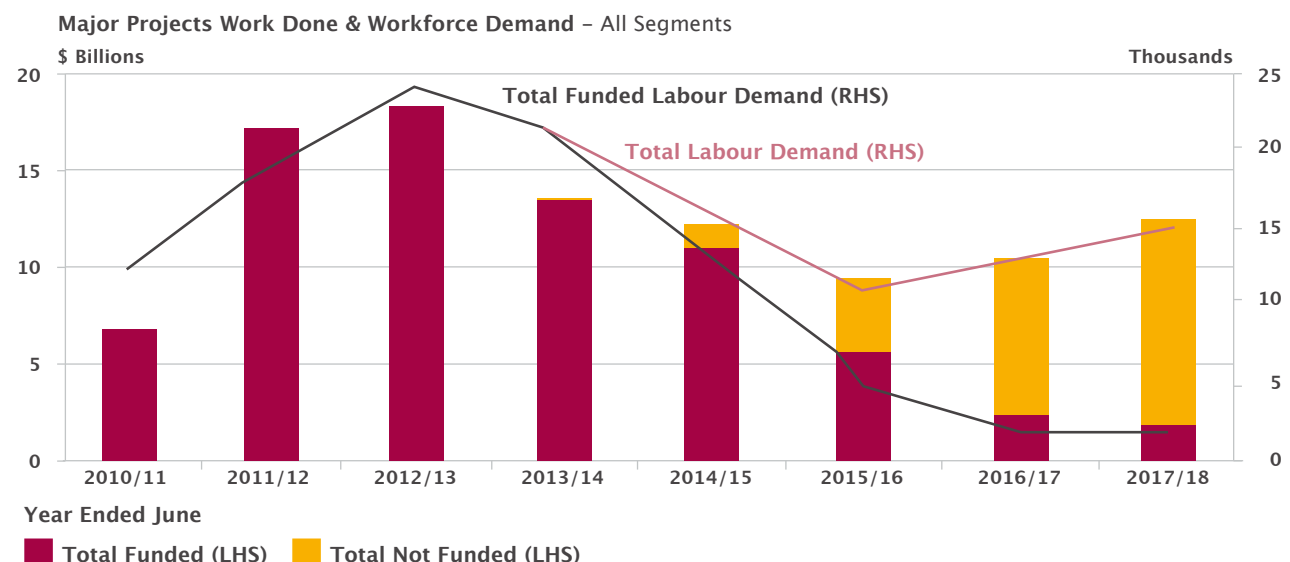
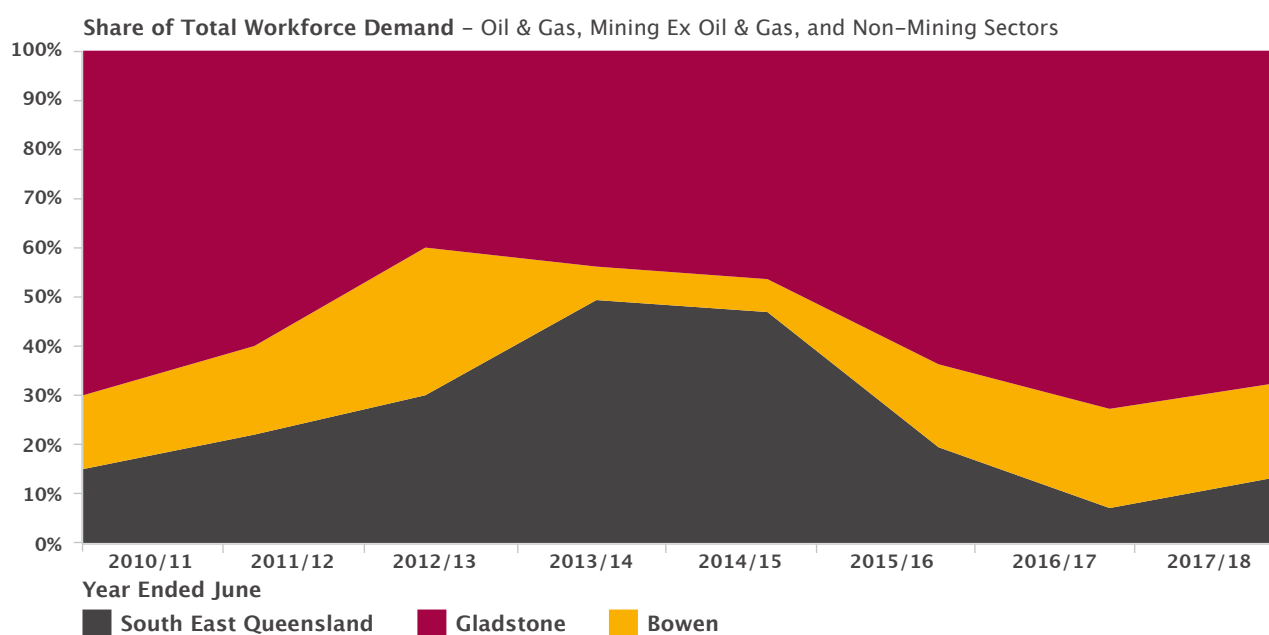


Figure 1.2.



- **The cycles in major project work will also see shifts in employment demand through the next five years.** From the peak in 2012/13, workforce demand is expected to fall 50% to 11,400 persons by 2015/16, before recovering to 15,700 persons by 2017/18. As shown in **Figure 1.2**, there is also a sectoral shift in employment demand, with oil and gas demand falling as a share of total workforce demand after 2014/15.

Funded versus Unfunded Projects

This projection is based on a considered view of both funded and unfunded projects. Consequently, it is likely to provide a more realistic outlook of major projects activity in Queensland, and illustrate how the workforce requirement is likely to develop over the forecast period.

If the exercise were simply narrowed to consider just those projects which currently had funding approval, then major projects activity would experience a more rapid decrease in activity.

However, this is not the most likely scenario for activity given the reasonable probability that many (currently unfunded) projects will eventually be funded and committed to within the forecast horizon. Therefore, the unfunded forecast view is closer to a “worst case scenario” outlook, should international development deteriorate significantly further and the combination of threats to the Queensland construction industry remain unaddressed.

Towards an Addressable Market for Local Contractors

Given the high import content of materials, equipment, buildings and structures attached to LNG projects and the use of direct labour employment contracts in assembling downstream LNG components on site, BIS Shrapnel has produced an alternative measure of major projects work, which better captures the (smaller) market for which local contractors can effectively compete. This analysis is based on discussions with major contractors regarding the approximate percentage of LNG major project value year by year (both upstream and downstream, which are quite different) that tends to be imported, offered through

1. Queensland Major Projects

Figure 1.3.

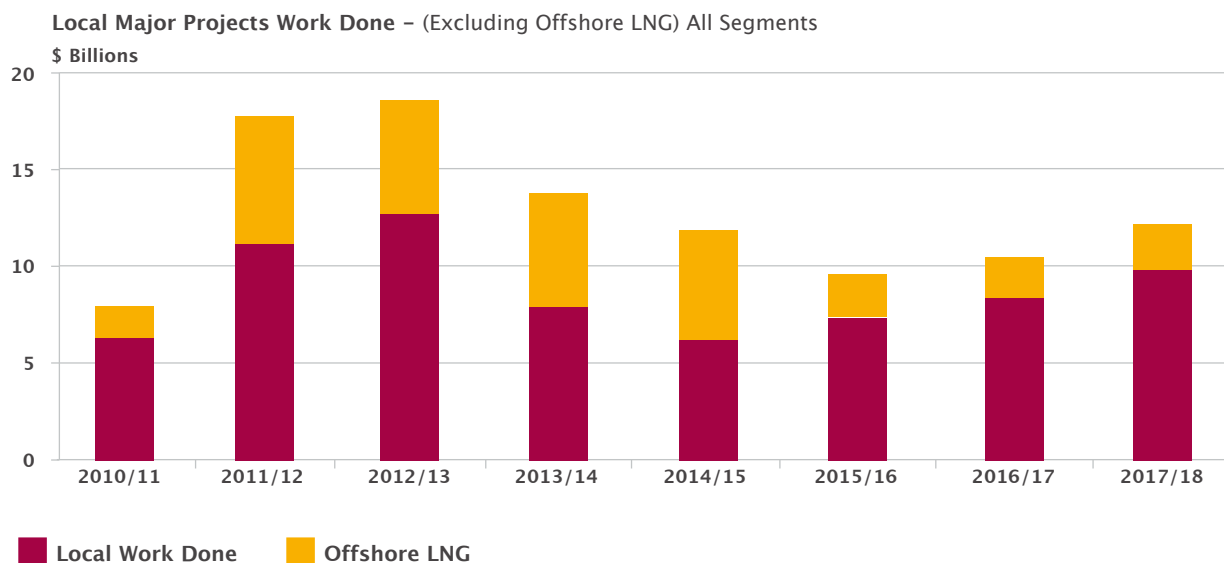
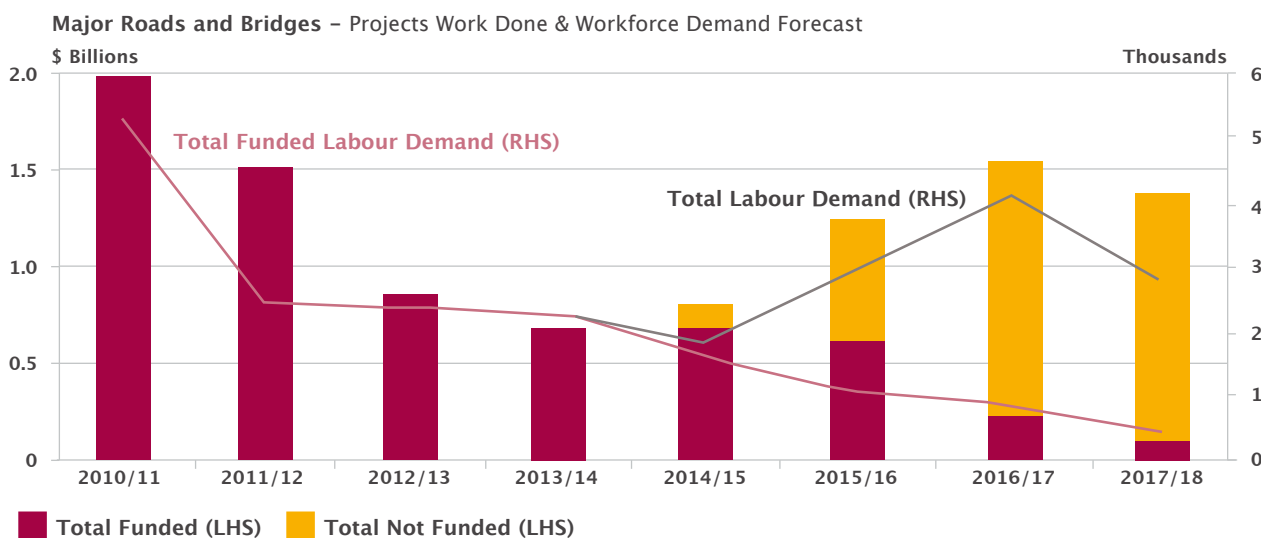


Figure 1.4.



direct labour employment contracts or tendered as packages of work to local contractors. **Figure 1.3** shows the expansion of the contractor market was likely not as steep as indicated by the total value of major project work alone (and official ABS engineering construction data, which includes the value of imported LNG components) during 2011/12. During this period, the three major Gladstone-based LNG projects began to ramp up construction considerably, but this period coincided with a large increase in imports. The analysis shows, however, that the local contract market continued to grow strongly into 2012/13, corresponding well with the data on construction employment which also rose during the same year.

Furthermore, much of the downturn in local contractor work occurs in 2013/14, with another smaller decline in 2014/15 before stabilising in 2015/16. By contrast, a much greater proportion of major project work after 2015/16 is assumed to be won by local contractors, being more upstream related LNG work, other inland resources projects (such as Galilee Basin thermal coal mines and railways) and public infrastructure.

Roads and Bridges

Major project work for roads and bridges is expected to deteriorate further through the next 1–2 years, but may then pick up sharply from 2015/16. Constrained Federal and State Government funding and the absence

of major toll road projects are the primary reasons for the initial weakness. However, with the next round of Nation Building Program projects (NBP2) starting from 2014/15 and the addition of the Toowoomba Second Range Crossing (as a potential PPP), Gateway Upgrade North (GUN) and possibly the Kingsford Smith Drive (all currently unfunded), Queensland roads and bridges construction work is expected to recover through to 2016/17 and remain elevated in 2017/18.

Flood-related reconstruction funding has been broken down into smaller packages of less than \$100 million, and therefore does not impact the major projects outlook presented here. It does, however, influence the overall level of civil construction activity within the state, and the ability of the State and Federal Government to source labour and fund major projects into the future.

As shown in **Figure 1.4**, major project road and bridge construction work done is expected to contract by nearly 60% by 2014/15 compared to the peak of 2010/11.

Major project workforce demand is expected to decline by a similar proportion over the same period.

The next round of NBP2 projects is expected to trigger the next upswing in 2015/16, but is unlikely to deliver the activity peaks of 2010/11. For contractors in this segment, a positive development has been the outsourcing of road maintenance arrangements in Brisbane, the Gold Coast and Sunshine Coast. As with flood-related works, this activity has not been considered in this report given that the ultimate packages of work will likely be well under the \$100 million threshold, and the focus is on maintenance as opposed to construction work.

Railways and Harbours

Major project work across railways and harbours in Queensland has moved to a higher plane over the last few years, with work done peaking in 2013/14 at over \$1.6 billion. Workforce demand requirements mirror the work done profile, with major railways and harbours construction employment having grown to 3,300 persons in 2012/13 and remaining at this level in 2013/14.

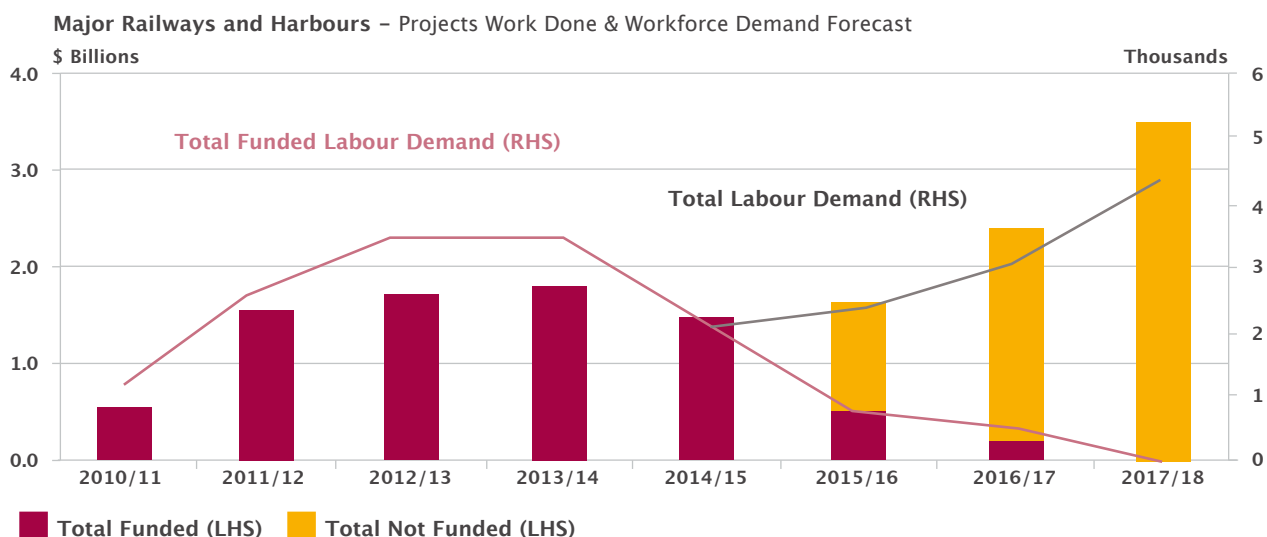
Railways and harbours work has been driven predominantly by the demands of the resources sector. Consequently, the pause in new resource project commencements during the second half of calendar 2012 is driving a lower volume of major project work in this segment across 2014/15 and 2015/16. Activity remains relatively high in 2014/15, but this is mainly due to two very large ports projects: the \$2.5 billion Hay Point Stage 3 expansion (timed to complete in 2014/15) and the \$2.4 billion Wiggins Island Stage 1 (mostly complete by 2014/15). Without new projects to fill the gap, work done and employment is expected to drop sharply over 2015/16.

The key risk to the railways and harbours major project forecast concerns the future of the Galilee Basin – this is, essentially, the “Not Funded” category of work shown in **Figure 1.5**.

Should the development of the Galilee Basin take place (located further north and west of existing coal infrastructure in the Bowen Basin), this will necessitate a massive construction program involving over 400 kilometres of new rail and up to 120 million tonnes per annum of new coal port capacity.

For this report, it has been assumed that major construction will begin on one Galilee Basin coal mine

Figure 1.5.



1. Queensland Major Projects

by 2015/16, along with associated infrastructure. However, there remains significant risk that the cost of developing these projects relative to expected coal prices may see activity delayed beyond 2016/17.

Water and Sewerage

Water and sewerage work done and workforce demand for major projects both climbed strongly in 2011/12 and 2012/13, largely on account of new water treatment plant facilities and pipeline work.

Major project sewerage activity experienced double digit growth rates over the last couple of years, albeit from a low base, to settle just shy of \$400 million and employ around 600 persons.

Looking ahead, as shown in **Figure 1.6**, water and sewerage is expected to surge in the short term, peaking in 2013/14 at over \$800 million. This is underpinned by new water treatment facilities and pipeline construction projects supporting upstream Coal Seam Gas (CSG) field development in the Surat Basin. However, as these projects finish, activity and workforce demand is anticipated to decline sharply, bottoming out at just over \$250 million and 350 persons in 2014/15. By 2016/17, activity is expected to be rising strongly again due to stronger pipeline work and the beginning of the new projects that will provide flood mitigation benefits as well as additional water supplies for new coal and CSG fields. Taken together, work done is expected to reach a new cyclical peak of \$800 million by 2017/18, employing over 800 persons.

There are significant risks with the water and sewerage major projects outlook. Many pipeline projects are unfunded because they are related to coal projects, so

there is plenty of flexibility for their starting dates. If conditions do not prove ideal for these projects, they could be further delayed or pushed out beyond the forecast horizon, considerably weakening the industry growth profile.

Electricity, Pipelines and Telecoms

Electricity, pipelines and telecoms major project work employed more than 3,000 persons in 2012/13, two thirds of which were involved in (non-water) pipelines work. In aggregate, electricity, pipelines and telecoms work done reached nearly \$1.6 billion in 2012/13, a new record as shown in **Figure 1.7**. The growth in 2012/13 was delivered by a simultaneous increase in activity in the electricity and pipeline segments. In the electricity sector, a host of new Powerlink distribution and supply projects were a key driver. In the pipeline sector, the South West Queensland Pipeline and a series of CSG pipelines took activity to a whole new level.

In the short term, major project electricity, pipelines and telecoms work done is expected to contract sharply, settling under \$100 million in both 2014/15 and 2015/16. Over the medium to long term, the picture is much different sector by sector. With regards to electricity, weaker forecasts of electricity demand from the Australian Energy Market Operator (AEMO) suggest that new baseload generation capacity will not be required until the 2020s. For non-water pipelines, the vast bulk of major project work (comprising major gas transmission lines between Gladstone and CSG fields in the Surat Basin) is occurring now and will decline substantially in subsequent years.

Figure 1.6.

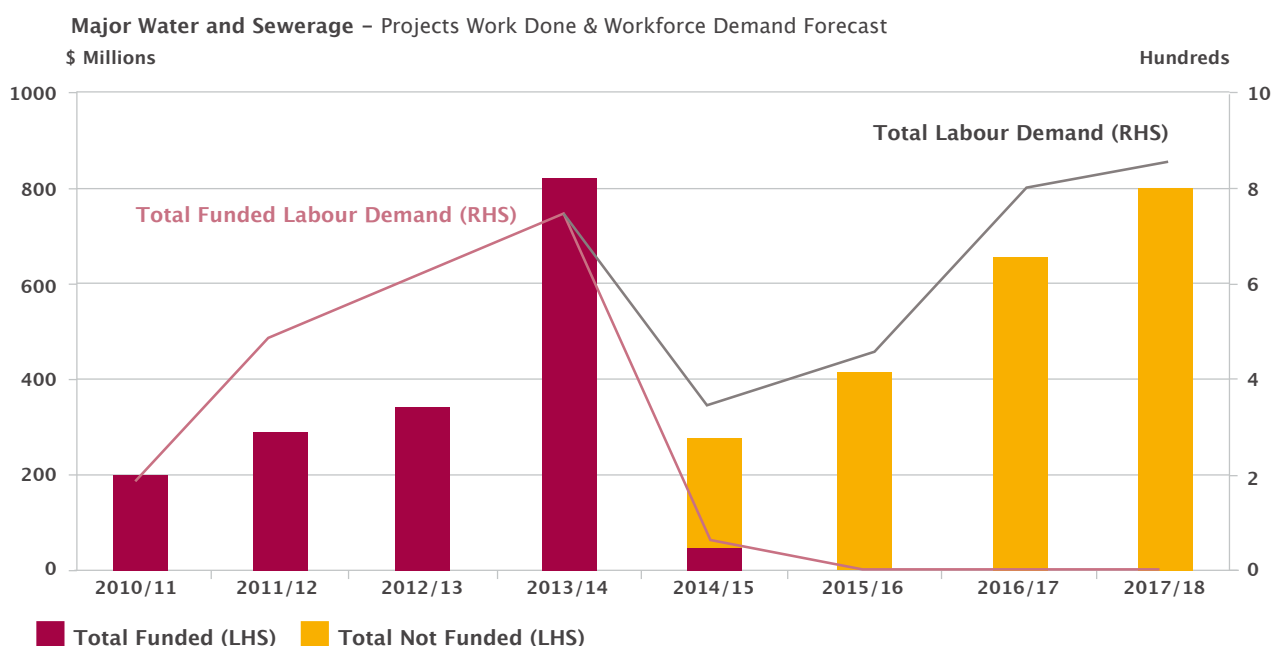


Figure 1.7.

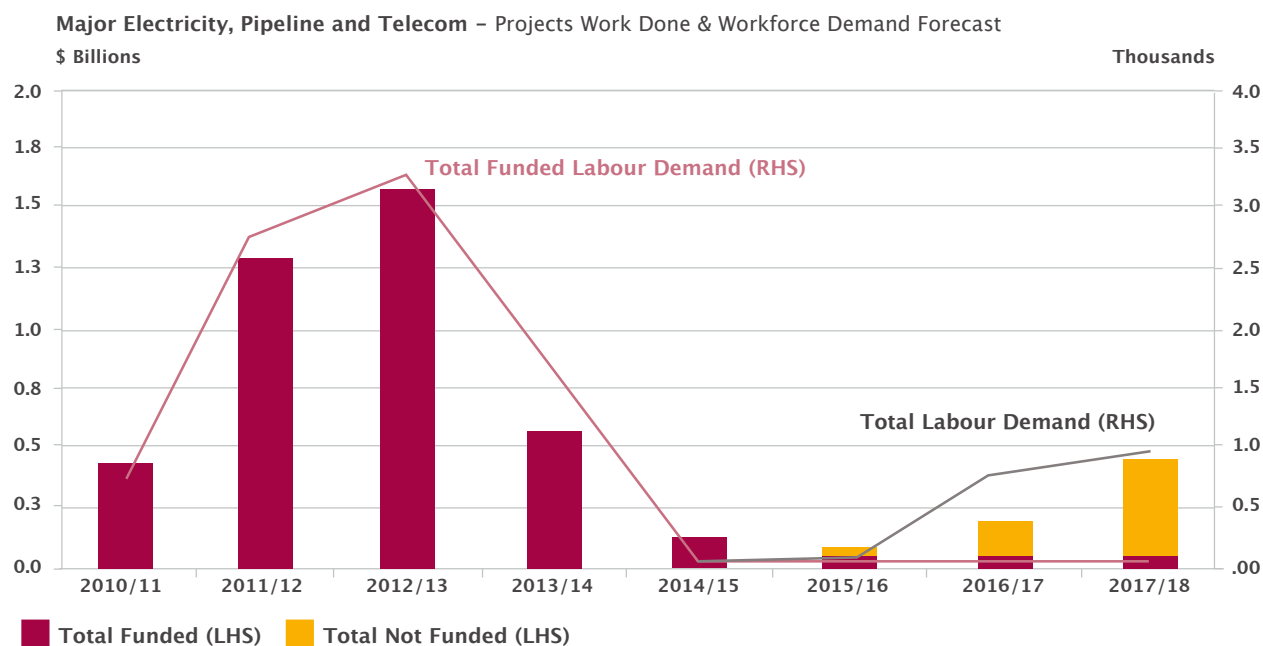
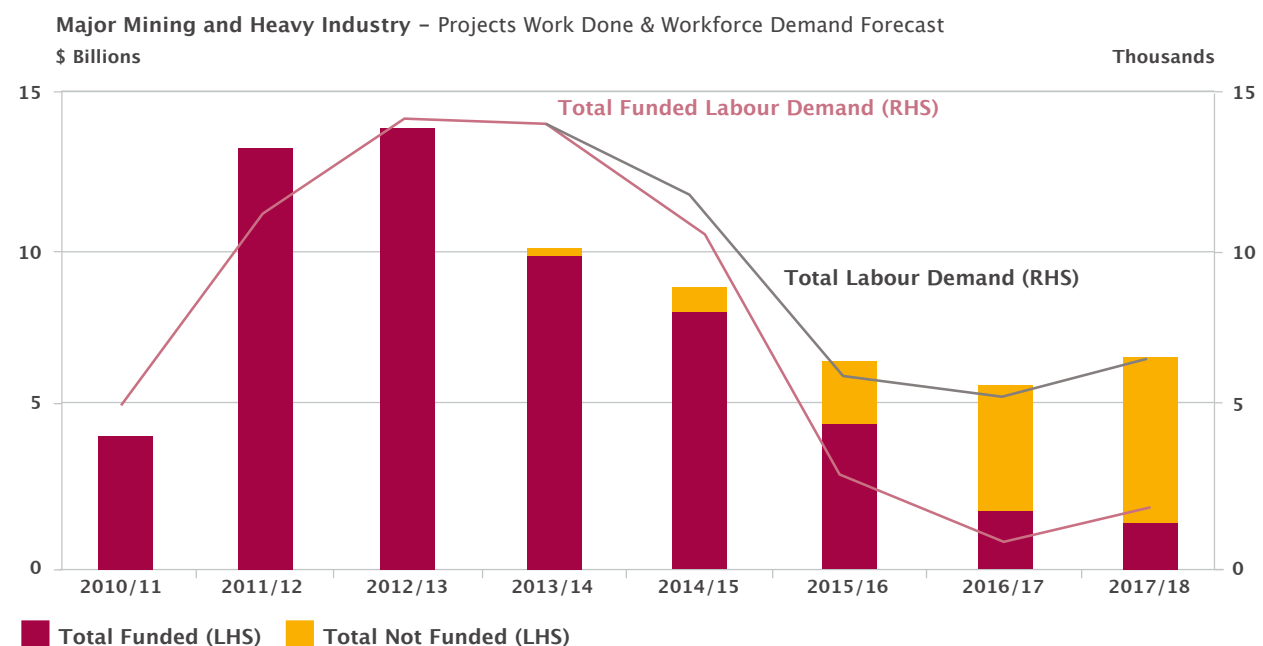


Figure 1.8.



Ongoing development of the CSG fields to feed the LNG trains once they are built will require continual upstream investment in pipelines (and other infrastructure) over the long term.

Finally, major project telecoms activity is assumed to remain consistent from here as the fibre to the node National Broadband Network (NBN) network is rolled out progressively across Queensland.

A major upside opportunity for additional pipeline work is if Surat Basin coal fields were to be developed within the forecast period. However, this is not assumed in the Report.

1. Queensland Major Projects

Figure 1.9.

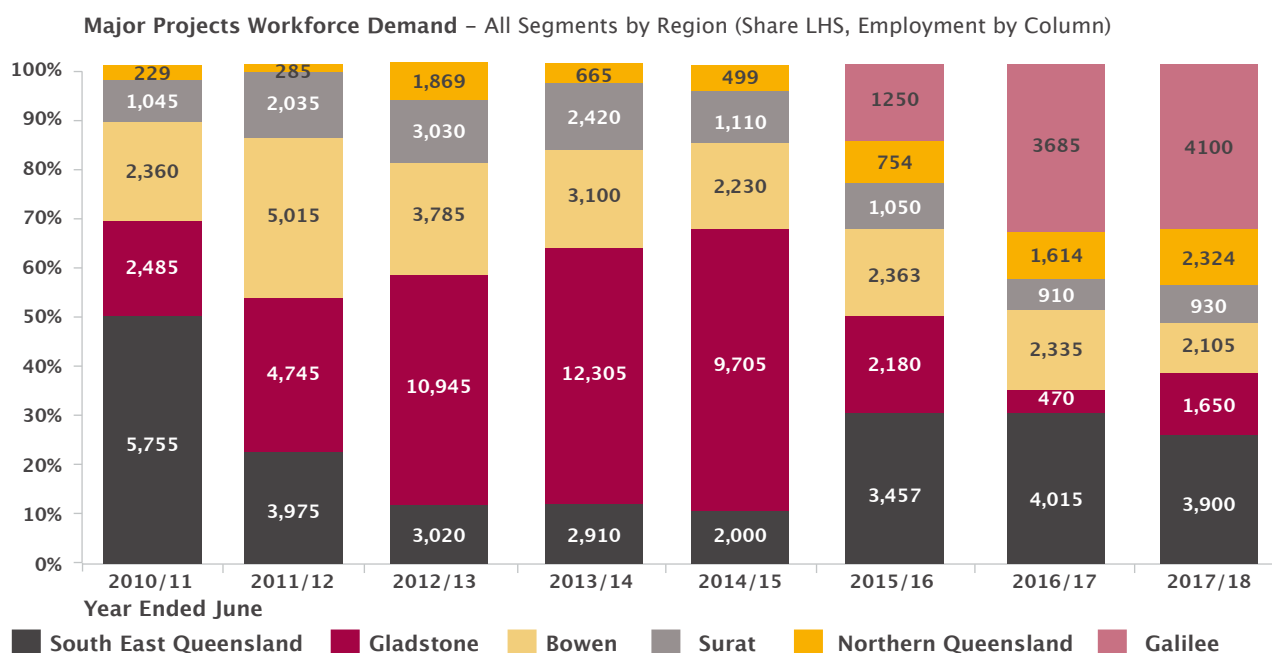
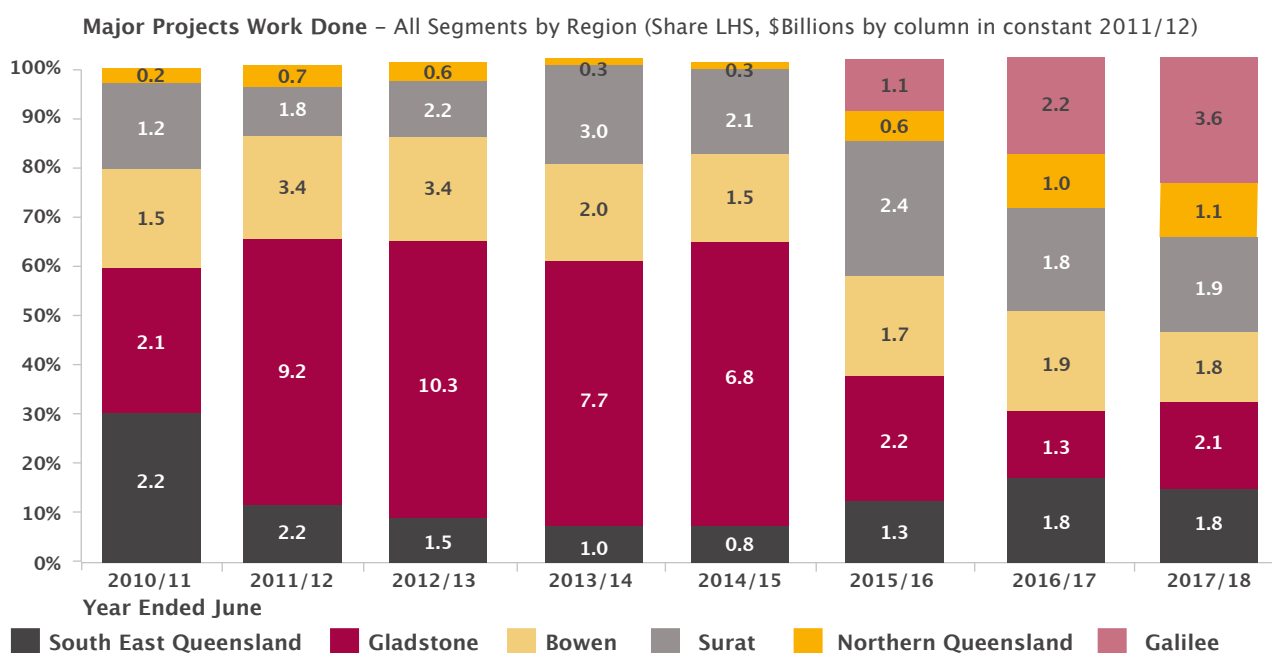


Figure 1.10.



Mining and Heavy Industry

Mining and heavy industry major project work has experienced a period of unprecedented expansion between 2010/11 to 2012/13, increasing a collective 215% to reach a new peak of \$13.6 billion, as shown in **Figure 1.8**. From a major project workforce perspective, the number employed in Queensland's mining and heavy industry space doubled over the same period to

13,800 persons. Queensland's LNG projects were the key driver of growth (although as mentioned, many of these positions may have been effectively off-shored) while existing coal projects, such as the Broadmeadow, Caval Ridge, Daunia and Grosvenor coking coal mines, also sustained a high level of work.

While major project work done is expected to have peaked in 2012/13, measured labour demand is

expected to remain steady in 2013/14 despite sharp falls in work done. However, this is mostly driven by peak phases of downstream activity on LNG projects which may not be contestable by local contractors. By contrast, labour demand for major coal projects is expected to slip by one quarter in 2013/14 (to 1,870 persons), while a 70% decline is expected for other minerals projects (to just 350 persons).

Further declines in work done and workforce demand are forecast in subsequent years, with funded activity dipping to 2010/11 levels by 2015/16, and moving substantially lower thereafter as current projects move to completion. However, assuming Queensland can meet challenges on costs and competitiveness, and is supported by strengthening global demand, a range of mining and heavy industry projects that are currently unfunded could come back late in the forecast period. Most of these are coal projects (in the Bowen and Galilee Basin), but there are also other developments such as Rio Tinto's South of Embley bauxite project, the Paradise phosphate project, and ethanol projects in North Queensland.

Regarding LNG, it has been assumed in this report that a Shell LNG train will not proceed, but the upstream CSG fields will be developed to support one expansion of the existing projects by 2016/17. This is a significant departure from the previous 2013 Report. However, ongoing development of CSG fields over the operational life of LNG facilities (at least two decades) will require continual investment in related field infrastructure, including roads, pipelines, gas facilities, and water. Again, while not major projects in their own right, in aggregate, they will lift the volume of sector activity compared to pre-CSG times.

Queensland Regional Focus

Significant shifts in major project work and employment are expected at the regional level over the forecast period, as shown in **Figures 1.9** and **1.10**. While major project activity will be declining in aggregate terms, a greater share of this work is expected to be focused in the Gladstone and Surat Basin regions over the next twelve months. Later, activity is expected to switch back to South East Queensland, the Bowen Basin and the Galilee Basin. The LNG boom continues to be the key driver of this switch, which once completed, gives way to a potential upswing in coal-related work in the Bowen and Galilee Basins. Meanwhile, a broader based recovery in South East Queensland is dependent on investment decisions by State and Federal governments, particularly regarding new transport infrastructure.

The initial shift of labour and capital to Gladstone and the Surat Basin, in a very concentrated period of time, continues to present challenges to local communities and projects.

The construction workforce has more than doubled here in recent years to meet the construction schedule of the LNG projects. Other regions are set to remain around current workforce demand initially. Tight semi-skilled and skilled labour conditions will likely be the result.

Currently, fly-in-fly-out (FIFO) construction workforces, new entrants and the use of overseas fabricators are helping to fill regional labour gaps. FIFO workforces, although a viable solution to intense, temporary skill requirements, have introduced challenges for regional communities. In many cases, these communities suffer from a classic free rider problem: FIFO workers enjoy regional community services (health care and other common access services) while not necessarily contributing fully in return if their spending and taxes leak back to their home region or interstate. Further, local businesses lose employees to major projects eroding communities. Although many of these projects and associated workforce pressures may be viewed as "one off" type events, they are in reality quite likely to be recurring as investment cycles in regional communities play out time and again.

Strengths, Weaknesses, Threats by Region

South East Queensland

Publicly funded infrastructure works are the key driver in South East Queensland, with roads and railways work likely to remain the principal source of major project activity. In this sense, the projection of declining levels of public investment and major project works in this region places local contractors at significant risk. A turnaround in public investment is expected to come through after the middle of the decade, supporting major project activity in South East Queensland. However, conditions will remain difficult until then, with only a handful of major road and rail projects, road maintenance contracts and potential flood reconstruction works in the near term.

Gladstone

The strengths, weaknesses and threats to the Gladstone region are shaped by the outlook for LNG and coal, the latter affecting the staged development of the Wiggins Island Coal Export Terminal (WICET). Major project demands are expected to have peaked in 2013/14 in this region, and are then expected to decline sharply as various LNG jetties projects and the \$2.4 billion first stage of WICET move to completion. Whether the decline becomes more substantial later on depends on whether further stages to existing LNG projects, or new LNG projects commence during the forecast period or are delayed by high cost pressures and the emergence of competitive threats (such as from US shale gas). One brownfield LNG expansion has been assumed in this Report which, in conjunction with water, road and pipeline works, sees a recovery late in the forecast period.

1. Queensland Major Projects

Bowen Basin

Coal related major projects shape the Bowen Basin region. A substantial portion of these projects are either underway and heading to completion, or unfunded. Given weakness in thermal coal prices and falling coking coal prices, the next round of major projects remain under threat. In particular, a number of producers with allocations to the Wiggins Island Coal Terminal remain unable to access finance and further delays cannot be ruled out. In this Report, it is assumed that several of the delayed coal projects will be revived late in the forecast period under more favourable Australian dollar prices and local cost structures, but it is not guaranteed.

Galilee Basin

The Galilee Basin remains a key downside threat to our forecasts. As indicated in the Major Projects List, one major coal project has been assumed for the Galilee Basin. Mine construction is expected to commence later in the forecast period, alongside supporting rail and port infrastructure. However, these projects could easily be pushed back by a lack of funding or low coal prices.

Surat Basin

Upstream CSG LNG work is currently driving robust activity in the Surat Basin. Given the region's significant thermal coal resources (which are expected to remain unrealised for now) there is substantial upside opportunities to the forecast. If economic conditions permit the Wandoan Coal Project to proceed for example, then this could start a chain reaction of development as other mines are developed to piggy back on related infrastructure such as the Southern Missing Link rail project. In addition, a number of CSG fired electricity generators are currently proposed in the region meaning further upside potential exists, although there is a low probability of this occurring in the next five years given the outlook for electricity demand.

North Queensland

The North West Queensland Mineral Province could stand to benefit from multiple major base minerals projects covering phosphates, silver-lead-zinc, copper, tin and nickel. Timing of the global economic recovery and demand for metals and minerals will be the key factor underwriting the next round of minerals investment in this region. While dominated by the sheer scale of the coal and LNG investments further south, base metals and minerals projects in this region may still be substantial over the next three to five years.

2. International & Domestic Economy – Setting the Stage

The health of the global economy is critically important to Queensland and the local contracting industry. Queensland's abundance of natural resources means the outlook for the global economy and, more importantly, industrial production has a strong bearing on future levels of investment activity and major project work. In particular, Queensland is a dominant player in the global seaborne coal trade and will shortly be a key player in the international LNG market. Investment in these industries not only provides major project work directly, but the boost to state economic activity and production also helps underwrite broader employment growth and investment in traditional economic infrastructure.

Rising metal and energy consumption in the East Asian region, particularly China, has been the main source of demand growth for the past three decades. China now accounts for around one-quarter to one-third of global consumption of most minerals and metals. Therefore, any disturbance to Chinese economic growth, and Chinese investment and infrastructure construction growth specifically, has important implications for world commodities demand, prices and investment.

Beyond China, stable growth in energy demand in mature Asian markets (including Japan, South Korea and Taiwan) coupled with stronger growth among emerging economies such as India and South-East Asia will continue to spur investment in the coal and gas sectors.

While a question mark remains around Queensland's current competitiveness, characteristics such as geographical location, quality of resources and supporting infrastructure, political stability and, eventually, a lower Australian dollar should help maintain Queensland's position in the global minerals and energy supply chain.

Outlook for the Global Economy

Following lower growth in calendar 2012 and calendar 2013, prospects for the global economy are starting to improve. Following growth around 3% over the past two years, global economic growth is expected to accelerate to 3.7% in calendar 2014 and 4.1% in 2015, as shown in Figure 2.1.

Economic growth prospects differ substantially by region, however.

- **Europe has taken the first steps to emerge from recession, but is expected to continue to struggle for growth** through the forecast period. Austerity policies, high debts, structural and cultural change, and competitive disparities in the currency union are expected to constrain growth through the Euro region.
- **The United States' (US) economy is set to accelerate over the next few years** as the private

Figure 2.1. Real GDP/Gross National Product (GNP) Forecasts

Year Ended December	OECD ⁽¹⁾	US	Japan	Euro Area ⁽²⁾	China	India	Other East Asia ⁽³⁾	World GDP
2012	1.4	2.2	2.0	-0.6	7.8	4.0	3.9	3.0
2013e	1.4	2.0	1.8	-0.5	7.8	4.4	3.8	3.1
Forecasts								
2014	2.2	3.0	1.4	1.0	1.4	7.4	4.5	3.7
2015	2.5	3.0	1.9	1.5	7.6	6.9	4.6	4.1

e: estimate

(1) Organisation for Economic Co-operation and Development: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States.

(2) Euro area: Cyprus, Estonia, Ireland, Malta, Slovakia, Slovenia, France, Germany, Italy, Spain, Portugal, Austria, Belgium, Netherlands, Luxembourg, Finland, Greece.

(3) Other East Asia: Indonesia, South Korea, Malaysia, Philippines, Singapore, Taiwan, Thailand, Vietnam.

Source: OECD, IMF, National Government Sources, BIS Shrapnel

2. International & Domestic Economy

sector revives, employment continues to pick up, and US company profits and investment benefit from relatively inexpensive energy and low funding costs. High public sector debt, and the possibility of further political brinkmanship in dealing with this, represents a downside risk.

- **China is expected to experience lower, yet still robust, growth** as the economy rebalances away from exports and investment towards sustainable domestic consumption.
- **Developing countries will assume a greater leadership role in world growth.** The economies of South-East Asia are expected to benefit from stronger trade volumes as the Chinese economy stabilises at growth rates in the 7% range. After suffering setbacks in recent years, the Indian economy is expected to stabilise in 2014 before heading back toward long term growth rates above 6%.

Figure 2.2.
\$USD Commodity Prices – Metals and Gold

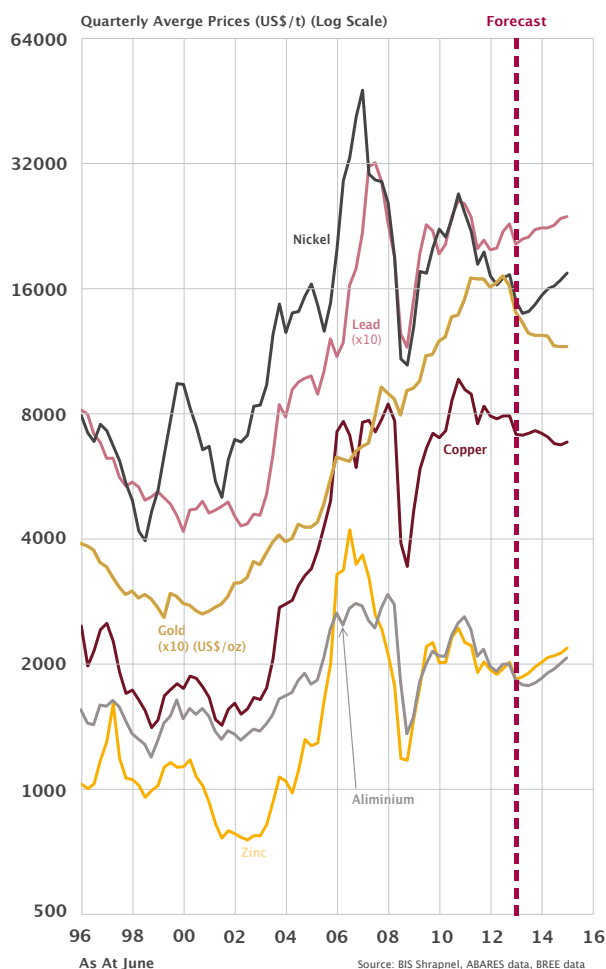
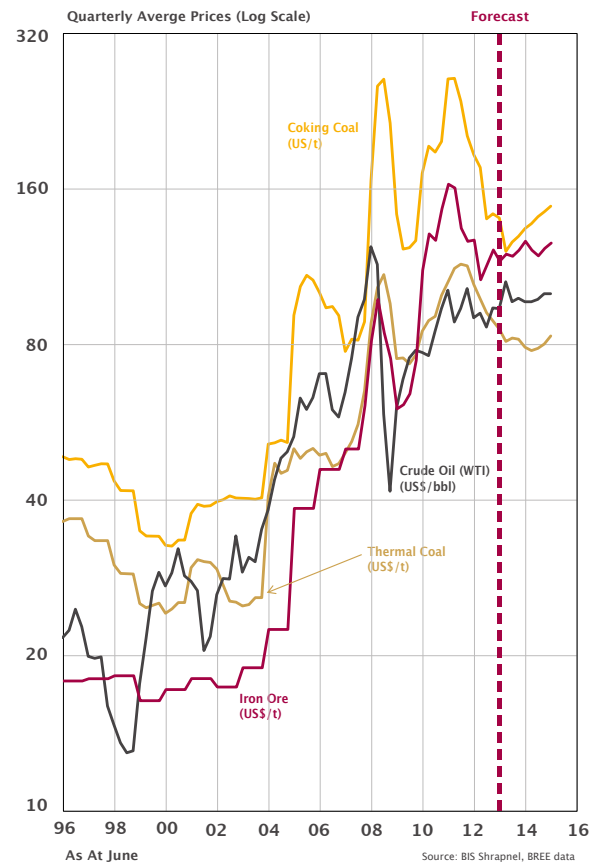


Figure 2.3.
\$USD Commodity Prices – Oil, Coal and Iron Ore



The mild acceleration in world growth over the next few years is expected to support growth for most commodity prices (gold being the exception).

However, commodity prices (in US dollar terms) are generally expected to increase only gradually and fall considerably short of the price peaks achieved over the past five years, as shown in **Figures 2.2 and 2.3**. A falling Australian dollar through the forecast period, however, could see more significant increases in commodity prices in Australian dollar terms, assisting the development of resources projects later in the forecast period.

Coking coal prices fell by over 30% during 2012/13, following the resolution of supply disruptions which plagued the market in 2012 (particularly Queensland's floods). Coking coal prices are likely to soften further during 2013/14 before strengthening in the middle of the decade. Whilst the growing Chinese steelmaking industry is expected to support demand for coking coal, a strong supply-side response is expected to see coal production growth keep pace with demand growth, keeping a lid on prices in the longer term.

Thermal coal prices have also fallen recently, with Japanese fiscal year (JFY) contracts cutting the price for second consecutive year. The JFY 2013 contract price settled at US\$95 and represents a fall of US\$30/tonne over the last two years. Similarly, spot prices travelled lower to around US\$80/tonne. At these prices, the exchange rate becomes a key factor, as a number of Australian thermal coal mines struggle to remain profitable. As miners cut back investment intentions, rising demand in South and East Asia should underpin a longer term, but gradual, recovery in spot prices.

Outlook for the Australian Economy

The Australian economy is in a transition phase. Over the past five years, the economy was heavily reliant on mining and government investment for growth.

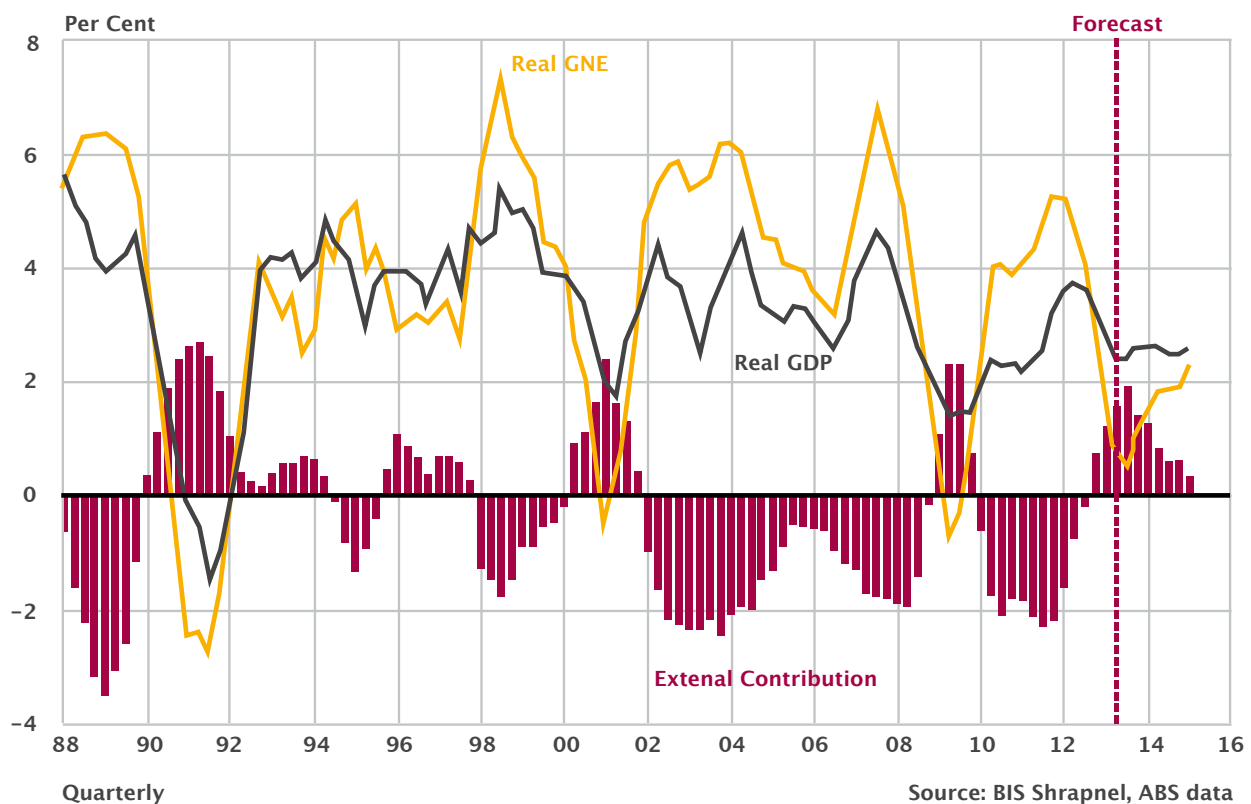
Weakness elsewhere across the economy (particularly in trade exposed industries badly affected by the GFC and the high Australian dollar) slowed the annual average rate of economic growth (GDP) during the 2007/08 to 2012/13 period to 2.5%, down from the 3.6 % annual average growth experienced in the decade to 2007/08.

During 2012/13, GDP growth slowed to 2.6%, from a resources-driven 3.7% through 2011/12. Growth in domestic demand (GNE) slowed from 5.2% in 2011/12 to just 1.6% in 2012/13, as shown in **Figure 2.4**.

Key features of the outlook for the Australian economy from here:

- The Australian economy is expected to remain softer while growth drivers shift from resources to non-resources investment. GDP growth is expected to remain between 2 and 3% during both 2013/14 and 2014/15, but picking up to 3.5% by 2015/16 as non-resources investment recovers.
- Declining government expenditure and resources investment will be the key constraining factors in the short to medium term. Despite commodity prices remaining high in a historical sense, weaker demand growth and lower competitiveness is impacting on decisions to invest in new capacity. Meanwhile, all levels of government are in fiscal repair mode, constrained by the need to bring budget deficits under control. While public investment has been declining for the last two years, further cuts to infrastructure spending are likely.
- The positive legacy of the resources investment boom is that increased capacity will continue to underwrite strong increases in mining production

Figure 2.4. Australia GNE and GDP: Moving Annual Total, Annual % Change



2. International & Domestic Economy

and exports, making a strong positive contribution to growth right through the next five years.

- Interest rate cuts delivered by Reserve Bank have also allowed residential building to regain momentum. While focused in New South Wales at first, it should extend to other states with significant undersupply including Queensland and Western Australia, making a positive contribution to growth.
- A broader recovery in non-resources investment is still likely to be at least one to two years away. A bounce in consumer and business confidence following the 2013 Federal election was not sustained as more negative news on resources investment and domestic manufacturing (including the closure of Rio Tinto's Gove refinery and Holden vehicle production) offset more positive global sentiment and a weakening Australian dollar. However private consumption and business investment, supported by low interest rates, a weakening Australian dollar, solid income growth and rising domestic demand, should eventually make positive contributions to growth. As the housing recovery becomes entrenched and confidence about the global and Australian economic outlook grows, households are expected to dip into their large savings buffer to fund a re-acceleration in consumer spending.

In summary, business conditions are expected to remain difficult over the next two years as non-mining investment takes time to come through.

Further depreciation in the value of the Australian dollar would help speed up the adjustment process and assist Australia's trade-exposed industries. The Australian dollar is reasonably valued (from the point of view of competitiveness) between US70 and US75 cents. However, there remains considerable uncertainty as to extent and timing of depreciation, which will be linked to the winding back of major economy monetary stimulus, particularly the United States. The major beneficiaries of the lower dollar will be those trade-exposed sectors that were badly affected when the dollar rose, including agriculture, trade-exposed manufacturing, tourism, education, and finance and business services. Mining, too, would also stand to benefit significantly from a lower Australian dollar.

3. Queensland Economy

Apart from positive global fundamentals, a strong and diverse Queensland economy is also important to the local contracting industry. As one of Australia's fastest growing states, there has been substantial public and private investment in infrastructure over the past decade to support the expanding population, ranging from new schools and hospital buildings, to integrated transport and utilities networks. This investment is often realised as local construction activity, which in turn boosts local employment, incomes, spending and economic growth.

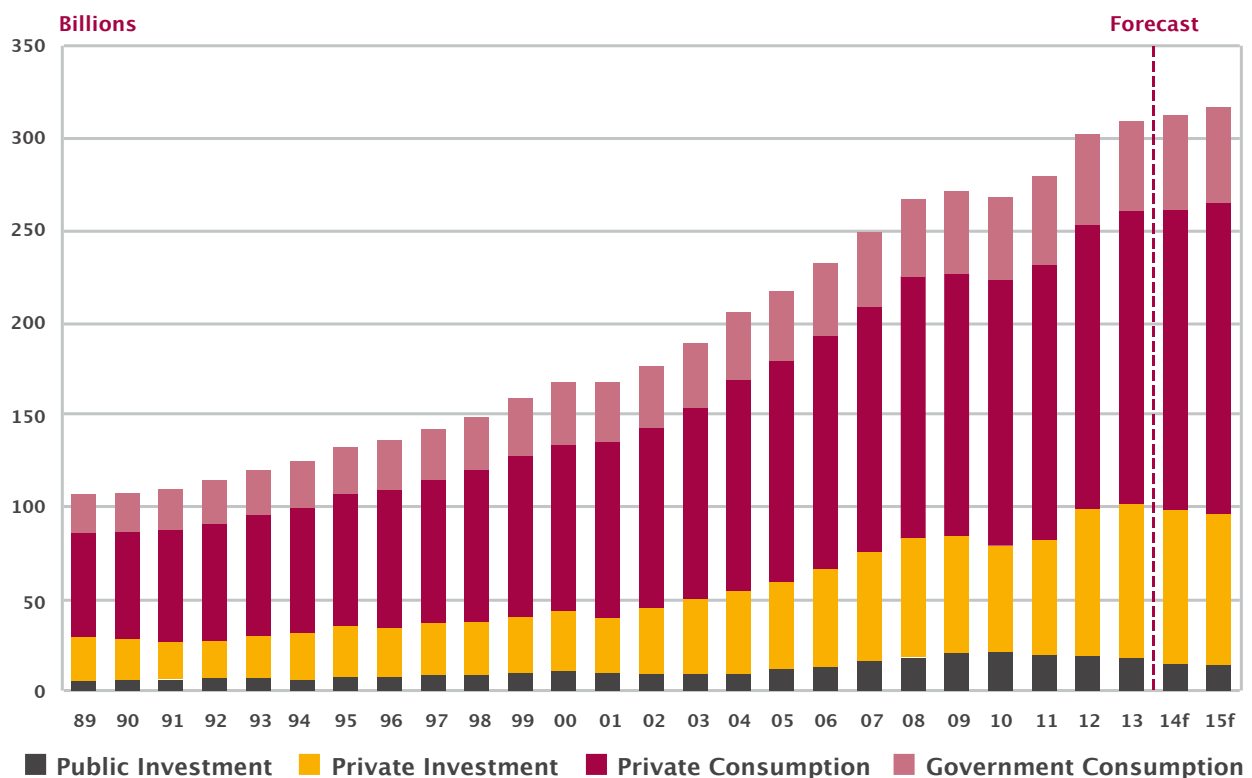
Although the Queensland economy is reasonably diversified, it is more heavily concentrated in agriculture, mining and tourism than the Australian economy.

Over the past few years the tourism industry has been hit very hard by the high Australian dollar, while output from Queensland mining and agriculture has been severely impacted by floods and storms. The long run

impact of the global financial crisis, weaker global growth and demand – has impacted on Queensland manufacturers and exporters, while the resources investment boom has crowded out investment in other parts of the economy. As a consequence, recent growth in the Queensland economy has been sourced almost exclusively from resources investment, as shown in **Figure 3.1**. In this sense it has been a microcosm of Australia's "two speed economy" but even more extreme (as illustrated in **Figure 3.2**).

Given the likely decline in resources investment from here, it will be important that new drivers of investment and economic growth emerge, not only for the health of the contracting industry, but to maintain employment growth and living standards in the state.

Figure 3.1. Queensland Economy: Components of Domestic Demand



3. Queensland Economy

Recent Trends

After experiencing a private investment “recession” in the wake of the global financial crisis, the Queensland economy grew more rapidly again through 2011/12. State Final Demand (SFD) – a measure of domestic demand, being goods and services sold in the state excluding imports and exports – surged by 8.6% in 2011/12, the fastest growth since 2003/04. Gross State Product (GSP) – a measure of state income and output, grew by 4.4% in real terms. The renewed growth was driven by a surge in resources-related investment, as well as a recovery in consumption growth, which offset weakening levels of public investment and a trough in housing activity.

This surge in growth was not sustained in 2012/13, as more mixed signals began to emerge regarding both private and public investment. Private investment growth slowed sharply from 27% to 6% as weaker commodity prices saw several major mining projects delayed, particularly for coal. Public investment fell again for a third successive year as the State Government completed a raft of projects spanning transport, water and energy without a commensurate increase in new projects. High State Government debt and lower GST revenues is still driving cuts in public spending, affecting funding for infrastructure projects and producing lower employment and wage growth in the public service.

Overall, growth in domestic demand (SFD) decelerated sharply to 2.4% with state economic growth (GSP) slowing to an estimated 3.6%. While mining investment continued to unwind, non-mining sectors such as housing and business services have yet to pick up the baton to drive growth.

2014 and Beyond

Over the next five years, divergent investment cycles are expected to play out across non-mining and mining-related sectors of the Queensland economy. As the Queensland economy transitions, growth is expected to be weaker, but more broadly based. Key features of the state economic outlook are:

- **Growth will weaken further in 2013/14 and stay weaker for several years.** Growth in Queensland domestic demand is forecast to slow to under 1% in 2013/14 and grow only modestly thereafter, supported by housing (initially) and non-mining investment (later), but against the headwind of lower mining investment. Economic growth in Queensland is also expected to dip in 2013/14, before recovering marginally in 2014/15. A positive and growing net exports position (as coal and LNG exports soar from recent investments) will keep economic growth stronger than growth in domestic demand. A lower Australian dollar can be expected

Figure 3.2. Queensland SFD and Australia GNE: Year Ended June, Annual % Change

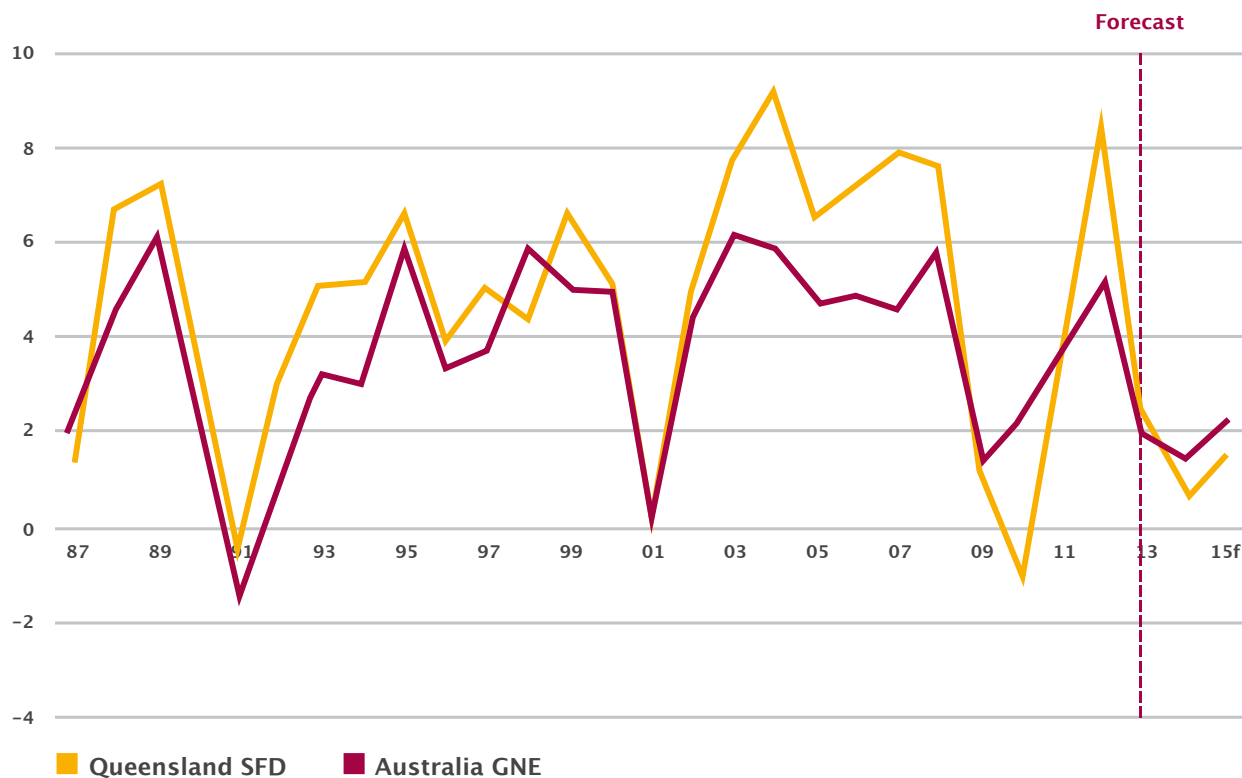
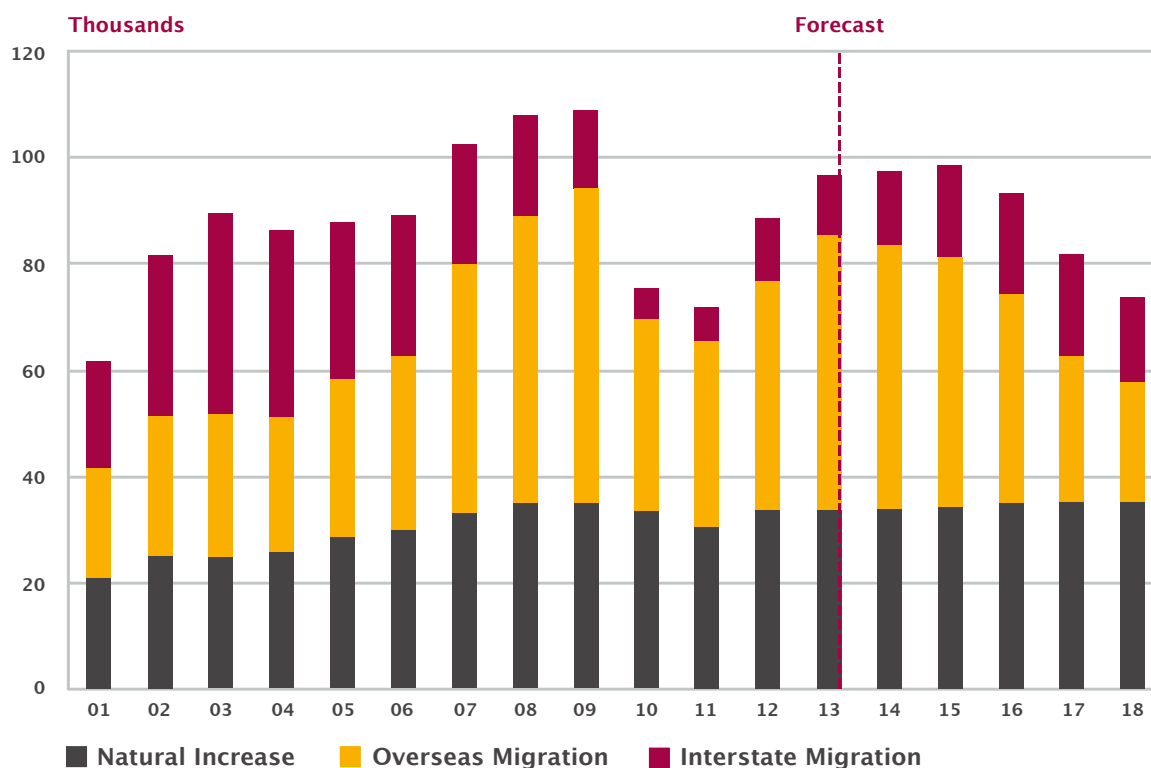


Figure 3.3. Queensland Population Increase, Annual



to boost Queensland's key tourism and education, exports and agricultural industries eventually, as well as limiting the US dollar falls in resource-related commodity prices, in terms of Australian dollar revenues.

- **Mining investment – the key driver of economic growth in Queensland over the past decade – is expected to decline significantly, even if major new coal developments in the Galilee Basin proceed.** During the mining investment boom, total engineering construction for coal and minerals mines, smelters, and oil and gas facilities (including LNG) ballooned from \$637 million in 2000/01 to \$22.8 billion in 2012/13 (both in constant 2010/11 prices). Construction on associated infrastructure, such as railways, harbours and electricity, also increased substantially.

Having risen so spectacularly, the coming fall in mining investment will have a huge impact on the construction industry, private investment and the broader Queensland economy, even if much of the boom in LNG has been supported by offshoring and imports.

- **Dwelling investment is expected to recover, but will not fill the gap left by lower mining investment.** Dwelling investment in Queensland

has declined nearly 30% since peaking in 2006/07, despite a fast growing population. BIS Shrapnel estimates that during 2012/13 alone, dwelling commencements in Queensland were around 10,000 dwellings (or 26%) below the estimated underlying demand. Ongoing population growth from here (as shown in Figure 3.3), an emerging dwelling shortage, low vacancy rates, rising rents and below-average interest rates should all help support a significant recovery in dwelling investment.

This, in turn, will provide economic benefits for other Queensland sectors, such as manufacturing, retail trade, and property services. But despite a pickup in housing, private investment is still expected to fall nearly 10% over the next few years.

- **Meanwhile, further falls in public investment over the next two years are likely to compound the downturn in private investment.** Public projects funded since the GFC have been completed without being replaced by new initiatives, with the State Government firmly focused on reducing the State's debt burden. The nearing completion of a swathe of flood recovery and reconstruction initiatives following the 2011 and 2013 floods is also contributing to falling levels of public investment. In the short term, the State Government is likely to continue to rein in

3. Queensland Economy

any non-essential expenditure, while at the same time pursuing asset sale programs, including some of its office building portfolio. In the medium to longer term (three-five years), public investment should begin to recover on the back of new infrastructure projects and reinvestment in plant and equipment. This will likely require funding supported by stronger State Government revenues and/or asset sales.

- **A broader based investment recovery, both public and private, is expected, but will take time to come through.** A high Australian dollar and weak profitability (outside of mining) since the GFC has stymied broader business investment in the Queensland economy. However, over the medium to longer term, some of these barriers to investment are expected to subside. Population growth will remain one of the fastest of all Australian states. Wholesale and retail trade will be assisted by a pickup in housing activity. A weaker Australian dollar will eventually spur investment in tradeables sectors (and, specifically, tourism facilities) – but the very low levels of investment outside of mining, transport and education over the past five years means that Queensland is not catering for even moderate growth in demand. Consequently, further smaller cycles in investment can be expected over the next three to five years.

In summary, it is the very diversity of the Queensland economy which will help soften the impact of the fall in minerals investment.

Essentially, the greater the fall in commodity prices and mining investment from here, the greater will be the fall in the Australian dollar and the greater the structural readjustment in the economy.

The Queensland economy has been attracting labour, providing jobs and growing more strongly than the national average for decades, well before the mining boom. Structural change will take the Queensland economy back towards balanced growth based on tourism, agriculture and education services; precisely those sectors that suffered during the period that the mining boom raised the dollar to levels at which those industries weren't competitive, as well as parts of mining itself.

The key risk for Queensland is the timing and magnitude of this readjustment. While the current round of LNG investment (both downstream and upstream) should prevent a sudden collapse in mining investment and, hence, resource-related employment, there is a risk that a faster unravelling of investment could occur, which could itself negatively affect business and consumer confidence and postpone the forecast upswing in dwelling construction.

With regards to the Australian dollar, the key risk is that it stays higher for longer, relative to commodity prices, which would further delay investment in mining and other trade exposed industries.

4. Queensland Construction Outlook

Divergent investment cycles across non-mining and mining-related sectors of the Queensland economy will have significant implications for the Queensland construction industry and local contractors. Cycles in aggregate activity, meanwhile, have implications for costs.

The construction sector can be broken down into sub-segments including residential building, non-residential building and engineering construction. In recent years, growth in construction work has been dominated by resources-related engineering construction, but over the past decade there has also been substantial cycles in investment in residential building, non-residential building and non-mining engineering construction (both publicly and privately funded).

In turn, the strong cycle in total construction work in Queensland, as well as nationally, has fuelled increases in construction costs.

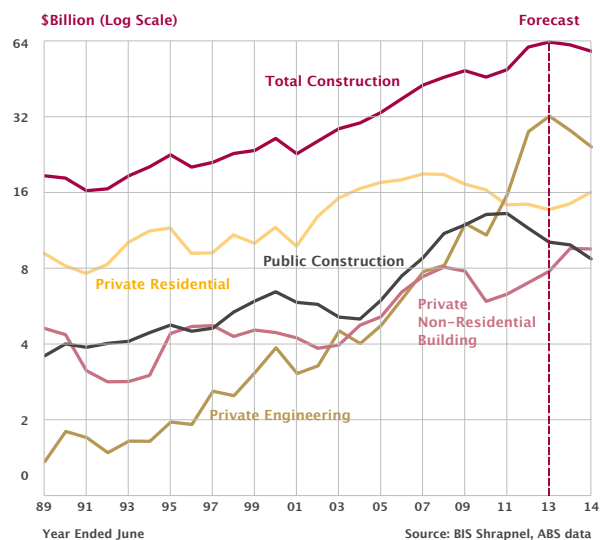
While the coming downturn in major project work will be mostly felt in the larger, engineering construction segment, it will be important for contractors and suppliers to the construction industry, to plan for growth in other segments, and within parts of the engineering construction itself, as new investment cycles unfold.

Recent Trends and Outlook for Construction Activity

Following growth of 20% in 2011/12, total construction activity grew at a more moderate 6.9% in 2012/13. Once again, most of this growth was driven by the engineering construction segment – particularly oil and gas, and related gas pipelines – as investment continued to ramp up in Queensland's coal seam LNG industry. There was also a further pickup in private non-residential building, particularly offices and accommodation, which partially offset falling public education and health building. Elsewhere, construction activity tended to be weaker in aggregate through 2012/13, with residential building and public sector funded engineering construction both down on 2011/12 levels.

The large size of the engineering construction market suggests that movements in this segment will have the greatest impact of measured work done in the Queensland construction industry. As a consequence,

Figure 4.1.
Queensland Construction by Segment



total construction activity is expected to weaken in Queensland over the next four years as resources related investment in coal and coal seam LNG cools from very hot levels. However, other construction sectors are expected to experience different cycles from here, affecting the aggregate value of construction work, as shown in Figure 4.1.

The key features of the outlook are as follows:

- **Residential building is expected to rise by approximately one-third over the four years to 2017.** With Gold Coast and Sunshine Coast markets still expected to absorb excess stock built during the previous boom, most of the growth initially will come from the Brisbane region. Despite the strong growth outlook from here, annual residential building activity is expected to remain lower than the peaks experienced prior to the GFC, while the pick-up in residential work will not completely offset the impact of falling engineering construction on measured total construction work done.
- **Non-residential building is expected to edge lower through the next few years, but experience a substantial shift in the mix of activity.** Much of the recent volume of work has been driven by the public sector, both Federally through the Building the Education Revolution (BER) scheme and also the

4. Queensland Construction Outlook

State Government (Gold Coast and Sunshine Coast University Hospitals), which have helped offset the collapse in private non-residential building after the GFC. There is also evidence that the large boom in resources projects has created its own second round effects in stimulating non-residential industrial and commercial developments in the regions. However, the medium term outlook is decidedly weaker, with a lack of major new projects relative to the existing pipeline of work and a looming office oversupply stymieing commercial and industrial building.

- **Longer term, strong population growth coupled with a rebalancing of the economy away from resources investment to tourism and services are both expected to support higher levels of non-residential building in Queensland.** This will particularly boost activity across social and institutional segments (health, aged care and education) but also support commercial and industrial spaces (retail, warehousing, accommodation and entertainment).
- **Following a sharp slowdown in growth in 2012/13 (from 44% to 13%), BIS Shrapnel expects a decline in engineering construction work done of around 45% over the next four years – equivalent to around \$17.5 billion in annual work being shed by 2016/17.** The decline in public investment in tandem with major resources projects is the key driver for this outcome. Nonetheless, activity should remain

historically high, with future work done consistently exceeding that which occurred in any year prior to 2009.

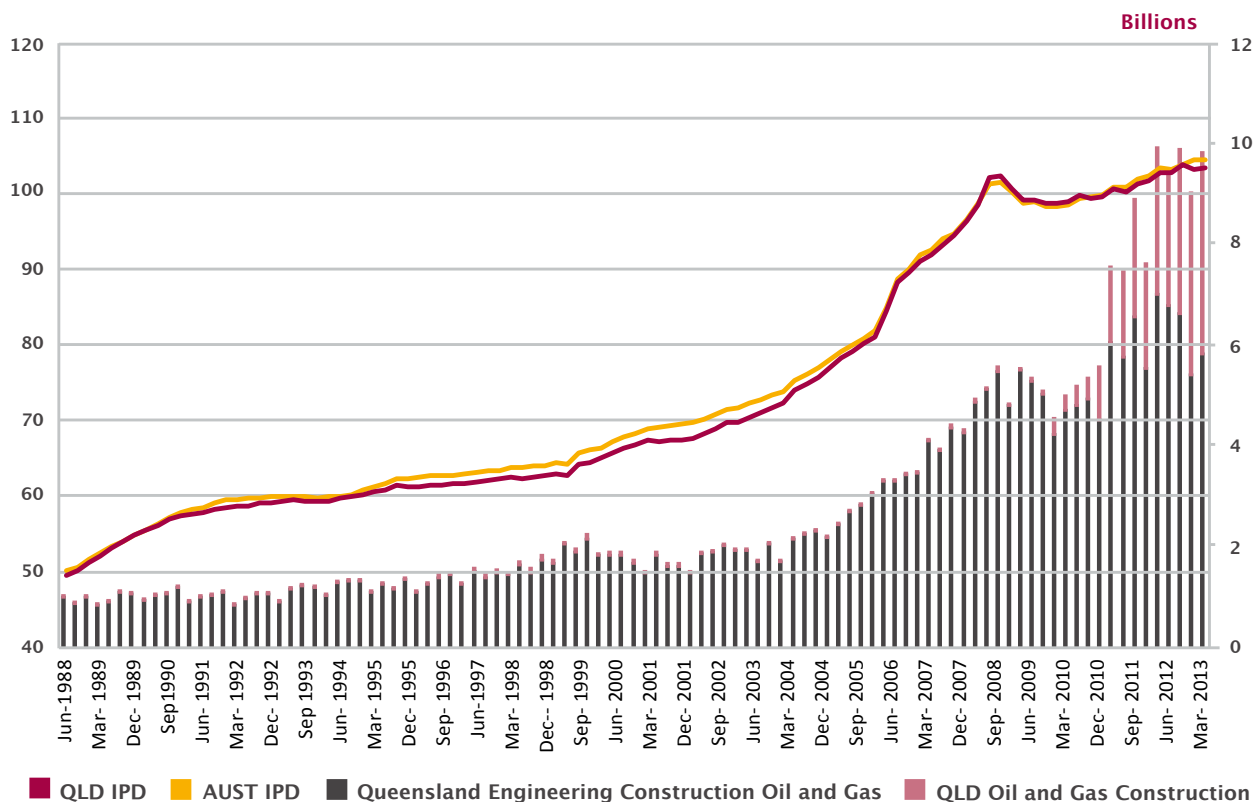
- **Overall, measured construction activity in Queensland is likely to fall by approximately one quarter over the next four years, with the next cyclical upswing getting underway by 2016/17, based on a peaking in residential building and a gradual recovery in non-residential building and engineering construction.**

Queensland Construction Costs

Growth in construction costs tends to be linked to the amount of construction activity going on at any time. There is a positive correlation between construction activity and construction costs because high (and rising) levels of demand (i.e. construction activity) not only places pressure on the existing supply of inputs, boosting input prices, but also allows supplier margins to increase.

Where capacity constraints exist, rising construction activity can lead to strong increases in input prices as investment in new capacity is itself costly and takes time to come on stream. Furthermore, skills shortages in key trades can be a risk to productivity, which can itself drive higher cost outcomes over time. Construction costs may also vary due to changes in commodity prices

Figure 4.2. Engineering Construction Implicit Price Deflators versus Queensland Work Done



determined in global markets (e.g. steel and oil). These price changes may occur independent of domestic construction activity.

Construction Employment and Wages

While measured construction activity in Queensland is expected to decline significantly from recent record high levels, it is expected to remain high in historical terms through the next five years. However, given the high import content of the recent boom (for example, the installation of downstream LNG facilities) – as well as the relatively high local labour content of rising upstream gas work and the residential building market – the downturn in domestic construction work in Queensland is likely to be less pronounced (see **Figure 1.3** for the outlook in local construction work). This has implications for Queensland construction skills demand, employment and wage growth.

Securing an adequate supply of labour skills to cater for the shifting demands in the construction industry without raising costs cannot be taken for granted; it requires ongoing assessment, planning and innovation. The industry has already demonstrated significant versatility in sourcing construction labour skills at different stages of the major project life cycle (from engineering and civil skills at the preparation phase to construction, mechanical and electrical trades skills at the building and installation phases),

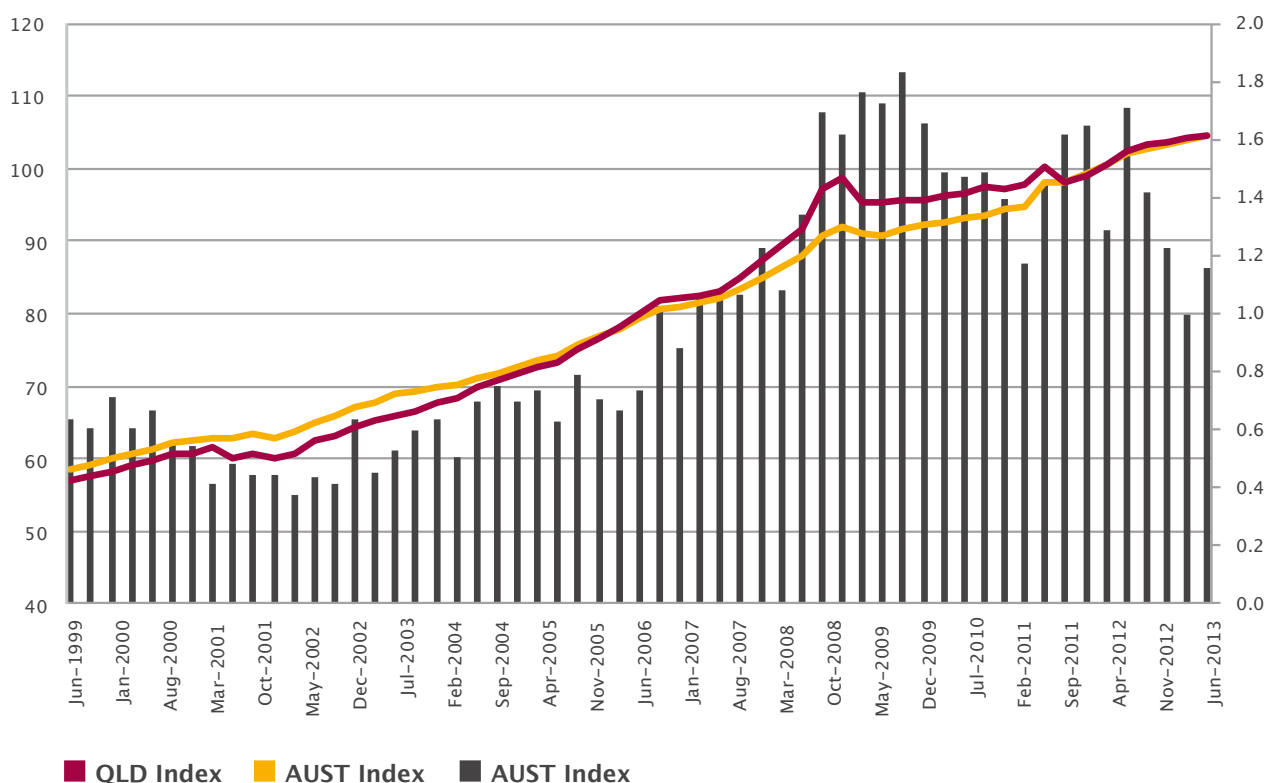
although part of the solution has been to offshore large parts of the engineering, design and construction process.

Similarly, strategies have been put into place to best handle the remote nature of the resources boom through the use of FIFO and Drive-In-Drive-Out (DIDO) workforces whilst boosting regional infrastructure development.

At the national level, construction employment surged during the 2000s in line with construction activity. While employment growth paused immediately following the GFC, construction employment picked up in 2010/11 as a new round of resources projects, as well as the Federal Governments BER scheme ramped up. However employment growth stalled thereafter, and has since fallen despite a surge in engineering construction work. This was largely because the engineering construction boom (and, in particular the LNG driven oil and gas boom) leaked heavily into imports and not necessarily domestic jobs. The expected upswing in residential building activity, with its relatively intensive use of construction labour is expected to drive rising demand for construction labour through the next five years at the national level.

Queensland construction employment has followed a broadly similar trend to national construction employment over the last decade but with one key difference: it has been significantly stronger than the

Figure 4.3. Road and Bridge Construction Price Indexes versus Queensland Work Done



4. Queensland Construction Outlook

national average. Robust population growth fuelled a boom in new dwelling building, which in turn brought about a significant round of investment in social and physical infrastructure. As the resources boom then ramped up, Queensland's construction employment ballooned to 248,000 persons in 2008/09, before easing after the onset of the GFC.

While construction employment edged up slightly in 2012/13, the increase was very likely understated given strong increases in mining employment which was likely to have been related to the construction phase of major coal and LNG projects.

Conversely, a sizeable winding down in engineering construction work, with a delayed upswing in residential building, is expected to see construction employment fall in Queensland over the next few years. However, a likely upswing in residential building from 2014/15 and, later, a new cycle of civil and mining projects is expected to place new, more intensive demands on construction labour. This may introduce challenges for the construction industry in Queensland, particularly if these demands coincide with a broader, national recovery in construction activity.

Queensland construction wages (measured by average weekly ordinary time earnings data) have grown significantly through the construction boom, rising 34% over the last five years. However, the slowdown in growth in construction work (and sharp falls in new commencements) has also seen construction wage growth slow significantly over 2012 and 2013. Consequently, much of the "price premium", which had been built into Queensland construction wages compared to national average during the recent boom, has dissipated.

This outcome is also reflected in the Queensland measures of overall construction cost growth (see below) with Queensland construction costs rising at a slower pace than the national average over the past two years. While this is better news for the competitiveness of the Queensland construction industry, much more needs to be done to ensure that wage pressures remain contained, move closer in line with productivity outcomes from here, and do not threaten Queensland's share of the next round of major projects.

Measuring Construction Cost Growth

Given use of similar construction materials and skilled labour, costs for engineering construction are linked to broader cost trends in the building and construction industry. Two reasonable gauges of construction cost growth in the engineering construction segment are:

- **The implicit price deflator (IPD) for engineering construction work done**, derived by dividing current price (nominal) engineering construction data from the Australian Bureau of Statistics by its corresponding constant price (real) data series.

This effectively isolates changes in the price of construction, as opposed to changes in activity.

- **The Road and Bridge Construction Price Index**, also published by the ABS as part of the Producer Price Index, is perhaps a better measure of local construction costs in the engineering construction market given that roads is the second largest engineering construction subsector (outside of mining and heavy industry) and is less likely to have substantial imported components.

As shown in **Figure 4.2**, the key features of the engineering construction implicit price deflator (IPD) series are:

- **An explosion in growth in the index between 2003 and 2008 compared to the previous decade.** During this period, the IPD increased by 36% at the national level, and 40% in Queensland, where much of the engineering construction boom was concentrated. While growth in margins likely contributed to cost pressures, prices for inputs such as labour (wages), steel and fuel also rose significantly through this period.
- **A fall in the index over 2008/09 with the onset of the GFC.** In Queensland, the IPD fell 3.5% between December 2008 and March 2010 (3.2% for Australia). Given the extent of the prior increase, the cost base still remained very high however.
- **Much more muted growth in the index in the subsequent period to 2012/13.** That this weaker growth has occurred at a time when measured engineering construction seemingly boomed again in Queensland to even greater heights illustrates that the latter boom was driven more by the LNG sector which utilised a very high proportion of imports (in design, engineering and fabrication) that helped take pressure off local supplies. That residential and non-residential building activity also significantly weakened over 2012 and 2013, and probably helped keep cost growth contained.
- **Another small decline in the index for Queensland over the first half of calendar 2013.** This likely reflects the weaker growth in local construction activity (across all segments), weaker input prices and possibly weaker margins. Even so, construction costs, by this measure, remain nearly 50% higher in Queensland than they were a decade ago.

The Road and Bridge Construction Price Index series exhibits similarities to the engineering construction IPD. In particular:

- **Construction costs by this measure grew very strongly through the 2000s, in line with sharply rising construction activity.** Again, Queensland construction costs grew faster than the national average during June 2003 and June 2008 (the years of strongest growth in the index. Queensland costs grew by 40% compared to a national increase of 27%.

- **Furthermore, costs fell back immediately after the onset of the GFC, but picked up again (at a more moderate pace) over the next five years to June 2013.** Interestingly, cost growth in Queensland since the GFC has been weaker than the national average, and particularly so between 2008 and 2011 (a period where Queensland road construction fell from \$1.5 billion per quarter to \$1.2 billion per quarter). However, increases in roads activity associated with major projects and flood reconstruction works has seen Queensland more or less match national cost growth over the past two years.

Summary and Implications

- **Over the past decade, a boom in construction activity in Queensland has more or less corresponded to a simultaneous boom in construction costs.** While the peak of the ‘domestic’ construction boom occurred just prior to the GFC in 2008, a “secondary boom” in LNG and coal work between 2010 and 2013 offset declining residential and non-residential building activity and helped underwrite further increases in construction costs.
- **Costs have a tendency to go up quickly, but don’t tend to come down quickly.** Despite the GFC, costs by both measures fell only marginally. While cost growth in Queensland associated from the post-2008 boom was much weaker than that experienced during the 2003–2008 period (and weaker than national measures of cost growth), it is being driven from a high base. As at June 2013, construction costs as measured by the Queensland engineering construction implicit price deflator were still nearly 50% higher than in 2003, despite falling marginally in the first half of the calendar year.
- **Falling engineering construction activity over the next few years is likely to have a moderating impact on costs, given the engineering construction market’s share of total construction work.** However, costs are already substantially higher than they were prior to the boom and may need to fall further to make private projects economic (particularly in mining and resources). This has been hard to achieve in the past and may present challenges to the industry going forward, given the cycles of work that are expected in residential and non-residential building (which tend to be more labour intensive and domestically concentrated) over the next five years, and the potential for another significant cycle in engineering construction activity.

5. Key Implications, Challenges and Risks

Figure 5.1 compares last year's Major Projects five year outlook to the present forecast (note 2012/13 is now historical rather than forecast). Several key points are worth mentioning:

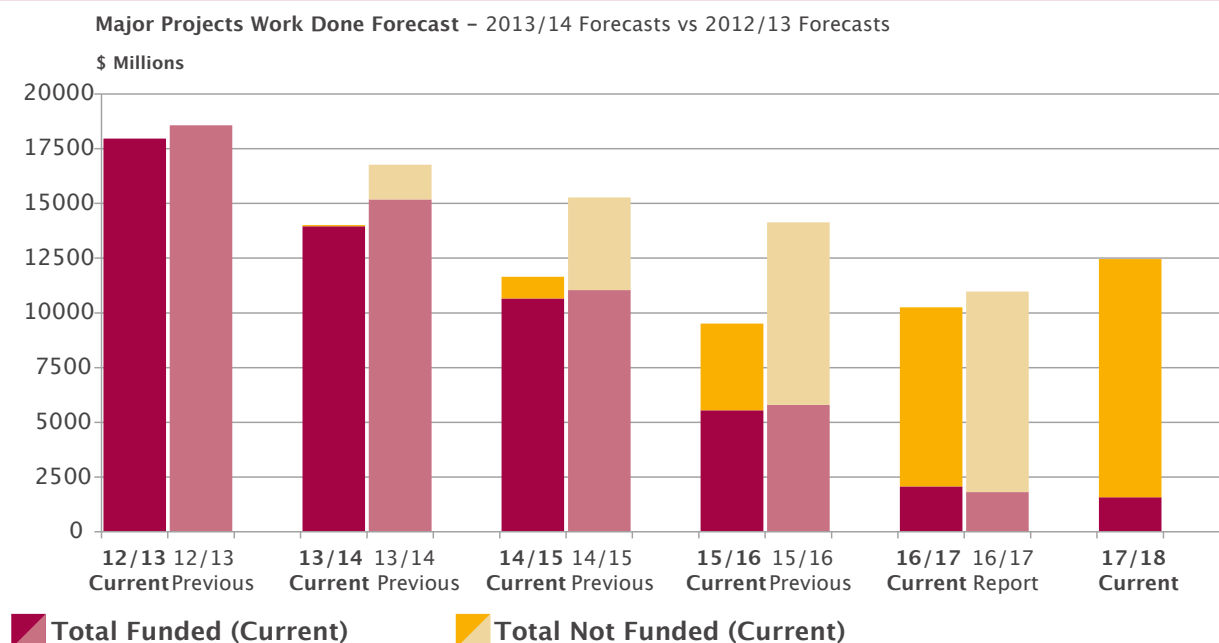
- **Major Project work done in 2012/13 turned out to be very close to forecast.** However, it did come in marginally below forecast as the decline in commodity prices, with a stubbornly high Australian dollar, saw more projects delayed than anticipated – particularly from early 2013.
- **The outlook for Major Project work is now much weaker than the previous Report.** In the near term, this is due to both weaker levels of funded and unfunded work (with now almost all unfunded work in 2013/14 not expected to proceed). Later on, a much sharper decline is expected as more unfunded projects have been removed from the Major Project List, continuing a trend from the 2013 Report. Of these, the single largest omission from this Report is the greenfield Shell LNG project. Instead, it is currently assumed that gas reserves identified for this project will help longer term, brownfield developments at other LNG locations.
- **An earlier trough in major project work is now expected.** The sharper decline in major project work

over the next two years is expected to see a trough in activity in 2015/16, compared to the consistent fall across all years in the 2013 Report. This trough is also lower than the lowest point the 2013 Report (2016/17) as more major projects have been shifted out of the next five year period than added.

- **An upswing in major project work is now expected from 2016/17, rising further over 2017/18.** To some extent, this represents the impact of shifting some of the projects delayed in 2012/13 and 2013/14 to re-commence later in the forecast period. It also represents an upgrading of the outlook for private projects (such as the Galilee Basin developments, and upstream work on LNG projects) since the last report, as well as some public projects (the Brisbane to Melbourne Inland Rail project, for example). However, in aggregate, more major project work has been subtracted than added, with the total volume of activity lower than previously forecast. The majority of work further out remains unfunded and highly risky.

Meanwhile, a closer analysis of major project work contestable for the local contracting industry (as opposed to the total value of work) reveals substantial differences to the traditional perspective,

Figure 5.1.



as shown in Figure 1.3. Primarily, the low proportion of work won by local contractors on the downstream LNG projects (as compared to imports and EPCM labour hire agreements) results in much lower measured activity over 2011/12 and 2012/13. Furthermore, much of the downturn in local contractor work occurs in 2013/14, with another smaller decline in 2014/15 before stabilising in 2015/16. By contrast, a much greater proportion of major project work after 2015/16 is assumed to be won by local contractors (being more upstream related LNG work, and other inland resources projects such as Galilee Basin thermal coal mines and railways, as well as public infrastructure). On this basis, major project local contractor work is expected to trough slightly below 2010/11 levels, although there are risks that the trough may be weaker than this if key, currently unfunded, projects do not commence.

The Boom in Review

The 2000s engineering construction boom presented Queensland with stern challenges, but also an opportunity to showcase how the industry could adapt to delivering substantially higher volumes of work while avoiding skills and equipment shortages, bottlenecks and rising costs which characterised previous construction booms. The industry has delivered projects and growth of such magnitude, often in demanding, complex regional locations and in completely new industries (for Queensland), shows that innovation in project and skills planning and delivery has, indeed, taken place.

Yet this innovation has not occurred exactly as expected; nor has it been completely successful in solving the challenges of the boom.

In previous Major Project Reports, it was noted that the breadth, location and scale of the boom in Queensland major project work would require transformational thinking in the way projects and skills were delivered. For instance, it was thought that the boom in LNG-related major project work in Queensland would require a plethora of skills ranging from civil trades through to mechanical, structural, electrical and other engineering skills regionally focused in Gladstone as well as upstream through the Surat Basin.

In practice, these projects are being designed, procured and delivered in a way which attempts to minimise demand for local skills, fabrication and materials. Engineering and design has moved offshore to lower cost sites in Asia and Europe. Fabrication is mostly

taking place in huge yards in the Philippines, Thailand and Malaysia, whereupon large completed modules are then transported to Queensland and assembled under EPCM direct labour hire contracts. There is still a heavy local civil footprint in the downstream LNG developments, such as preparing LNG production train sites and the Gladstone harbour for development and putting in place local infrastructure such as jetties, bridges, roads and gas pipelines. This is now almost completed, but it is turning out that it may be the upstream components of these projects (the Surat gas fields themselves) which instead provide the greatest demands on the local skills base, and over a much longer time horizon.

While this approach to circumvent local skills shortages and cost increases has not been completely successful, it has reduced pressure on local skills demand, particularly in key 'hot spot' regions such as Gladstone, and hence contained cost growth. Furthermore, now that this avenue has been opened, it is likely to become a regular feature of the industrial landscape for major project works, and may grow its share of activity outside of "traditional" resources projects in future cycles.

In particular, the approaches taken on LNG projects to minimise onsite costs through the boom could be even more pronounced for future projects in the Galilee Basin: it may not be a simple case of returning to "business as usual" for local construction contractors if and when these projects proceed.

This has significant ramifications for the future planning of skills demand, and catering for the regional location of work.

Another feature of the 2000s boom in major project work was the increased utilisation of FIFO (and DIDO) workforces to cater for sharp and sudden increases in demand, particularly in rural and regional locations. While the use of these workforces has increased the flexibility of local contractors to respond to shifting work demands, it has also created additional pressures on local infrastructure (such as housing and utilities) which, by the very nature of FIFO arrangements, has not been completely fundable or addressable by local governments alone. As a consequence, the regional shift to FIFO work led to significant price impacts on local accommodation, housing, trade and other local services which added to the costs of project development and delivery.

5. Key Implications, Challenges and Risks

Now regional communities face the new, and equally daunting, challenge of dealing with the downturn. While the loss of FIFO workforces is restoring prices for regional services such as housing to lower levels (and assisting in reducing costs), it is also reducing regional demand and trade.

Furthermore, where prior investments were made to cater for the increase in the workforce population, these now run the risk of seeing substantial idled capacity.

Implications and Challenges

Following an unprecedented boom in engineering construction major project activity over the past decade, the industry in Queensland is in the midst of a sharp reversal in fortune. In the 2013 Queensland Major Projects Report, it was noted that major project work would be likely to decline by 40% over the five years to 2016/17. In this Report, the size of the decline in major project work has been sharpened to 55%, but there is also now the potential for another significant, if smaller, cycle in major project work towards the end of the forecast period.

The eventual extent of the downturn (and whether the next cycle of work materialises, or remains a mirage) may depend crucially on how industry and government react from here; how issues are identified and prioritised, and whether long term, transformative solutions are put into place. While negative external factors, such as weaker growth in global demand and a high exchange rate, are beyond the direct control of industry participants, there remains much that can be done to improve the prospects for major project activity, and secure the longer term health of the Queensland contracting industry, the engineering construction market, other construction segments which benefit from a strong engineering market (such as residential and commercial building) and the broader economy.

Causes of the Downturn in Major Project Work

In considering the implications of the outlook, it is important to identify the key causes of the expected downturn in major project work, whether these are temporary or permanent effects, what is within the power of industry participants to address, and what strategies or solutions arise from this. From the analysis in this Report, these causes present themselves:

- **Completion of an unusually high phase of investment**, with investment likely to revert to more “normal” levels from here. This includes both private and public investment.
- **Moderation in global demand growth (and price) for resources**, which may be temporarily or permanently affecting the next round of projects.
- **Relatively high costs and lower competitiveness** which is affecting Queensland’s share of major

project work. This includes the impact of the high Australian dollar, but also factors which may be more specific to the efficiency of the local construction industry.

Each of these causes is important, and offer different insights into developing strategies and solutions for contractors operating in the Queensland major project industry.

Completion of Large Investment Phase

Over the past decade, total engineering construction work done in Queensland as measured by the ABS – including the major projects in this Report – has risen five-fold from \$6.6 billion to \$38 billion per annum (in constant 2010/11 prices). With such a rapid and large increase, it seems natural to expect some moderation in future. However, while engineering construction major project work as discussed in this Report is expected to fall 55% over the next three years, it is still likely to remain well above levels experienced through much of the 2000s. Furthermore, once accounting for off-shored fabrication and direct labour employment, the outlook for major project work available to local contractors, while still negative, is less severe and remains at a relatively high level.

The boom phase in engineering construction work, itself, was driven by a convergence of four factors which are unlikely to be repeated in the near future:

- **A need (and funding availability) to invest heavily in Queensland’s public infrastructure** to cater for strong population growth, following a relative lack of infrastructure investment in the 1990s.
- **A “once in a generation” mining boom**, mainly focused in coal, to satisfy the industrial development of China particularly, but also cater for development in periphery Asian economies.
- **The one-off development phase of a massive new LNG industry**, based on CSG, to satisfy the high energy demands of developing Asia.
- **Major civil reconstruction and repair works to redress damage caused by 1 in 100 year flood events** that affected much of Queensland in 2011 and again in 2013 (although this has not been included in the Major Project List as packages of work are contracted at less than \$100 million).

Viewed in this way, it was always unlikely that the engineering construction market would continue growing indefinitely in Queensland, or even be sustained at the level of work experienced in 2012 or 2013. There is no clear substitute for oil and gas work in the near term which will keep overall activity at these historically high levels.

For a contracting industry that has been acclimatised to double digit rates of growth, and hence focused on securing additional labour skills and innovating to win work while keeping costs under control. This is a significant psychological shift.

Even so, there are important policy implications that arise. If much of the boom's volatility has been driven by, more or less, "one-off" or "generational" resources investment from the private sector, then this places a greater onus on State and Federal Governments to offer a stabilising and, importantly, known pipeline of major public project work. In this respect, the Queensland State Government pioneered the development of longer term infrastructure plans with the introduction of the SEQIPP (and later, QTRIP) during the 2000s, in turn influencing the development of similar infrastructure plans for other states and territories, as well as the Federal Government.

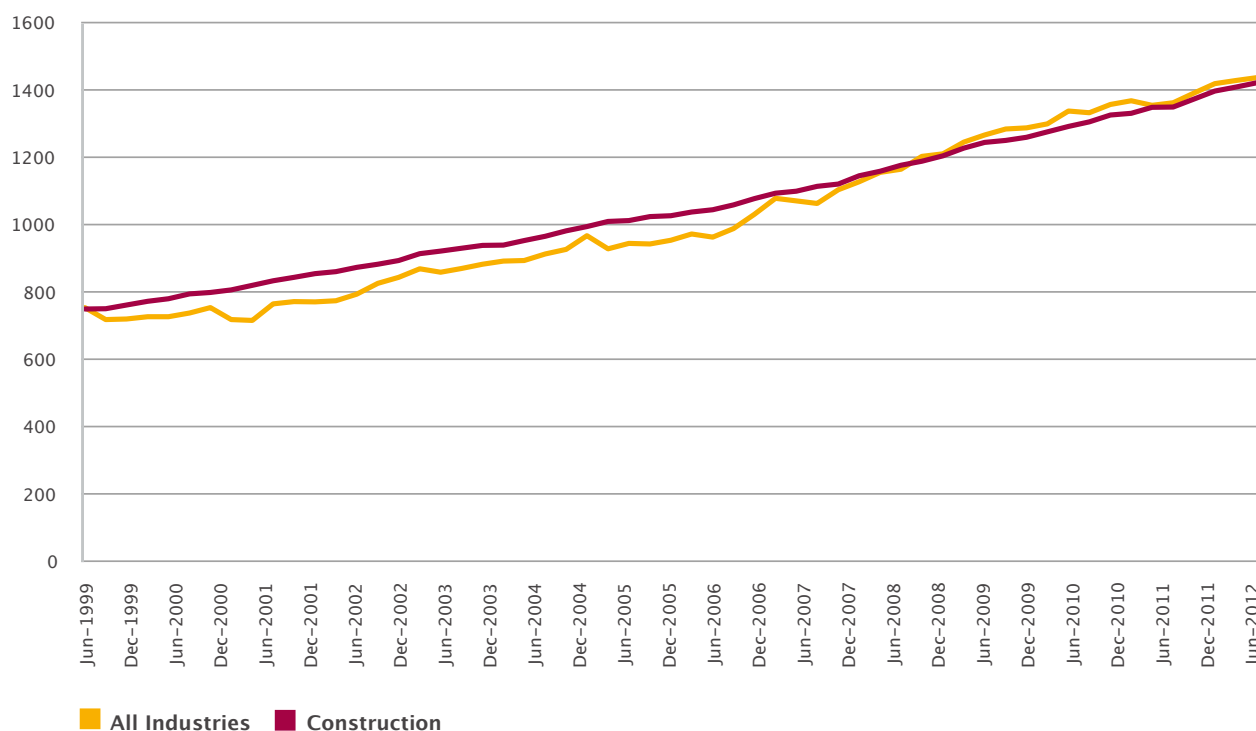
However, these plans were also a product of their time; a time of strong economic growth and even stronger government revenues which gave the infrastructure plans the credibility of being funded and delivered. While the State Government continued to invest heavily after the GFC, the significant debts it accumulated, coupled with weaker revenues and higher deficits, has now ushered in a period of weaker public investment in major projects, and much greater uncertainty within and outside government as to which projects will be funded, how they will be funded, and when.

So instead of offering a stabilising influence, public sector funded major projects are currently amplifying the decline in work and adding to overall industry uncertainty.

Consequently, it is important from here that both the State and Federal Governments can rapidly assess and announce a coherent and funded long term infrastructure strategy for the state to cater for ongoing population and sustainable economic growth.

Ideally, these plans will take account of likely cycles in private sector investment to avoid amplifying the boom/bust construction cycle, with its impacts on costs and employment. State and Federal Governments can use longer term plans to build major projects for industry where it may be difficult to coordinate investment amongst many private sector interests. Build Own Operate Transfer (BOOT) is a type of procurement arrangement with the private sector so that it finances, builds the asset and operates it for a concession period (say 30 years) before transferring it to public ownership. A Reverse BOOT is the opposite – public finances, builds and operates the asset and transfers to private sector after a period of time. Stronger long term plans can also play a role in reserving infrastructure corridors and acquiring land which could help reduce the cost of future infrastructure projects.

Figure 5.2. Wages in the Construction Industry, Australia (AWOTE, Full Time Persons)



5. Key Implications, Challenges and Risks

Related to this, public sector infrastructure strategies should encompass not just engineering construction major projects, but also other major investment projects and programs that will drive more balanced economic growth and employment.

In recent years, growth in investment has been highly unbalanced and tilted heavily to the resources economy. This made sense while commodity prices were high, but will make less sense in future if lower commodity prices (and a lower Australian dollar) stimulate demand in parts of the economy badly affected by the commodities boom and high dollar – in particular, the non-mining tradeable goods and services sector, including parts of manufacturing, education and tourism.

In turn, this also suggests a review of the fiscal tax/transfer system to ensure sustainable growth in net revenues that can be used to fund or seed major infrastructure projects in future.

The recent failure of GST revenues, for example, to keep pace with government expenditure needs, suggests that new sources of revenue may need to be found in future, either by broadening the tax base, or raising the rate of tax, whilst loopholes in the tax/transfer system which affect its neutrality (i.e. income should be taxed equivalently regardless of its source) and efficiency (both administratively and in the sense that it does not distort efficient economic decision-making) should be closed off. Furthermore, given the high level of uncertainty associated with forecasting growth in the global and domestic economy, and consequently tax revenues, it will be important that future tax and spending policies are well designed so that changing economic conditions do not affect the overall fiscal position.

In assisting the readjustment, there may be a role for the public sector in boosting incentives to invest in growth areas by redirecting funding or subsidies from declining industries.

While major engineering construction projects themselves have substantial “second order” impacts on industrial building (for example, the surge in building activity along the route of the major gas transmission pipelines in the Surat Basin), there may also be a case for State and Federal Governments to directly sponsor or enact policies to stimulate private investment to service demand in the non-resources economy (for example, policies to support sustainable health and education building, residential building or the development of new commercial tourism precincts or facilities).

For the contractor industry, this is especially important, as any substantial pickup in Queensland non-engineering construction will quickly flow through to

additional skills and labour demand in the construction industry, (given the relatively higher labour intensity of building work) as well as demand for local materials, equipment and other services. A lower profile for engineering construction major project work, as indicated by this Report, may not necessarily be accompanied by equivalently lower demand for labour, skills, materials or services across the construction industry. Competition for resources, both within the construction industry in Queensland, as well as across different regions and other Australian states, may keep demand, and prices for services relatively high in the medium to long term, despite recent evidence pointing to a cooling in cost growth.

Finally, the end of the long private and public engineering construction boom suggests strategies should be put into place by contractors to target opportunities in operating and maintaining the large asset base installed, rather than focusing exclusively on servicing new investment. This also includes the substantial civil construction work associated with the long term (10 to 20 year) development of the Surat Basin gas fields which will provide a sustainable source of gas during the operations phase of the downstream LNG plants. On the public sector side, there have recently been plans put into place to outsource road maintenance tasks in the more urbanised south east corner of the state. While the type and value of these contracts are not considered in this Major Projects Report (focusing on construction projects greater than \$100 million), they are likely to add around \$1 billion in contract work alone over the coming decade, with the prospect of further competitive contracting out of maintenance tasks ahead as the State Government seeks to save costs.

Moderation in Global Demand Growth for Resources

To a significant extent, the downturn in major project work reflects an industry response to weaker growth in global demand for Queensland’s key resources (particularly coking coal, but also thermal coal). This has pushed down prices, and is now delaying substantial work in developing new coal mines and related infrastructure, such as railways, port and harbours, water and energy.

While the direct causes of the slowdown in global growth (and, for Queensland, this almost exclusively refers to China, but also includes demand from emerging economies in Asia) are outside the control of the local industry, the squeeze on commodity prices and resource revenues is driving an industry response to costs, which have risen substantially during the boom, affecting competitiveness.

Of immediate concern here is the interpretation of the moderation in global demand for coal, and whether this is likely to be a temporary or more permanent feature of the outlook.

Under the former scenario, global demand for coal may eventually reaccelerate in the future to service increasing industrial production and steel making (coking coal) as the global economy recovers, as well as rising energy demand (thermal coal). As coal supply takes time to come on-stream, this will manifest in further cycles in commodity prices which will underwrite the investment in new capacity. Assuming that Queensland's share of demand is maintained, this will lead to further cycles of investment in coal mines and related infrastructure (both to expand capacity as well as sustain existing, high rates of production), along with the usual policy implications and prescriptions for managing the boom/bust cycle in the regions affected and maintaining competitiveness.

However, there remains a significant risk that the weaker growth in global demand in coal may be a more permanent phenomenon – particularly for thermal coal (which, through the large Galilee Basin projects mentioned in this Report, underwrites a significant expansion in unfunded major project work).

This scenario is dependent upon (quite plausible) decisions made in China (which has accounted for over 70% of the growth in seaborne coal demand since 1990): in particular, whether tougher emissions policies will be introduced which will accelerate a shift in its energy mix away from the burning of thermal coal towards gas and renewables, or; if China begins the process of relocating heavy industry inland to take advantage of substantial Mongolian coal reserves. Either scenario would likely result in a more permanent downward shift in demand growth for the seaborne coal market, resulting in lower long term prices for coal. While Queensland has higher quality thermal and coking coal deposits, if these scenarios eventuate, it can be expected that resources investment and related major project work in Queensland will remain significantly lower in future. This would free skills and resources to support investment elsewhere, but it would be then imperative that plans are put in place by government and industry to develop alternative growth strategies for the state, and the appropriate skills and industrial mix to achieve this.

In this Report, a middle ground has been assumed. While demand and prices for coking and thermal coal are not expected to spike again, they are expected to rise gradually from here in response to a recovery in global demand growth which is more or less met by additional supply. A falling Australian dollar through the forecast period could be expected to encourage further greenfield investment and sustaining capital

in Queensland coal mines. Importantly, however, it is expected that India joins China as a key driver of global thermal coal demand as it moves to a phase of more rapid and substantial energy investment. Although (at current prices) it may be economically rational for India (or China) to simply purchase its coal requirements on the spot market, the long term strategic benefit of owning a supply chain, from pit to port to power station, may encourage a new wave of investment in Queensland's Galilee Basin, where significant planning and feasibility activity has been undertaken during the past decade.

The downside risk is that these projects do not proceed with consequences for overall major project activity and demand. The upside risk is that the timing of these projects (from 2016/17) could see them occurring simultaneously with a broader recovery in public and private investment as other projects, currently delayed, come back in view. Queensland is also likely to be competing against other states for resources during this period, with nearby New South Wales, in particular, likely to be experiencing a boom in construction work driven by a wave of public infrastructure projects such as the North West Rail Link, F3-M2 Link, Sydney Light Rail and the multistage WestConnex road project.

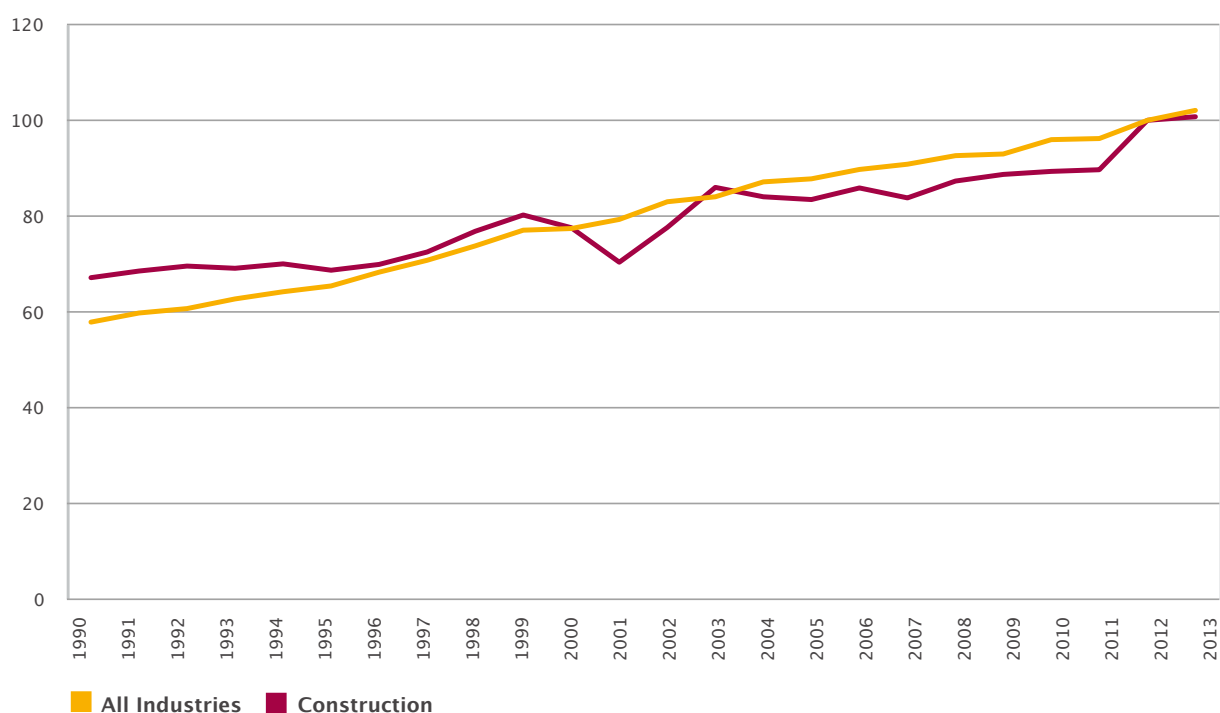
This will require careful planning to ensure Queensland retains the skills to undertake the Galilee projects effectively and efficiently against regional competition from the South East corner and New South Wales. The regional nature and expected timing of the Galilee work also means that it is not too late to learn from the lessons of the recent boom; that the Galilee region is supported by industry and government in terms of delivering local infrastructure and employment practices that will encourage the development of more sustainable communities that are less buffeted by the volatility of employment at the investment phase (versus the production phase) and the use of FIFO workforces.

Relatively High Costs and Lower Competitiveness

Arguably the greatest concern arising from the imminent downturn in major project work relates to the perceived high cost and low competitiveness of industry in Australia, both at the investment and operation phases of major projects. While perhaps not the principal driver of the downturn in major project work, both the fall in commodity prices and lower public sector revenues has exposed the real cost of doing business in Australia; a cost which was easier to ignore when commodity prices were at record highs and public sector revenues strong. Furthermore, this issue has the advantage of being more addressable by both industry

5. Key Implications, Challenges and Risks

Figure 5.3. Labour Multifactor Productivity in the Construction Industry, Australia



and government, and so it has naturally attracted considerable focus.

Both private and public sectors in the Queensland economy are demanding lower costs to improve competitiveness, and are achieving this in different ways. Miners, for example, are moving operations back “in house” where they feel they are not receiving appropriate value in contracting work out. Where work is being contracted out, it is being moved to contractors that can offer the lowest prices. This is seeing a shift in the distribution of work from larger, higher cost contractors to smaller, lower cost and lower overhead operations. Anecdotal evidence suggests that, already, large cost savings have been attained (and having already been achieved, may be followed up by further rounds of cost cutting).

On the public sector side, State Governments are examining ways that public infrastructure can be delivered and maintained more cheaply. This includes developing more efficient methods of funding and financing infrastructure development (from use of “availability charges” and tax incentives to new approaches involving asset sales and “capital recycling”) as well as opening up “traditional” public sector activity, such as maintenance, to greater commercial competition. Furthermore, the Federal Government has asked the Productivity Commission to undertake an inquiry into public infrastructure, with a specific stream of inquiry into “the scope for reducing the costs associated with such infrastructure”. Following

submissions, a draft report will be released in March 2014, with a final report and recommendations to be delivered in May 2014. These are all important steps in understanding the nature of the cost challenge, and coming up with solutions to improve efficiency and competitiveness.

However, the most pressing issue affecting Australian costs (relative to international competitors) may not be productivity per se, but competitiveness.

Typical measures of labour productivity for the construction industry (that is construction industry gross value added (GVA or output) divided by hours worked) show that it has increased over the past decade, although not at the same pace as all industries, nor construction wages (see **Figures 5.2 and 5.3**). Interestingly, wage increases in the construction industry were more pronounced during the 2000s when labour productivity growth was at its weakest (a point also noted by the Productivity Commission’s Public Infrastructure Issues Paper) but this was likely the result of severe skills shortages during the construction boom (particularly in the mining regions) which gave greater wage bargaining power to labour, at a time when the “marginal employee” was likely to be less productive than their predecessors per unit of invested capital. This emphasises the importance of matching construction skills to meet demand over the construction cycle. Apart from cyclical factors, however, there may also be structural factors at work which could constrain

growth in productivity outcomes in the future, such as inadequate investment in productivity enhancing technology and capital, outdated work practices and standards, and excessive regulation. These should be open to discussion and review.

A more substantial driver of Australia's relatively high cost base than productivity has been the impact of the stubbornly high Australian dollar. While a rising Australian dollar has helped make imports relatively cheaper, it has also made local goods and services (including construction and operations services) more expensive vis-à-vis the rest of the world.

In this respect, it has been arguably the combination of the sharp fall in commodity prices, combined with a high dollar (supported by capital inflows associated with the resources investment boom, but also extremely loose monetary policies adopted by major economies such as the United States), which has stoked the greatest concerns over Australia's relatively low competitiveness. Lower competitiveness has, in turn, led to (a quite rational) fear that Australia may lose some of the next round of resources investment to lower cost regions. In 2012, for instance, the Business Council of Australia reported that it was 40% more expensive to deliver LNG projects in Australia compared to the United States. While the literature of studies focusing on cross-country comparisons of construction costs is still in its infancy, it is very likely that such comparisons have been highly affected by movements in the nominal exchange rate.

One simple way of measuring the impact of the exchange rate on domestic construction costs is to adjust standard measures of construction cost growth (such as the engineering construction implicit price deflator in the previous Section) for changes in the movement of the Australia dollar. This is shown in **Figure 5.4**, where the national engineering construction implicit price deflator for each quarter has been multiplied by the exchange rate of the Australian dollar to Special Drawing Rights, or SDRs (a weighted basket of major currencies representing claims of IMF member countries).

Viewed in this way, a slightly different historical picture of Australia's competitiveness emerges. Firstly, rather than increasing between 1997 and 2003, a falling Australian dollar actually made local construction more internationally competitive during this period. This likely helped put Australia at the front of the queue as a destination for capital and, along with the rise of China in supercharging global demand, helped kick-start the domestic boom in resources development. By contrast, the relentless rise in the Australian dollar between 2003 and 2008 reversed these gains and exacerbated the loss of competitiveness from rising domestic costs. The sharp fall in the dollar in the immediate aftermath of the GFC in 2008/09 restored some of this competitiveness

(and, fortuitously, at a time when major investment decisions were being made on three massive LNG projects in Queensland). However, the strong rise in the dollar thereafter, despite a recent decline, has once again placed Australia at a competitive disadvantage. While the national engineering construction implicit price deflator only rose 5.7% between June 2009 and June 2013, in exchange-rate adjusted terms the increase has been a more substantial 24.6%.

The Australian dollar has fallen from its peak, but it is not yet low enough to allow Australian business to compete, let alone rebuild. Meanwhile, industry continues to be lost across secondary processing operations and the primary activities that supply them, operation by operation, unable to survive, not just in manufacturing, but also in services.

Although the impact of the high dollar has been highly significant to competitiveness, it is not directly addressable by industry and government. Consequently, it makes more sense to focus attention to areas where cost pressures may prove more controllable, particularly for public projects.

Here, there are several fertile areas for review and policy development:

I. Firstly, the complexity and number of the regulatory approvals processes adds to the cost and time of project development. Major projects in Queensland need to satisfy State and Federal approvals processes, including meeting stringent environmental and social objectives, including commercial viability, community interest, native title and land access requirements. While it is important that all development applications are thoroughly assessed, there is often a duplication of processes between the State and Federal levels whilst project complexity and a lack of public sector resources often sees assessment timeframes extend over several years. Furthermore, the application of different criteria at different levels of government can lead to different approvals outcomes, increasing project risk. In some instances, additional community requirements in the approvals (or tendering) process, such as satisfying local content or employment targets, may also represent a potential cost impost on major projects.

II. Secondly, the high cost of the bidding and procurement process (as identified by KPMG in a 2010 review for Infrastructure Australia concerning Public Private Partnerships) also effectively raises costs for major projects. Issues identified here include:

- **The relatively high cost of design** (typically the major component of bid costs) in submitting Australian tenders compared to overseas experience.

5. Key Implications, Challenges and Risks

- This may be due to excessive design and documentation being required at all phases of the bid process (instead of once a preferred proponent has been selected) coupled with a lack of design work undertaken by the employing public sector agencies.
- **The time taken to assess tenders**, including extensions of the Request for Proposals (RFP) phase to include “best and final offers” (BAFO) and on some occasions “exclusive negotiation phases” which may precede the final announcement of the preferred proponent. In the KPMG report, Australian procurement times (averaging 14–19 months) were longer than in Canada, but shorter than the United Kingdom, although more recent PPP style projects in Australia have taken much longer than this.
- **High and rising complexity of the assessment process** given the size of the projects and risks involved, the degree of detailed design and other commercial/legal documentation to be provided, and the increasing sophistication of tools to assess and manage tenders which itself has become more expensive.

III. In turn, the high cost of bidding and procurement may act as a disincentive for new entrants (including larger international contractors) to compete in the tender process, further reducing efficiency.

Sometimes the assessment criteria for bids may involve ranking proponents by their record of delivering successful projects in the Australian market, which also discriminates against new entrants. As a consequence of all these factors, bids for major PPP style projects tend to be dominated by the largest Australian companies (particularly the two major industry players), while international contractors are usually limited to joining local consortia to gain entry to the market.

IV. The increasing complexity of major projects, coupled with deficiencies in the contracting process and project management may also contribute to rising costs, both for public sector and private sector projects. Here, inadequacies in initial project design and scoping, unclear definitions and poor allocation of risks can lead to costly changes in specifications later on, or, if physical construction work has already started, expensive variations. In this respect, there have been many examples where “cost blowouts” on major projects have been driven more by inadequate estimation and scoping rather than unexpected increases in input costs.

V. Finally, poor estimation and allocation of risks may also contribute to high costs for some projects. Ideally, an efficient tender process and price depends on a proper identification of risks associated with the project, with the proponent best placed to take on only those risks under their direct control.

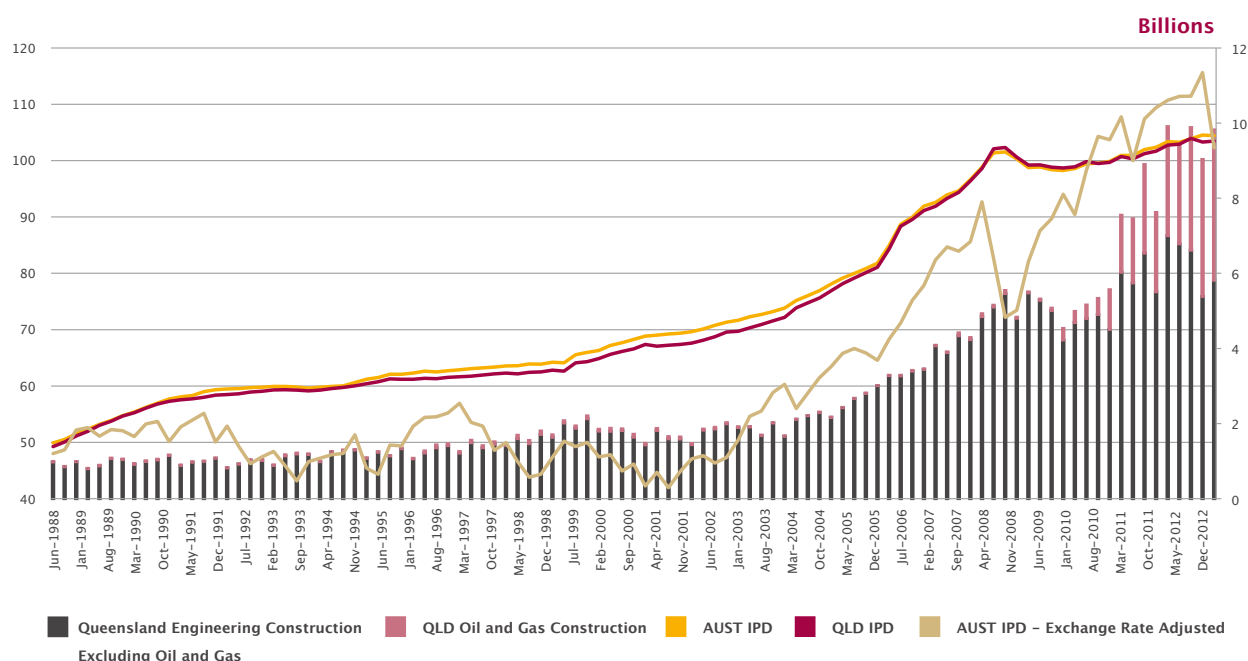
In practice, however, proponents have had to absorb many risks outside of their direct control (such as trafficking risk, site access, delays in documentation, unsuitable or dangerous site and material conditions, and wet weather) which has inflated the cost of projects.

Recommendations

In approaching all these aspects of costs and competitiveness, several solutions present themselves:

- **Tackle risks to productivity within the construction industry.** As shown in **Figure 5.3**, multifactor productivity growth in the construction industry has lagged behind other industries over the past two decades. Stronger growth in productivity would enable major projects to be completed more quickly and efficiently and, in future, should provide the fundamental basis for increasing returns to capital and labour. The range of measures that could be adopted here is diverse:
 - Reviewing skills and training practices, including harmonisation of professional and trade skills across state and international borders, the use of 457 and other work visas, obligations for constructors to go beyond just compliance training and competencies towards developing real proficiency, and ensuring that planning for skills better matches likely future demands based on long term state development policies and objectives.
 - Developing policies which encourage greater capital investment in the construction industry which would boost the efficiency of labour employed.
 - More transparent and effective long term planning from governments to help smooth out volatile cycles in construction activity which have a direct impact on demand and costs.
- **In a similar vein, State and Federal Governments should be prepared to review regulation governing workplace and industrial practices.** While labour productivity in the construction industry is not the main impediment to competitiveness facing major projects currently, there are likely to be gains in understanding the evolution of existing practices and identifying areas where inefficiencies may exist. This may mean reviewing existing enterprise bargaining approaches and arrangements in the construction industry, and better monitoring of processes and outcomes to ensure that they are genuine, fair, reasonable and correct in law. Ideally, this should be a constructive conversation between industry, government and labour.
- **Innovation will be vital.** One of the greatest ‘X’ factors in reducing costs on major projects will likely come from (as yet unidentified) changes to design, engineering and construction processes or materials used that, while small on their own, may bring huge

Figure 5.4. The Impact of the Australian Dollar on Competitiveness



benefits in terms of reducing overall project costs. As an example, new pipe cleaning technologies from the water and sewerage industry may yet drive significant cost reductions in the roll out of the NBN. Competition in the construction industry, coupled with the increasing demands of clients, are key long run drivers of innovation. Where types of construction projects are repeatable (rather than one off), innovations in design and delivery can be more easily developed, transferred and applied. Innovation is also more likely under procurement arrangements that focus on team integration, alliancing and non-price outcomes rather than traditional lump sum (fixed price) arrangements which place the greatest cost risk on contractors (and lead to more adversarial outcomes). Finally, performance-based regulations (i.e. detailing the output required), as opposed to the industry's historical reliance on prescriptive regulations (i.e. detailing materials and processes required to achieve a certain goal) may also encourage greater innovation regulation. In this sense, promoting industry competition, integrated procurement models and tackling excessive prescriptive regulations will all assist in encouraging innovation within the industry.

- **Streamline regulatory approvals and accelerate decision timeframes.** In this instance, the Queensland Government appears to be taking a lead by its moves with the Federal Government in late 2013 to develop a "one stop shop" for environmental approvals, as well as its decision to fast-tracking mining exploration leases. While strict environmental standards should be maintained, the need to only

submit one environmental application instead of two, as well as the decision on mining exploration leases, is likely to accelerate decisions and reduce pre-construction costs for proponents.

- **Reductions in general business regulations and "red tape".** The Queensland Government has already announced targets for reducing the regulatory burden on businesses, but it is important that these remain quantified as bottom line improvements for businesses (in either obligation, time or cost), and not an exercise in reducing word counts in legislation.
- **For major public projects, costs could be significantly reduced through adjustments made at the tendering stage. This may include:**
 - Committing to published decision timeframes, and use fewer bid stages.
 - Reducing the focus on design before selecting the preferred bidder.
 - Ensuring the government team has adequate skills and experience.
 - More efficient allocations of risk between government and bidders.
 - Earlier selection of preferred bidder.
 - Reimbursement of bid costs to all bidders.
 - Reducing the information required from bidders that is not relevant to assessing their capability or ability to achieve certainty on commercial terms.

5. Key Implications, Challenges and Risks

- **For private and public sector funded projects, further cost gains may be made through seeking greater competition at the tendering stage.** This may mean adjusting criteria (such as package sizes, demonstrated Australian experience, and the complexity of the tendering process) to attract new entrants to the market (both overseas-based and domestic).
- **For all projects, a greater focus on the allocation of risks, scoping and engineering design before the construction phase** is highly pertinent where it can reduce expensive redesign work, the introduction of new processes, and contract variations.

There is substantial anecdotal evidence that poor quality control at these project stages have played a significant role in creating cost overruns at major projects.

Amongst this discussion and focus on costs, it is important to remember that cost reduction alone should not be the overwhelming focus of the industry over the long term. Certainly, costs are higher than in the past and, thanks to a high Australian dollar, threaten our international competitiveness on major projects. Where high costs are caused by inefficiencies (whether in labour or product markets, in excessive regulation, or in specific industry practices) as identified above, these should be addressed in a consultative and thoughtful manner by governments, industry and labour. Over the long term however, a fixation on costs at the expense of quality and achieving sustainable industry outcomes, is likely to be counterproductive. Maintaining a healthy Queensland state economy relies on sustaining a highly skilled, innovative and harmonious construction industry that delivers sustainable, high quality projects, and is flexible to respond effectively to the challenges ahead.

Risks to the Outlook

Compared to previous Major Project Reports, the outlook for activity has become even more uncertain and hence subject to greater risks and revisions as new information becomes available.

Over the next few years, the biggest global risk relates to the economic outlook for key trading partners, such as China and India, the strategic decisions they make in achieving sustainable growth, and how this will impact on the global trade of resources for which Queensland has a strong supply position, particularly coking coal, thermal coal, and gas.

Much of this remains outside of the control of Australia, but there is much that can be done locally to prepare industry for possible developments, and maximise the chances of success when opportunities arrive.

In this respect, the most significant downside risk to the forecasts in this Report are that either economic

growth remains weaker than expected in China and/or strategic decisions are made which otherwise reduce growth in demand for Queensland's resources. The latter may include decisions by China to impose tighter environmental regulations which would drive changes in the energy mix between coal, gas, nuclear and renewables; or relocate industry inland closer to domestic coal sources. For Queensland, this would likely lead to a larger decline in minerals-related investment and major project work done, and workforce demand than shown here.

Another significant risk revolves around India and whether it will proceed to invest in opening up the Galilee Basin to provide long term thermal coal energy security. Two Galilee thermal coal projects have been assumed here (including related infrastructure requirements in port and rail), but this could easily be just one – or none. Obviously, if these projects were not to proceed, then the longer term outlook for major project activity becomes much weaker. This may also have knock on effects for public investment: weaker than anticipated economic growth and State Government revenues may make it more difficult to fund the next round of public infrastructure projects, requiring either more funding from alternative sources, such as the Federal Government, the private sector, or from recycling capital from infrastructure asset sales (such as being undertaken in New South Wales).

On the public sector side, there are both upside and downside risks to the forecast. The Report assumes that tight public finances will constrain public sector funded infrastructure work over the next few years, with a recovery (currently unfunded) developing towards the end of the five year forecasting horizon. The downside risk, as mentioned above, is that economic circumstances delay the upswing for longer than this, or weaken its intensity. On the upside, the new Federal Government is making positive noises about infrastructure, with the Brisbane to Melbourne inland rail project and National Network road projects taking priority. There is the possibility that some works on these projects may come through faster than anticipated here, particularly if economic conditions outperform expectations. Ultimately, the speed in which the Federal and Queensland Governments can identify and fund a long term infrastructure plan for the state will be vital in reducing this uncertainty.

There are also upside and downside risks surrounding the volume and timing of work for LNG projects. Since the 2013 Major Projects Report, the outlook for greenfield LNG development in Queensland has become much weaker given a loss of competitiveness and the emergence of new international competitors for gas exports such as the United States (which, up until five years ago was still debating the need to be importing gas). Consequently, some of the downstream greenfield development work previously forecast has been scaled back in this Report. However, there are still considerable volumes of work to be done in sustainably developing

the upstream gas fields and related infrastructure to provide gas over the life of these projects – and the quantum of this work is highly uncertain. In previous Reports, it was assumed that this type of work was worth around \$300 to 400 million per annum.

In this report, based on contracts already tendered and discussions with Queensland's major contractors, this figure has been raised closer to \$1 billion per annum (and could be more).

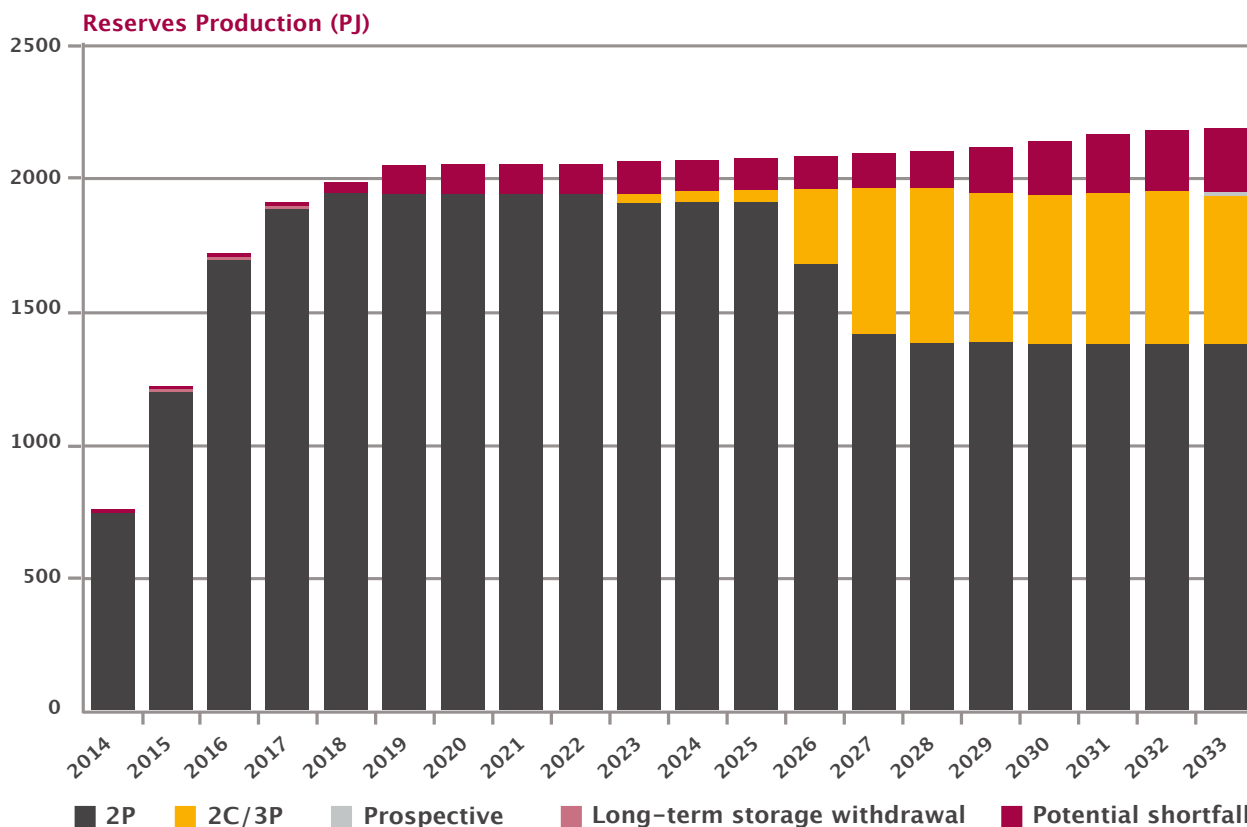
It is uncertain how this investment is packaged, however, and how much can be technically classified as “major project” work (that is, a contract valued over \$100 million). Even so, it appears likely that ongoing upstream gas field works will offer greater value to contractors than the relatively small proportion of work won on the downstream LNG and port facilities.

Finally, it has been assumed in this Report that there will be no constraints to industrial development in Queensland due to energy shortages or supply disruptions.

However, recent modelling by the Australian Market Energy Operator (AEMO) for the latest Gas Statement of Opportunities (GSOO) indicates that the Australian east coast – and Queensland particularly – is facing a looming shortfall of domestic gas supply from 2018.

Essentially, Queensland will not have enough gas to supply all proposed LNG trains and the domestic market, with a gas shortage of approximately 250 Tj per day estimated from 2019. New South Wales is also likely to be affected, but less so (mainly affecting peak demand). On the downside, this may see both strong increases in domestic gas prices and potential supply disruptions to industry which would further lower competitiveness and increase development risk, threatening major project work. On the upside, policy responses to deal with this threat, such as expanding the capacity of the South West Queensland Pipeline (SWQP) to import gas from South Australia or providing incentives to develop new domestic gas sources within the state, may boost major project work from what is shown here.

Figure 5.5. East Coast Gas Supply – AEMO: Gas Stat



Appendix – 2014 Major Projects List

Queensland Project Description	Sponsor	Sector	Region	Total Project Value (\$Millions)
ROADS AND BRIDGES				
CUNNINGHAM HIGHWAY/AMBERLEY INTERSECTION	Qld Government	Roads	South East Queensland	200
MAINS ROAD/KESSELS ROAD INTERSECTION	Federal Government	Roads	South East Queensland	300
DECEPTION BAY RD: BRUCE HWY TO LIPSCOMBE RD	Qld Government	Roads	South East Queensland	124
TRANSAPEX – LEGACY WAY LINK	BCC	Roads	South East Queensland	1700
BRISBANE NEW PARALLEL RUNWAY PHASE 1 & 2	Brisbane Airport	Runways	South East Queensland	250
PEAK DOWNS HWY IMPROVEMENTS – ETON RANGE	Qld Government & Federal Government	Roads	Bowen	170
TOOWOOMBA RANGE SECOND CROSSING	Qld Government & Federal Government/ Private	Roads	South East Queensland	1600
CENTENARY HIGHWAY LOGAN MOTORWAY TO SPRINGFIELD STAGE 2 (DELIVERED WITH RAIL)	Qld Government	Roads	South East Queensland	125
IPSWICH MOTORWAY VARIOUS SECTIONS: ROCKLEA TO DARRA	Qld Government & Federal Government	Roads	South East Queensland	500
PORT OF BRISBANE MOTORWAY GATEWAY MOTORWAY TO PRITCHARD STREET	Qld Government & Federal Government	Roads	South East Queensland	385
GATEWAY MOTORWAY UPGRADE SOUTH (GUST)				
EST BUSWAY FROM EIGHT MILE PLAINS TO ROCHENDALE (SCHOOL RD)	Qld Government & Federal Government	Roads	South East Queensland	140
GATEWAY MOTORWAY UPGRADE NORTH (GUN)				
SANDGATE ROAD TO DEAGON DEVIATION	Qld Government & Federal Government	Roads	South East Queensland	150
STAGE 2: NUDGE TO CABBAGE TREE CREEK	Qld Government & Federal Government	Roads	South East Queensland	550
STAGE 3: CABBAGE TREE CREEK TO BRACKEN RIDGE	Qld Government & Federal Government	Roads	South East Queensland	150
BRUCE HIGHWAY				
SARINA TO CAIRNS: CARDWELL RANGE REALIGNMENT	Federal Government	Roads	Northern Queensland	143
SARINA TO CAIRNS: DUPLICATION FROM VANTASSEL ST TO FLINDERS HIGHWAY (TOWNSVILLE SOUTHERN APPROACH)	Federal Government	Roads	Northern Queensland	138
CURRA TO SARINA: CALLIOPE INTERCHANGE AT DAWSON HIGHWAY	Federal Government	Roads	Gladstone	152
CURRA TO SARINA: CABBAGE TREE CREEK TO CARMAN ROAD & BACK CREEK RANGE	Federal Government	Roads	Bowen	100
COOROY TO CURRA: (SECTIONS A) COOROY SOUTHERN INTERCHANGE TO SANKEYS ROAD	Federal Government	Roads	South East Queensland	550
COOROY TO CURRA: (SECTION C) TRAVESTION ROAD TO KEEFTON ROAD	Federal Government	Roads	South East Queensland	400
SARINA TO CAIRNS: CAIRNS SOUTHERN APPROACH STAGE 1 – SHEEHY ROAD (FOREST GARDENS) TO RAY JONES DRIVE	Federal Government	Roads	Northern Queensland	150
SARINA TO CAIRNS: CAIRNS SOUTHERN APPROACH STAGE 2–EDMONTON TO GORDONVALE DUPLICATION	Federal Government	Roads	Northern Queensland	145

Funded
 Not Funded
 Key Assumptions

Engineering Value (\$Millions)	Project Status	Commence-ment Date	Completion Date	2012/13 (\$Millions)	2013/14 (\$Millions)	2014/15 (\$Millions)	2015/16 (\$Millions)	2016/17 (\$Millions)	2017/18 (\$Millions)
150	Expected	2015/16	2017/18				20	35	35
216	Under Construction	2011/12	2014/15	43	50	43			
93	Probable	2017/18	2019/20						12
1500	Under Construction	2010/11	2015/16	410	279	213	21		
160	Expected	2015/16	2017/18				20	75	65
120	Expected	2015/16	2016/17				55	65	
1300	Expected	2015/16	2017/18				150	650	500
94	Under Construction	2012/13	2013/14	25	25				
450	Probable	2017/18	2020/21						50
231	Complete	2012/13	2013/14	62	12				
90	Under Construction	2012/13	2013/14	45	45				
107	Under Construction	2012/13	2013/14	48	49				
460	Probable	2014/15	2017/18			75	180	180	50
125	Probable	2014/15	2016/17			20	40	70	
107	Under Construction	2012/13	2013/14	28					
80	Expected	2013/14	2015/16		18	36	29		
106	Under Construction	2010/11	2015/16	11	16	43	35		
75	Under Construction	2011/12	2015/16	22	26	23			
300	Under Construction	2013/14	2016/17		100	160	160		
250	Expected	2016/17	2018/19					75	125
110	Under Construction	2010/11	2013/14	43	39				
76	Expected	20016/17	2018/19					73	146

Appendix – 2014 Major Projects List

Continued

Queensland Project Description	Sponsor	Sector	Region	Total Project Value (\$Millions)
SARINA TO CAIRNS: CATTLE CREEK AND FRANCES CREEK UPGRADES	Federal Government	Roads	Northern Queensland	145
SARINA TO CAIRNS: GOORGANGA FLOOD PLAIN (SOUTH OF PROSERPINE)	Federal Government	Roads	Northern Queensland	330
SARINA TO CAIRNS: HAUGHTON RIVER FLOODPLAIN UPGRADE	Federal Government	Roads	Northern Queensland	338
CURRA TO SARINA – YEPPEN FLOODPLAIN SOUTH	Federal Government	Roads	Northern Queensland	150
SARINA TO CAIRNS: MACKAY RING ROAD / BYPASS – STAGE 1	Federal Government	Roads	Northern Queensland	150
CABOOLTURE TO CALOUNDRA UPGRADES (3 PACKAGES)	Federal Government	Roads	South East Queensland	195
PACIFIC MOTORWAY				
NERANG TO TUGUN/VARSITY LAKES – LANES & INTERCHANGES	Qld Government & Federal Government	Roads	South East Queensland	440
(SECTION C) DAISY HILL TO LOGAN MOTORWAY AT LOGANHOLME	Qld Government & Federal Government	Roads	South East Queensland	280
TOWNSVILLE REGION				
TOWNSVILLE RING ROAD – STAGE 4: SHAW RD TO MOUNT LOW	Federal Government	Roads	Northern Queensland	135
KINGSFORD SMITH DRIVE CORRIDOR				
KINGSFORD SMITH DRIVE CORRIDOR	Brisbane City Council	Roads	South East Queensland	600
TOTAL ROADS AND BRIDGES MAJOR PROJECTS				
RAIL				
(PASSENGER)				
DARRA TO SPRINGFIELD PASSENGER LINE 2: RICHLANDS TO SPRINGFIELD	Qld Government	Passenger (Rail)	South East Queensland	418
GOLD COAST RAPID TRANSIT SYSTEM STAGE 1	Qld Government / GCC	Passenger (Rail)	South East Queensland	949
MORETON BAY RAIL LINK (REDCLIFFE RAIL LINK)	Qld Government	Passenger (Rail)	South East Queensland	1147
GOLDCOAST RAPID TRANSIT SYSTEM STAGE 2	Qld Government / GCC	Passenger (Rail)	South East Queensland	1000
BRISBANE UNDERGROUND (REPLACING DEFUNCT CROSS RIVER RAIL)	Qld Government / BCC	Passenger (Rail)	South East Queensland	3500
COOMERA TO HELENSVALE: 2ND TRACK	Qld Government	Passenger (Rail)	South East Queensland	300
(COAL/FREIGHT)				
GSE 140 GOONYELLA SYSTEM EXPANSION (TO SUPPORT HAY POINT)	Aurizon	Coal (Rail)	Bowen	185
WIGGINS ISLAND BALLOON LOOP	Aurizon	Coal (Rail)	Gladstone	200
ROCKLANDS AND STANWELL DUPLICATION (BLACKWATER)	Aurizon	Coal (Rail)	Bowen	200
DINGO TO BLUFF DUPLICATION (BLACKWATER)	Aurizon	Coal (Rail)	Bowen	175
WIGGINS ISLAND RAIL PROJECT – SEGMENT 2	Aurizon	Coal (Rail)	Gladstone	100
GOONYELLA COAL RAIL FURTHER UPGRADES	Aurizon	Coal (Rail)	Bowen	300
TOWNSVILLE EASTERN ACCESS RAIL CORRIDOR	Qld Government	Freight (Rail)	Northern Queensland	200
INLAND MAINLINE FREIGHT UPGRADE – QUEENSLAND BORDER TO ACACIA RIDGE	Federal/Queensland Government	Freight (Rail)	South East Queensland	1500
GALILEE BASIN COAL RAIL INFRASTRUCTURE*	Adani or GVK	Coal (Rail)	Galilee	2750
TOTAL RAIL MAJOR PROJECTS				

Funded
 Not Funded
 Key Assumptions

Engineering Value (\$Millions)	Project Status	Commence-ment Date	Completion Date	2012/13 (\$Millions)	2013/14 (\$Millions)	2014/15 (\$Millions)	2015/16 (\$Millions)	2016/17 (\$Millions)	2017/18 (\$Millions)
76	Expected	20014/15	2016/17			16	40	20	
241	Expected	20015/16	2017/18					15	75
200	Expected	20016/17	2018/19					55	110
106	Expected	20014/15	2016/17			53	53		
100	Expected	20014/15	2015/18			50	50		
137	Expected	2014/15	2016/17			18	70	49	
330	Under Construction	2009/10	2014/15	18	30				
200	Expected	2017/18	2018/19						80
101	Expected	2014/15	2014/15			25	75		
480	Probable	2016/17	2017/18				160	160	160
			WORK DONE	756	690	775	1158	1522	1408
			Funded	756	690	680	608	209	65
			Not Funded	0	0	95	550	1313	1343
293	Under Construction	2010/11	2013/14	183	38				
664	Under Construction	2010/11	2013/14	171	175				
650	Expected	2013/14	2016/17		125	190	190	145	
700	Probable	2015/16	2017/18				150	300	250
2750	Probable	2017/18	2022/23						150
220	Probable	2017/18	2019/20						75
157	Under Construction	2011/12	2013/14	80	37				
140	Under Construction	2011/12	2014/15	55	55	15			
140	Under Construction	2011/12	2014/15	55	55	15			
123	Under Construction	2012/13	2014/15	60	60	3			
75	Expected	2013/14	2015/16		5	70			
200	Probable	2016/17	2018/19					50	100
160	Probable	2016/17	2018/19					55	80
1050	Probable	2017/18	2021/22						50
2000	Expected	2016/17	2019/20				450	750	1250
			WORK DONE	604	550	293	790	1300	1955
			Funded	604	550	293	190	145	0

Appendix – 2014 Major Projects List

Continued

Queensland Project Description	Sponsor	Sector	Region	Total Project Value (\$Millions)
HARBOURS/PORTS				
WESTERN BASIN DREDGING AND DISPOSAL PROJECT	Gladstone Ports Corporation	Coal (Harbour)	Gladstone	1000
WIGGINS ISLAND STAGE 1-27 MTPA	Wiggins Island Coal Export	Coal (Harbour)	Gladstone	2400
HAY POINT STAGE 3 EXPANSION 11 MTPA	BMA	Coal (Harbour)	Bowen	2500
CURTIS LNG JETTY	Santos	LNG (Jetty)	Gladstone	200
GLADSTONE LNG JETTY	BG	LNG (Jetty)	Gladstone	150
DREDGING FOR BRISBANE NEW RUNWAY	Brisbane Airport	Roads (Dredging)	South East Queensland	500
AUSTRALIA PACIFIC LNG JETTY	Origin	LNG (Jetty)	Gladstone	240
SOUTH OF EMBLY PORT UPGRADE	Rio Tinto	Bauxite (Harbour)	Northern Queensland	400
TOWNSVILLE OUTER HARBOUR EXPANSION – STAGE 1	Public/Private	Freight/Bulk (Harbour)	Northern Queensland	850
GALILEE BASIN COAL HARBOUR INFRASTRUCTURE (ABBOT POINT)*	Adani or GVK	Coal (Harbour)	Bowen	3000
TOTAL HARBOURS MAJOR PROJECTS				
WATER				
QGC WATER TREATMENT FACILITIES – KENYA + NOTHERN	Queensland Gas Company	WTP	Surat	1800
CONDABRI CENTRAL, TALINGA & REEDY CREEK WATER TREATMENT FACILITIES	Origin	WTP	Surat	1500
ASSUMED WATER TREATMENT/PIPING AT FAIRVIEW AND ROMA REGION	Santos	WTP/Pipeline	Surat	1000
WOLEEBEE CREEK TO GLEBE WEIR PIPELINE (145KM) (WAS FROM REEDY CREEK)	Sunwater	Pipeline	Surat	430
GORGE WEIR TO BYERWEN PIPELINE PROJECT (110KM) (FOR BOWEN COAL PROJECTS)	Sunwater	Pipeline	Bowen	240
LOWER FITZROY RIVER INFRASTRUCTURE PROJECT – RAISING EDEN BANN WEIR STAGE 1	Gladstone Area Water Board (GAWB)	Dam	Gladstone	171
GLADSTONE TO FITZROY RIVER PIPELINE	Gladstone Area Water Board (GAWB)	Pipeline	Gladstone	345
WYARALONG DAM WTP STAGE 1	Qld Gov	WTP	South East Queensland	250
CEDAR GROVE CONNECTOR (WAS SOUTHERN REGIONAL PIPELINE EXTENSION)	Qld Gov	Pipeline	South East Queensland	100
UNNAMED FOODBOWL OPPORTUNITY	Federal Government	Dam	Northern Queensland	700
SHELL/ARROW WATER TREATMENT FACILITIES SURAT AND BOWEN	Shell/Arrow/Bow	WTP/Pipeline	Surat	1800
GALILEE BASIN FLOOD MITIGATION AND WATER SUPPLY DAM	Adani or GVK	Dam	Galilee	300
GALILEE BASIN FLOOD MITIGATION AND WATER SUPPLY PIPELINE	Adani or GVK	Pipeline	Galilee	600
TOTAL WATER MAJOR PROJECTS				
SEWERAGE				
S1 SEWER UPGRADE – BRISBANE	BCC	Pipeline	Brisbane	160
TOTAL SEWERAGE MAJOR PROJECTS				

 Funded

 Not Funded

 Key Assumptions

* We have assumed either Hancock/GVK's Alpha or Adani's Carmicheal project will proceed

Engineering Value (\$Millions)	Project Status	Commence-ment Date	Completion Date	2012/13 (\$Millions)	2013/14 (\$Millions)	2014/15 (\$Millions)	2015/16 (\$Millions)	2016/17 (\$Millions)	2017/18 (\$Millions)
			Not Funded	0	0	0	600	1155	1955
268	Under Construction	2010/11	2014/15	82	35	26			
1200	Under Construction	2011/12	2014/15	300	450	450	75		
1750	Under Construction	2011/12	2014/15	525	525	350			
120	Under Construction	2011/12	2013/14	72	8				
90	Under Construction	2012/13	2014/15	33	48	9			
300	Expected	2013/14	2014/15		100	100	100		
144	Expected	2013/14	2015/16		45	72	27		
200	Expected	2014/15	2016/17			50	100	50	
650	Possible	2016/17	2017/18					275	200
2250	Possible	2016/17	2019/20				450	700	1250
			WORK DONE	1012	1211	1057	752	1025	1450
			Funded	1012	1211	1057	302	50	0
			Not Funded	0	0	0	450	975	1450
1400	Under Construction	2010/11	2012/13	400	100				
1200	Under Construction	2011/12	2013/14	600	300				
800	Under Construction	2011/12	2013/14	400	200				
300	Expected	2012/13	2014/15	40	220	40			
180	Probable	2014/15	2016/17			30	90	60	
128	Probable	2014/15	2016/17			40	60	28	
207	Probable	2016/17	2018/19					50	100
175	Probable	2017/18	2018/19						60
80	Probable	2017/18	2018/19						15
500	Probable	2014/15	2016/17			100	200	200	
1400	Expected	2016/17	2019/20					100	200
225	Expected	2017/18	2020/21					75	125
450	Expected	2017/18	2020/21					150	300
			WORK DONE	1440	820	210	350	663	800
			Funded	1440	820	40	0	0	0
			Not Funded	0	0	170	350	663	800
120	Probable	2014/15	2015/16			60	60		
			WORK DONE	0	0	60	60	0	0
			Funded	0	0	0	0	0	0

Appendix – 2014 Major Projects List

Continued

Queensland Project Description	Sponsor	Sector	Region	Total Project Value (\$Millions)
ELECTRICITY				
KUMBARILLA POWER STATION 450–600MW	QGC/BG	Generation	Surat	500
MACKAY CO-GENERATION 36MW	Mackay Sugar	Generation	Bowen	120
KOGAN CREEK SOLAR BOOST PROJECT	CS Energy	Generation	Surat	105
DIAMANTINA POWER STATION	APA & AGL	Generation	Northern Queensland	550
SPRINGDALE TO BLACKWALL TRANSMISSION LINE	Powerlink	Distribution/Supply	South East Queensland	125
COOPER'S GAP WIND FARM	AGL	Generation	South East Queensland	1200
GALILEE BASIN TRANSMISSION PROJECT *	Adani	Distribution/Supply	Galilee	300
TOTAL ELECTRICITY MAJOR PROJECTS				
PIPELINES				
SOUTH WEST QUEENSLAND PIPELINE (SWQP) – STAGE 2 (& 3)	Epic Energy/Origin	Gas	South East Queensland	858
GLADSTONE COMPONENT OF PIPELINE WORK FOR CURTIS LNG PROJECT	QGC & BG Group	CSG	Gladstone	163
SURAT COMPONENT OF PIPELINE WORK FOR AUSTRALIA PACIFIC LNG PROJECT	Origin	CSG	Surat	675
GLADSTONE COMPONENT OF PIPELINE WORK FOR AUSTRALIA PACIFIC LNG PROJECT	Origin	CSG	Gladstone	225
SURAT COMPONENT OF GLADSTONE PIPELINE WORK FOR GLADSTONE LNG PROJECT	Santos	CSG	Surat	488
GLADSTONE COMPONENT OF PIPELINE WORK FOR GLADSTONE LNG PROJECT	Santos	CSG	Gladstone	163
BOWEN TO GLADSTONE PIPELINE WORK FOR SHELL ARROW LNG (OR MERGER)	Shell/Arrow/Bow	CSG	Surat	450
TOTAL PIPELINES MAJOR PROJECTS				
TELECOMMUNICATIONS				
NATIONAL BROADBAND NETWORK – QLD COMPONENT	NBN Co.	Telecomms	Other	6928
TOTAL TELECOMMUNICATIONS MAJOR PROJECTS				
OIL & GAS				
CURTIS LNG UPSTREAM FIELD DEVELOPMENT	QGC & BG Group	LNG	Surat	4700
CURTIS LNG DOWNSTREAM (2 TRAINS, 8.5MTPA)	QGC & BG Group	LNG	Gladstone	14840
CURTIS LNG STAGE 2 (EXPANSION TO 12MTPA)	QGC & BG Group	LNG	Gladstone	8000
GLADSTONE LNG UPSTREAM FIELD DEVELOPMENT	Santos & Petronas	LNG	Surat	4500
GLADSTONE LNG PROJECT DOWNSTREAM (2 TRAINS, 7.8 MTPA)	Santos & Petronas	LNG	Gladstone	14350
AUSTRALIA PACIFIC LNG UPSTREAM FIELD DEVELOPMENT	Origin/Conoco Phillips	LNG	Surat	6500

Funded
 Not Funded
 Key Assumptions

Engineering Value (\$Millions)	Project Status	Commence-ment Date	Completion Date	2012/13 (\$Millions)	2013/14 (\$Millions)	2014/15 (\$Millions)	2015/16 (\$Millions)	2016/17 (\$Millions)	2017/18 (\$Millions)
			Not Funded	0	0	60	60	0	0
425	Under Construction	2010/11	2012/13	128					
72	Under Construction	2010/11	2012/13	6					
53	Under Construction	2011/12	2013/14	17	16				
385	Under Construction	2011/12	2013/14	193	53				
50	Expected	2015/16	2016/17				25	25	
720	Probable	2017/18	2019/20						100
200	Expected	2016/17	2019/20					50	100
			WORK DONE	343	68	0	25	75	200
			Funded	343	68	0	0	0	0
			Not Funded	0	0	0	25	75	200
640	Completed	2010/11	2012/13	200					
130	Under Construction	2010/11	2012/13	130					
540	Under Construction	2010/11	2012/13	350					
180	Under Construction	2011/12	2013/14	50	150				
390	Under Construction	2011/12	2013/14	150	150				
130	Under Construction	2011/12	2014/15		120	50			
360	Expected	2016/17	2018/19					100	200
			WORK DONE	880	420	50	0	100	200
			Funded	880	420	50	0	0	0
			Not Funded	0	0	0	0	100	200
4850	Under Construction	2010/11	>2016/17	40	50	50	50	50	50
			WORK DONE	40	50	50	50	50	50
			Funded	40	50	50	50	50	50
			Not Funded	0	0	0	0	0	0
3700	Under Construction	2009/10	2017/18	320	600	600	600	300	300
7590	Under Construction	2009/10	2014/15	2000	2250	1500			
6400	Under Construction	20017/18	2019/20					1200	2000
3600	Under Construction	2009/10	2017/18	320	600	600	600	320	320
7500	Under Construction	2009/10	2015/16	2000	2250	2250	1000		
5200	Under Construction	2009/10	2017/18	320	600	600	600	400	240

Appendix – 2014 Major Projects List

Queensland Project Description	Sponsor	Sector	Region	Total Project Value (\$Millions)
AUSTRALIA PACIFIC LNG PROJECT (2 TRAINS, 9MTPA)	Origin/Conoco Phillips	LNG	Gladstone	15000
SHELL LNG SURAT BASIN UPSTREAM FIELD DEVELOPMENT	Shell/Arrow/Bow	LNG	Surat	2000
TOTAL OIL & GAS MAJOR PROJECTS				
BAUXITE, ALUMINA & ALUMINIUM				
SOUTH OF EMBLEY	Rio Tinto Alcan	Bauxite	Northern Queensland	600
TOTAL BAUXITE, ALUMINA & ALUMINIUM MAJOR PROJECTS				
OTHER HEAVY INDUSTRY				
AUSTCANE ENERGY PROJECT – ETHANOL	Austcane Energy Project	Ethanol	Northern Queensland	220
NORTH QUEENSLAND BIO ENERGY – ETHANOL PLANT	North Queensland Bio Energy	Ethanol	Northern Queensland	300
TOTAL OTHER HEAVY INDUSTRY MAJOR PROJECTS				
COAL				
BROADMEADOW COKING COAL MINE EXPANSION	BMA	Coal	Bowen	900
CAVAL RIDGE COKING COAL MINE	BMA	Coal	Bowen	3740
GROSVENOR COKING COAL MINE	Anglo Coal	Coal	Bowen	1400
GROSVENOR SOUTH COKING COAL MINE	Anglo Coal	Coal	Bowen	200
GROSVENOR NORTH COKING COAL MINE	Anglo Coal	Coal	Bowen	150
YARRABEE	Yancoal	Coal	Bowen	260
ROLLESTON THERMAL COAL MINE EXPANSION	Xstrata	Coal	Bowen	400
DINGO WEST	Bandanna Energy	Coal	Bowen	150
SPRINGSURE CREEK COKING COAL MINE	Bandanna Energy	Coal	Bowen	800
MINYANGO COAL PROJECT	Caledon Resources	Coal	Bowen	750
BARALABA SOUTH OPEN CUT EXPANSION	Cockatoo Coal	Coal	Bowen	200
BARALABA NORTH OPEN CUT EXPANSION	Cockatoo Coal	Coal	Bowen	200
NEW ACLAND STAGE 3 EXPANSION	New Hope Corporation	Coal	Other	700
MIDDLEMOUNT COKING COAL MINE STAGE 2	Peabody/Yancoal	Coal	Bowen	325
BYERWEN	Qcoal	Coal	Bowen	250
FOXLEIGH PLAINS PROJECT	Anglo Coal, Steel Companies	Coal	Bowen	200
HAIL CREEK EXPANSION – UNDERGROUND	Rio Tinto	Coal	Bowen	1100
GAILILEE BASIN COAL PROJECT	Adani or GVK	Coal	Gaililee	6000
TOTAL COAL MAJOR PROJECTS				
OTHER MINERALS				
MT CARLTON (SILVER HILL)	Evolution Mining	Gold	Northern Queensland	127
CLONCURRY COPPER PROJECT	Copper Chem	Copper	Northern Queensland	200
MT GARNET TIN	MGT Resources	Tin	Northern Queensland	124

■ Funded

■ Not Funded

■ Key Assumptions

* We have assumed either Hancock/GVK's Alpha or Adani's Carmichael project will proceed

Engineering Value (\$Millions)	Project Status	Commence-ment Date	Completion Date	2012/13 (\$Millions)	2013/14 (\$Millions)	2014/15 (\$Millions)	2015/16 (\$Millions)	2016/17 (\$Millions)	2017/18 (\$Millions)
8000	Under Construction	2009/10	2015/16	2000	2250	2250	1000		
1600	Under Construction	2009/10	2017/18	200	200	300	600	600	600
			WORK DONE	7160	8750	8100	4400	2820	3460
			Funded	7160	8750	8100	4400	1620	1460
			Not Funded	0	0	0	0	1200	2000
400	Probable	2016/17	2018/19					40	180
			WORK DONE	0	0	0	0	40	180
			Funded	0	0	0	0	0	0
			Not Funded	0	0	0	0	40	180
110	Probable	2016/17	2017/18					55	55
200	Probable	2015/16	2016/17				100	100	
			WORK DONE	0	0	0	100	155	55
			Funded	0	0	0	0	0	0
			Not Funded	0	0	0	100	155	55
720	Under Construction	2010/11	2013/14	360	80				
2992	Under Construction	2011/12	2013/14	1200	800				
1000	Under Construction	2012/13	2014/15	225	370	370			
150	Probable	2015/16	2016/17				75	75	
100	Probable	2017/18	2019/20						50
169	Probable	2015/16	2016/17				78	91	
280	Probable	2014/15	2016/17			175	175	175	
100	Probable	2016/17	2016/17					100	
640	Probable	2014/15	2016/17			120	300	220	
600	Probable	2014/15	2016/17			170	320	110	
160	Probable	2013/14	2014/15		60	100			
160	Probable	2015/16	2016/17				80	80	
490	Possible	2015/16	2017/18				70	210	210
284	Possible	2016/17	2019/20					65	135
200	Possible	2014/15	2015/16			100	100		
140	Possible	2016/17	2017/18					70	70
660	Possible	2017/18	2020/21						150
4000	Possible	2015/16	2019/20				600	1200	1800
			WORK DONE	1785	1310	1035	1798	2396	2415
			Funded	1785	1250	370	0	0	0
			Not Funded	0	60	665	1798	2396	2415
45	Under Construction	2011/12	2012/13	21.3					
110	Under Construction	2012/13	2012/13	165					
50	Expected	2012/13	2013/14	30	20				

Appendix – 2014 Major Projects List

Queensland Project Description	Sponsor	Sector	Region	Total Project Value (\$Millions)
LADY LORETTA SILVER/LEAD/ZINC – STAGE 2	Xstrata	Silver/Lead/Zinc	Northern Queensland	460
ROCKLANDS COPPER	Cudoco	Copper	Northern Queensland	250
GOLD COAST QUARRY	Boral	Quarry	South East Queensland	140
PARADISE PHOSPHATE SOUTH PROJECT	Legend International holdings	Phosphates	Northern Queensland	400
MERLIN PROJECT MOLYBDENUM	Inova Mines	Molybdenum	Northern Queensland	345
RED DOME MUNGANA	Mungana Gold Mines	Gold	Northern Queensland	330
TOTAL OTHER MINERALS MAJOR PROJECTS				
TOTAL MAJOR PROJECTS				

Engineering Value (\$Millions)	Project Status	Commence-ment Date	Completion Date	2012/13 (\$Millions)	2013/14 (\$Millions)	2014/15 (\$Millions)	2015/16 (\$Millions)	2016/17 (\$Millions)	2017/18 (\$Millions)
184	Expected	2011/12	2013/14	70	54				
125	Under Construction	2012/13	2014/15	50	75	15			
42	Expected	2015/16	2016/17				30	12	
300	Expected	2016/17	2018/19					100	150
180	Expected	2017/18	2019/20						70
215	Expected	2017/18	2019/20						65
			WORK DONE	336	149	15	30	112	285
			Funded	336	149	15	0	0	0
			Not Funded	0	0	0	30	112	285
			WORK DONE	14356	14018	11645	9513	10258	12458
			Funded	14356	13958	10655	5550	2074	1575
			Not Funded	0	60	990	3963	8184	10883









QUEENSLAND MAJOR
CONTRACTORS ASSOCIATION