

Queensland

# EXPLORATION SCORECARD

TRACKING QUEENSLAND'S PROGRESS  
TOWARDS BECOMING AN EXPLORATION  
LEADER BY 2020, WITH BRISBANE  
AT ITS HEART



AN INITIATIVE OF THE QUEENSLAND  
RESOURCES COUNCIL

2015

# FOREWORD

## WELCOME TO THE FIFTH ANNUAL QEC EXPLORATION SCORECARD

On behalf of the Queensland Exploration Council (QEC) Scorecard Working Group, we are pleased to introduce the 2015 QEC Exploration Scorecard. This edition is significant, marking the mid-point in the decade-long span of the QEC's Discover Queensland 2020 vision. The scorecard includes a new section that reflects on the achievements over the past five years, while contemplating the possibilities for the next five years.

Unfortunately, exploration in 2015 has been a case of '*a falling tide lowers all boats*'. Just about every lead indicator has declined, reflecting a very difficult outlook for Queensland explorers.

Global commodity demand has softened, with many commodities facing uncertainty over future demand levels. Softer demand has weakened many commodity prices, which makes raising capital for exploration challenging. Fortunately, reductions in the Australian dollar have partially buffered these international revenue pressures. The upside of the downturn has been industry reporting improvements in the availability of skills, equipment and land available for exploration.

The impacts of the challenging global business environment have been stark; with reductions in many lag indicators. Capital raising remains extremely difficult. Minerals exploration spending in Queensland has fallen by 28%, offset by a 23% increase in petroleum exploration spending over the 2014/15 year. The QEC Exploration Index (compiled by Deloittes) showed a 5.3% decline over the 12 months to June 2015.

While Queensland has little influence over international commodity prices and global investor sentiment; we can control the regulatory environment for explorers. How has Queensland responded to the challenge of reform?

For the second year running, the survey recorded strong improvements in the exploration permit processes. Once again in 2015, the Department of Natural Resources and Mines (DNRM) has substantially outperformed its customer service standard for processing applications for coal and mineral exploration. The sentiment survey shows that industry recognises these tangible improvements, with sentiment towards Departmental assistance in Queensland passing the national figure for the first time in the scorecard's five year history.

The Department's MyMinesOnline initiative has delivered significant time savings and far greater transparency for tenure applicants. Each year, more functions are added, that reduces the time, cost and uncertainty of applying for tenure. As 'title is vital', these reforms to tenure administration are welcome.

DNRM's industry reporting reform project reduced the cost to industry of reporting progress on exploration activities. Reforms to petroleum reporting alone have saved industry up to \$1 million per annum.

The electronic delivery of geoscience data packages through QDEX has delivered savings estimated at \$0.9 million per annum. Industry feedback consistently rates Queensland well on the quality and accessibility of pre-competitive geoscience data for minerals and coal.

The scorecard has benefited from having the same core group of expert volunteers steering the development of the scorecard for all five editions. We'd like to thank all the current members of the working group, ably chaired by Euan Morton. QEC has been pleased to again work with the Australian Drilling Industry Association (ADIA) to include a specific survey of sentiment in the drilling industry. The outlook for drilling is an important bellwether for exploration generally.

We commend the fifth annual exploration scorecard for your consideration. Our thanks to all the companies who completed the two sentiment surveys.

*Michael Roche*

**Michael Roche**  
Chief Executive  
Queensland Resources Council

*GD Dickie*

**Dr Geoff Dickie, PSM**  
Chair  
Queensland Exploration Council

November 2015

## MEMBERS OF THE QEC SCORECARD WORKING GROUP 2015

Euan Morton (Chair)	Synergies Economic Consulting Pty Ltd	Nigel Carpenter	Australian Drilling Industry Association
Lyall Hinrichsen	Department of Natural Resources and Mines	Stephen Kelemen	Santos
<b>SUPPORT</b>			
Brett O'Donovan	Exploration Industry Consultant	Andrew Barger	Queensland Resources Council
Chris Brown	Morgans Financial Limited	Amy Greene	Queensland Resources Council
John Briggs	Ashurst Australia	Emma Haigh	Queensland Resources Council
Mark Thornton	Geological Survey of Queensland		

# CONTENTS

<b>2015 PERFORMANCE SUMMARY</b>	<b>4</b>
1.0 Background	6
1.1 The Queensland Exploration Council (QEC)	6
1.2 The QEC Exploration Scorecard	7
1.3 The QEC 2020 vision – <i>Queensland as an exploration leader</i>	7
1.4 Queensland's exploration sector	7
 <b>LEAD INDICATORS – DRIVERS OF ACTIVITY AND PERFORMANCE</b>	 <b>8</b>
2.0 Resources prospectivity and endowment	8
3.0 Commodity prices	11
4.0 Explorer and investor confidence	13
4.1 State government geoscientific funding and activities	13
4.1.1 Access to geosciences data	15
4.2 Regulatory and policy stability	16
4.3 Exploration company sentiment	18
4.3.1 Operating sentiment	20
4.3.2 Investment sentiment	23
4.4 Sentiment of drilling companies	24
4.4.1 Calculation of regulatory burden and perceptions of impact	24
4.4.2 Operating sentiment	25
4.4.3 The operating outlook	26
5.0 Access to the factors of production	27
5.1 Tenure administration	27
5.2 Access to human and intellectual capital	30
5.2.1 Supply and demand of workers	30
5.2.2 Liveability of Queensland	32
5.3 Access to equity capital	33
 <b>LAG INDICATORS – EXPLORATION SUCCESS</b>	 <b>34</b>
6.0 Minerals and petroleum exploration	34
7.0 Production by resource	37
8.0 Production and comparisons with global demand	38
9.0 Market capitalisation movements	39
Glossary	40
Acronyms	43

# PERFORMANCE SUMMARY

## THE QUEENSLAND EXPLORATION SECTOR 2015<sup>1</sup>

### LEGEND

Good	<span style="color: green;">●</span>
No significant impediment	<span style="color: lightgray;">●</span>
Cause for concern	<span style="color: orange;">●</span>
Significant problems	<span style="color: red;">●</span>

LEAD INDICATORS – DRIVERS OF ACTIVITY AND PERFORMANCE	Year to June...				
	2011	2012	2013	2014	2015
<b>Resources prospectivity and endowment (Section 2)</b>	<span style="color: green;">●</span>	<span style="color: green;">●</span>	<span style="color: green;">●</span>	<span style="color: green;">●</span>	<span style="color: green;">●</span>
• Highly prospective - Queensland enjoys significant endowments of coal, minerals and gas.					
<b>Commodity prices (Section 3)</b>	<span style="color: green;">●</span>	<span style="color: green;">●</span>	<span style="color: lightgray;">●</span>	<span style="color: orange;">●</span>	<span style="color: red;">●</span>
• Prices for most <b>base and precious metals</b> have weakened over the past 12 months.					
• The <b>\$US thermal and metallurgical coal</b> prices have decreased substantially.	<span style="color: green;">●</span>	<span style="color: green;">●</span>	<span style="color: orange;">●</span>	<span style="color: red;">●</span>	<span style="color: red;">●</span>
• As the global oil price has fallen, so too has the index price for <b>LNG</b> .	<span style="color: green;">●</span>	<span style="color: green;">●</span>	<span style="color: green;">●</span>	<span style="color: green;">●</span>	<span style="color: red;">●</span>
<b>State government geoscientific funding and activities (Section 4.1)</b>					
• The Geological Survey of Queensland (GSQ) expenditure in 2014-15 was \$18.4 million, consistent with average expenditure over previous years.	<span style="color: green;">●</span>	<span style="color: green;">●</span>	<span style="color: green;">●</span>	<span style="color: green;">●</span>	<span style="color: green;">●</span>
• GSQ approved four projects under third (and final) round of the <a href="#">Future Resources Program Industry Priority Initiative</a> ; successfully launched the <a href="#">Resources Queensland online app</a> and online HyLogger™ data through the AuScope portal and allocated grants for rounds 8 & 9 of the <a href="#">Collaborative Drilling Initiative</a> .					
<b>Regulatory and policy stability (Section 4.2)</b>					
• The Queensland Government has been responsive to industry feedback, establishing Ministerial Roundtable processes and has continued to streamline regulation and improve tenure processes.	<span style="color: orange;">●</span>	<span style="color: orange;">●</span>	<span style="color: orange;">●</span>	<span style="color: orange;">●</span>	<span style="color: orange;">●</span>
• The Queensland Government introduced a new policy for petroleum and gas to allow applications for Potential Commercial Areas (PCAs). Industry has welcomed this new tenure option.					
• The Queensland Government introduced a ban on uranium mining, which has a detrimental impact on uranium exploration.					
• Queensland's land access regime remains unchanged, despite consistent industry concerns with its cost and delays.					
<b>Operating and investment sentiment (Section 4.3)</b>					
Survey results from <b>exploration companies</b> noted:					
• Nine of the 13 factors recorded an improvement in sentiment in Queensland from last year. Significantly, sentiment towards <i>Departmental assistance</i> saw Queensland pass the national figure for the first time in five years of the scorecard.					
• Queensland's sentiment scores for <i>successful use of geoscience data</i> (+25) and <i>resource prospectivity and endowment</i> (+23) are considered the most positive whereas <i>conduct and compensation agreements</i> (-50) and <i>environmental regulations</i> (-45) are considered the most negative.	<span style="color: orange;">●</span>	<span style="color: orange;">●</span>	<span style="color: orange;">●</span>	<span style="color: orange;">●</span>	<span style="color: orange;">●</span>
• As you would expect given generally low activity levels, <i>land available for exploration</i> (+5), <i>equipment availability</i> (+30) and <i>labour and skills availability</i> (+27) were all positive and improved strongly on 2014 results.					
• The significant improvements in sentiment continued for factors primarily influenced by the DNRM – being <i>government/Departmental assistance</i> , and <i>exploration permit process</i> . Queensland sentiment still trails the rest of Australia, but the gap has generally narrowed.					
• Sentiment in Queensland remains negative and behind the rest of Australia in the areas of <i>cultural heritage regulations</i> , <i>Native Title regulations</i> , <i>environmental regulations</i> , <i>conduct and compensation agreements</i> , and <i>policy uncertainty</i> .					

	Year to June...				
LEAD INDICATORS – DRIVERS OF ACTIVITY AND PERFORMANCE	2011	2012	2013	2014	2015
<p>Survey results from <b>drilling companies</b> noted:</p> <ul style="list-style-type: none"> <li>• Sentiment towards all types of regulation is more negative from drilling companies active in Queensland when compared to other Australian jurisdictions.</li> <li>• The majority of drilling companies are unsure they will have sufficient cash reserves to sustain their operations beyond two years.</li> <li>• Drilling companies active in Queensland have become more negative with regard to <i>environmental, mining and workplace health and safety legislation</i> when compared to 2014.</li> <li>• Although still negative, sentiment towards <i>petroleum and gas, policy uncertainty</i> and <i>land access</i> have marginally improved when compared to 2014.</li> </ul>				●	●
<p><b>Tenure administration (Section 5.1)</b></p> <ul style="list-style-type: none"> <li>• One of the real success stories in Queensland exploration has been the reform to tenure processing. A concerted effort over a number of years to streamline these tenure processes, combined with a clear focus on managing the time taken to reach decisions has delivered a major acceleration in processing time.</li> <li>• For the second year running, DNRM has substantially outperformed its customer service standard for processing applications for coal (EPC) and mineral (EPM) exploration. The aim to have 80% of applications processed within 12 months (6 months if there is no native title) has been achieved, and the department has delivered 94% of applications.</li> <li>• While the area granted for petroleum exploration in 2014-15 was comparable with 2013-14, the areas granted for coal and metal exploration declined.</li> </ul>	●	●	●	●	●
<p><b>Access to human and intellectual capital (Section 5.2)</b></p> <ul style="list-style-type: none"> <li>• Internet vacancies for geologists and geoscientists indicate a dramatic decline from early 2012.</li> <li>• Completion of drilling qualifications continued to decline in Queensland.</li> </ul>	●	●	●	●	●
<p><b>Liveability of Queensland (city and regional hubs) (Section 5.2.2)</b></p> <ul style="list-style-type: none"> <li>• Brisbane is once again rated the most liveable of the Australian cities and regions most commonly chosen by geosciences professionals to reside.</li> </ul>	●	●	●	●	●
<p><b>Access to equity capital (Section 5.3)</b></p> <ul style="list-style-type: none"> <li>• In 2014-15 companies exploring in Queensland announced \$55 million in capital raisings for minerals exploration. This is an increase of 36% compared with 2013-14, but well below the first three years of the scorecard.</li> </ul>	●	●	●	●	●
LAG INDICATORS – EXPLORATION SUCCESS	2011	2012	2013	2014	2015
<p><b>Mineral exploration (Section 6)</b></p> <ul style="list-style-type: none"> <li>• Queensland in 2014-15 recorded a 28% decrease in mineral exploration compared to 2013-14 (\$475 million to \$340 million).</li> <li>• Queensland's greenfields performance as a percentage of total minerals exploration expenditure decreased in 2014-15 to 35% compared with 36% in 2013-14.</li> <li>• In 2014-15, Queensland spent 1.3% of its minerals revenues (sales) on exploration, a decrease from 1.6% in 2013-14.</li> </ul>	●	●	●	●	●
<p><b>Petroleum exploration (Section 6)</b></p> <ul style="list-style-type: none"> <li>• Petroleum expenditure in Queensland increased 23% in 2014-15 (\$613 million to \$752 million). All other states experienced a decline.</li> </ul>	●	●	●	●	●
<p><b>Levels of reserves (Section 7)</b></p> <ul style="list-style-type: none"> <li>• Reserve/production levels for copper, gold, lead, silver, and zinc remain at low levels.</li> <li>• Reserve/production levels for Queensland bauxite is currently ~58 years.</li> <li>• Reserve/production levels for Queensland coal is currently ~82 years (~59 years of coking and ~220 years of thermal).</li> <li>• Reserve/production levels for Queensland will change once all LNG plants are fully operational from ~132 years at current production to ~26 years.</li> </ul>	●	●	●	●	●
<p><b>Minerals production and comparison with global demand (Section 8)</b></p> <ul style="list-style-type: none"> <li>• The growth in Queensland's total production of bauxite, coal, copper, gold, lead, silver, zinc and nickel and aluminium and alumina exceeded the growth in global demand for these commodities in 2014-15.</li> </ul>	●	●	●	●	●
<p><b>Market capitalisation movements (Section 9)</b></p> <ul style="list-style-type: none"> <li>• The QEC Exploration Index showed a 5.3% decline over the 12 months to 30 June 2015. This compares with a 3% decrease for the S&amp;P/ASX All ordinaries, a 1.8% decrease in the <a href="#">Queensland Exploration Index</a> (Queensland based ASX listed companies) and a 21.7% decrease in the Deloitte Queensland E&amp;R Index (Queensland based ASX listed energy and resources companies).</li> </ul>	●	●	●	●	●

# 1.0 BACKGROUND

## 1.1

### THE QUEENSLAND EXPLORATION COUNCIL

#### 2020 Exploration Vision – Queensland as an exploration leader

The vision of the Queensland Exploration Council (QEC) is to see Queensland acknowledged as a minerals and energy exploration leader by 2020 with Brisbane at its 'heart'. This vision is maximised by fostering investment in Queensland exploration using expertise and services sourced from Queensland.

The Queensland Resources Council (QRC) formed the QEC in December 2010 to drive the [2020 Exploration Vision, Discover Queensland](#). The QEC brings together senior representatives from established and emerging resource companies, government, the finance and broking community and academic leaders.

Under the chairmanship of geologist and former Queensland Deputy Coordinator-General Dr Geoff Dickie, PSM, the QEC is working to put Queensland on the front foot in the global contest for new resource sector investment.



Key initiatives of the QEC include:

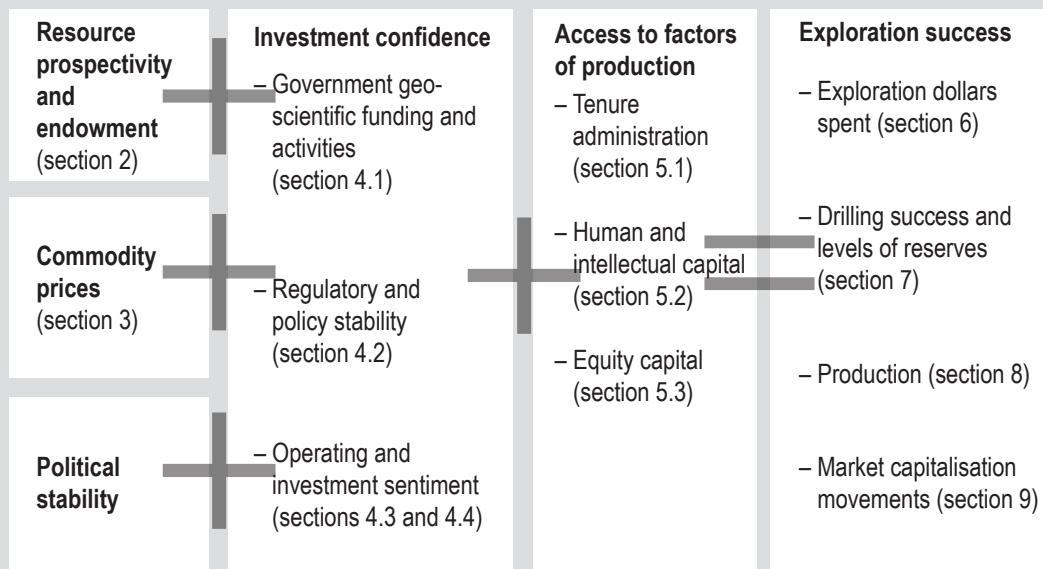
- monthly investor forums to profile junior resources companies to potential investors
- bi-monthly luncheon series for executives of junior resources companies
- annual Queensland Exploration Breakfast
- quarterly publication of the QEC newsletter [Queensland Explorer](#)
- annual publication of the [Queensland Exploration Scorecard](#)
- annual Capital Raising Seminar
- annual Technical Seminar
- participation in Brisbane's [Mining Resources Convention](#) conference series
- local and international promotion of Queensland as an attractive investment destination for explorers
- Engagement with local governments to promote the importance of exploration activities.

For more information, visit the QEC [website](#).

CHART 1: SCORECARD STRUCTURE

#### LEAD INDICATORS – FACTORS THAT DRIVE EXPLORATION ACTIVITY AND PERFORMANCE

#### LAG INDICATORS – MEASURING ACTUAL SUCCESS



## 1.2 THE QUEENSLAND EXPLORATION SCORECARD

The QEC Exploration Scorecard is a valuable tool in tracking the progress towards the [Discover Queensland, the 2020 Exploration Vision](#). This is the fifth edition following the publication of the inaugural Scorecard in 2011.

Data from both government (DNRM) and industry - as well as survey information from companies actively exploring in Queensland - are used to inform the results. Members of QEC, QRC and the Australian Drilling Industry Association (ADIA) provide invaluable feedback on industry perceptions, which adds insights into industry perceptions to supplement the official statistics.

To evaluate the sector's progress, the Exploration Scorecard 2015, retains the layout of previous editions and continues its analysis of key exploration indicators.

The Scorecard is developed on the assumption that increasing exploration activity is broadly driven by:

- resource prospectivity and endowment
- commodity prices
- explorer and investor confidence
- political stability
- access to the essential factors of production (capital, land, and skills).

As the market drives commodity prices, the Scorecard concentrates on those lead indicators that can be influenced – namely, explorer and investor confidence and access to the essential factors of production. Outcomes or lag indicators that measure actual exploration success are also included. Chart 1 shows the scorecard structure.

## 1.3 THE QEC 2020 VISION – DISCOVER QUEENSLAND

In 2010, the Queensland Exploration Council's (QEC) Discover Queensland vision set the bold target of making Queensland the minerals and energy leader by 2020. The vision challenged industry and policy makers to:

*'Imagine a vibrant exploration sector, stimulated by locally-based new exploration ventures and serviced by a dynamic community of lawyers, accountants, investment bankers, geologists and researchers, supported by technology providers, scientists, academics and administrators.'*

It is clear that much of the work remains to be done in achieving the 2020 vision; however, the impact of the changing economic conditions since 2010 cannot be overstated. The focus for many explorers in 2015 is simply to survive the global economic headwinds. The challenge for Queensland remains to create the most attractive environment for exploration so that when the economic cycle turns, the state is best placed to compete for exploration investment.

The explorers' sentiment survey provides direct feedback on how effective the industry feels the reforms of the past year have been. Traditionally, the industry has not minced words, and in 2015 highlighted the need to:

- ‘...improve land access and Land Court’
- ‘...improve certainty in legislation and policy’
- ‘...permitting timeframes are far too long, even with generally diligent departmental staff’, and noted
- ‘...DNRM now very proactive and helpful. Regional Coal hub in Rockhampton is excellent.’

Exploration is a global business, and Queensland needs to compete for every dollar of investment. As such, this scorecard aims to provide an annual stocktake of progress in the areas Queensland can control. What reforms have been implemented? Which impediments have been reduced? How are we selling the benefits of exploring in Queensland? How does the exploration community hear of successful exploration in Queensland?

Since the first scorecard was released in November 2011, Queensland has had four Prime Ministers, three Premiers and four Ministers for Mines. Political continuity has been in short supply.

In 2010, the industry was still recovering from the global financial crisis and particularly for explorers, there were still very real constraints on raising capital, but industry sentiment was bullish. Lead exploration indicators were on the rise

In 2010, commodity prices were strong and rising and exploration activity was generally robust. While the economic conditions were generally good, the expansion of the industry was putting pressure on resources, with many costs being bid upwards. There was a general shortage of skills and equipment. Substantial investment in infrastructure was under way with the rapid expansion of both the coal seam gas industry and the coal industry. Key exploration indicators began a slow decline in late 2011 and it can be argued that the flow-on effect of this started to affect the industry in mid 2012. Unfortunately, this decline appears yet to have bottomed.

In 2010, the industry's policy concerns were much as they remain today. Queensland's land access regime had just been introduced and many explorers were struggling with the cost and complexity of the new system. Unfortunately, neither side of politics has addressed this issue and it remains one of the major impediments to exploration activity in Queensland.

In 2010, the industry was still looking for a system of long-term funding for pre-competitive geoscience and advocating for a system of flow through shares, to enable tax losses from exploration companies to be accessed by investors. In 2014-15, there was \$25 million available for the Commonwealth Exploration Development Incentive.

Queensland's tenure systems were largely paper-based in 2010 and processing of applications, renewals and variations was an arduous (and occasionally inconsistent) process. Faced with complex approval structures, industry was actively poaching departmental staff, which was creating further delays as new staff were trained up.

In 2013-14, the department introduced a new customer service standard of resolving 80% of all mineral or coal exploration applications within 12 months (or within six months if they did not require native title) and has successfully delivered on this standard.

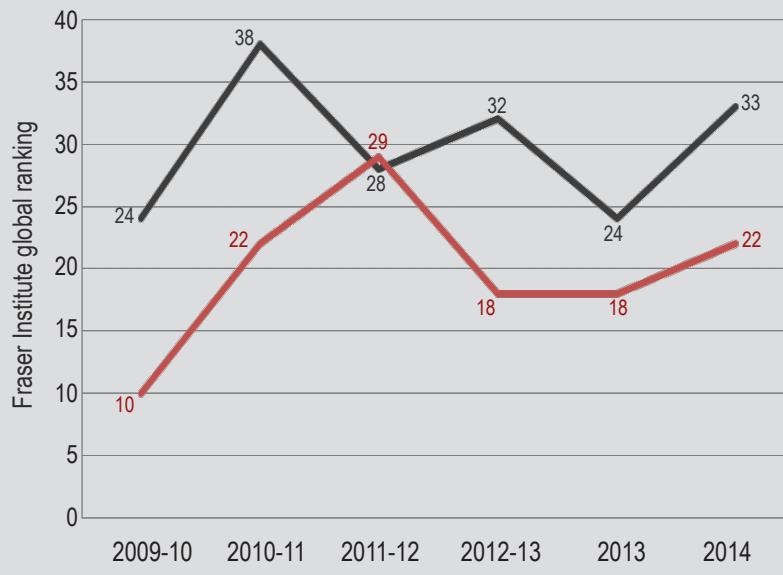
The first exports of LNG from CSG out of Gladstone Harbour in 2015 confirm that Queensland has built a world-first export industry based on the quality of Queensland's gas reserves. The three LNG plants on Curtis Island are equivalent in cost and complexity to the Snowy Hydro Scheme and Queensland has seen three of these world-class projects proven up, and built, with two of them already commissioned and exporting.

It is important to recognise that the jobs, revenues and royalties from these LNG plants are founded on the success of the dozens of drill rigs that mapped out the extent of Queensland's CSG reserves. In exploration, success breeds success, and it is important to recognise Queensland's CSG to LNG industry as an exploration success story.

The 2010 vision mapped out an aggressive set of key performance indicators for 2020 including three new major metal discoveries and bringing geothermal energy into production. The vision aspired to see 100 more exploration companies headquartered in Brisbane, serviced by twice as many brokers and with 100 new floats from junior explorers. Clearly, these KPIs are a product of the positive outlook in 2010 rather than the more sombre economic conditions in 2015.

The final performance indicator in the 2010 vision focussed on global perceptions of Queensland as an exploration destination, aiming to see Queensland secure improved rankings on the Fraser Institute's annual survey. There are two critical indexes on the survey – policy potential index and minerals best practice index.

**CHART 2: FRASER INSTITUTE - QUEENSLAND'S RANK, 2009-10 TO 2014**



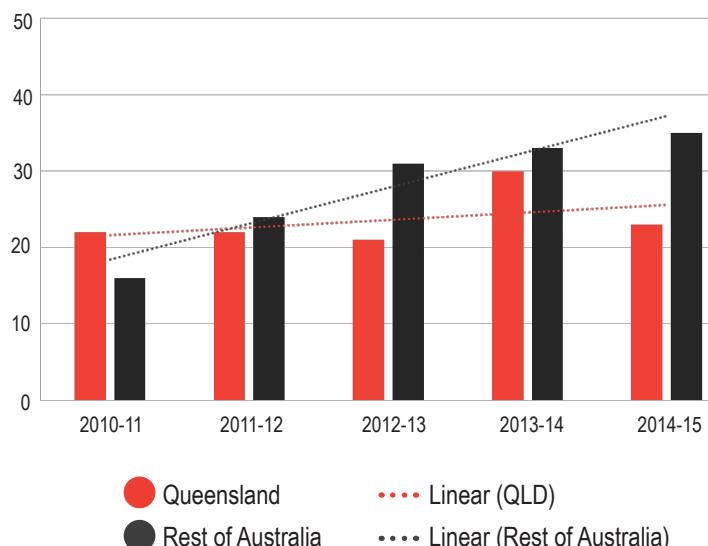
Source: ?

The Fraser Institute's policy perception index is a composite index, measuring the overall attractiveness of the jurisdictions in the survey (122 in 2014). In 2006/07 Queensland was ranked eighth out of 65 jurisdictions.

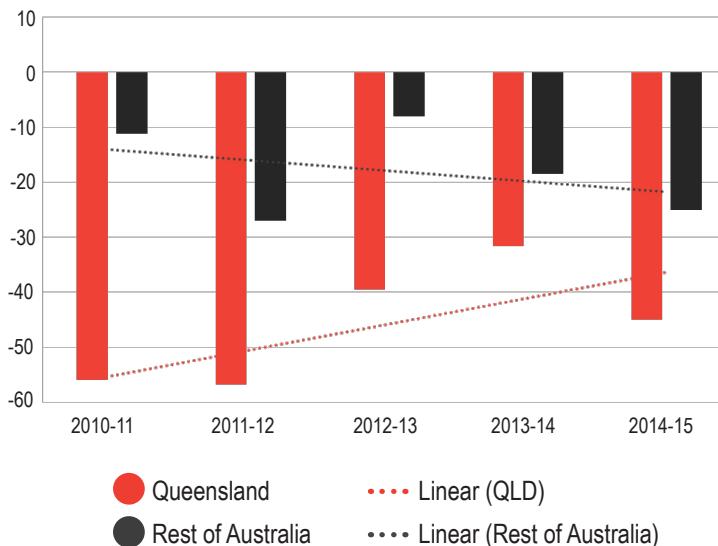
The nearest equivalent in the scorecard is 16D, the sentiment around policy uncertainty. While the scorecard sentiment shows a clear trend of improvement over the five years, the Fraser Institute's policy perception index seems to show variability rather than a clear trend.

The Fraser Institute's best practice minerals potential index rates a jurisdiction's attractiveness based on perceptions of the geology. Survey respondents are asked to rate the pure mineral potential, assuming that their policies are based on 'best practice', ie independent of any policy settings. The Fraser Institute index is dominated by Queensland's fall from the top 10 jurisdictions in 2010/11.

RESOURCE PROSPECTIVITY (CHART 16A)



POLICY UNCERTAINTY (CHART 16D)



In 2015, sitting near the bottom of the commodity price cycle, the challenge for Queensland is to be poised and ready to get boots on the ground once demand returns.

There is cause for optimism. New exploration techniques, better mapping and more sophisticated remote sensing offer the prospects of grappling with the resource wealth that lies under cover. Deeper drilling is more expensive, so needs to be better targeted.

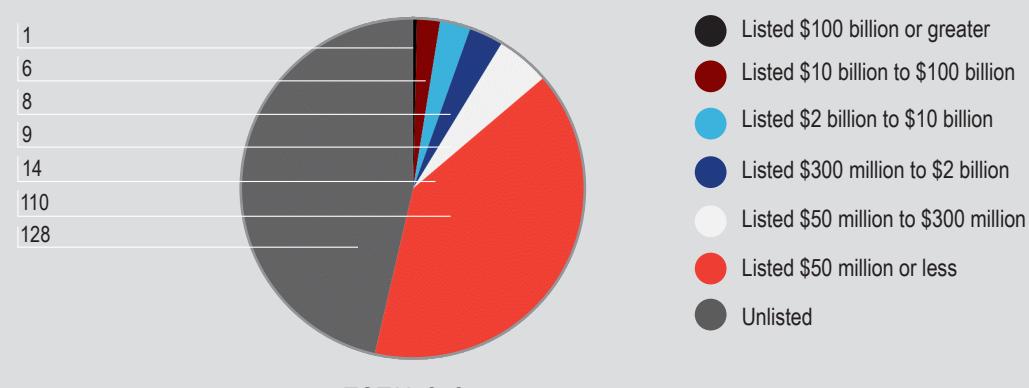
It is important to acknowledge that well-funded activist groups are challenging the industry's legitimacy. Particularly in social media, the entire resource industry is being actively demonised, which will require companies to work hard to build good working relationships with their landholders, shareholders, local governments and communities. Ultimately, all politics is local and there is no better defence for the industry than being an integral part of the local community and economy.

It seems likely that through to 2020, Queensland exploration will remain focussed mainly on ensuring supplies of the bulk commodities like coal and petroleum. The inability to mine uranium diminishes the rationale for exploration. However, Queensland also has strong prospects in rare earths and exotic elements like scandium, molybdenum, and rhenium.

## 1.4 THE QUEENSLAND EXPLORATION SECTOR

It is estimated that around 276 companies conducted exploration activities in Queensland in 2015. The companies are diverse in their size (market capitalisation), business models, and exploration targets.

CHART 3: NUMBER OF COMPANIES ACTIVELY EXPLORING IN QUEENSLAND BY MARKET CAPITALISATION AS AT 30 JUNE 2015



Source: SNL Metals & Mining

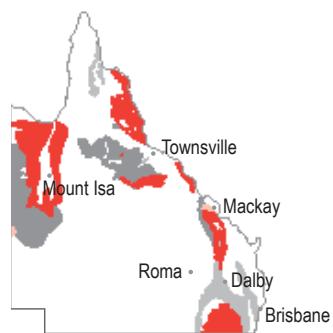
# 2.0 RESOURCES PROSPECTIVITY AND ENDOWMENT

Prospectivity is a major driver of exploration activity. Queensland's prospectivity for coal, petroleum and minerals is evident and recognised globally.

Queensland is blessed with a rich endowment of resources – both a diversity of resources and highly prospective deposits right around the state. Queensland's rich prospectivity in base metals, gold, and uranium; significant endowment of coal and gas is presented in the following charts.

Source: GeoScience Australia

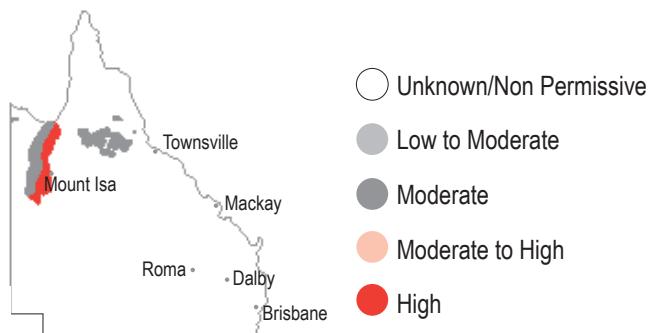
**CHART 4: QUEENSLAND BASE METAL PROSPECTIVITY**



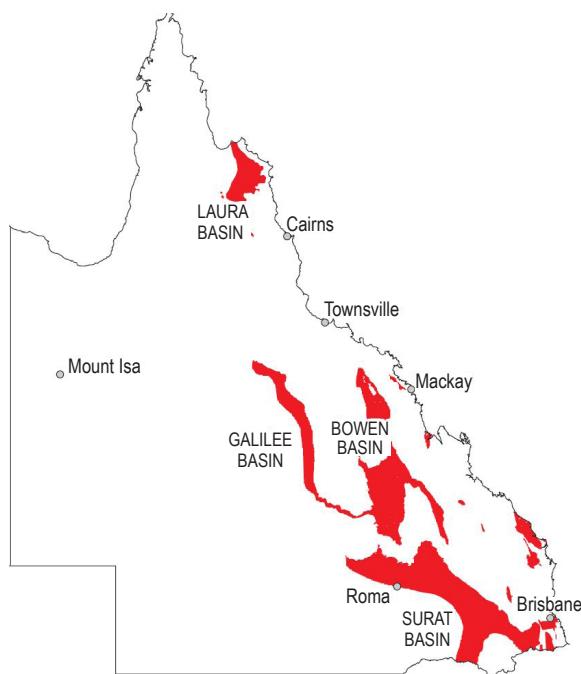
**CHART 5: QUEENSLAND GOLD PROSPECTIVITY**



**CHART 6: QUEENSLAND URANIUM PROSPECTIVITY**



**CHART 7: QUEENSLAND'S KEY COAL AREAS**



## KEY FINDINGS

- **Queensland base metals prospectivity**

The world-renowned North-West Queensland Mineral Province (NWQMP) hosts major Mount Isa-style copper deposits, large sediment-hosted silver-lead-zinc deposits (such as George Fisher, Cannington, Century and Dugald River) and numerous significant copper-gold deposits (such as the Ernest Henry deposit, which also contains substantial magnetite mineralisation).

Base metal deposits have been identified south and west of Cooktown, in the Townsville Hinterland and along the east coast from south of Mackay to west of Brisbane. There remain many lightly explored prospective areas prospective for base metals in Queensland, and further exploration has the potential to identify new deposits (Chart 4), particularly under cover as new geochemical, magneto-telluric and other 'remote sensing' technologies are deployed in the field.

- **Industrial minerals**

Australia is the world's largest producer of bauxite, representing almost a third of global production. The large bauxite resources at Weipa with more than 3,000 million tonnes have average grades between 49 and 53% of aluminium oxide and are amongst the world's highest-grade deposits. Importantly, Queensland's bauxite deposits are shallow and relatively easy to mine. Queensland also has substantial deposits of iron ore (magnetite) and phosphate, which for the most part have not been brought into production.

Source: GeoScience Australia

## KEY FINDINGS CONTINUED

While sand mining in Queensland was initially focussed on rutile production, industrial minerals such as zircon and ilmenite are now in demand for a diverse range of applications throughout the world including glass, ceramics, construction and engineering, metallurgy and casting, oil and gas recovery, and environmental protection.

Queensland has high prospectivity for the rare earth elements (REE) and critical elements that are necessary for many modern and future technologies. The former uranium mine at Mary Kathleen contains about 7Mt of REE at ~4% remaining in the tailings facility. REE have also been found at the Korella prospect south of Mount Isa.

The world's richest Rhenium (Re) deposit has been found at the Merlin deposit south of Cloncurry and Scandium (Sc) is also found at the SCONI deposits west of Townsville in North Queensland. Another critical element is Indium (In) at the Baal Gammon deposit in the Cairns hinterland while several Tungsten (W) deposits are known also in the Cairns hinterland. There is also renewed interest in exploring for Graphite in North West Queensland.

### • Queensland gold prospectivity

Many major gold deposits are known in the east of the state, including multi-million ounce deposits in the Charters Towers region (such as Charters Towers, Ravenswood and Mount Leyshon), in the northern Drummond and Bowen basins (Pajingo and Mount Carlton) and at Mount Morgan, Gympie, Kidston, Croydon, Chillagoe, Mount Rawdon and Cracow. Current gold exploration is mostly focused on discovering new intrusion-related and epithermal gold deposits in north Queensland. Significant gold resources are also contained as a secondary commodity in copper-gold deposits in the NWQMP (Chart 5).

### • Queensland uranium prospectivity

Queensland is highly prospective for uranium. The NWQMP hosts the historically mined Mary Kathleen uranium deposit and significant undeveloped deposits at Valhalla and Westmoreland. Other significant uranium deposits include Ben Lomond (near Townsville) and Maureen (in the Georgetown region) (Chart 6). The Queensland Government has a policy of not permitting uranium mining in the state.

### • Queensland coal endowment

Queensland has a number of major coal basins that feature both coking and thermal coals. In theory, the reductions in coal prices across all coal qualities will reduce the volume of coal that can be economically recovered. In practice, the economics of these calculations are unlikely to be updated until a mine plan is being worked up.

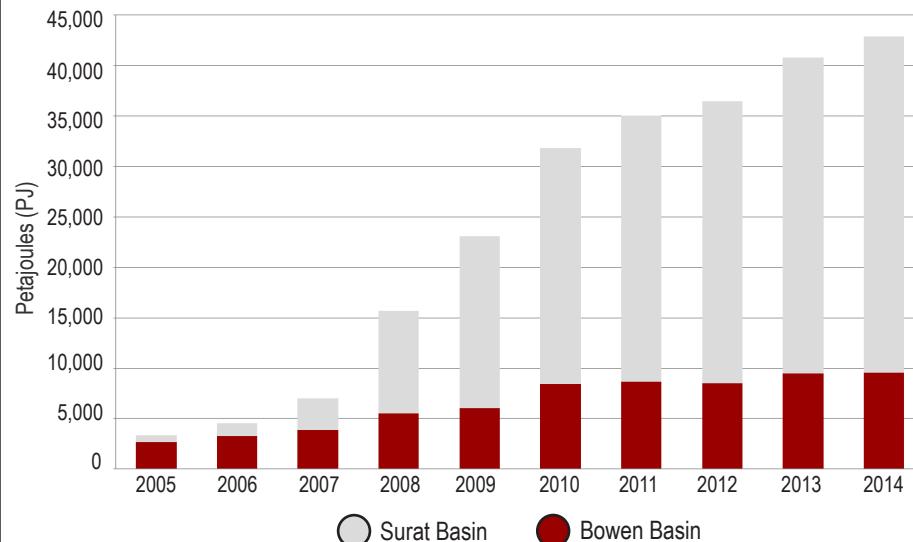
The period of strong exploration activity in coal has seen Queensland book around 14 billion tonnes of proven and probable coal reserves. Measured and indicated resources have also grown to 55 billion tonnes. These increases are a lag and associated with the high amount of coal exploration in previous years, particularly around the Surat and Galilee Basins (Chart 7).

### • Queensland's gas prospectivity and endowment

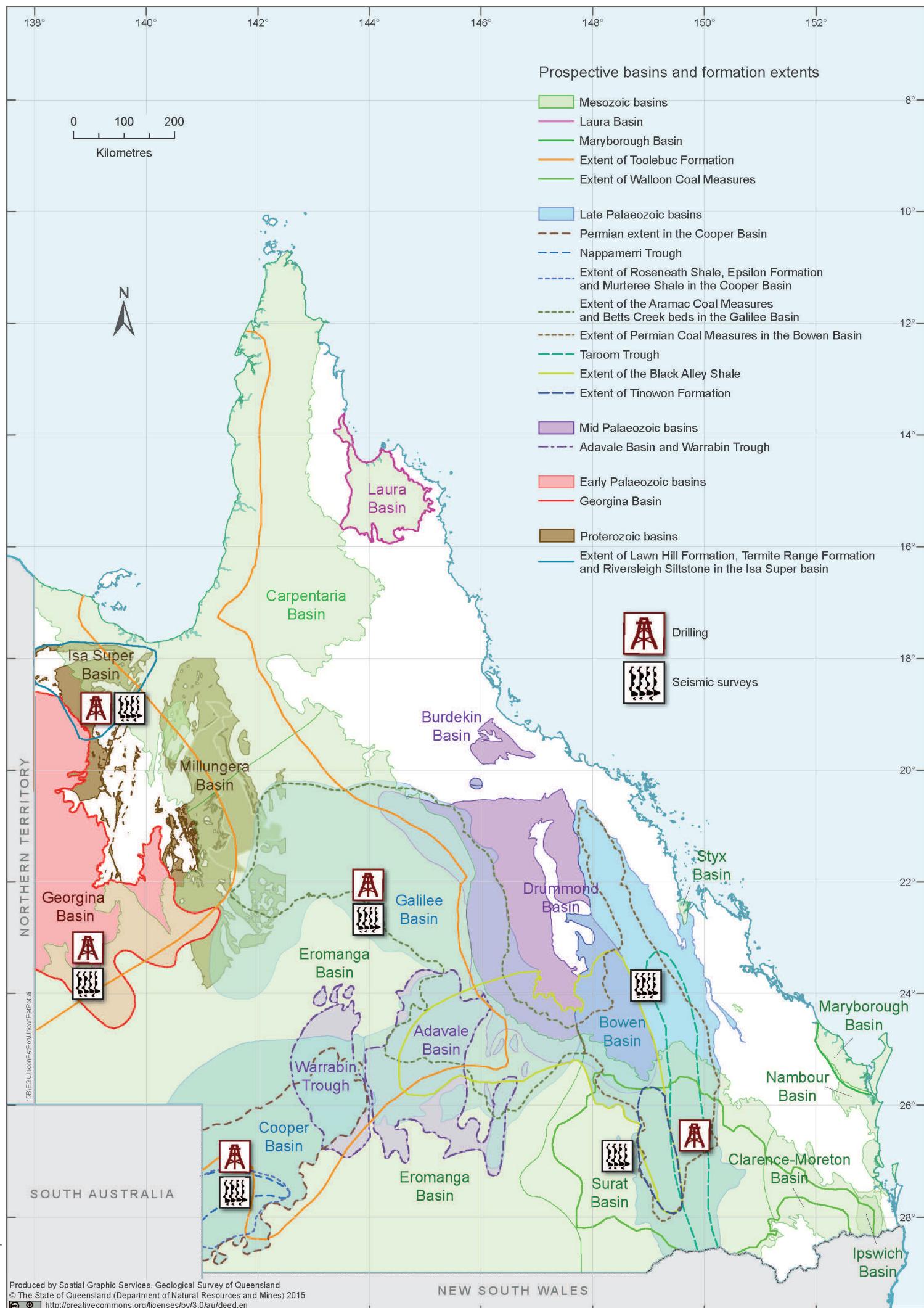
Queensland has a significant gas endowment, with major conventional and CSG discoveries having been made in the Cooper, Bowen and Surat basins that have been and are being developed to supply Australia's east coast and export LNG markets. Remaining gas prospects in these basins predominately include tight gas and shale gas plus ongoing CSG all of which will likely have lower deliverability and require higher capital expenditure than in the past.

In recent years other basins such as the Galilee, Georgina and the Mount Isa sub-basin have been the subject of exploration. The large volumes of prospective or contingent gas resources in these basins, plus the Cooper, Bowen and Surat basins, occur in various 'unconventional' reservoirs (ie coal-seam gas, shale gas and tight gas) and present a challenge to industry, requiring both the development of appropriate technologies and lower costs (Charts 8 and 9).

CHART 8: QUEENSLAND COAL SEAM GAS RESERVES (2P)



## CHART 9: QUEENSLAND GAS PROSPECTIVITY AND ASSOCIATED INFRASTRUCTURE MAP



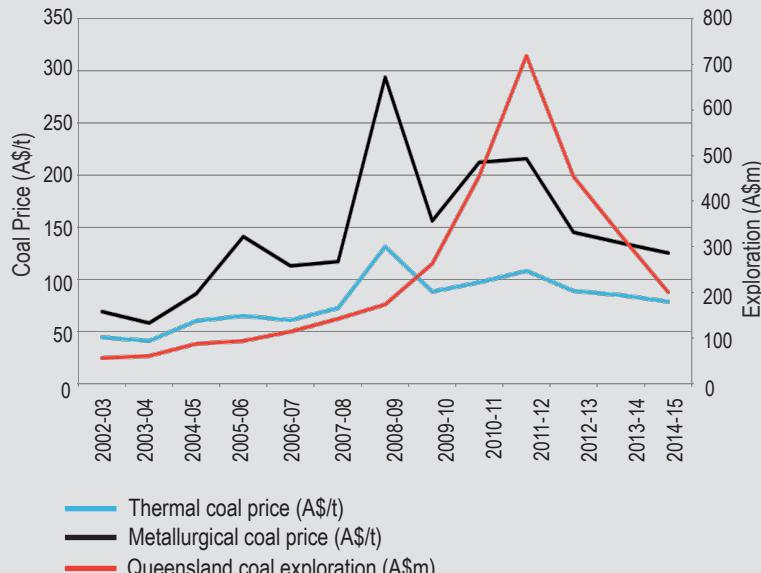
# 3.0 COMMODITY PRICES

Commodity prices are a significant driver of exploration activity in Queensland. Charts 10-13 show the relationship between average global benchmark prices for coal, gold, copper, and LNG compared with Queensland exploration expenditure for each commodity since 2002.

## KEY FINDINGS

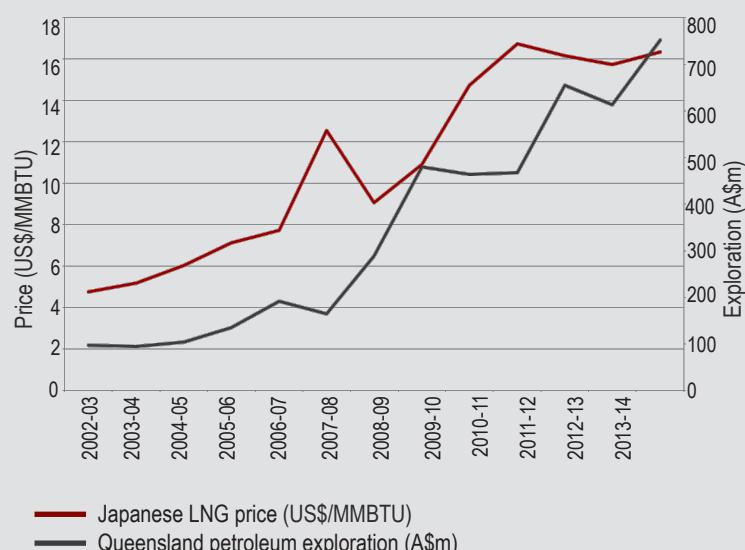
- While commodity prices and hence company revenues are usually denominated in \$US terms, investor confidence is more directly affected by profitability, which is measured in Australian dollar terms. The substantial reduction in the Australian dollar against the US dollar over the past 12 months has been significant in softening the decline in commodity prices.
- Coal exploration expenditure declined by approximately 40 percent in 2015 (Chart 10).
- Queensland petroleum expenditure increased sharply whilst there was a material softening of LNG prices in the first half of 2015 (Chart 11), which is expected to see an impact in future years.
- The rate of decline for gold and copper prices eased slightly in 2014-15, while the exploration expenditure for gold continued to decline (Chart 12). Copper exploration increased slightly in 2014-15 after a significant decline between 2011-14 (Chart 13).

**CHART 10: GLOBAL AVERAGE BENCHMARK COAL PRICES AND QUEENSLAND EXPLORATION SPEND, 2002-03 TO 2014-15**



Source: BREE, Resources and Energy Quarterly,  
ABS 8412.0

**CHART 11: GLOBAL AVERAGE BENCHMARK LNG PRICES AND QUEENSLAND PETROLEUM EXPLORATION SPEND, 2002-03 TO YEAR END 2014\***

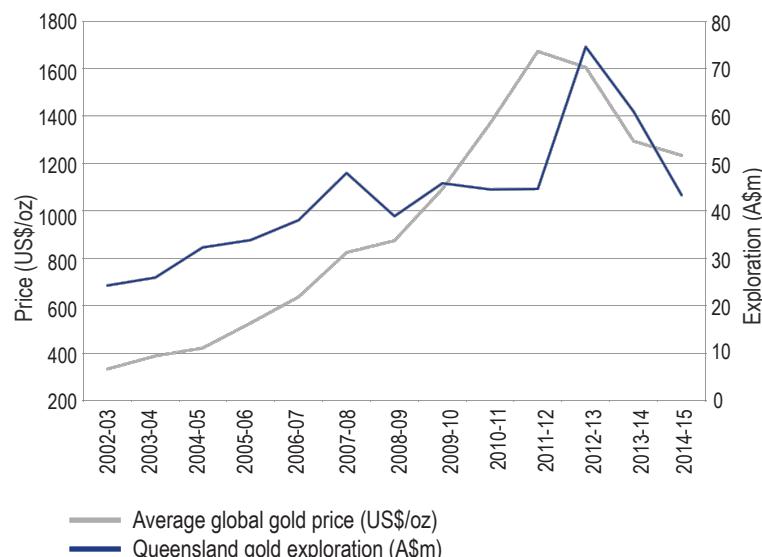


\*It is important to note that LNG prices have fallen sharply since January 2015 and the 2014-15 price depicts that at the end of that period, which is around half that at year end 2014.

Source: BP Statistical Review of World Energy, EnergyQuest, ABS 8412.0

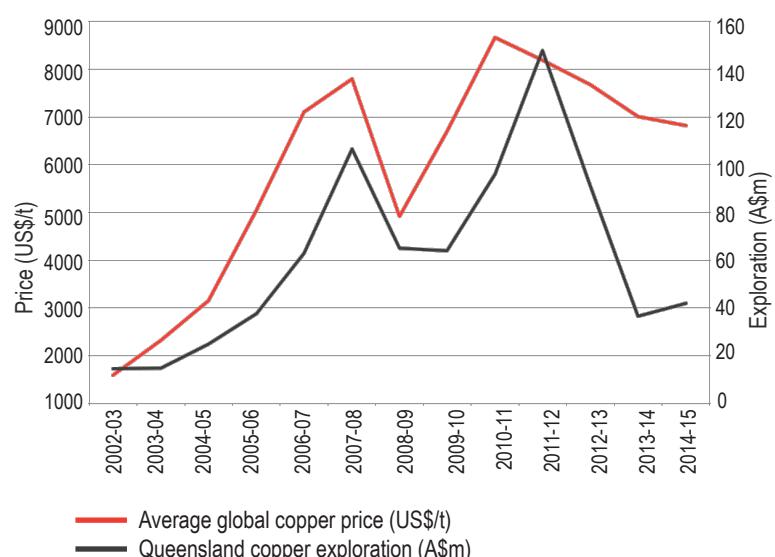


**CHART 12: GLOBAL AVERAGE BENCHMARK GOLD PRICES AND QUEENSLAND EXPLORATION SPEND, 2002-03 TO 2014-15**



Source: BREE, Resources and Energy Quarterly,  
ABS 8412.0

**CHART 13: GLOBAL AVERAGE BENCHMARK COPPER PRICES AND QUEENSLAND EXPLORATION SPEND, 2002-03 TO 2014-15**



Source: BREE, Resources and Energy Quarterly,  
ABS 8412.0

# 4.0 EXPLORER AND INVESTOR CONFIDENCE

A key driver of exploration activity is explorer and investor confidence, influenced by perceptions of business risk and the likelihood of success.

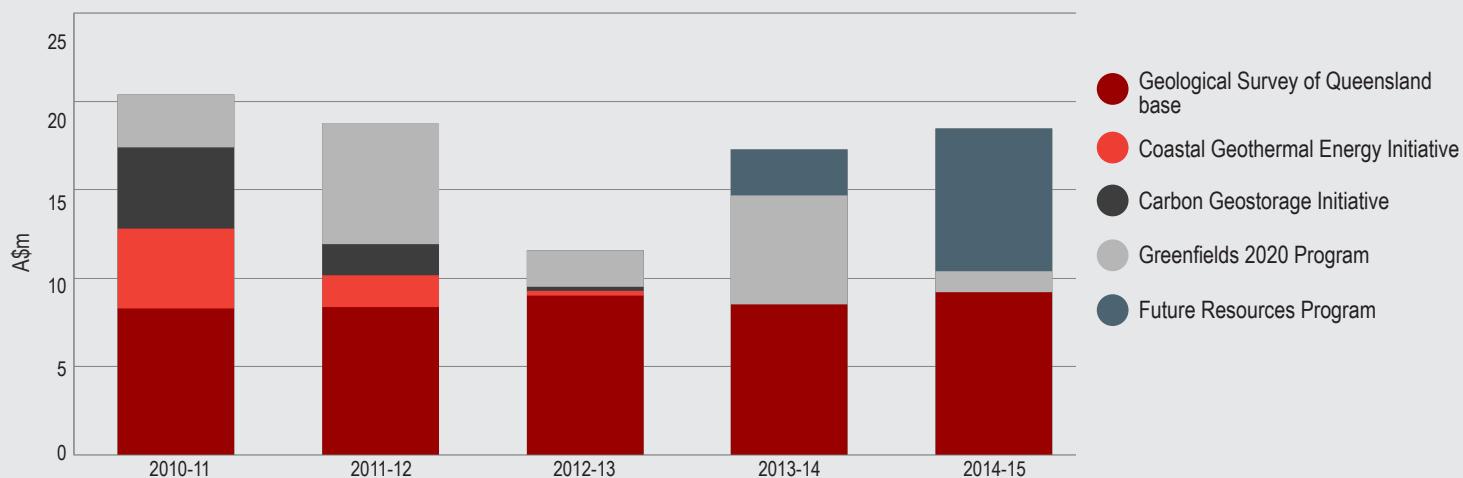
Risk and success perceptions are in turn influenced by factors such as geoscientific funding and associated activities, legislative, regulatory and policy stability, and operating and investment sentiment.

This section outlines a number of measures assessing each aspect.

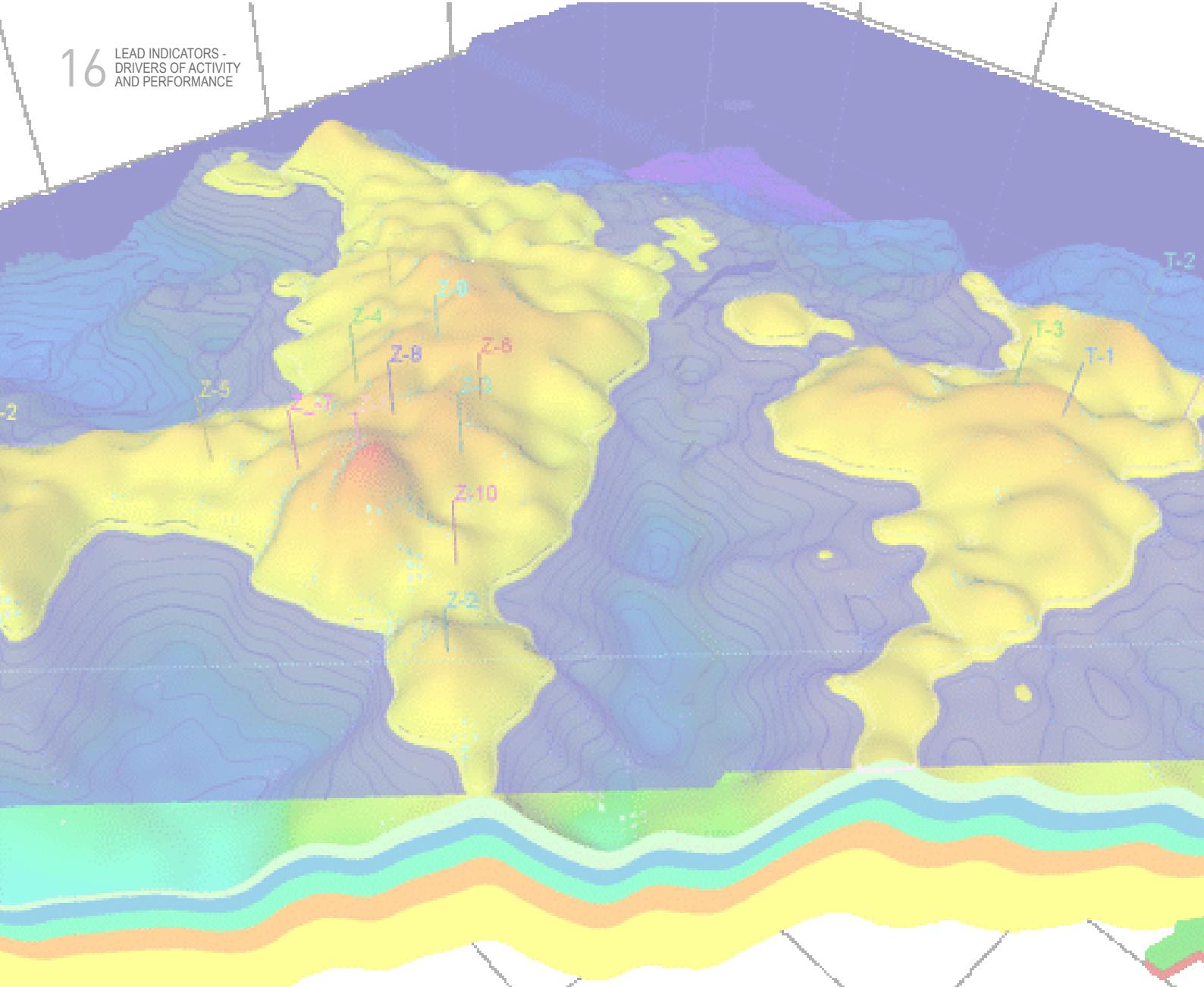
## 4.1 STATE GOVERNMENT GEOSCIENTIFIC FUNDING AND ACTIVITIES

Total state government geoscientific funding and the breakdown of that funding across the various programs is shown in Chart 14.

CHART 14: TOTAL GEOLOGICAL SURVEY OF QUEENSLAND EXPENDITURES (A\$M), 2010-11 TO 2014-15



Source: Department of Natural Resources and Mines



## MAJOR GSQ ACHIEVEMENTS IN 2014-15

A summary of the major Geological Survey Queensland (GSQ) achievements in 2014-15 is provided below. Four successful projects from the third and final round of the Future Resources Program Industry Priorities Initiative submissions were selected and approved:

- A program to develop advanced geochemical detection methods for ore bodies under deep cover in northwest Queensland.
- A program to develop a powerful new suite of geophysical tools, maps and datasets that can be used to lower exploration risk and significantly increase exploration success rates in the Cloncurry region.
- A program to use advanced computer simulation to predict structural sites of mineralisation in northwest Queensland, which will be then be checked by ground surveys.
- A program of subsurface data modelling and surface mapping to ensure environmentally sustainable gas extraction from the Surat Basin.
- Rounds eight and nine grants under the [Collaborative Drilling Initiative](#) were allocated with \$5.99 million paid to 52 companies for 72 projects over eight rounds matched by \$18.41 million spent by the companies themselves.

**Queensland Digital Exploration** (QDEX) Data has gradually been populated with public data sets throughout the year with 4,331 published by 30 June 2015. The published data sets mainly consist of airborne geophysics, gravity, 3D models and geochemistry data. Uploading wireline logs and seismic data is in progress.

The Interactive Resource and Tenure Maps (IRTM) system was decommissioned early in the financial year after being replaced by the new [MinesOnlineMaps](#) system. Download services and Web Map services were transferred to the new Queensland Government QSpatial directory service. Download statistics are no longer available.

The design and cost estimate for the proposed expansion of core storage at the Exploration Data Centre at Zillmere were completed in early 2015. Subdivision and procurement of the land has also been under way during the year and tenders for final design and construction are expected to be called early in 2015-16.

## KEY FINDINGS

- GSQ expenditure in 2015 was \$18.4 million, consistent with the average expenditure over previous years (Chart 14).
- The main differences in GSQ's 2015 expenditure compared with 2014 (\$17 million) were the winding down of Greenfields 2020 funding from \$6.2 to \$1.2 million and the ramping up of the Future Resources Program from \$2.6 to \$8 million.
- GSQ approved four projects under the third and final round of the Future Resources Program Industry Priority Initiative; successfully launched the [Resources Queensland mobile app](#) and online HyLogger™ data through the AuScope portal; and allocated grants for rounds eight and nine of the Collaboration Drilling Initiative.

## 4.1.1

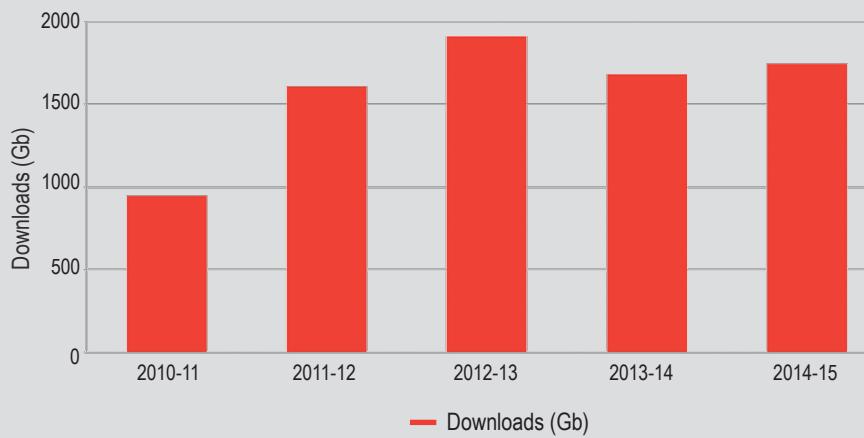
### ACCESS TO GEOSCIENCES DATA

As a result of moving spatial data downloads from (the now decommissioned) Interactive Resource and Tenure Maps (IRTM) to the new QSpatial system in late 2014, no relevant download statistics are available for comparison with previous years. Some new metrics are publicly available for the [QDEX Data](#) system and have been included this year to provide a different perspective. As this system is not yet fully populated with legacy data, there may still be some anomalous results.

By 30 June 2015 some 4331 data packages have been published for public access. Seismic data packaging has been delayed to take advantage of efforts to scan ancillary data and to standardise the SEG-Y file headers. Over the 2014-15 financial year a total of 5724 data extracts had been performed using the standard interface. There are other tools available to download data from the system, but statistics from these downloads are not available, which means these figures are underestimates.

Prior to the system upgrade, data was manually packaged and posted to customers (at a cost of \$165 per package and taking on average seven business days from order lodgement to delivery date). GSQ estimate the savings to industry for the financial year over the previous manual process to be about \$944,000 and to have avoided 40,000 days waiting time for the data.

**CHART 15: INTERACTIVE RESOURCE AND TENURE MAP (IRTM) DOWNLOADS, 2010-11 TO 2013-14**



## KEY FINDINGS

- The new [QDEX Data](#) system has so far saved customers almost \$1 million in direct costs and saved almost 40,000 days in waiting for data to arrive in the mail. These savings will increase as more data packages are published and faster network infrastructure becomes available.

# 4.2 REGULATORY AND POLICY STABILITY

In a globalised and increasingly competitive operating environment, governments need to provide a workable and stable regulatory framework for exploration and drilling activity.

This section provides an annual snapshot of the year-to-year regulatory changes from 2011 (representing the baseline) as they relate to exploration activities in Queensland.

TABLE 1: CHANGE IN REGULATORY CONTROLS – FROM 1 JULY TO 30 JUNE

Types of exploration controls in Queensland	Changes between 2011 and 2012	Changes between 2012 and 2013	Changes between 2013 and 2014	Changes between 2014 and 2015
<b>A. Foundation requirements for exploration- processes that most holders of exploration permits must meet on application and continuously through the life of the tenure:</b>				
• Cultural heritage (aboriginal and non-aboriginal)	●	●	●	●
• Application for environmental authority (this requirement removed in 2013 in some circumstances)	●	●	●	●
• Application for exploration rights (applications for coal subject to tender process in 2012 - minerals applications are unchanged)	●	●	●	●
• Application for exploration rights (petroleum and gas rights subject to tender process)	●	●	●	●
• Landowner compensation	●	●	●	●
• Native title considerations	●	●	●	●
• Remediation obligations	●	●	●	●
• Renewal of exploration rights	●	●	●	●
• Administrative improvements in processing applications			●	●
<b>B. Gateway controls on exploration – policies that present barriers to tenure in some areas:</b>				
• Land regulated as 'Restricted Area'	●	●	●	●
• Land otherwise off limits for environmental reasons (e.g. National Parks and strategic environmental areas)	●	●	●	●
• Restrictions on exploration activity in other areas of regional interest (e.g. priority agricultural areas (including strategic cropping areas) and priority living areas)		●	●	●
• Land subject to other third party interests (e.g. overlapped exploration rights for other commodities)	●	●	●	●
<b>C. Conditioning controls on exploration - policies that impose additional conditions:</b>				
• Applications and approvals to disturb native vegetation	●	●	●	●
• Applications and approvals to work in waterways	●	●	●	●
• Transfer duty – became payable in 2012 – farm-in agreements exempted in 2013	●	●	●	●
<b>D. Controls on production (but indirectly relevant to exploration):</b>				
• Ban on uranium mining - lifted in 2013 and reimposed in 2015		●	●	●
• Introduction of new federal controls on impacts of coal seam gas and large coal mining developments on water resources		●	●	●
<b>E. Year-specific issues:</b>				
• In 2012, some relaxation of controls on oil shale		●		

## LEGEND

- Favourable reduction in regulatory control occurred in that year
- Potentially unfavourable but too early to tell
- No change in regulatory control occurred in that year
- Unfavourable increase in regulatory control occurred in that year

Source: Ashurst Australia, QRC

## CHANGES BETWEEN 1 JULY 2014 AND 30 JUNE 2015

Key changes over the 2014-15 year were as follows -

### Policy:

- **New restricted land area, RA 404** - in October 2014, the DNRM introduced an 'Operational Policy – renewal of exploration permits in areas proposed for national parks and regional parks'. This policy deals with the DNRM's discretion when considering whether to renew an exploration permit within an area that has been acquired with the intention of becoming National Park or Regional Park under the Nature Conservation Act. The policy provides explorers with guidance on how a decision will be made about the renewal of their tenure and this transparency is valuable.
- **New PCA policy** – In July 2014, the DNRM introduced an 'Operational Policy – application for declaration of a Potential Commercial Area'. This policy applies to oil and gas explorers seeking Potential Commercial Areas (PCAs) under the P&G Act and provides them with guidance and clarity on PCA requirements.
- **Uranium policy** – the new government reintroduced the ban on uranium mining in Queensland. While not directly prohibiting exploration, the ban on uranium production has a significant indirect impact on uranium exploration too.

### Ongoing reforms:

- Ministerial Advisory Committee for Exploration (MACE) - the new Minister for Natural Resources and Mines supports this initiative and has convened a resource sector roundtable. The MACE initiatives will be considered through this process.
- Resources Queensland (formerly ResourcesQ) – the Minister for Natural Resources and Mines supports much of the ResourcesQ initiative, with the major exception of uranium mining. The Minister has convened roundtables for the resources sector and community. For further information, click [here](#).
- Modernising Queensland's Resources Acts/Tenure Reform Taskforce - The fundamental concept of the program is to reduce legislative complexity and to reform the current frameworks for resources tenures across five separate Resources Acts. Reduced complexity will allow the department to focus resources on high-value administration like application assessment and active monitoring of industry performance. The proposed reforms for exploration contain a number of features and attributes that should address industry and stakeholder concerns and, at the same time, encourage innovation and productivity gains through adoption of new technologies. For further information, click [here](#).
- The MERCP Act is the first phase in the implementation of the Modernising Queensland's Resources Acts and serves to establish a new Common Act for resources tenure. When fully delivered this project will see the streamlining of legislation and a reduction in regulatory burden for industry. An important component of this Act is the over-lapping tenure framework developed by the coal and coal seam gas industry to increasing investment certainty for companies through ensuring security of tenure and facilitating co-existence between the two sectors.
- On 7 July 2015, the Queensland Government released the terms of reference for the Queensland Gas Supply and Demand Action Plan (Action Plan), which will be addressed in next year's scorecard.

# 4.3

## EXPLORATION COMPANY SENTIMENT

For the fifth year, the QRC surveyed companies actively exploring in Queensland for their views on a range of factors believed to influence operational and investment confidence.

Operating sentiment reflects the degree to which 13 different factors were perceived to positively or negatively impact commercial objectives. Investment sentiment indicates the degree the various macro factors were perceived to positively or negatively impact on decisions to headquartered their exploration activities in Queensland.

The online survey received 55 responses and this compares to 69 responses last year. Respondents varied in terms of market capitalisation (Table 2), exploration interests (Table 3) and where headquartered (Table 4). Not all participants answered every question.

**TABLE 2: SURVEY RESPONDENT - BY MARKET CAPITALISATION, 2014-15**

2014-15		
Your company's market capitalisation	Response (percent)	Response count
\$10 billion or greater	15%	8
\$2 billion to \$10 billion	7%	4
\$300 million to \$2 billion	6%	3
\$50 million to \$300 million	9%	5
\$50 million or less	64%	35
<b>TOTAL</b>		<b>55</b>

**TABLE 3: SURVEY RESPONDENT - BY MAIN EXPLORATION TARGET, 2014-15**

2014-15		
Your company's main exploration target	Response (percent)	Response count
Coal (all types)	24%	13
Oil	2%	1
Gas	15%	8
Base and/or precious metals	44%	24
Bauxite	4%	2
Phosphate	-	-
Other	13%	7
<b>TOTAL</b>		<b>55</b>

**TABLE 4: SURVEY RESPONDENT - EXPLORATION HEADQUARTERS, 2014-15**

2014-15		
Where exploration activities headquartered	Response (percent)	Response count
Queensland	48%	21
New South Wales	9%	4
Western Australia	21%	9
South Australia	9%	4
Victoria	9%	4
Tasmania	-	-
Northern Territory	-	-
International	5%	2
<b>TOTAL</b>		<b>44 (11 skipped)</b>

In order to coalesce the responses into a single value it was necessary to apply weights to the responses. ‘Strongly positive’ (negative) responses were given a weighting of 1 (-1), ‘positive’ (negative) responses were given a weighting of 0.5 (-0.5) and ‘not at all’ responses were given a weighting of 0. These weightings were applied to the number of responses to arrive at a single value reflecting the sentiment for that factor. Hence, the higher the positive score on a factor indicates more positive sentiment. As different numbers of participants responded to each question, it was necessary to reduce each factor to a percentage in order to enable responses for each factor to be compared with the others. Consequently, if every survey participant indicated their sentiment for a factor was ‘very positive’ the score would be 100 for that factor.

This is illustrated in Table 5 below. Here, in relation to resources prospectivity, there were:

- Four respondents out of 46 (or 9%) who indicated resources prospectivity very positively influenced the operating and investment sentiment; each response attracted a weighted score of 1.0, resulting in a weighted score of 9
- 21 respondents out of 46 (or 46%) indicated resources prospectivity positively influenced the operating and investment sentiment, each response attracted a weighted score of 0.5, resulting in a weighted score of 23
- 14 respondents out of 46 (or 30%) indicated resources prospectivity did not influence the operating and investment sentiment, each response attracted a weighted score of 0, resulting in a weighted score of 0.
- Six respondents out of 46 (or 13%) indicated resources prospectivity negatively influenced the operating and investment sentiment, each response attracted a weighted score of -0.5, resulting in a weighted score of -7
- One respondent out of 46 (or 2%) indicated resources prospectivity very negatively influenced the operating and investment sentiment, each response attracted a weighted score of -1.0, resulting in a weighted score of -2.

These values summed to a score of 23 out of a possible 46 (which would have occurred if every participant responded ‘very positively’).

**TABLE 5: CALCULATION OF WEIGHTED SURVEY RESULTS (EXAMPLE)**

Resources prospectivity	Weights	Response count	Response (percent)	Weighted responses
Very positively	1	4	9%	9
Positively	0.5	21	46%	23
Not at all	0	14	30%	0
Negatively	-0.5	6	13%	-7
Very negatively	-1	1	2%	-2
		46	100%	23

Note: For interpretation, the higher the positive score, the higher the positive sentiment and vice versa.

# 4.3.1

## OPERATING SENTIMENT

Companies were asked to indicate to what degree 13 individual factors positively or negatively impacted upon their commercial objectives for their Queensland operations during 2014-15. The factors chosen were considered important in the day-to-day operations of a resources exploration company and, with the exception of one new factor, all others have remained constant since the 2011 scorecard.

Companies were also asked to nominate which Australian jurisdiction they are most active in apart from Queensland. For that jurisdiction, they were asked to indicate to what degree the same factors positively or negatively impacted upon their commercial objectives in that jurisdiction during 2014-15. These results were aggregated to present a 'Rest of Australia' comparison. For Queensland-specific factors, the number of responses was 48, and for other jurisdictions the number of responses was 24.

The survey results of the 13 factors (Charts 16A to 16M) that influence operating sentiment are presented in four clusters, which generally align with the broad factors thought to drive exploration activity and performance:

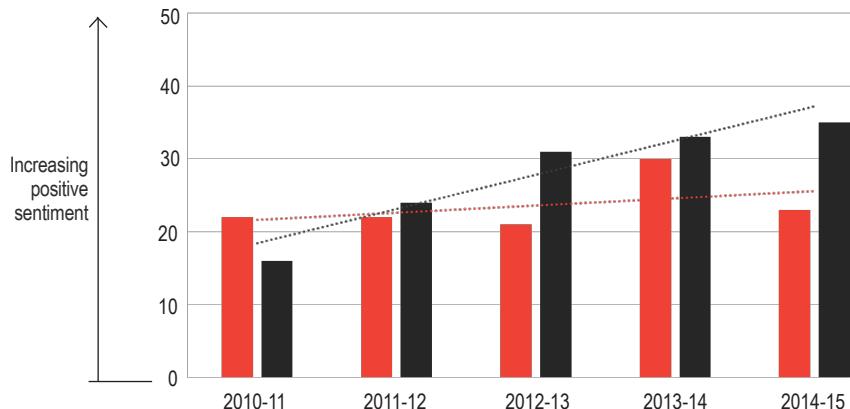
- a. resource prospectivity
- b. State government assistance and pre-competitive data
- c. regulatory, legislative and policy stability
- d. access to the factors of production.

### LEGEND

- |  |                                 |
|--|---------------------------------|
| <span style="color: red;">●</span> Queensland          | ..... Linear (QLD)              |
| <span style="color: black;">●</span> Rest of Australia | .... Linear (Rest of Australia) |

### A. SENTIMENT TOWARDS RESOURCE PROSPECTIVITY

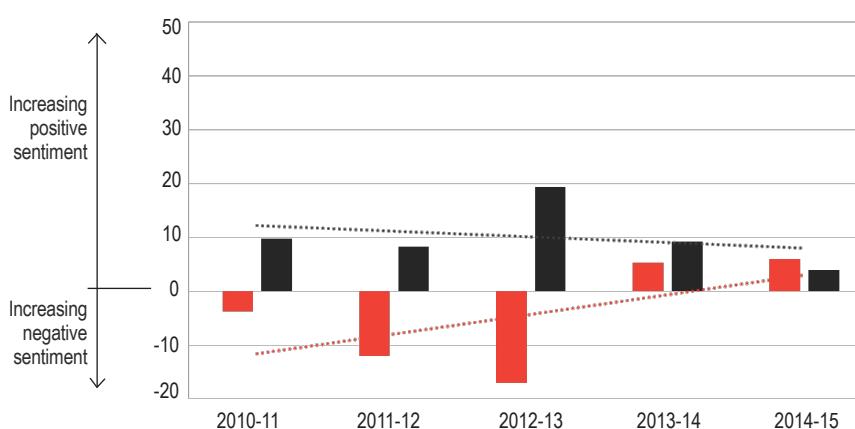
CHART 16A: RESOURCE PROSPECTIVITY



The five-year trend shows that explorers see greater prospectivity in the rest of Australia than in Queensland. The decline in Queensland prospectivity from last year is quite marked. This possibly reflects a perception that Queensland has been thoroughly explored. The reality is that as modelling improves and better techniques for exploring under cover emerge, new exploration successes will challenge these perceptions.

### B. SENTIMENT TOWARDS AVAILABILITY OF PRE-COMPETITIVE DATA AND STATE GOVERNMENT ASSISTANCE

CHART 16B: GOVERNMENT AND DEPARTMENTAL ASSISTANCE

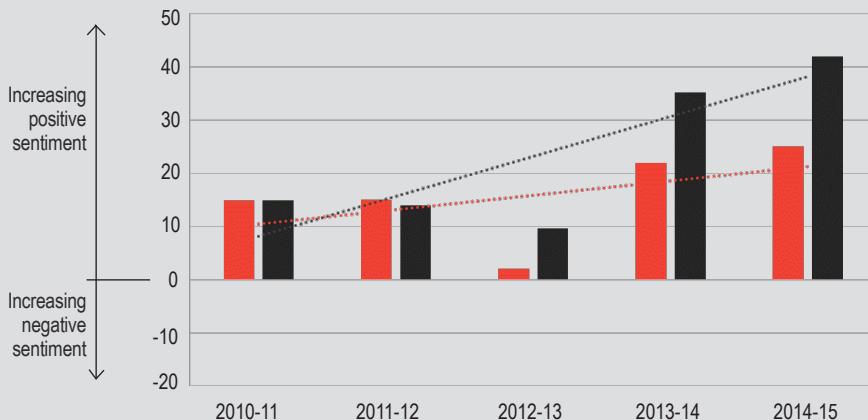


The converging five-year trend lines tell an impressive story. As the rest of Australia has seen a decline in the industry's rating of assistance from key Departments, Queensland has enjoyed an improvement. This is the first year where the sentiment towards Queensland was higher than for the rest of Australia.

## LEGEND

- Queensland      ..... Linear (QLD)
- Rest of Australia    .... Linear (Rest of Australia)

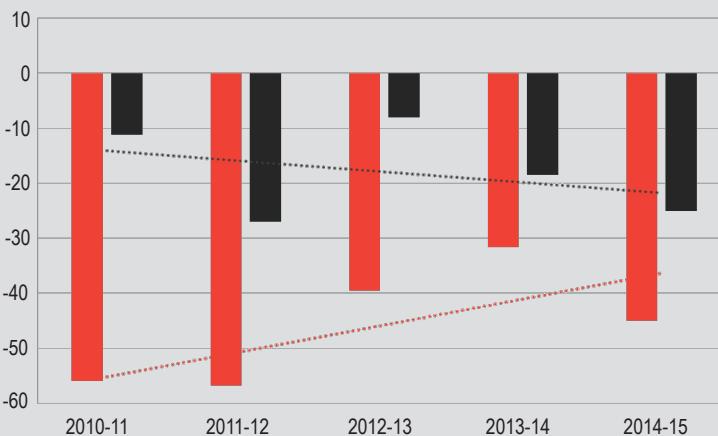
**CHART 16C: PRE-COMPETITIVE GEOSCIENTIFIC DATA**



The five-year trends suggest that explorers hold geoscientific information from other jurisdictions in higher regard than they do the equivalent data from Queensland; however, the working group suspects the survey question may have confused some respondents by asking the extent to which the use of pre-competitive geoscience data contributed to the commercial objectives of their organisation.

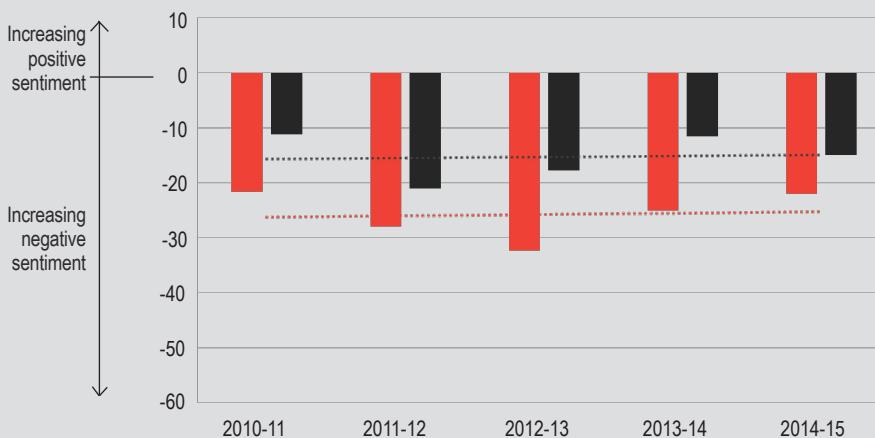
## C. SENTIMENT TOWARDS REGULATORY AND POLICY STABILITY

**CHART 16D: POLICY UNCERTAINTY**



Policy uncertainty is an anathema to investing in exploration. While the five-year trends suggest that Queensland is closing the gap on other jurisdictions, it is a concern to see explorers become more concerned about policy uncertainty in Queensland in the last year.

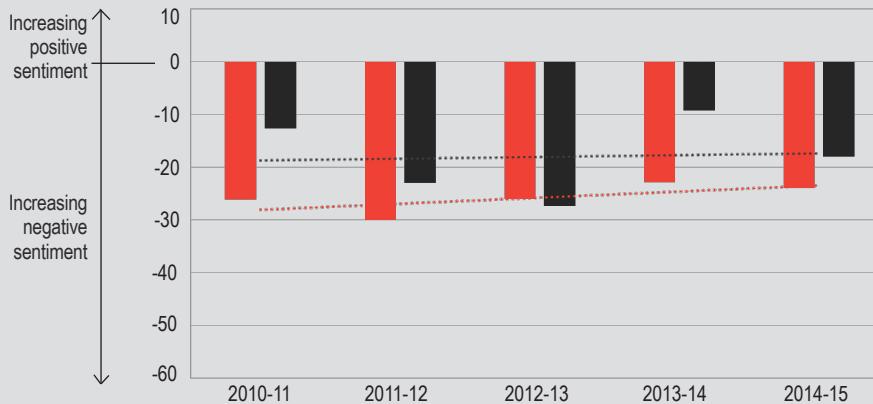
**CHART 16E: CULTURAL HERITAGE REGULATIONS**



While there have been no substantial changes in Queensland's cultural heritage regulations in the past five years, cultural heritage is consistently rated as a greater regulatory deterrent in Queensland than in the rest of Australia.

**LEGEND**

- Queensland ..... Linear (QLD)
- Rest of Australia ..... Linear (Rest of Australia)

**C. SENTIMENT TOWARDS REGULATORY AND POLICY STABILITY CONTINUED****CHART 16F: NATIVE TITLE REGULATIONS**

As was the case for cultural heritage regulations, the Native Title regulations have been quite stable for the five years of the scorecard, yet the year-on-year sentiment has been quite volatile.

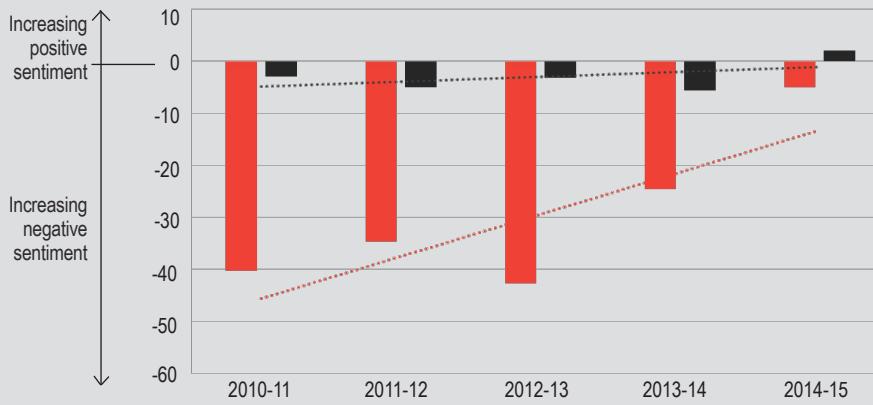
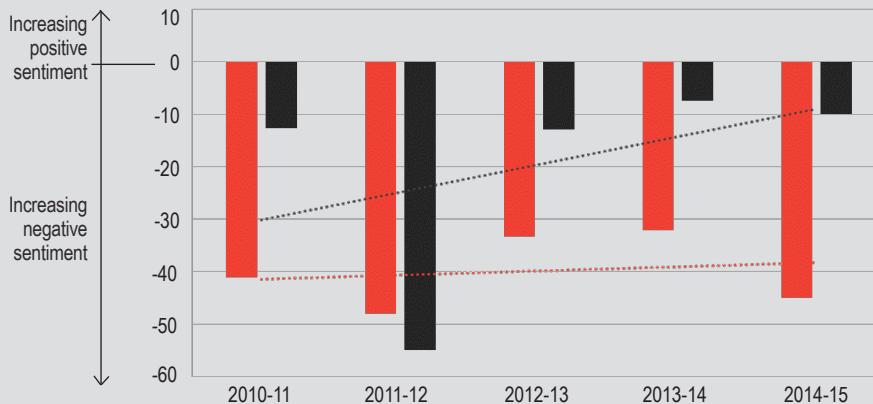
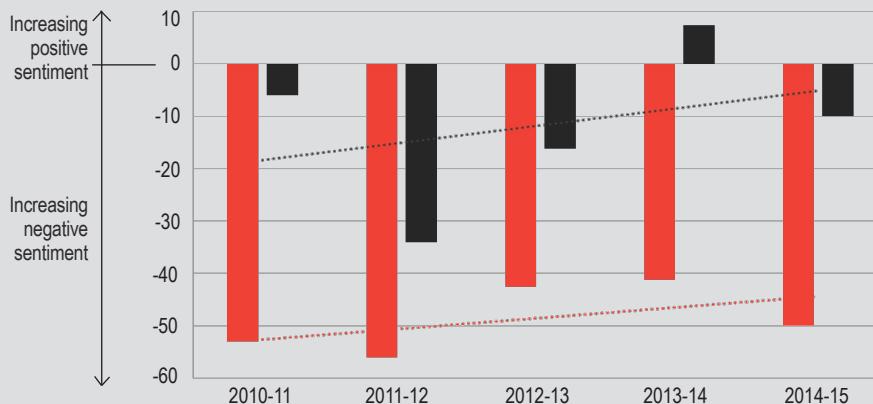
**CHART 16G: EXPLORATION PERMIT PROCESSES**

Chart 16G is the one that the Minister for Mines should carry around in his wallet and show off at barbeques. The improvement in the five-year trend is very impressive, with most of the improvement has been recorded in the past three years.

**CHART 16H: ENVIRONMENTAL REGULATIONS**

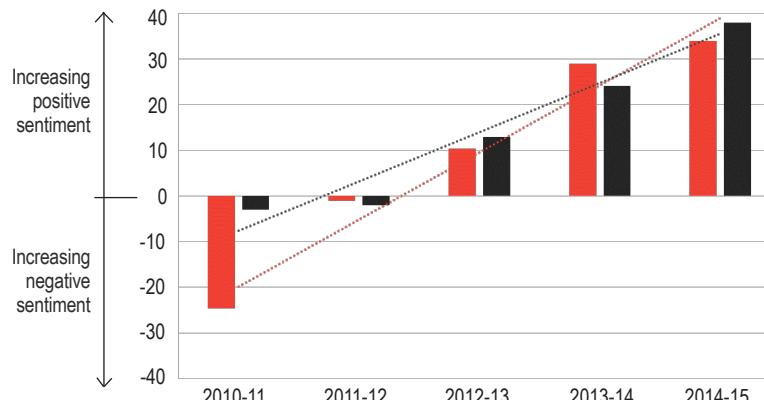
The five-year trend on environmental regulations seems to be a story of missed opportunity in Queensland, with sentiment in the rest of Australia stronger and improving.

**CHART 16I: CONDUCT AND COMPENSATION AGREEMENTS**

Conduct and compensation agreements and the land access regime in general have been a consistent year-on-year concern for Queensland explorers. It is the issue that many single out in their comments – highlighting the cost, uncertainty and the unproductive role played by a small number of regional law firms.

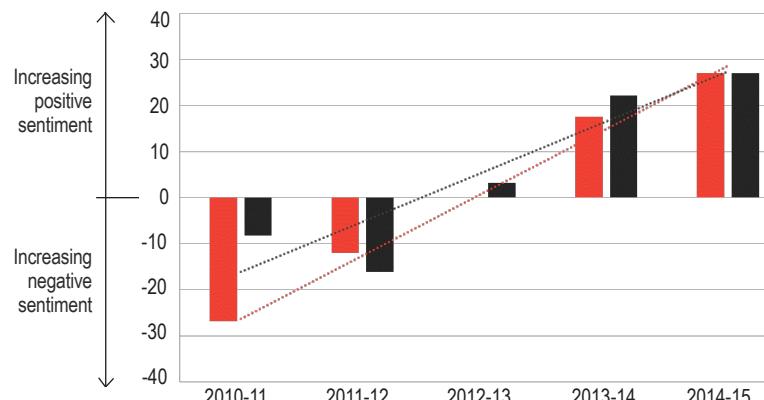
## D. SENTIMENT TOWARDS FACTORS OF PRODUCTION

**CHART 16J: EQUIPMENT AVAILABILITY**



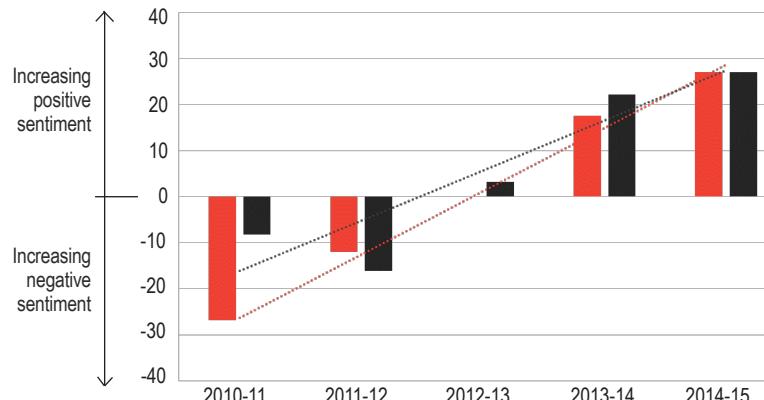
The availability of equipment in both Queensland and the rest of Australia follows a consistent trend for the past five years. Clearly as exploration activity slows, more equipment becomes available.

**CHART 16K: LABOUR AND SKILLS AVAILABILITY**



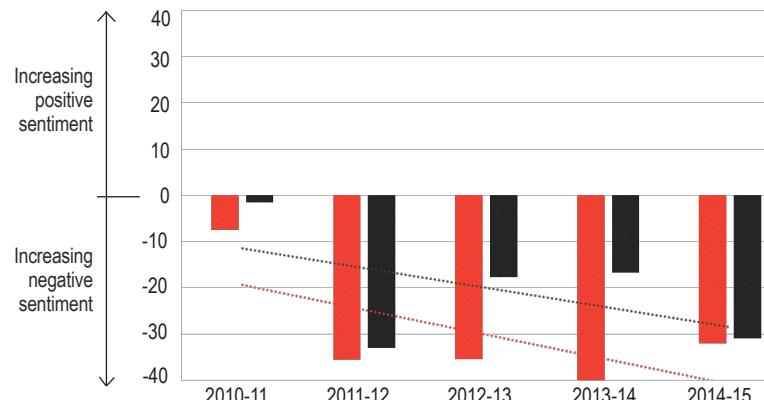
As is the case for many of the factors of production, the availability of labour and skills in both Queensland and the rest of Australia follows a consistent trend for the past five years.

**CHART 16L: LAND AVAILABLE FOR EXPLORATION**



The availability of land for exploration has improved strongly in Queensland over the past two years, but the sentiment towards Queensland is still below the sentiment towards the rest of Australia. No land has been released for coal exploration for two years.

**CHART 16M: ACCESS TO INVESTMENT CAPITAL**



For the past four years, the availability of investment capital has been a real issue of concern for explorers, particularly in Queensland.

Source: 2015 Exploration Sentiment Survey results

## KEY FINDINGS

- Comparing the five-year trends in Queensland with the five-year trends for the rest of Australia suggests across the 13 factors, there were five factors where the trend was comparable, three where the rest of Australia improved at a better rate than Queensland and four where Queensland improved at a faster rate.
- In 2014-15 sentiment towards nine of the 13 factors in Queensland improved compared to last year. Of significant improvement, sentiment towards *land available for exploration* rated positive (5) for the first time and equally significant improvements in *exploration permit process* from -25 to -5 over the past 12 months. Sentiment towards *access to investment capital* (-32) also made improvements (from -40).
- There were moderate improvements in sentiment for those factors primarily influenced by DNRM – being *government/departmental assistance*, *pre-competitive geoscientific data*, *exploration permit processes*; however sentiment towards *policy uncertainty* deteriorated significantly in the past 12 months. Also of note is that for the first time in measuring sentiment has the Queensland departmental assistance rated more highly than the rest of Australia.
- Compared to previous years, sentiment in Queensland remains negative, and considerably behind the rest of Australia in the areas of *cultural heritage regulations*, *Native Title regulations*, *environmental regulations*, *conduct and compensation agreements* and *policy uncertainty*.

# 4.3.2 INVESTMENT SENTIMENT

Applying the same weighted average scoring methodology, companies were also asked to indicate to what degree individual factors positively or negatively affected their company's decision to continue to headquarter their exploration activities in Queensland and if not in Queensland currently, which factors would influence their company to move and headquartered in Queensland. There were 23 responses to these questions.

**CHART 17: INFLUENCE ON MOVING HEADQUARTERS TO QUEENSLAND, 2010-11 TO 2014-15**

Source: 2015 Exploration Sentiment Survey results

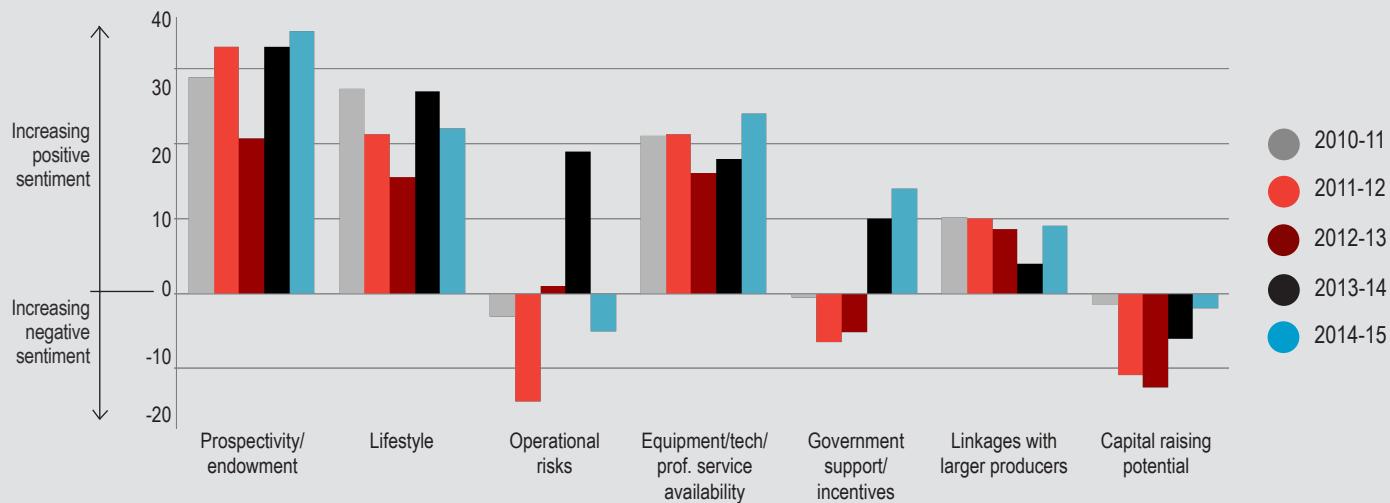
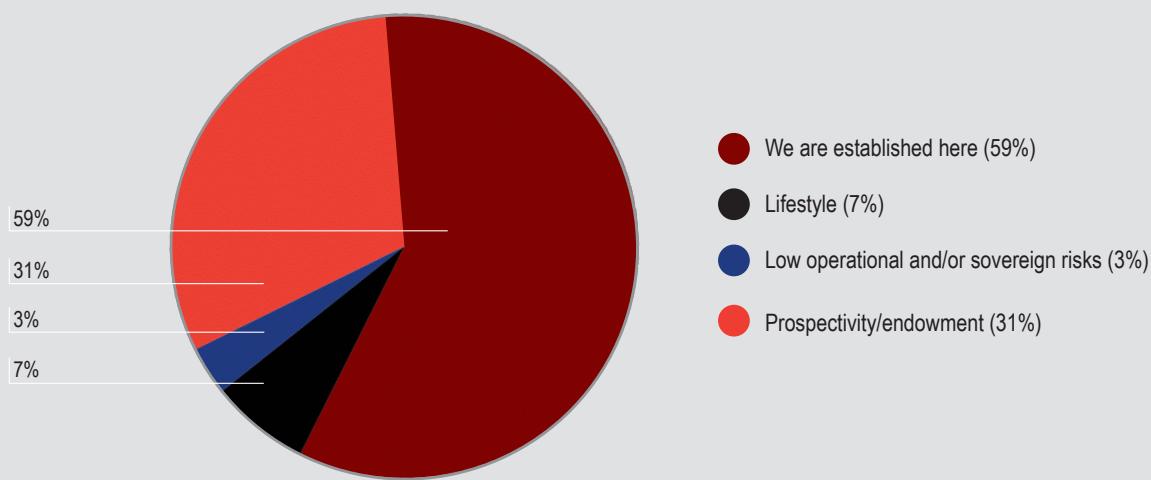


Chart 17 shows that the exploration industry sees a lot of change in operational risks from year to year. In 2014, the sentiment was positive, whereas in 2015, that sentiment reverted to negative. It may be that this question is linked to the industry's concerns over policy uncertainty, which is presented in graph 16D, which shows industry's concern with policy uncertainty increasing.

**CHART 18: INFLUENCE STAYING HEADQUARTERED IN QUEENSLAND, 2014-15**

Source: 2015 Exploration Sentiment Survey results



## KEY FINDINGS

- *Prospective/endowment* followed by *equipment/technical/professional service availability* rate as the number one and two reasons why a company may be influenced to move and headquartered their exploration operations in Queensland.
- *We are established here* (59%), followed by *prospective/endowment* (31%) and *lifestyle* (7%) are the top three reasons why a company already headquartered in Queensland would opt to maintain their exploration operations in Queensland. Interestingly, *linkages with larger producers*, *equipment/tech/professional service availability*, *government support/incentives* and *capital raising potential* had no influence on a company's decision to stay headquartered in Queensland.

# 4.4

## SENTIMENT OF DRILLING COMPANIES

The Australian Drilling Industry Association (ADIA) asked 83 companies with drilling interests in Queensland a number of questions to gauge the operating outlook and sentiment, including the degree to which eight individual factors positively or negatively affected their Queensland commercial objectives in 2015. The factors chosen were considered important in the day-to-day operations of a drilling company.

The online survey received 28 responses representing a response rate of 34%. The respondents represent a cross section of drilling companies with operational interests in the fields of petroleum and gas, coal, mineral, geotechnical and water. The total number of rigs represented by the respondents is 72, consistent with previous samples.

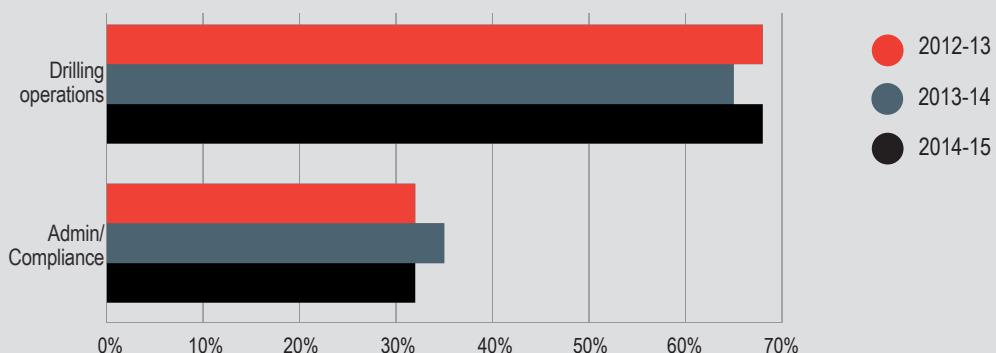
Companies were also asked to nominate in which Australian jurisdiction they are most active, apart from Queensland. For that jurisdiction, they were asked to indicate to what degree the same factors positively or negatively impacted upon their commercial objectives in that jurisdiction during 2015. These results were aggregated to present a 'Rest of Australia' comparison. For Queensland-specific factors, the number of responses was 28, and for other jurisdictions, the number of responses was 16 where companies indicated that they were active in other Australian jurisdictions (predominantly New South Wales and Northern Territory).

# 4.4.1

## CALCULATION OF REGULATORY BURDEN AND PERCEPTIONS OF IMPACT

It is recognised that the drilling industry plays a pivotal role in exploring and developing Queensland's natural resources. The sentiment expressed in the drilling industry data reflects the immediate impact of the contraction of the resource industry due to lower commodity prices, exacerbated by reduced exploration activity and difficulties in gaining access to capital.

**CHART 19: SPLIT OF OPERATIONAL COSTS**



Source: 2015 ADIA survey of members

# 4.4.2

## OPERATING SENTIMENT

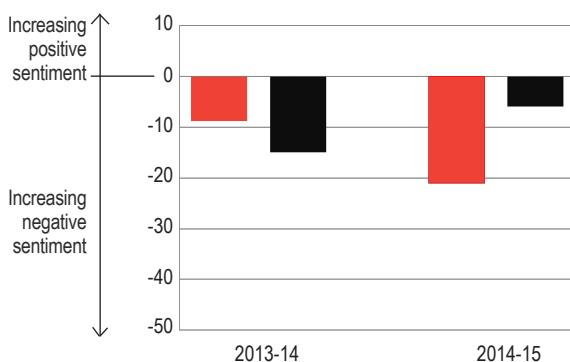
It is recognised that the drilling industry plays a pivotal role in exploring and developing Queensland's natural resources. The sentiment expressed in the drilling industry data reflects the immediate impact of negative lead indicators within the resources sector such as access to investment capital and commodity price upon the drilling industry. It also highlights that the drilling industry is the last sector to benefit from positive lag indicators, such as policy changes and improvements in industry confidence.

### LEGEND

- Queensland
- Rest of Australia

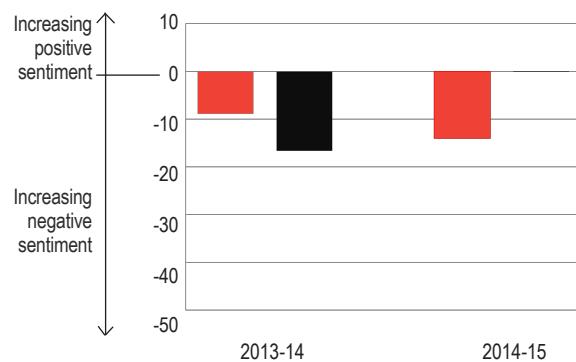
### A. SENTIMENT TOWARDS REGULATORY & POLICY STABILITY

**CHART 20A: SENTIMENT TOWARDS ENVIRONMENTAL LEGISLATION**



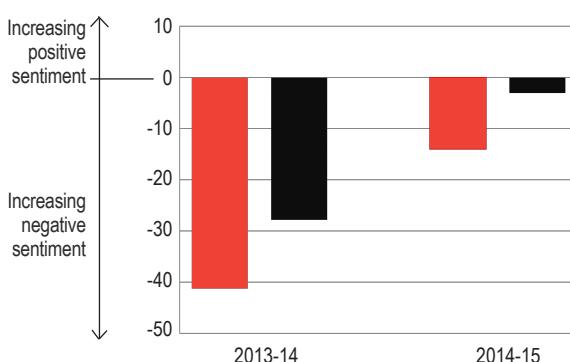
The drilling survey reveals a similar perspective on environmental regulations to the more general sentiment survey. Chart 16H shows that in the last two years, both surveys see a reduction in the perception of Queensland's environmental regulations. It should be noted that 16H asked a question about environmental regulation, whereas 19A focuses on environmental legislation, which is a narrower question.

**CHART 20B: SENTIMENT TOWARDS MINING LEGISLATION**



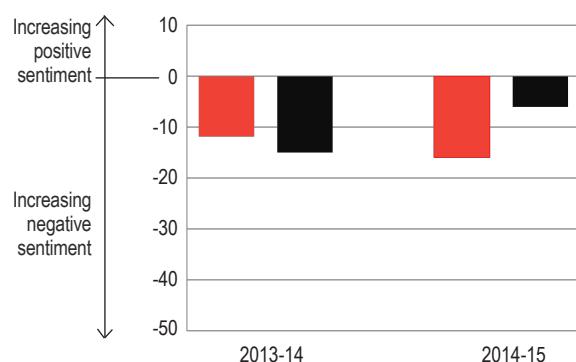
It is difficult to know what has driven such a strong improvement in the perceptions of mining legislation in the rest of Australia. Presumably the reduction in the sentiment in Queensland reflects uncertainty around when recent legislative changes might commence.

**CHART 20C: SENTIMENT TOWARDS PETROLEUM & GAS LEGISLATION**



Comparing the drilling sentiment reported for the two main regulatory frameworks in Queensland, mining and petroleum, makes for interesting reading. The drilling industry sees a reduction in sentiment for mining regulation, but an improvement in the petroleum. Given the complex state of legislative reforms that is described in section 4.2, many of which have not yet commenced, it is difficult to be clear about which reforms have generated this reaction.

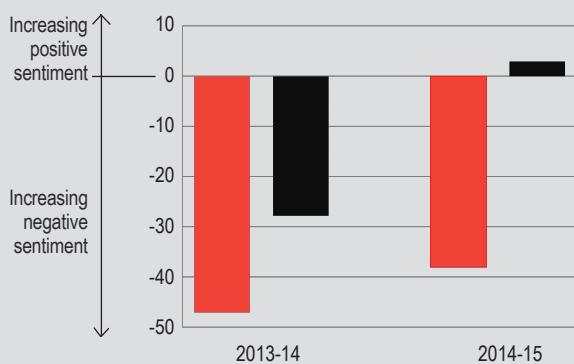
**CHART 20D: SENTIMENT TOWARDS WORKPLACE, HEALTH & SAFETY LEGISLATION**



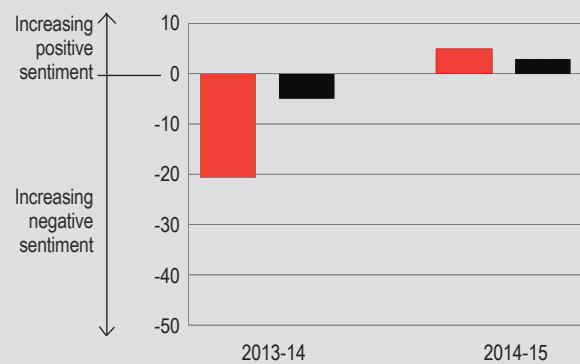
The drilling industry's sentiment on safety legislation again shows the trend of a deteriorating perception of Queensland as compared with a strong improvement in sentiment for the rest of the country. This may reflect an increase in audit and compliance work in Queensland.

**LEGEND**

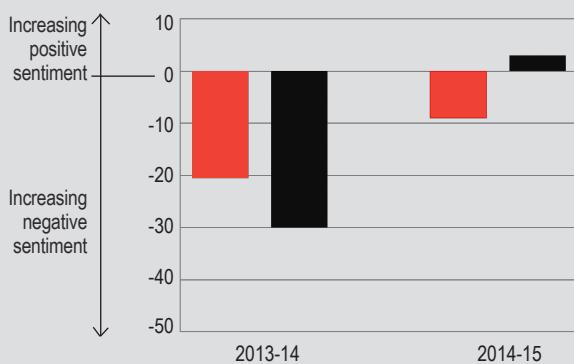
- Queensland
- Rest of Australia

**B. SENTIMENT TOWARDS THE FACTORS OF PRODUCTION****CHART 20E: SENTIMENT TOWARDS POLICY UNCERTAINTY**

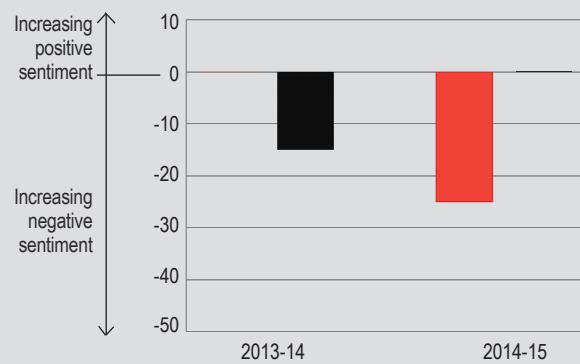
The drilling industry reported a different outlook on policy uncertainty to the full sentiment survey. The drilling industry reports a reduction in policy uncertainty over the past 12 months, whereas the full survey (chart 16D) shows an increase.

**CHART 20F: SENTIMENT - LABOUR SKILLS/AVAILABILITY**

The drilling industry survey and the full survey (reported in Chart 16J) show a very similar trend over the past two years where the availability of equipment in both Queensland and the rest of Australia is not seen as a constraint, and so the sentiment has improved.

**CHART 20G: SENTIMENT - LAND ACCESS**

The drilling industry's sentiment on land access shows a substantial improvement from last year for Queensland, and an even more dramatic improvement for the rest of Australia. The comparable graph for the full survey is 16I, where sentiment towards conduct and compensation agreements deteriorated from last year. It is possible that this question is also capturing some of the sentiment reported in Chart 16G, which shows a strong improvement in exploration permit processes.

**CHART 20H: ACCESS TO CAPITAL**

Once again, the sentiment in the drilling survey moved independently of the survey of the full survey (at Chart 16M). Chart 16M shows an improvement in the access to capital for the entire industry (coming from the lowest score ever recorded for this item in 2014); whereas the drilling sentiment moved from neutral in 2014 to being a strong concern in 2015.

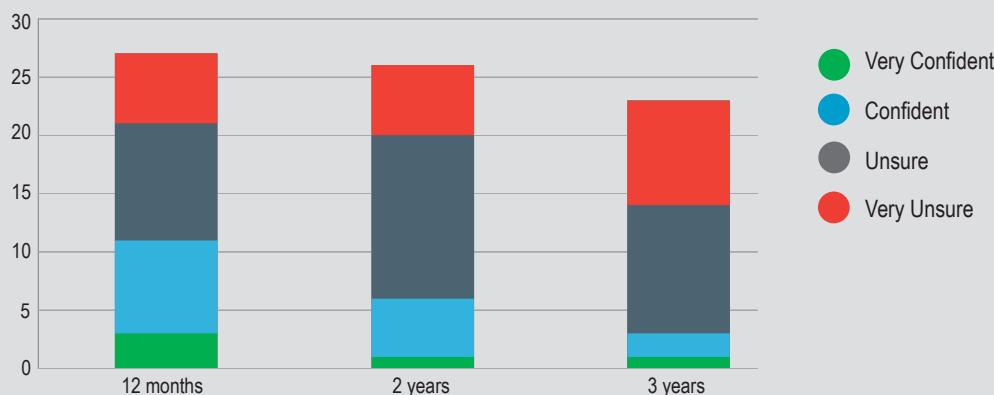
# 4.4.3

## THE OPERATING OUTLOOK

Drilling companies were asked to report if their cash reserves would be sufficient in 12 months, two years and three years given current market conditions. They were subsequently asked about their confidence in business conditions improving in Queensland over the next three years.

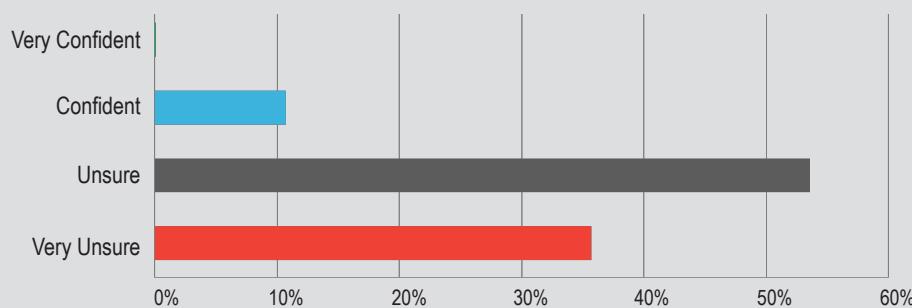
### CHART 21: SUFFICIENT CASH RESERVES TO SUSTAIN OPERATIONS

*To what degree are you confident that given the current market conditions that you have sufficient cash reserves to sustain operations for the following time periods?*



### CHART 22: CONFIDENCE IN IMPROVED BUSINESS CONDITIONS IN QUEENSLAND OVER THE NEXT 12 MONTHS

*How confident are you of improved business conditions in Queensland over the next 12 months?*



Source: 2015 ADIA survey of members

## KEY FINDINGS

- Drilling company respondents estimate that 32% of operational costs were on administration and compliance with 68% of costs on drilling activities in 2015. This compares with 35% and 65% respectively in 2013-14 (Chart 19). The contraction of the resource sector has resulted in drilling companies attempting to reduce non drilling costs.
- The vast majority of drilling companies are increasingly unsure or very unsure that they will have sufficient cash reserves to sustain their operations beyond two years (Chart 21). Sentiment towards access to capital is more negative when compared to 2014.
- Sentiment towards all types of regulation is more negative from drilling companies active in Queensland when compared to other Australian jurisdictions.
- Drilling companies active in Queensland have become more negative with regard to *environmental, mining and workplace health and safety legislation* when compared to 2014.
- Although still negative, sentiment towards *petroleum and gas, policy uncertainty and land access* have marginally improved when compared to 2014.
- *Labour/skills availability* has improved and reflects the reduction in staffing levels and therefore increased availability of skilled labour.

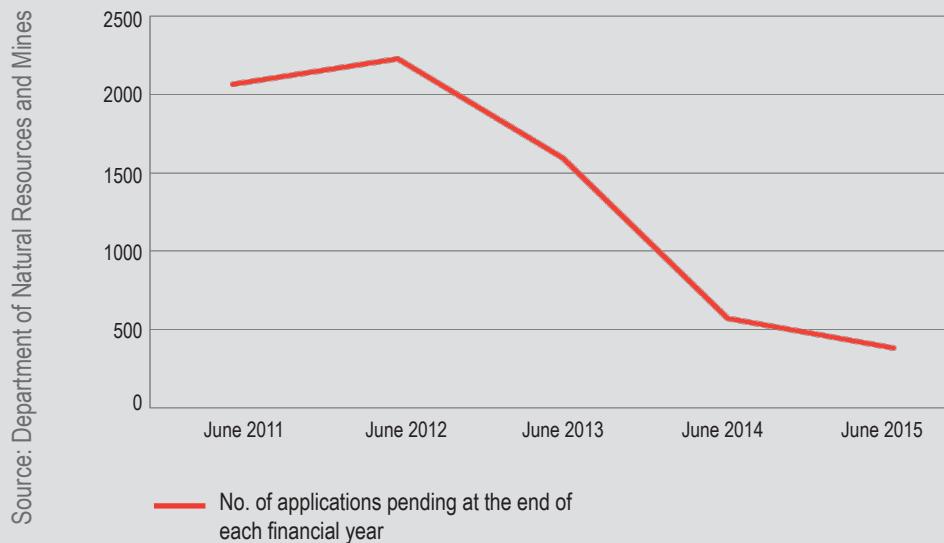
# 5.0 ACCESS TO THE FACTORS OF PRODUCTION

## 5.1 TENURE ADMINISTRATION

A significant factor influencing exploration success is how quickly exploration companies can secure tenure. The scorecard collates available data on how Queensland is performing each year in terms of processing applications, the area granted to each commodity group for exploration and maps where applications have been made.

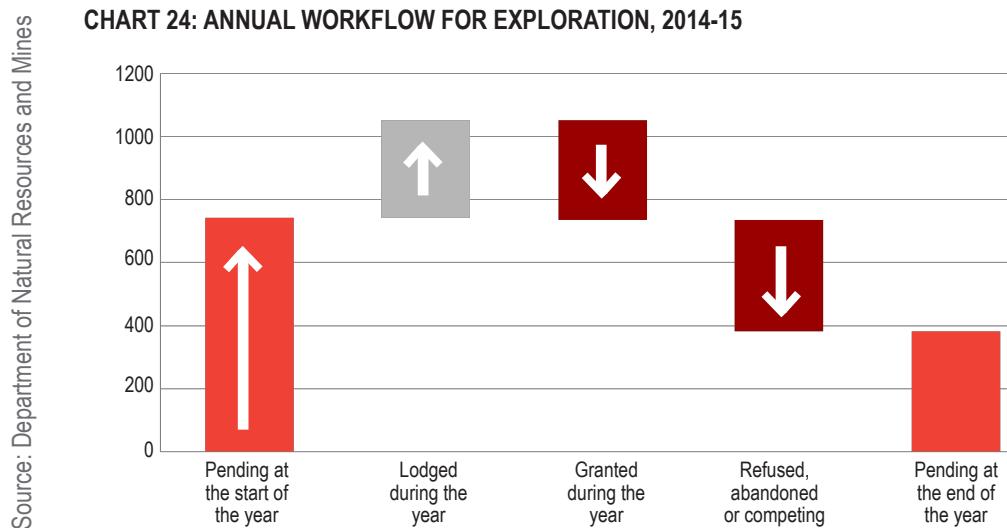
The period has been marked by a steady progress on completion of processes in a timely manner. Key developments that contributed to the processing gains include the completion of functionality upgrades to *MyMinesOnline* and the 'One Window' pilot that marked the beginning of integration between DNRM and the Department of the Environment (EHP) systems in relation to tenure processing.

**CHART 23: BACKLOG: TOTAL APPLICATIONS (ALL COMMODITIES) PENDING AT THE END OF EACH FINANCIAL YEAR**



Note: Chart 23 reflects applications on hand at the end of each financial year (annual time series), net of refused, abandoned and competing applications (permits that for a variety of reasons are still current but cannot be progressed). Chart 24 reflects the workflow for the past financial year and includes these refused, competing or abandoned applications.

**CHART 24: ANNUAL WORKFLOW FOR EXPLORATION, 2014-15**



The customer service standard of resolving 80 percent of all mineral or coal exploration applications within 12 months (or within six months if there is no Native Title) has been achieved since being introduced in 2013-14. Striving for business improvement saw the standard exceeded in 2014-15 with 94 percent of applications being resolved within the time periods.

**Service-delivery:**

- Improvements to *MyMinesOnline* - The MyMinesOnline system has been upgraded to increase functionality to enable resources companies operating in Queensland to now lodge applications for 72 different resource permits electronically and pay online.

The greater functionality includes online applications for a: prospecting permit, mining lease, mining claim and mineral development licence. Petroleum customers can now lodge a number of new permit applications online including a: potential commercial area, pipeline licence, petroleum facility licence, petroleum survey licence and a data acquisition authority. Transactions such as relinquishment of land, the partial surrender of land and varying access were also released.

As a result, industry is seeing reduced time taken to assess applications for permits.

- **Industry Reporting Reform Project** – lead by GSQ, this project is reducing the cost of statutory reporting, facilitating access to quality geoscience data, and increasing the level of transparency and public access to details about exploration, mining and petroleum activities. Further information on this project can be found at [DNRM](#).

Since commencing in October 2014, the project has delivered many practical benefits for the Queensland resources sector and government, including:

o Petroleum and gas regulation changes released in June 2015 have estimated savings exceeding \$1 million/year. These changes reduce submission requirements for daily drilling reports, pipeline transmission reports, and core, cuttings and fluid samples.

o Webpage navigation designed to make it easier for companies to understand and meet their statutory obligations. These will be introduced in the 2015-16 year. The year should also see the release of a single, integrated reporting portal for water and environment reporting requirements.

o Streamlining and automating the reporting lifecycle with submission of coal statistics and sales now a fully electronic process through MyMinesOnline system. Other reports planned to be streamlined and automated in 2015 include petroleum reserves, petroleum production and mineral production.

Charts 23 and 24 provide a summary of DNRM dealings with applications.

**CHART 25: TOTAL AREA GRANTED BY EXPLORATION TENURE TYPE, AS AT 1 JULY EACH YEAR**

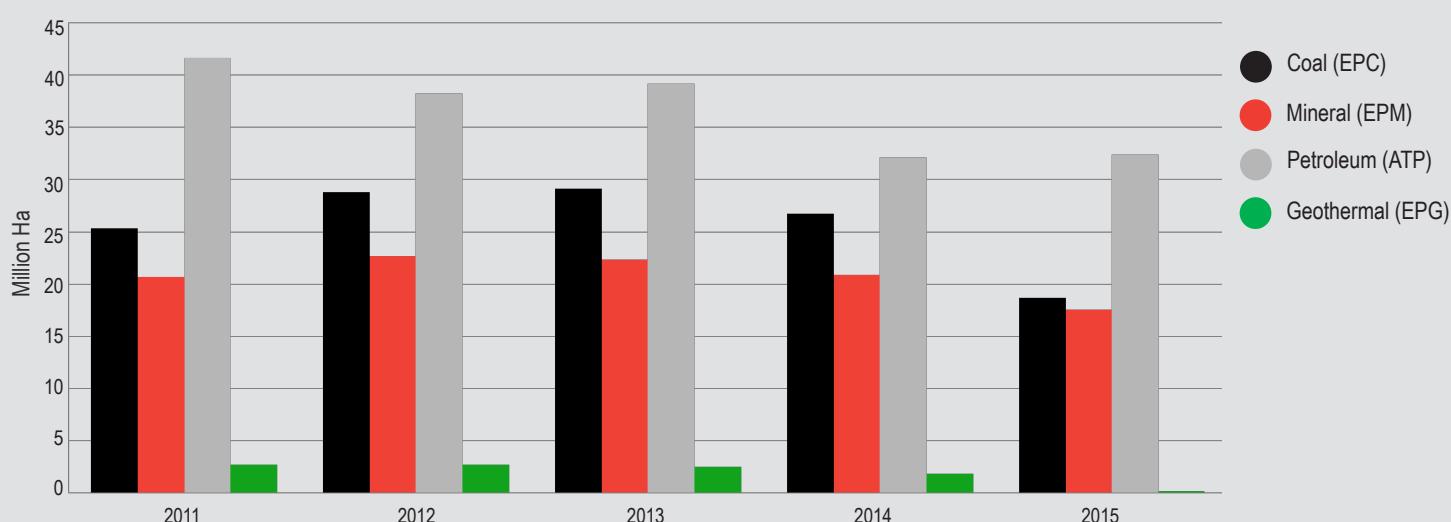
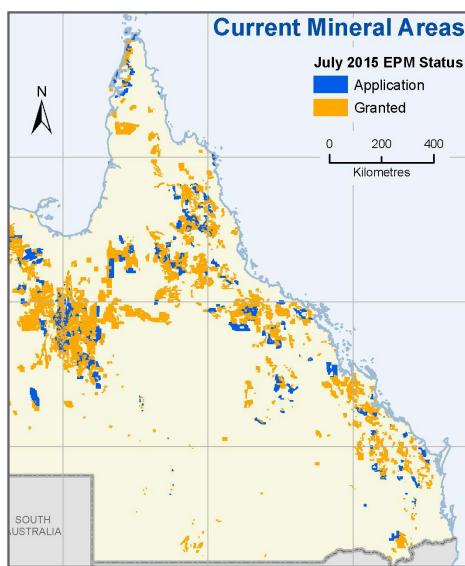
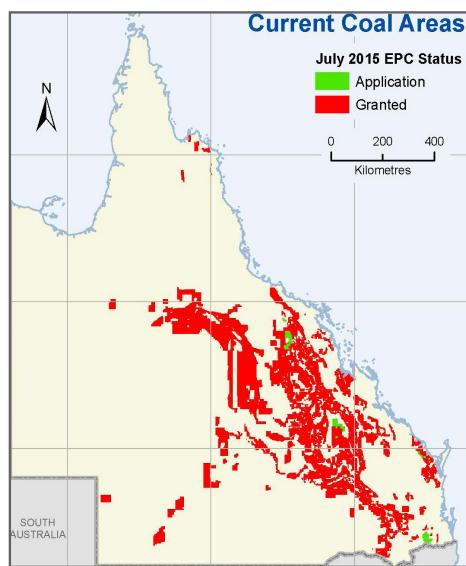


Chart 25 shows the running total area of exploration tenures granted for the four major tenure types over each of the past five years.

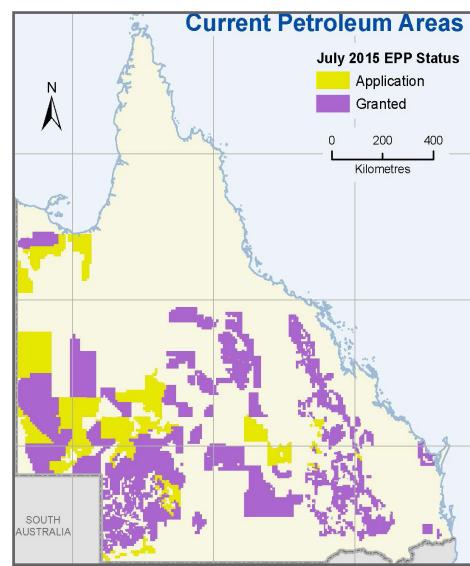
**CHART 26: EXPLORATION PERMIT MINERAL COVERAGE, JULY 2015**



**CHART 27: EXPLORATION PERMIT COAL COVERAGE, JULY 2015**



**CHART 28: AUTHORITY TO PROSPECT PETROLEUM, JULY 2015**



Source: Department of Natural Resources and Mines

Charts 26-28 show the granted tenures in relation to the applications for tenures as at July 2015. Note these figures are revised each year and due to the timing of the request, there are small corrections to the previous year's data.

## KEY FINDINGS

- One of the real success stories in Queensland exploration has been the reforms to tenure processing. A concerted effort over a number of years to streamline these tenure processes, combined with a clear focus on managing the time taken to reach decisions has delivered a major acceleration in processing time.
- The department's customer service standard looked very aggressive when introduced in 2013-14, yet it has delivered each year since. The customer service standard of resolving 80 percent of all mineral or coal exploration applications within 12 months (or within six months if there is no Native Title) has been achieved since being introduced in 2013-14.
- Striving for business improvement saw the standard being exceeded in 2014-15 with 94 percent of applications being resolved within the time period. This is a reform that will service Queensland well when the next upswing in exploration tenure arrives.
- The area granted for petroleum has remained steady at 31 million ha. For minerals, the area has fallen by 5% from 19,000 ha to 18,000 Ha. For coal, the area granted has fallen by 24% to 19,000 ha from 25,000 ha in 2014, as there have been no coal land releases for two years.
- Once again, the tenure maps show the clear clustering of applications and granted tenures around known commodity deposits.

# 5.2

## ACCESS TO HUMAN AND INTELLECTUAL CAPITAL

Access to a skilled labour force is a significant enabler for growth in the sector. The following charts compare the potential pool of Australian and Queensland educated geoscience graduates with current demand (using internet vacancies) to identify general labour market conditions. Drilling qualification completions are also included for Queensland and the rest of Australia.

# 5.2.1

## SUPPLY AND DEMAND OF WORKERS

CHART 29: GEOSCIENCE FULL-TIME EQUIVALENT STUDENT LOAD, 2011 TO 2015

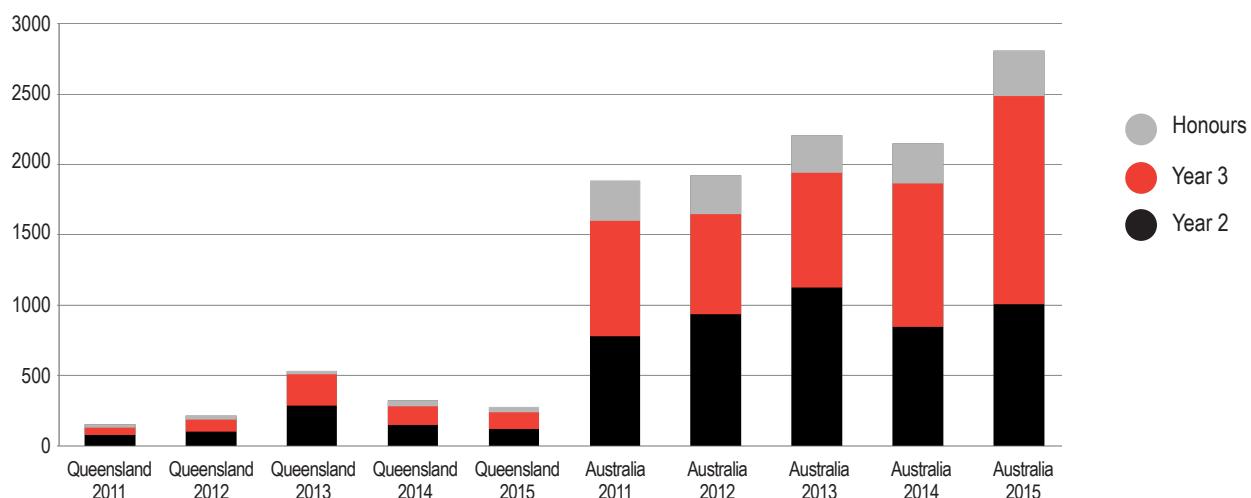
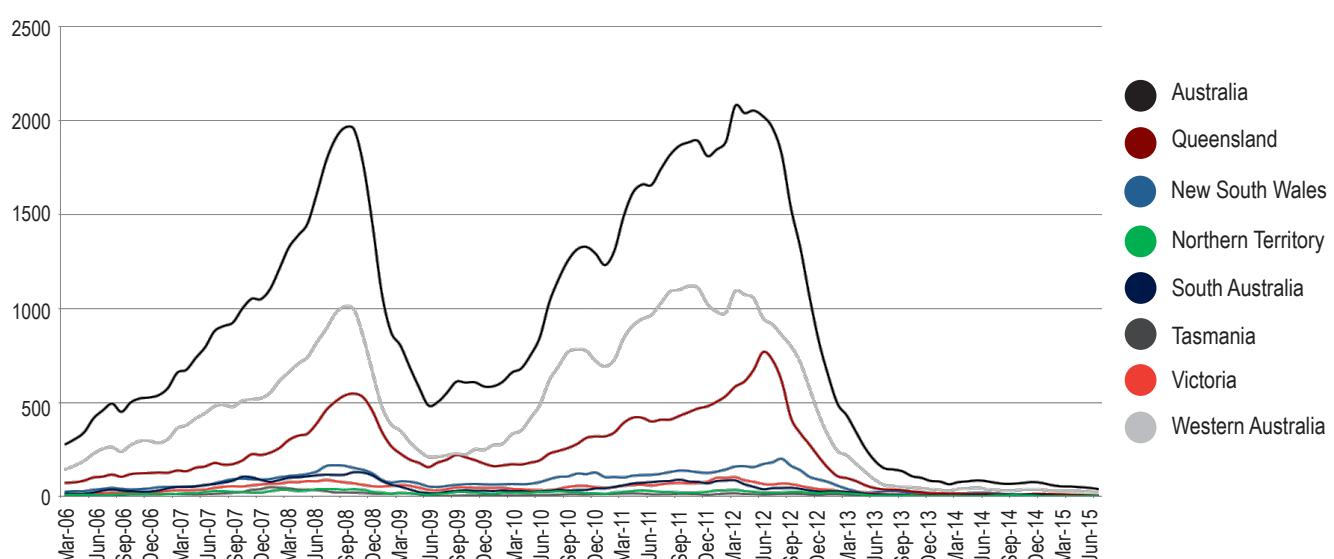
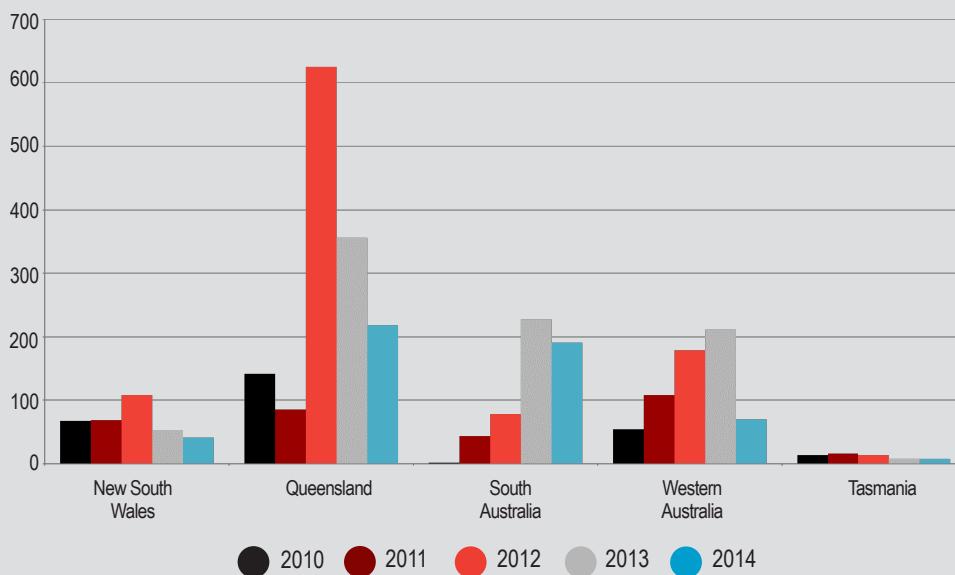
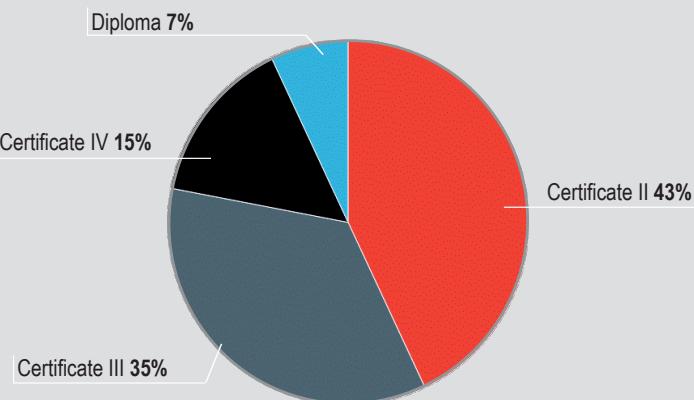


CHART 30: INTERNET VACANCIES FOR GEOLOGISTS AND GEOPHYSICISTS, MARCH 2006 TO JUNE 2015



Source: Australian Government Department of Employment

Source: Australian Geoscience Council (AGC)

**CHART 31: DRILLING QUALIFICATIONS COMPLETED, 2010 TO 2014****CHART 32: DRILLING QUALIFICATIONS COMPLETED, 2015**

Source: National Centre for Vocational Education Research (NCVER)

## KEY FINDINGS

- Australia wide, geoscience enrolments in 2015 increased, while the number of Queensland students in second and third year declined (Chart 29).
- Internet vacancies for geologists and geoscientists indicate a dramatic decline from early 2012 across all jurisdictions and plateauing at very low levels for 2014-15. Fewer vacancies are in line with weaker commodity prices, profitability and investment sentiment, and greater scrutiny of cash-flows.
- Completions in drilling qualifications decreased in all states including Queensland with the greatest decrease in Western Australia (211 in 2013 to 70 in 2014) (Chart 31).

## 5.2.2 LIVEABILITY OF QUEENSLAND

One of the key factors in attracting and retaining skilled employees is the liveability of host communities and the larger city hubs that typically service resource regions. To assess the comparable liveability of cities and regions where geoscience professionals currently reside (ie Brisbane, Cairns, Perth, Kalgoorlie-Boulder and Townsville), Synergies Economic Consulting applied a Liveability Index using the latest available public data.

As exploration teams tend to be highly mobile, the ability to fly in and out of an area is an important consideration. It is important that the current public debate over fly-in fly-out operational staff be confined to resource operations and not the more nimble and mobile exploration activities.

### KEY FINDINGS

- The liveability index is largely unchanged from 2014. Brisbane Perth and Cairns remain the most liveable cities. However, the gap in liveability has narrowed, as the liveability of Townsville and Kalgoorlie has improved.

CHART 33: LIVEABILITY INDEX, OVERALL SCORES 2015

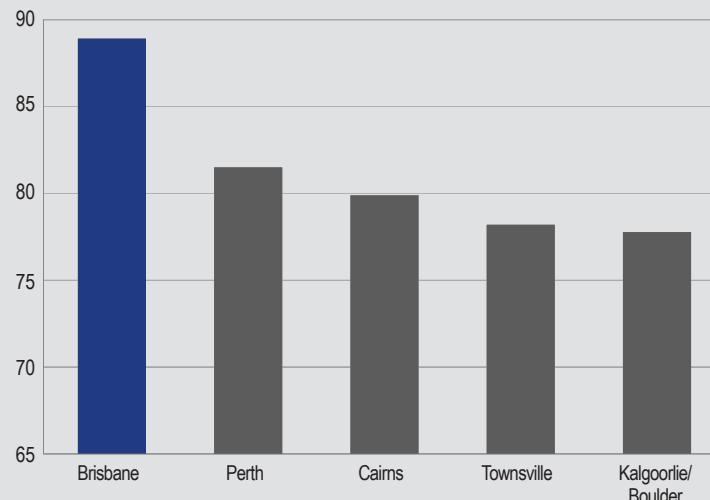
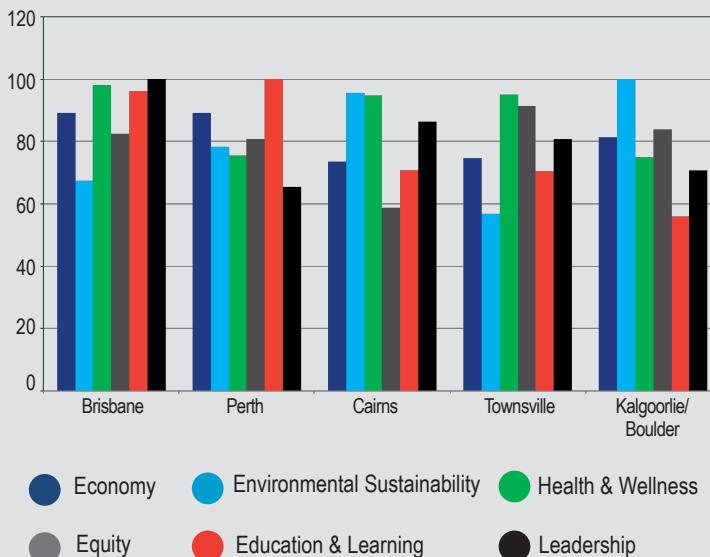


CHART 34: LIVEABILITY SCORE BY DIMENSION



# 5.3

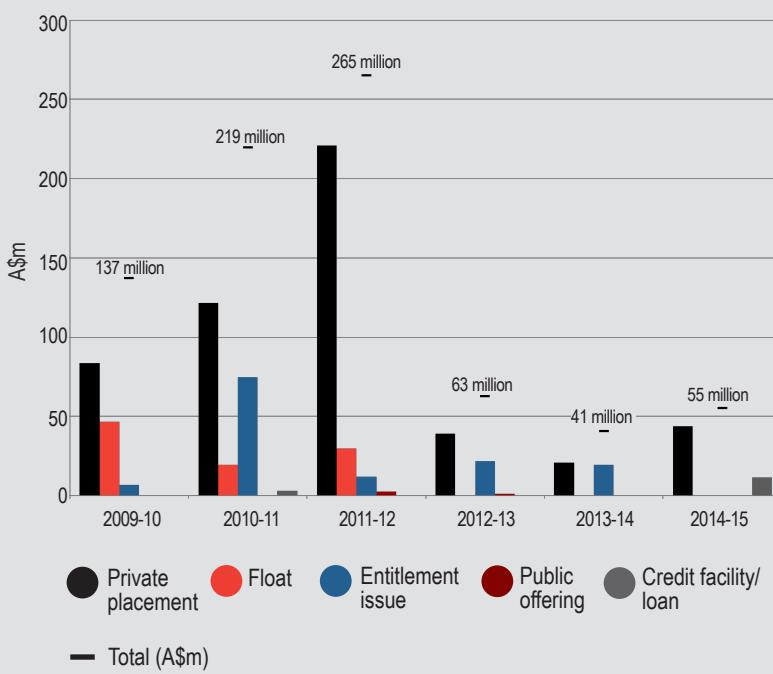
## ACCESS TO EQUITY CAPITAL

As many exploration companies have no regular source of revenue, access to equity capital to fund exploration activities is essential. The following charts show the combined domestic and global equity capital raisings of companies conducting exploration activity for minerals in Queensland by type of raisings and as a percentage of Australian raisings.

### KEY FINDINGS

- In 2014-15 companies exploring in Queensland announced \$55 million in capital raisings for minerals exploration. This is an increase of 36% compared with 2013-14, but well below the first three years of the scorecard.
- The capital raisings in 2014-15 were:
  - Private placement (79 percent of total raisings)
  - Credit facility/loan (21 percent of total raisings)
- Raisings for Queensland projects increased significantly as a percentage of total Australian raisings from 29 percent in 2013-14 to 48 percent in 2014-15.

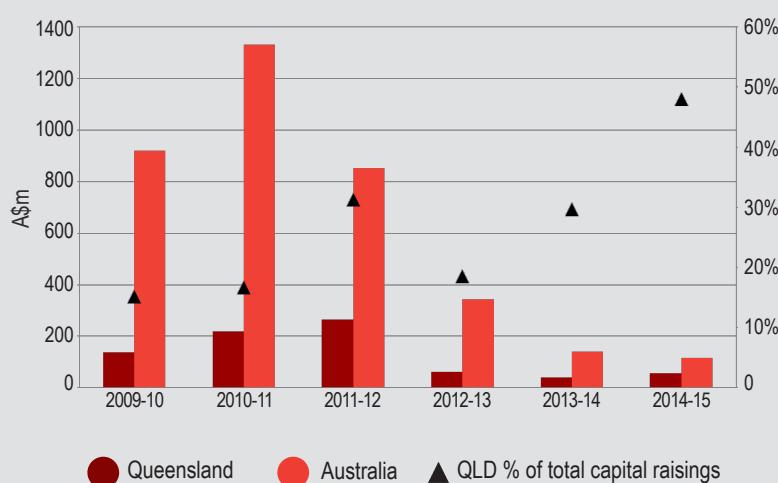
**CHART 35: EQUITY CAPITAL RAISINGS OF MINERAL EXPLORERS IN QUEENSLAND, 2009-10 TO 2014-15**



Note: Entitlement issue is no longer tracked by SNL

Source: SNL Metals and Mining

**CHART 36: EQUITY CAPITAL RAISINGS OF MINERALS EXPLORERS IN QUEENSLAND, 2009-10 TO 2014-15**



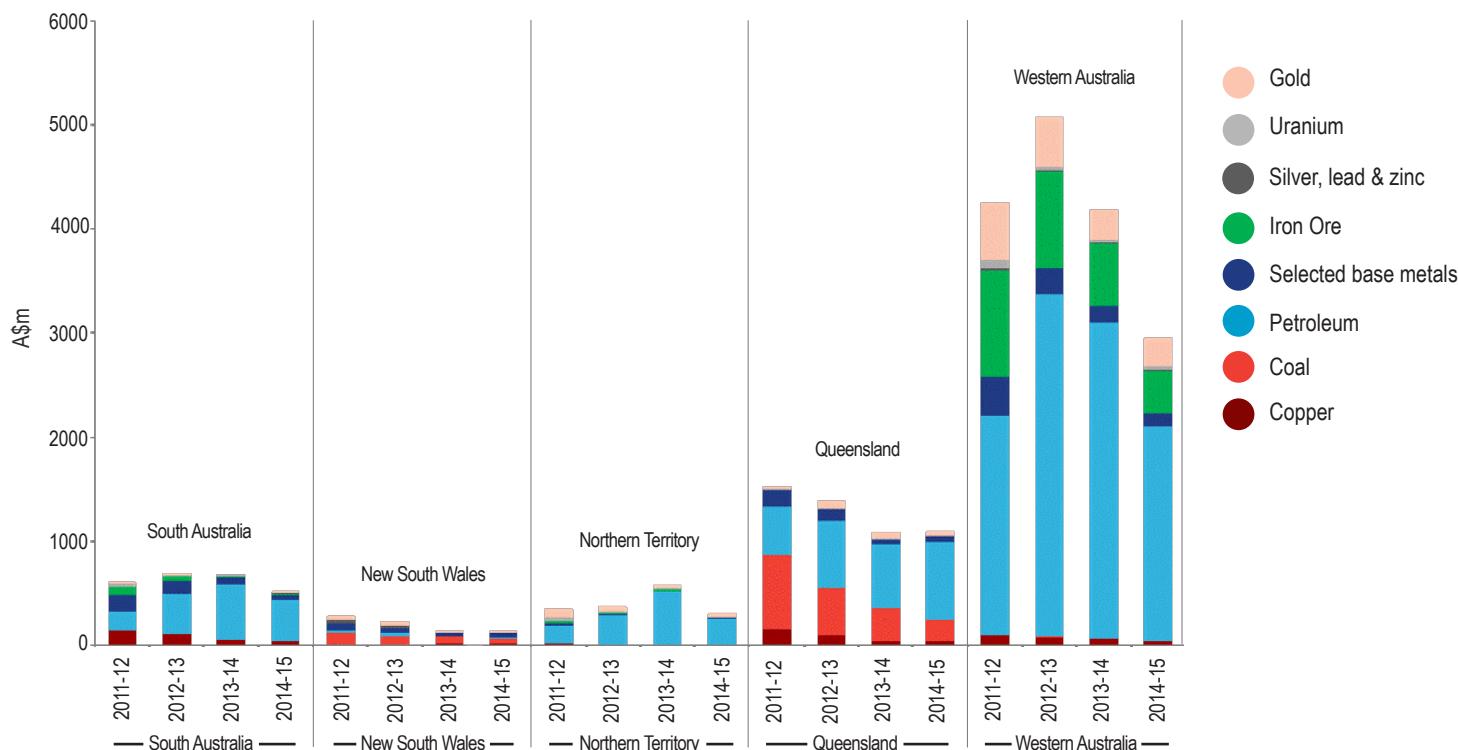
Source: SNL Metals and Mining

# 6.0 MINERALS AND PETROLEUM EXPLORATION

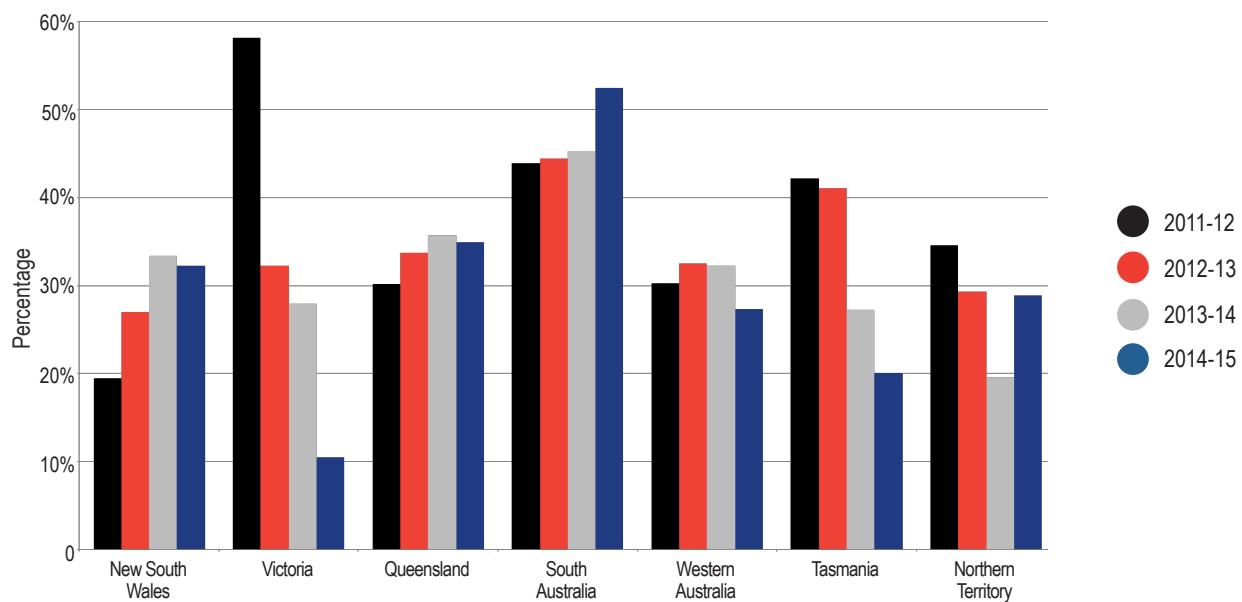
The following charts display a variety of measures to assess Queensland's exploration activities against other Australian jurisdictions in brownfield and greenfield exploration.

## 6.1 MINERALS AND PETROLEUM EXPLORATION EXPENDITURE

CHART 37: MINERALS AND PETROLEUM EXPLORATION, 2011-12 TO 2014-15

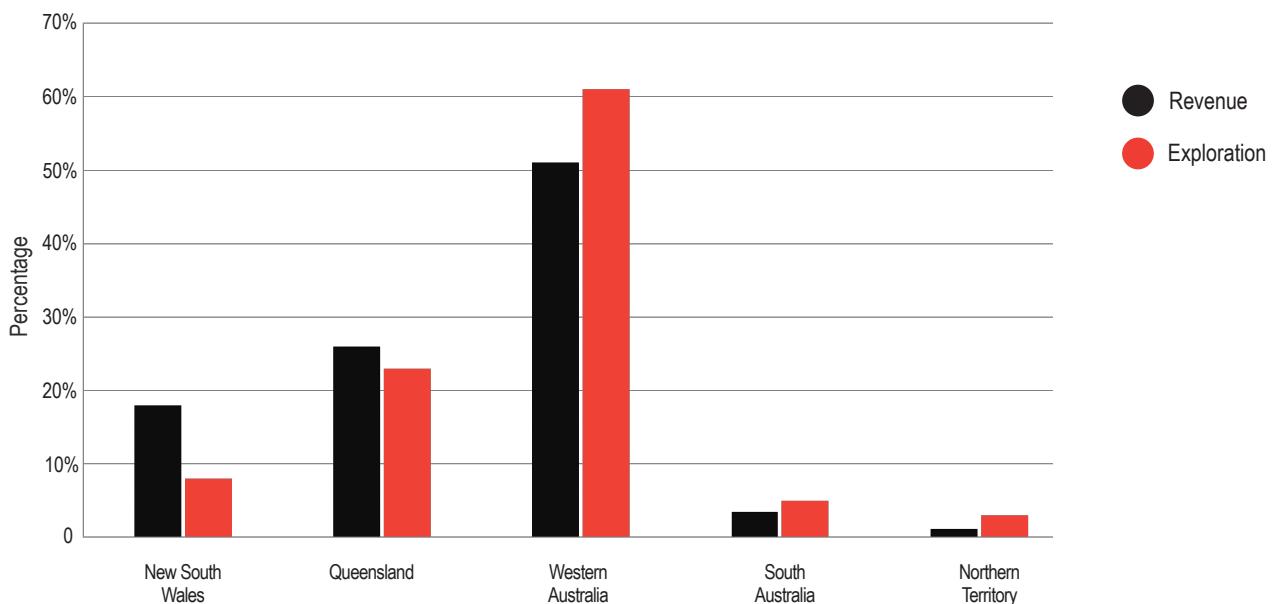


**CHART 38: NEW DEPOSITS (GREENFIELDS) AS A PERCENTAGE OF TOTAL MINERALS EXPLORATION EXPENDITURE, 2011-12 AND 2014-15**



Source: ABS 8412.0

**CHART 39: PERCENTAGE OF COAL AND MINERAL SALES REVENUES AND EXPLORATION SPEND BY STATE, 2014-15**



Source: ABS 8412.0

## KEY FINDINGS

- Queensland in 2014-15 recorded a 28% decrease in minerals exploration compared to 2013-14 (\$475 million to \$340 million). By comparison, Western Australia recorded a 23% decrease in minerals exploration (\$1,152 million to \$884 million) (Chart 37).
- Petroleum expenditure in Queensland increased 23% in 2014-15 (\$613 million to \$752 million), with Queensland the leading onshore explorer.
- Queensland's greenfields performance as a percentage of total minerals exploration expenditure was largely consistent in 2014-15 at 35%, compared with 36% in 2013-14 (Chart 38).
- In 2014-15, Queensland represented 26% of Australia's total sales (in dollar terms) of copper, nickel, silver, lead, zinc, gold and iron ore. By comparison, and during the same period, Queensland represented 23% of Australia's total exploration (in dollar terms) of these commodities (Charts 39).

# 7.0 PRODUCTION BY RESOURCE

Key measures of a successful exploration sector are consistent high quality discoveries (greenfields in particular), increasing levels of resources and reserves (reserves in particular – grade and tonnage), and ‘healthy’ reserve/production ratios (years of available reserves at current production rates).

TABLE 6A: QUEENSLAND YEARS OF RESERVES, BY COMMODITY, 2014-15

Commodity	QLD Production	QLD Reserves (Proved & Probable)	QLD Years (Reserves/production)
Bauxite ('000t)	27,434	1,581,200	~ 58
Copper (t)	301,000	2,914,140	~ 10
Gold (oz)	530,487	9,680,598	~ 18
Lead (t)	446,000	6,680,091	~ 17
Silver (oz)	32,986,665	251,610,000	~ 8
Zinc (t)	1,067,000	17,681,400	~ 17
Coking coal (Mt)*	152	4,866	~ 32
Thermal coal (Mt)*	77	5,125	~ 67

\*The production and reserve figures for coal and lead remain the same as the 2013-14 figures. It is unlikely that the 2014-15 figures will have changed significantly.

TABLE 6B: QUEENSLAND GAS PRODUCTION AND RESERVES, 2014-15

Natural Gas	Production (PJ)	2P Reserves	Years at current production	Years with LNG at Gladstone operational
Conventional	42	4406	~ 10	
CSG	285	42,860	~ 150	
<b>Total</b>	<b>327</b>	<b>43,266</b>	<b>~ 132</b>	<b>26<sup>+</sup></b>

<sup>+</sup>When the LNG plants at Gladstone are fully operational it is estimated that the YE 2014 reserves provides 26 years cover for expected annual LNG and domestic gas demand.

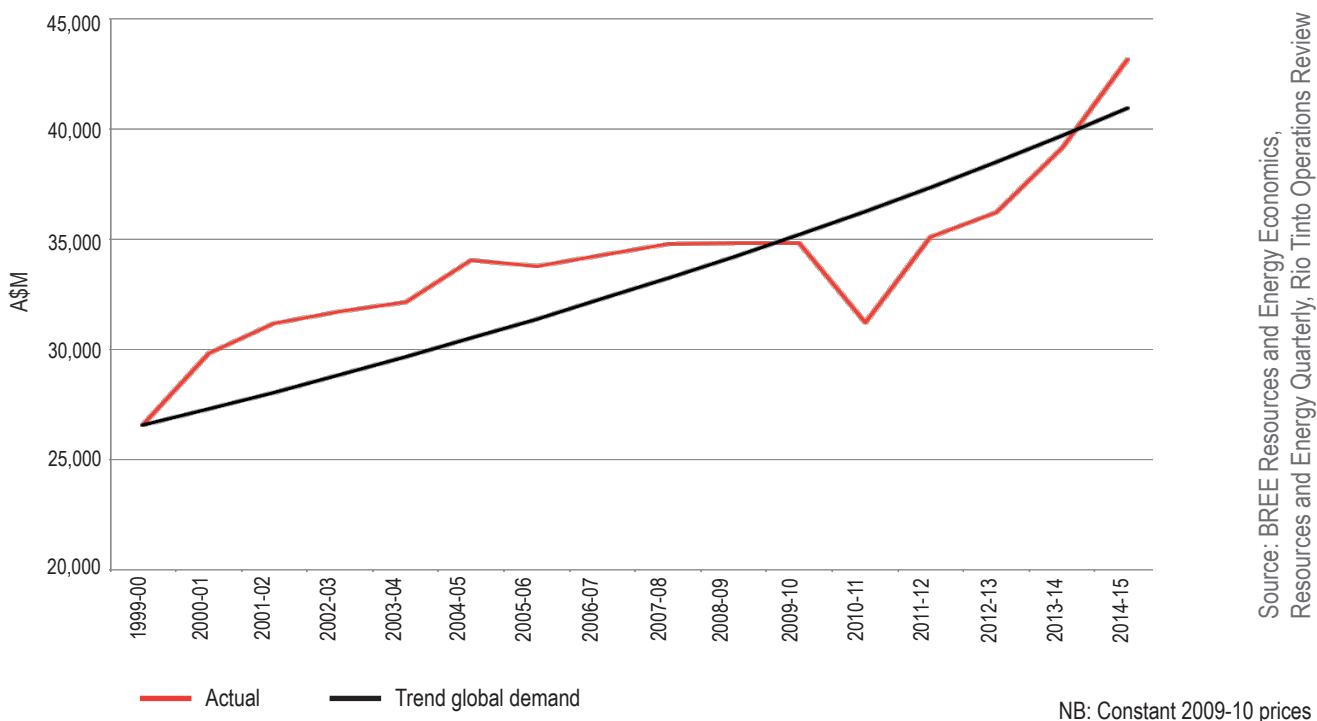
## KEY FINDINGS

- Reserve/production levels for Queensland bauxite is currently 58 years.
- Reserve/production levels for copper, gold, lead, silver, and zinc remain steady and at low levels.
- Based on known resources and current depletion rates Queensland's coal reserves will last another approximately 32 years for coking and 67 years for thermal coal.
- The impact of the LNG industry on remaining reserves is significant, decreasing from 132 years at current annual production to 26 years once LNG projects are fully operational.

# 8.0 PRODUCTION AND COMPARISONS WITH GLOBAL DEMAND

Chart 40 shows the actual production of resources in Queensland in comparison with trend growth in global demand.

**CHART 40: QUEENSLAND MINERAL AND COAL PRODUCTION IN COMPARISON WITH TREND GLOBAL DEMAND, 1999-00 TO 2014-15**



Source: BREE Resources and Energy Economics,  
Resources and Energy Quarterly, Rio Tinto Operations Review

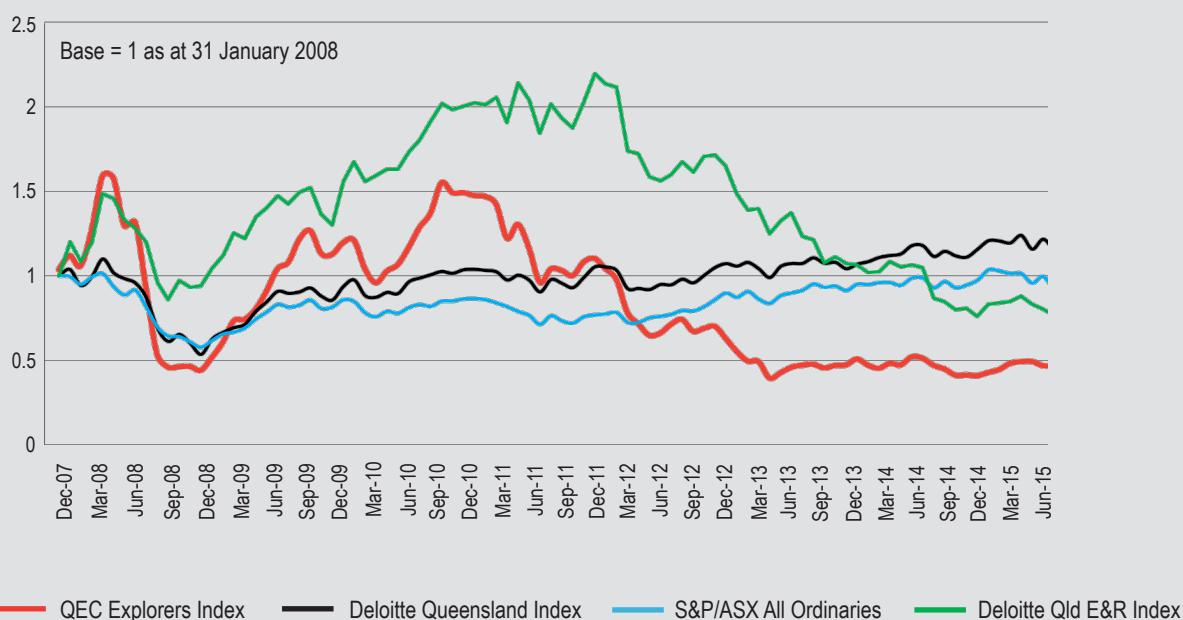
## KEY FINDINGS

- The collective growth in the value of production of Queensland's resources (of bauxite, coal, copper, gold, lead, silver, zinc, nickel, aluminium and alumina) exceeded global demand growth for these commodities in the years between 1999-00 and 2008-09 and again in 2014-15.
- The Central Queensland floods in early 2008, the heavy state-wide flooding in 2010-11, and to a lesser extent the Global Financial Crisis (GFC) in early 2009, curtailed production growth below the trend line of growth in global demand, until 2014-15.
- Next year, the graph will be recalculated as a volume index to reduce the impact of price changes. The new index will also include CSG-LNG to better reflect the mix of resources exported by Queensland.

# 9.0 MARKET CAPITALISATION MOVEMENTS

The market's estimates of future profitability, as measured by market capitalisation movements, are a useful measure of anticipated strength in a sector. The performance of Queensland-listed exploration companies on the Australian Securities Exchange (ASX) is compared with various other indices in Chart 41.

**CHART 41: QEC EXPLORERS INDEX VERSUS OTHER INDICES**



## KEY FINDINGS

- The QEC Exploration Index showed a 5.3% decline over the 12 months to 30 June 2015. This compares with a 3% decrease for the S&P/ASX All Ordinaries, a 1.8% decrease in the Queensland Exploration Index (Queensland based ASX listed companies) and a large 21.7% decrease in the Deloitte Queensland E&R Index (Queensland based ASX listed energy and resources companies).

# GLOSSARY

The **Carbon Geostorage Initiative** was to provide geoscientific data for the assessment of geological storage sites for the safe long-term storage of greenhouse gases.

The **Coastal Geothermal Energy Initiative** was a joint project between the Geological Survey of Queensland and the Office of Clean Energy to investigate potential sources of hot rocks for geothermal energy close to existing transmission lines.

An **entitlement issue** is where shareholders are given the right to subscribe for the new fully-paid share.

**Existing** deposits as defined by the ABS is exploration that is delineating or proving up an existing deposit, including extensions and infill, which has been classified as an Inferred Mineral Resource or higher.

**Exploration expenditure** covers all expenditure (capitalised and non-capitalised) during the exploratory or evaluation stages in Australia, Australian waters, and the Joint Petroleum Development Area (JPDA). Costs include cost of exploration, determination of reserves/ resources, engineering and economic feasibility studies, procurement of finance, gaining access to reserves, construction of pilot plants and all technical and administrative overheads directly associated with these functions.

**Exploration licence/permit** is designed to cover the exploration phase of a project and confers exclusive rights to the exploration for and recovery of samples from the area designated. These rights are granted by relevant Commonwealth, state or territory governments.

A **full-time equivalent (FTE)** measure attempts to standardise a student's actual course load against the normal course load. Calculating the full-time/part-time status requires information on the time periods for actual and normal course loads.

The **Future Resources Program** (\$30m) aims to maximise exploration success by supporting Queensland's resource and exploration industries. The program was funded through competitive cash bidding and represents a return on investment. It includes a number of initiatives outlined here: <http://www.dnrm.qld.gov.au/our-department/policies-initiatives/mining-resources/future-resources-program>.

The **Greenfields 2020 program** is an \$18 million program over four years to focus exploration in greenfield and under-explored areas of the state. It is also designed to revitalise interest in what are perceived to be 'mature' provinces, through the application of new ideas, models and technologies. There are seven initiatives in the program with the New Minerals Frontiers Initiative concentrating efforts in the Northern Economic Region, Southern Thomson, and Galilee areas. A number of new geoscientific information products have been released over the past few years including new airborne magnetic, radiometric and gravity survey. The Greenfields 2020 program also included \$3 million for the continuation of the popular and successful Collaborative Drilling Initiative.

The **Geological Survey of Queensland (GSQ)**, as part of the Department of Natural Resources and Mines, provides geoscience and resource information to improve the understanding of the geology and minerals and energy resource potential of Queensland, and promotes the geoscientific data and exploration potential to attract investment

An **indicated mineral resource** is that part of a Mineral Resource for which tonnage, densities, shape, physical characteristics, grade and mineral content can be estimated with a reasonable level of confidence. It is based on exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes. The locations are too widely or inappropriately spaced to confirm geological and/or grade continuity but are spaced closely enough for continuity to be assumed.

An **Inferred Mineral Resource** is that part of a Mineral Resource for which tonnage, grade and mineral content can be estimated with a low level of confidence. It is inferred from geological evidence and assumed but not verified geological and/or grade continuity. It is based on information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes which may be limited or of uncertain quality and reliability.

An **Initial Public Offering (IPO)** or float is the initial raising of capital by public subscription to an offering of securities.

The Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves 2012 Edition (the '**JORC Code**' or 'the Code') sets out minimum standards, recommendations and guidelines for Public Reporting in Australasia of Exploration Results, Mineral Resources and Ore Reserves. The Joint Ore Reserves Committee ('JORC') was established in 1971 and published several reports containing recommendations on the classification and Public Reporting of Ore Reserves prior to the release of the first edition of the JORC Code in 1989.

The **Interactive Resource and Tenure Maps** system (IRTM) is an online spatial data viewer for maps and spatially referenced images. It has a download facility for many layers and also an interactive web map service that can be linked to an online GIS tool for live data feeds. IRTM also has spatial links to the **Queensland Digital Exploration Reports** system (QDEX Reports) which is an online document management system for lodgement, search and retrieval of statutory exploration and other reports as well as many departmental mining-related publication collections. The link allows spatial searches in IRTM for historical tenure exploration reports in QDEX and some other spatial layers also link to QDEX documents.

**Lag indicators** are the indicators that measure actual exploration success.

**Lead indicators** are the factors that drive exploration activity and performance.

**Liveability Index** uses 16 indicators of liveability grouped in six dimensions:

- economy (median individual income; unemployment rate; SEIFA; availability and frequency of direct flights to key cities, Index of retail prices)
- environmental sustainability (air quality; water usage per person per year)
- health and wellness (GP services per capita; percentage of overweight persons; alcohol consumption at levels considered to be a high risk to health)
- equity (residential rental house vacancy rates; proportion of rented house; percentage of female councillors)
- education and learning (proportion of people whose highest year of school attended is year 12 or equivalent)
- leadership (percentage of population volunteering in organisations).

Each of the indicators is benchmarked against the top-performing city, which is assigned a base score of 100. The other cities' scores are derived from ratios that compare their respective performance to the performance achieved by the top-performing city.

A simple average is worked out for each of the six dimensions, after which the average score for each dimension is further aggregated into an equal weighting system.

**Market capitalisation** represents the public consensus on the value of a company's equity. An entirely public corporation, including all of its assets, may be freely bought and sold through purchases and sales of stock, which will determine the price of the company's shares. Its market capitalization is the share price multiplied by the number of shares in issue, providing a total value for the company's shares and thus for the company as a whole.

A **measured mineral resource** is that part of a Mineral Resource for which tonnage, densities, shape, physical characteristics, grade and mineral content can be estimated with a high level of confidence. It is based on detailed and reliable exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes. The locations are spaced closely enough to confirm geological and grade continuity.

A **mineral resource** is a concentration or occurrence of material of intrinsic economic interest in or on the earth's crust in such form, quality and quantity that there are reasonable prospects for eventual economic extraction. The location, quantity, grade, geological characteristics and continuity of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge. Mineral Resources are sub-divided, in order of increasing geological confidence, into inferred, indicated and measured categories.

The **MinesOnlineMaps** system is an online spatial data viewer replacing IRTM for maps and spatially referenced images. A new download facility and a web map service will be delivered through the Queensland Spatial Portal which is currently being updated. MinesOnlineMaps also has spatial links to the **Queensland Digital Exploration Reports** system (QDEX Reports) which is an online document management system for lodgement, search and retrieval of statutory exploration and other reports as well as many departmental mining-related publication collections. The link allows spatial searches in MinesOnlineMaps for historical tenure exploration reports in QDEX Reports and some other spatial layers also link to documents in QDEX Reports. <http://www.dnrm.qld.gov.au/mapping-data/maps/minesonlinemaps>.

**National parks** category includes national and state-run parks and nature conservation areas. No mining activity is permitted on an area declared a National Park.

**Nature refuges** as defined by the Department of Environment and Heritage Protection, is area of land voluntarily agreed between a landholder and the government to dedicate and protect for conservation purposes while allowing compatible and sustainable land uses to continue. There are different classifications of nature refuges, some that allow mining activity and some that prohibit altogether (similar to the Strategic Cropping Land triggers, however for environmental benefit).

**New deposits** as defined by the ABS is - exploration on previously unknown mineralisations or known mineralisations yet to be classified as an Inferred Mineral Resource or higher. They include:

- exploration resulting in finding mineralisation that was previously unknown
- exploration on previously known mineralisation that has not been subjected to modern exploration
- exploration within an existing mining tenement for the purpose of finding new sources of mineralisation that have not already been classified as at least an Inferred Mineral Resource.

An **Ore reserve** is the economically mineable part of a Measured and/or Indicated Mineral Resource. It includes diluting materials and allowances for losses, which may occur when the material is mined. Appropriate assessments and studies have been carried out, and include consideration of, and modification by, realistically assumed mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors. These assessments demonstrate at the time of reporting that extraction could reasonably be justified. Ore Reserves are sub-divided in order of increasing confidence into Probable Ore Reserves and Proved Ore Reserves.

**Potential commercial areas** are effectively a variation on a petroleum production lease but the usual requirement to commence production within two years is waived. It might be a field with high-quality reserves, but which requires pipeline and other services to make the recovery of the gas economical.

**Pre-competitive geoscience data** acquisition in Australia refers to the collection, collation and integration of basic geoscientific data by government agencies, essentially Geoscience Australia and the states' geological surveys. These strategic regional geoscientific research programs are generally aimed at upgrading historic data sets and filling data gaps by acquiring, efficiently and economically, modern geoscientific data at geologic province scale 2. Generally, the government agencies assigned priority to upgrading datasets over areas considered to be prospective but under-explored.

A **private placement** is the sale of securities to a relatively small number of select investors as a way of raising capital. Investors involved in private placements are usually large banks, mutual funds, insurance companies and pension funds.

A **probable ore reserve** is the economically mineable part of an Indicated, and in some circumstances, a Measured Mineral Resource. It includes diluting materials and allowances for losses which may occur when the material is mined. Appropriate assessments and studies have been carried out, and include consideration of and modification by realistically assumed mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors. These assessments demonstrate at the time of reporting that extraction could reasonably be justified.

**Probable reserves (oil and gas including CSG)** are those additional Reserves which analysis of geoscience and engineering data indicate are less likely to be recovered than Proved Reserves but more certain to be recovered than Possible Reserves. It is equally likely that actual remaining quantities recovered will be greater than or less than the sum of the estimated Proved plus Probable Reserves (2P). In this context, when probabilistic methods are used, there should be at least a 50% probability that the actual quantities recovered will equal or exceed the 2P estimate. (Petroleum Resources Management System, 2007)

**Prospectivity** refers the likelihood that specific types of mineral deposits are present in a geological province and may be discovered with ongoing exploration.

A **proved ore reserve** is the economically mineable part of a Measured Mineral Resource. It includes diluting materials and allowances for losses which may occur when the material is mined. Appropriate assessments and studies have been carried out, and include consideration of and modification by realistically assumed mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors. These assessments demonstrate at the time of reporting that extraction could reasonably be justified.

**Proved reserves (oil and gas including CSG)** are those quantities of petroleum, which, by analysis of geoscience and engineering data, can be estimated with reasonable certainty to be commercially recoverable, from a given date forward, from known reservoirs and under defined economic conditions, operating methods, and government regulations. If deterministic methods are used, the term reasonable certainty is intended to express a high degree of confidence that the quantities will be recovered. If probabilistic methods are used, there should be at least a 90% probability that the quantities actually recovered will equal or exceed the estimate. (Petroleum Resources Management System, 2007)

The **Queensland Digital Exploration Data system (QDEX Data)** is an online catalogue and download service for publishing large public data sets such as airborne geophysics, seismic surveys, wireline logs, geochemistry, 3D models and any other large items. It uses high compression algorithms and data streaming technology to transfer files over 1Gb in size. It has a simple web search interface but can also be accessed by customers using Oasis Montaj, ESRI ArcGIS or Mapinfo software (a free plug-in is available). <http://www.dnrm.qld.gov.au/mapping-data/qdex-data>. There are links between QDEX Data and QDEX Reports.

The **Queensland Digital Exploration Reports system (QDEX Reports)** is an online document management system for lodgement, search and retrieval of statutory exploration and other reports as well as many departmental mining-related publication collections. There is a link between QDEX Reports and the MinesOnlineMaps system which allows spatial searches in MinesOnlineMaps for historical tenure exploration reports in QDEX Reports and some other spatial layers. <http://www.dnrm.qld.gov.au/mapping-data/qdex-reports>

**Recreational areas** have features such as trails, ranging from urban cycle and walking paths to river trails and rugged bush tracks. These trails cover 300,000 hectares or less than half a percent of the state. These areas generally do not prohibit mining/exploration.

**Retention licence** (or MDL) is an intermediate form of tenure between the exploration licence and mining licence allowing the holder of the exploration licence to retain title to the area for a limited time. It is designed to ensure the retention of rights pending the transition of a project from the exploration phase to the commercial mining phase.

**State forests** are forest reserves set by the Governor-in-Council. Mining/exploration tenure can be granted over a state forest area, however conditions are prescribed by the Forestry Act 1959 to apply to the tenure holder under the resources legislation (for example the Mineral Resources Act 1989).

**Selected base metals** are made up of the following minerals: copper, silver, lead-zinc, nickel and cobalt.

**Smart Mining - Future Prosperity** was a package of initiatives designed to double the 2004-05 mineral and petroleum exploration expenditure of \$270 million by 2008-09. This target was easily achieved with expenditure of \$751.4 million in 2008-09, and annual exploration expenditure has continued to rise.



## ACRONYMS

<b>ABS</b>	Australian Bureau of Statistics	<b>GSQ</b>	Geological Survey of Queensland
<b>ADIA</b>	Australian Drilling Industry Association	<b>IPO</b>	Initial Placement Offering
<b>ATP</b>	Authority to Prospect	<b>IRTM</b>	The Queensland Government's Interactive Resource and Tenure Maps
<b>ASX</b>	Australian Securities Exchange	<b>JORC</b>	The Joint Ore Reserves Committee
<b>CSG</b>	Coal Seam Gas	<b>LNG</b>	Liquified Natural Gas
<b>DNRM</b>	Department of Natural Resources and Mines	<b>MDL</b>	Mineral Development Licence
<b>EHP</b>	Department of Environment and Heritage Protection	<b>ML</b>	Mining Lease
<b>EPC</b>	Exploration Permit for Coal	<b>PL</b>	Petroleum Lease
<b>EPG</b>	Exploration Permit for Geothermal	<b>QEC</b>	Queensland Exploration Council
<b>EPM</b>	Exploration Permit for Minerals other than coal	<b>QRC</b>	Queensland Resources Council
<b>FTE</b>	Full time equivalent	<b>QDEX</b>	Queensland Digital Exploration Reports database

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An initiative of



Queensland Resources Council  
Level 13 133 Mary Street Brisbane QLD 4000  
Phone: +61 7 3295 9560 Fax: +61 7 3295 9570

[qrc.org.au](http://qrc.org.au)  
[queenslandexploration.com.au](http://queenslandexploration.com.au)

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