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Department of Industry, Innovation and Science

Office of the Chief Economist

Resources and Energy Major Projects

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Foreword

The Resource and Energy Major Projects Report is a biannual snapshot of the stock of investment in Australia's resources and energy sectors. In this edition of the report we have seen a continuation of the trend recorded in the April 2015 report, with a further reduction in the number and value of projects across all categories of the investment pipeline. This picture is consistent with falling prices and the subsequent drive to cut costs and improve the efficiency of existing assets.

Australia's exports of resource and energy commodities have increased substantially over the last couple of years, supported by approximately $400 billion in investment between 2003 and 2014. In addition, there are 7 "mega projects", which are each valued at more than $5 billion, currently under construction in Australia. When these projects come into production there will be another lift in Australia's exports of resource and energy commodities.

The global increase in the supply of resources and energy commodities, of which Australia is a major contributor, is placing significant downward pressure on most commodity prices. As a result the number of projects being delayed or deferred has increased. Similarly the level of exploration in Australia has continued to decline from April 2015.

It is likely that these conditions will continue over the short to medium term as markets adjust to the increase in supply. As such, we expect to see a subdued environment for investment in resource and energy projects as mining companies shift their focus from seeking new development opportunities to reducing costs and enhancing productivity.

Beyond the medium term the outlook remains positive with non-OECD emerging economies continuing to urbanise and develop. This development will be underpinned by access to resources and energy commodities which are the building blocks of economic growth.

Mark Cully
Chief Economist
Department of Industry, Innovation and Science

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Executive Summary

The Resource and Energy Major Projects Report is a biannual snapshot of the stock of investment in Australia's resources and energy sectors. It comes at a time when the Australian resources and energy sectors are transitioning from the investment phase of the mining boom to the production phase.

The ongoing downturn in most commodity prices has led many companies to implement cost cutting programs to remain profitable. Reducing exploration expenditure has clearly been one of the principle ways for delivering savings. In 2014-15, Australia's total exploration expenditure, including both minerals and petroleum exploration, decreased 22 per cent, compared to 2013-14, to $5.4 billion.

The outlook for investment in the resources and energy sectors in Australia remains broadly unchanged from the April 2015 edition of the Resources and Energy Major Projects Report. The value of committed projects has declined and it is clear that this decline will not be offset by new investments coming through the pipeline in the short to medium term. Sharp falls in the price of most commodity prices are leading project proponents to delay or cancel projects.

In the last six months, the Queensland Curtis LNG project, one of the "mega" LNG projects, moved to the completed phase. The remaining "mega" LNG projects, including: Icthys, Wheatstone and Gorgon are still under construction, which is providing temporary support to the total value of committed projects. Many of these "mega" projects are scheduled for completion over the coming year and as they do the value of projects on the list will fall substantially.

In the six months to October 2015 four projects received a positive final investment decision worth $1.2 billion. However, over the same period seven projects worth $25 billion moved to the completed stage. In total, there were 35 projects, worth $221 billion, at the committed stage as at the end of October 2015.

The current state of the market has led to a backlog of projects at the Feasibility Stage. There are now 127 projects at the Feasibility Stage, two more than in April 2015 as companies delay making a final investment decision. While the appetite for risk among project developers and financiers appears to be low, Australia still has many world class resource deposits that can be developed when market conditions improve.

Background to the Resources and Energy Major Projects Report

The Resources and Energy Major Projects is a biannual report released by the Department of Industry, Innovation and Science (DIIS) that provides a review of the mining, infrastructure and processing facilities projects that increase, extend or improve the output of mineral and energy commodities in Australia. This edition of the report is an update on project developments over the six months from May 2015 to October 2015 (inclusive). Its purpose is to measure the value of the current and potential investment in the mining and energy sectors and provide an analysis of the key trends and issues underpinning the level of investment. The value of this 'stock' of investment is an important economic indicator for Australia. The annual capital expenditure that flows from it has been a major source of economic activity over the past five years and it supports expectations of resources and energy commodity output growth.

DIIS gathers information on major projects from a number of sources including company websites, ASX quarterly activity reports and media releases, and in some cases, from direct contact with company representatives. Although there is substantial investment by mining and energy companies in replenishing equipment, plant and other property, the focus of this report is on 'major' investments that are greater than $50 million. Smaller scale operations that cost less than $50 million are also an important contributor to the sector and the broader Australian economy; however gathering data on such projects is challenging as many are undertaken by private companies with fewer obligations to report progress and they often have shorter development cycles.

Developers of resources and energy projects often use different planning processes and assessment methods to support a Final Investment Decision (FID). Thus, there is no standard project development model with clearly defined stages and terminology that can be applied to every resources and energy project. To broadly represent the general lifecycle of a project DIIS use a four-stage model of the investment pipeline to measure the potential investment in Australia's resources and energy sectors.

To be included on the major projects list that accompanies this report, there must be evidence of project activities that support the project progressing to an FID within the next five years.

The four stages in the DIIS investment pipeline model are:

1. **Publicly Announced Stage**. Projects at this stage are either at a very early stage of planning (i.e. undertaking their first pre-feasibility study), have paused in progressing their feasibility studies or have an unclear development path. As a result, not all projects will progress from the Publicly Announced Stage to become operational facilities. To include a project on the major projects list at this stage, preliminary information on project schedule, planned output or cost must be publicly available.
2. **The Feasibility Stage**. This stage of the project development cycle is where the initial feasibility study for a project has been completed and the results support further development. This stage is characterised by further studies being undertaken to finalise project scope, complete engineering designs, assess environmental impacts and develop commercial plans. Projects at the Feasibility Stage are less uncertain than those at the Publicly Announced Stage, but are still not guaranteed to progress further as evaluations of commercial prospects have not yet been finalised and all regulatory approvals are yet to be received.
3. **Committed Stage**. Projects at this stage of the development cycle have completed all commercial, engineering and environmental studies, received all required regulatory approvals and finalised the financing for the project. Such projects are considered to have received a positive FID from the owner, or owners, and are either under construction or preparing to commence construction. Typically, projects at the Committed Stage have cost estimates, schedules and mine output that are well defined and often publicly released. Nevertheless, plans are subject to change due to schedule delays, scope changes and cost overruns even after construction has commenced.

4. **Completed Stage**. The period of time that a project undertakes commissioning or ramps up to full production varies; however, DIIS first classifies a project as being at the Completed Stage when they have substantially finished their construction and commissioning activities to the point where full commercial level production has commenced.

Earlier stages of developing mining and energy projects, such as identifying deposits and exploration activities, are not included in the model. While these activities remain important, it is beyond the scope of this report to assess exploration activities on a project by project basis. Instead, a summary and analysis of aggregate exploration expenditure is provided.

Exploration

Overview

Exploration is a key stage in the mining project development cycle. It is an investment in knowledge about the location, type, quantity and quality of deposits to potentially support future development. Before making the decision to undertake exploration activities, resources and energy companies consider a range of factors to ensure the benefits of exploration activities exceed the costs. These include prevailing and expected commodity prices; regulatory environments; geological prospects and fiscal arrangements.

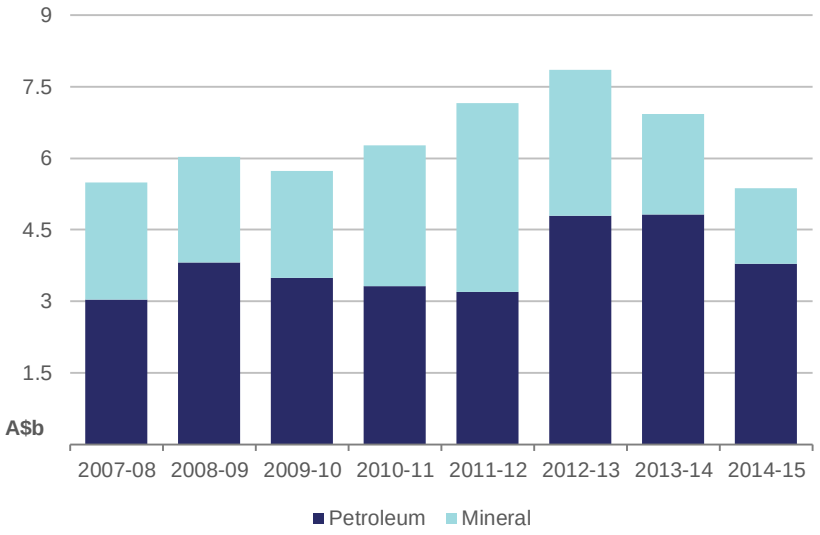
The environment of lower commodity prices has reduced exploration expenditure as companies respond to the need to cut costs and remain profitable.

Exploration Expenditure

In 2014-15, lower commodity prices and cost cutting led to a decline in exploration activity and expenditure. Total exploration expenditure, including both minerals and petroleum exploration, decreased 23 per cent, relative to 2013-14, to $5.4 billion. Petroleum exploration expenditure totalled $3.8 billion, down 21 per cent. Minerals exploration expenditure also fell considerably, down 25 per cent to $1.6 billion.

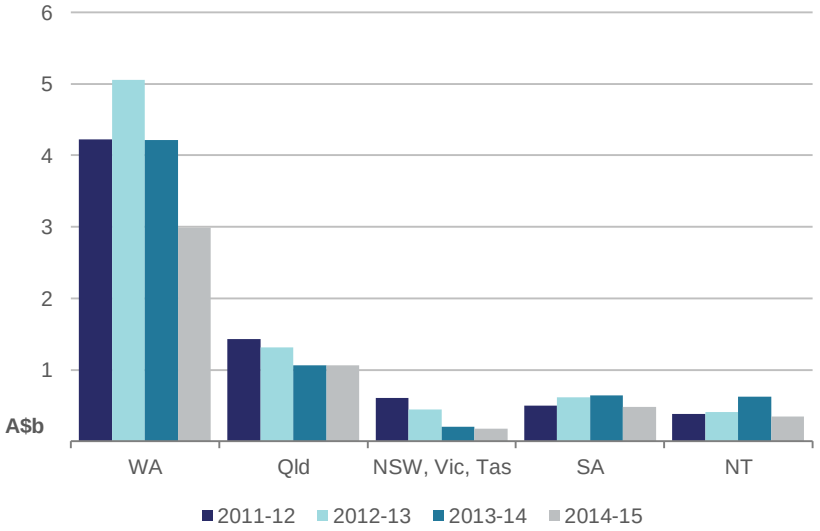
In Western Australia total exploration expenditure decreased 29 per cent, or $1.2 billion, to $3.0 billion in 2014-15. The combined expenditure of New South Wales, Victoria and Tasmania decreased 11 per cent to $180 million. Expenditure in the Northern Territory and South Australia decreased 45 per cent and 25 per cent, respectively. However, exploration expenditure in Queensland remained unchanged at $1.1 billion.

Figure 1: Australia's exploration expenditure



Source: ABS.

Figure 2: State exploration expenditure



Source: ABS.

The decline in minerals exploration expenditure demonstrated a commensurate decrease in exploration activity, as measured by the number of metres drilled. In 2014-15, the total metres drilled decreased 8 per cent, year-on-year, and totalled 5964 thousand metres. Metres drilled at new deposits and existing deposits decreased 10 per cent and 8 per cent, respectively. As a result of this drop in activity, exploration expenditure on new deposits decreased 29 per cent to $485 million and expenditure on existing deposits decreased 24 per cent to $1.1 billion.

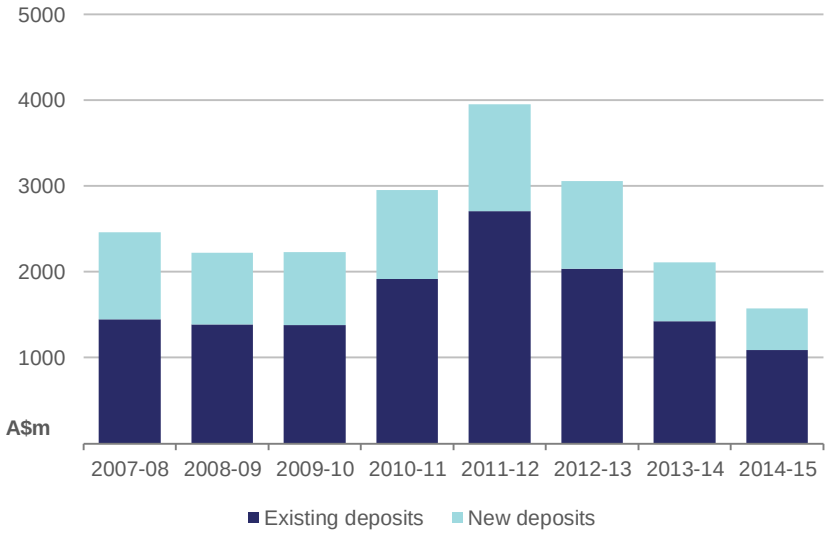
Exploration expenditure decreased across all types of mineral commodities in 2014-15. Expenditure on base metals decreased 13 per cent, relative to 2013-14, to $558 million. After peaking in 2011-12, base metals exploration expenditure has now declined 65 per cent. Although iron ore and coal export volumes increased over the past twelve months, exploration expenditure for both commodities decreased by 33 per cent and 37 per cent, respectively, in 2014-15. Gold exploration expenditure decreased 9 per cent with other minerals expenditure decreasing 12 per cent.

Total petroleum exploration expenditure decreased 22 per cent in 2014-15 and totalled $3.7 billion. Onshore exploration decreased 28 per cent to $1.2 billion. Offshore exploration also decreased, down 22 per cent to $2.5 billion. Offshore exploration accounted for more than 67 per cent of Australia's total exploration expenditure in 2014-15. The downturn in petroleum prices is likely to drive exploration lower in the short term.

Figure 3: Mineral exploration – metres drilled

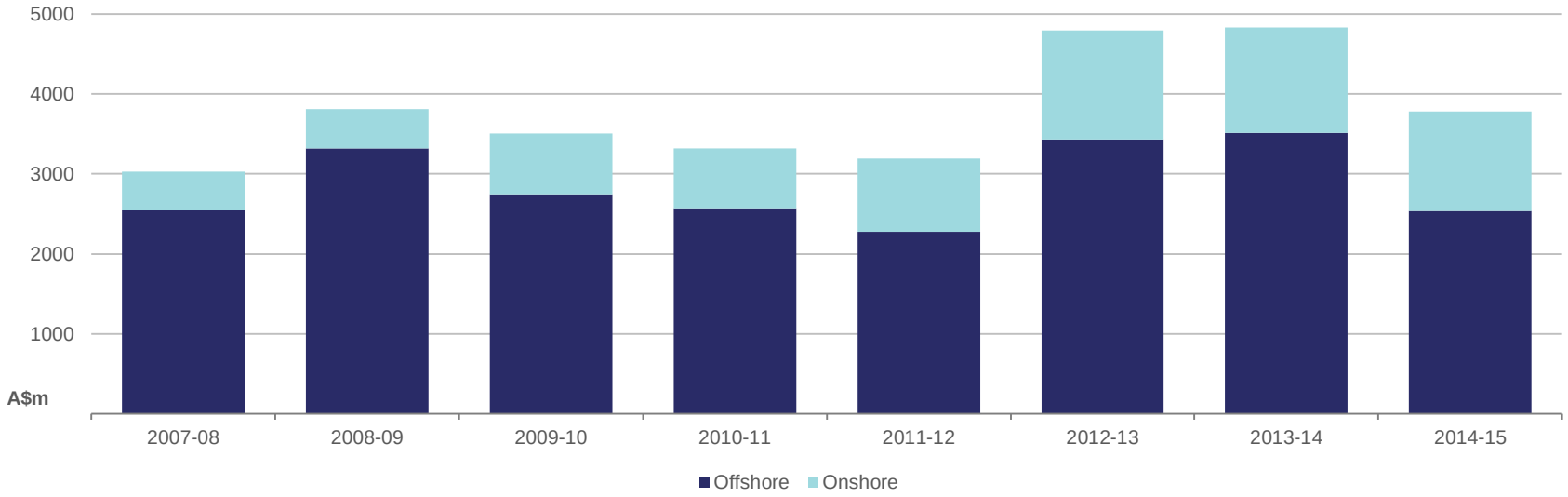
Source: ABS.

Figure 4: Mineral exploration expenditure



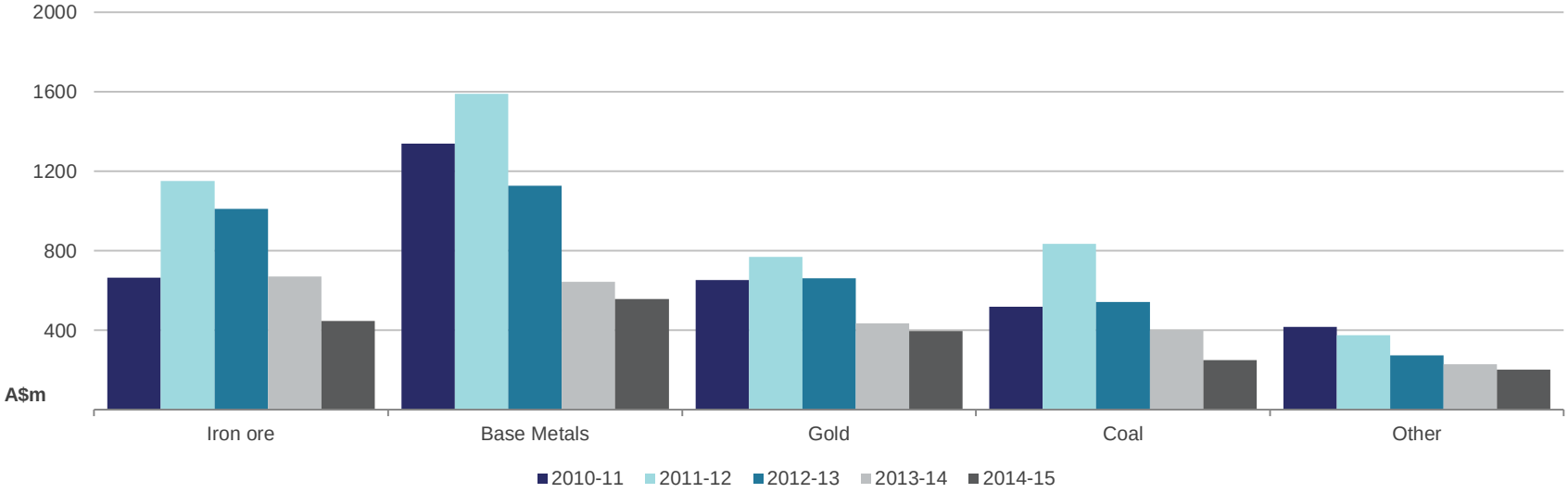
Source: ABS.

Figure 5: Petroleum exploration expenditure



Source: ABS.

Figure 6: Exploration by mineral



Source: ABS.

Projects at the Publicly Announced Stage

Overview

Projects at the Publicly Announced Stage are usually very early in their development and are typically undergoing an initial feasibility study to assess the commercial aspects of developing an identified resource. Projects that have stalled in progressing towards an FID and are investigating alternative development options are also classified as Publicly Announced to reflect their longer planning times.

As they are still in early planning stages, projects at the Publicly Announced Stage may not have finalised engineering designs or construction costs. To reflect this uncertainty, project costs are quoted as a cost band in the major projects list when they have not been announced by the project proponent. In most cases this is based upon an estimate developed by DIIS using industry averages for similar construction activities. The cost bands used by DIIS in this report for Publicly Announced projects are:

- $0 – $249m
- $250m – $499m
- $500m – $999m
- $1 000m – $1 499m
- $1 500m – $2 499m
- $2 500m – $4 999m
- $5 000m+

Summary of projects at the Publicly Announced Stage

Slowing demand growth in key markets and increasing supply of most commodities have lead to lower commodity prices in 2015. This trend has in turn impacted the development of resource and energy projects in Australia. At the end of October 2015, DIIS had identified 55 projects at the Publicly Announced Stage with a collective value of between $44 billion and over $57 billion (see Table 1). This is two less than reported in April 2015. Five projects were removed from the major projects list after extended periods of inactivity or announcements that they are on hold, seven projects were added to the list, eight advanced up the investment pipeline and four were moved back from the Feasibility Stage to reflect delays in their progress.

At the end of October there were seven iron ore projects worth $8 billion at the Publicly Announced Stage. The decline in iron ore prices through 2014 and into 2015 appears to have stalled the development of several iron ore projects. Four iron ore projects (three infrastructure and one mining) have been removed from the major projects list since April 2015 (worth a total of around $17 billion). There was only one iron ore infrastructure project and no iron ore mining projects, that progressed (to the completed stage) between April and October 2015, which was worth $325 million. No iron ore mining projects or iron ore infrastructure projects were added to the list in October 2015.

There are ten coal projects at the Publicly Announced Stage with a combined value of more than $14 billion. The number of coal projects at the publicly announced stage has increased by one and their total value has increased by $1.4 billion.

Despite the fall in the price of oil and gas and the overall increase in supply of these commodities on world markets, three projects were advanced from the Publicly Announced to the Feasibility Stage (worth over $31 billion) between April and October 2015. While no new LNG, oil and gas projects were added to the Publicly Announced Stage, the category maintains the largest share of projects at the Publicly Announced Stage. There are three LNG, gas and oil projects at the Publicly Announced Stage with a combined value of $23 billion. This high value is underpinned by three offshore gas projects.

At the end of October 2015 there were six gold projects with a combined value of between $1.0 and $1.8 billion in the Publicly Announced Stage. Two gold projects were added to the Publicly Announced Stage, while one was advanced to the Feasibility Stage. Given the ongoing fall in the price of gold since 2012, the number and value of gold projects at the Publicly Announced Stage is a positive result.

At the end of October 2015 there were nine metals projects, including copper, nickel, zinc, lead and aluminium at the Publicly Announced Stage. The number of projects has increased by two since April 2015, the net effect of removing two projects from the major projects list and four moving back to the Publicly Announced Stage. Metals projects at the Publicly Announced Stage have a combined value of over $20 billion, mainly due to BHP Billiton's Olympic Dam expansion.

The fall in most metal prices through 2015 has slowed the development of many projects in the early stages of planning. Many major producers have indicated through their quarterly reports that they are cutting, or intend to cut, capital expenditure (particularly exploration and project development) in an attempt to reduce costs.

Table 1: Publicly Announced Stage project summary

	Number of projects	Indicative cost range $m
Aluminium, Bauxite, Alumina	1	0 - 250
Coal	10	13 069 – 14 419+
Copper	4	8 186 – 8 219
Gold	7	1 027 – 1 777
Infrastructure	3	2 500 – 4 000
Iron ore	7	6 019 – 10 019
Lead, Zinc, Silver	1	67
LNG, Gas, Oil	3	9 000 – 12 500+
Nickel	4	1 764 – 2 264
Other commodities	9	1 677
Uranium	4	1 528 – 2 028
Total	53	**44 837 – 57 220+**

Projects at the Feasibility Stage

Overview

Projects that have progressed to the Feasibility Stage have undertaken initial project definition studies and commenced more detailed planning such as Front-End Engineering Design studies, Bankable Feasibility Studies and environmental surveys in support of finalising an Environmental Impact Statement. While there is an opportunity to progress projects at the Feasibility Stage to the Committed Stage, this is not guaranteed to occur. Projects at the Feasibility Stage have not been committed to and are only potential investments that may occur under the appropriate conditions. Therefore, the total value of projects at the Feasibility Stage cannot be directly compared to the value of the projects at the Committed Stage to forecast the future of capital investment in Australia's resources and energy sectors.

Summary of projects at the Feasibility Stage

The progress of projects at the Feasibility Stage has been affected by the down-turn in commodity prices. Since the generally acknowledged peak in commodity prices in 2011, the number of uncommitted projects (comprising those at both the Feasibility and Publicly Announced stages) has declined from a peak of 305 in April 2011 to 180 in October 2015.

At the end of October 2015 there were 127 projects at the Feasibility Stage with a combined value of $182 billion (see Table 2). The number of projects has increased by 2 since April 2015 and the total value is up 27 per cent. Once project progressed to the Committed Stage, four projects were added to the Feasibility Stage, seven projects progressed from the Publicly Announced Stage, four projects were moved back to the Publicly Announced Stage and four were removed from the major projects list. These projects were removed after announcements they were no longer being developed or following 12 months or more of inactivity.

Table 2: Summary of projects at the Feasibility Stage

	NSW		Qld		WA		NT		SA		Vic		Tas		Total	
	No.	$m	No.	$m	No.	$m	No.	$m	No.	$m	No.	$m	No.	$m	No.	$m
Aluminium, Bauxite, Alumina			1	1 500											1	1 500
Coal	11	5 452	26	51 767							2	227			39	57 447
Copper			1	294	1	202	1	190	2	922	1	291			6	1 899
Gold	1	80	1	123	6	872	1	1 046	1	17					10	2 138
Infrastructure	2	431	5	4 950	3	7 444			2	805					12	13 630
Iron ore	1	2 900			8	9 876			2	4 050					11	16 826
Lead, Zinc, Silver	2	490			1	70									3	560
LNG, Gas, Oil	2	2 200	3	3 700	6	67 900					2	800			13	74 600
Nickel					4	3 629									4	3 629
Other commodities	4	1 534	5	2 424	9	2 083	3	1 900	1	49	3	901	1	180	26	9 071
Uranium					2	915									2	915
Total	**23**	**13 087**	**42**	**64 758**	**40**	**92 991**	**5**	**3 136**	**8**	**5 843**	**8**	**2 219**	**1**	**180**	**127**	**182 215**

If market conditions remain subdued through to early 2016 several more projects may be removed from the list

Projects to develop or expand coal mines continue to account for the highest number and value of projects at the Feasibility Stage. There are 39 coal projects worth a combined $57 billion. This is an increase of two projects since April 2015, which is due to the addition of two new projects to the major projects list, and an increase of $3.4 billion (also since April 2015).

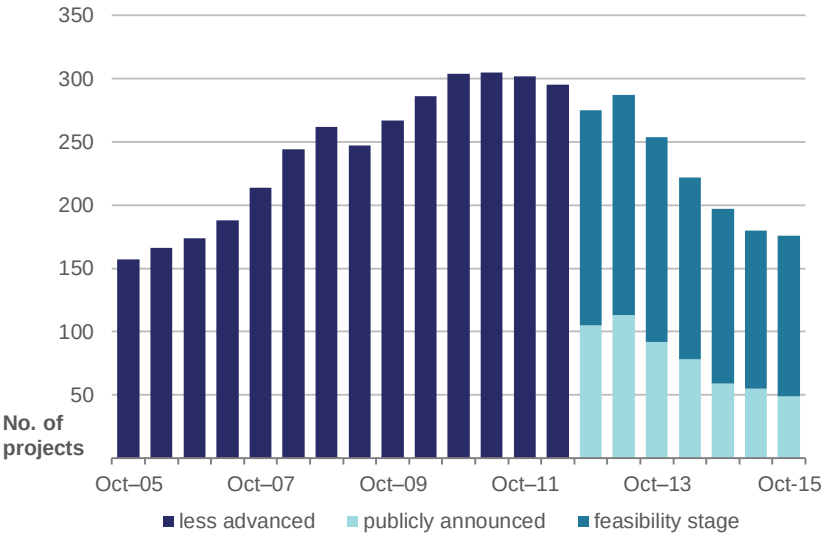
There are 11 iron ore projects at the Feasibility Stage with a combined value of $17 billion. This is two projects less than reported in April 2015 and the result of two projects being removed from the list. There are several high value, greenfield magnetite development projects that remain at the Feasibility Stage from April 2015, with a combined value of over $9 billion.

There are 13 LNG, gas and oil projects at the Feasibility Stage worth $75 billion. This is six more projects than reported in April 2015 and the result of two new projects being added, three being moved up from the Publicly Announced Stage and one being downgraded from the Committed Stage. The value of LNG, oil and gas projects at the Feasibility Stage increased by $45 billion between April and October, largely driven by the Browse FLNG project, which is estimated to cost over $30 billion.

There are 10 gold projects at the Feasibility Stage with a combined value of $2.1 billion. Following the retreat in the price of gold, producers have shifted their focus from expansions and new projects to cutting costs and improving efficiency. The Mt Todd mine expansion in the Northern Territory remains the highest value gold project at the Feasibility Stage—worth an estimated $1.0 billion.

Over the past six months the number of metals projects, including aluminium, copper, lead, zinc, silver and nickel projects, at the Feasibility Stage decreased by five to 13. This is the net effect of two projects being removed from the list of major projects and three projects moving back to the Publicly Announced Stage. The value of metals projects at the Feasibility Stage decreased by 45 per cent to $6 billion from April 2015.

Figure 7: Number of uncommitted projects



Over the past six months an abundance in the supply of most metals, combined with a slowdown in demand growth, led to a broad increase in stock levels and a fall in prices. This trend has in turn reduced the incentive for investment in metals projects. Metals X's Wingellina nickel mine was the largest metals project at the Feasibility Stage worth around $2.5 billion.

Projects at the Committed Stage

Overview

Projects at the Committed Stage have completed their planning activities, received all necessary Government regulatory approvals and finalised the financing of the project to allow construction. In most cases, projects at this stage of development have already started construction as there are typically pre-works undertaken as part of exploration and design activities. Most projects that progress to the Committed Stage will eventually commence production. Post-FID, there are still schedule, technical and financial risks that, if realised, can affect the commercial viability of a project and possibly lead to its cancellation.

Projects progressing to the Committed Stage

In the six months from April to October 2015, four projects worth $1.2 billion were identified as receiving a positive final investment decision and progressed to the Committed Stage (see Table 3).

This is significantly less than both the number and value of projects advanced between October 2014 and April 2015, and is consistent with the downward trend in investment in resources and energy since October 2012.

Analysis of committed investment

The number of projects at the Committed Stage decreased by three, relative to April 2015, to 35. These 35 projects have a combined value of around $221 billion which is $5 billion less than in April. Over the last six months 6 projects were completed, one progressed from the Publicly Announced Stage, three were added to the major projects list and one was removed from the major projects list. The peak of the investment boom has now well and truly passed; however, opportunities for further investment, particularly in infrastructure, still remain. Business conditions, cost competitiveness in Australia and the price cycle, will drive implementation of these opportunities.

The 'mega projects' valued at more than $5 billion represent the highest proportion of projects at the Committed Stage (see figure 10).

Table 3: Newly Committed Projects

Project	Company	State	Value ($m)
Boddington	Newmont Mining	WA	500
Chandler Salt Mine	Tellus	NT	464
Mount Marion Lithium project	Metals X	WA	117
Tanami Operations	Newmont Mining	NT	160
Total			**1 241**

Figure 8: Number and nominal value of committed projects

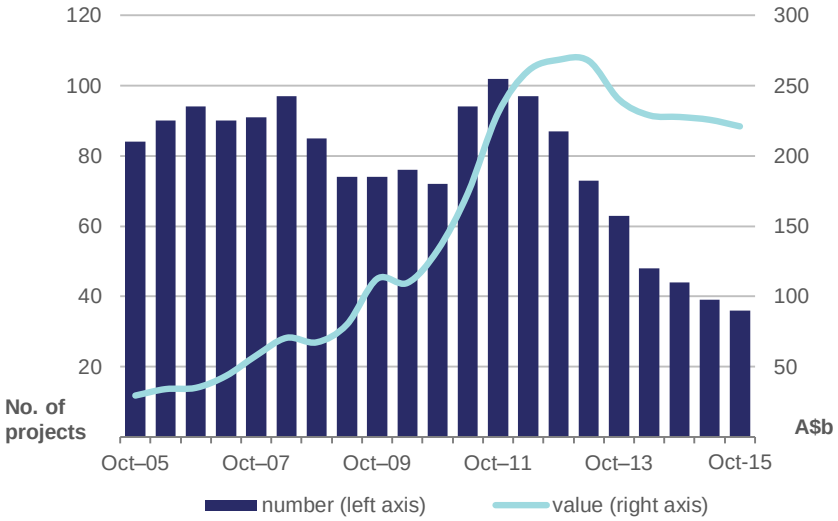


Figure 9: Value of projects at the Committed Stage, by commodity

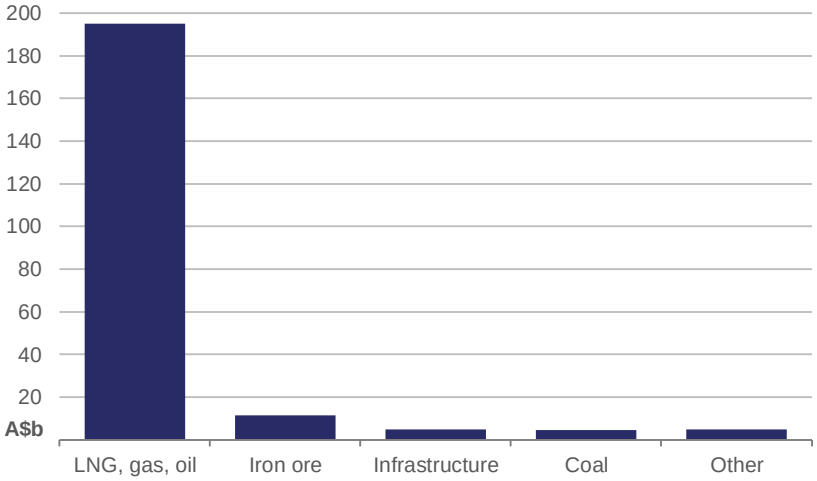
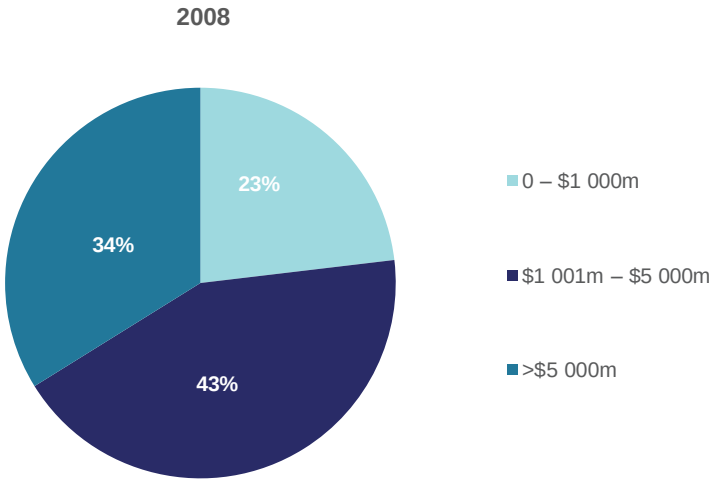
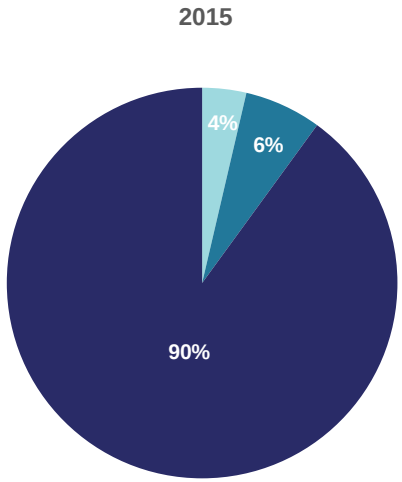


Figure 10: Share of committed investment—October 2008 vs October 2015





At the end of October 2015 there were seven mega projects at the Committed Stage, which represent 90 per cent of the value of all committed projects. This was one less project than reported in April 2015, due to the completion of the Queensland Curtis LNG project. Most of the mega-projects at the Committed Stage are LNG related, with Hancock Prospecting's 'Roy Hill' the only non-LNG mega-project. These projects have been the driving force of the investment boom and most are expected to be removed from the major projects list by the end of 2016.

Summary of projects at the Committed Stage

LNG, gas and oil projects continue to drive resources and energy investment in Australia, accounting for 88 per cent of committed investment (see Figure 9). There are 11 LNG, gas and oil projects at the Committed Stage with a combined value of $195 billion. Over the past six months, two LNG, oil and gas projects (worth $23 470 billion) moved on to the Completed Stage.

There are three iron ore projects worth $11 billion at the Committed Stage. Roy Hill is the largest iron ore project at the Committed Stage (accounting for approximately 90 per cent of the total value of iron ore projects at the Committed Stage) and the last non-energy mega project on the DIIS production pipeline. Roy Hill is scheduled for completion in late 2015.

There are six coal projects worth a combined value of $4.7 billion at the Committed Stage. This is one project less than in April, as one project moved to the Completed Stage. Three of the committed projects are in New South Wales and three are in Queensland; however, the three projects located in New South Wales are expansions/upgrades which are smaller in scale than the greenfield development projects located in Queensland. The Grosvenor underground mine in Queensland is the highest value project worth approximately $2 billion and is scheduled for completion in 2016.

There are four gold projects worth $971 million in the Committed Stage, which is two more than in April. This was attributable to two gold projects being added to the major projects list.

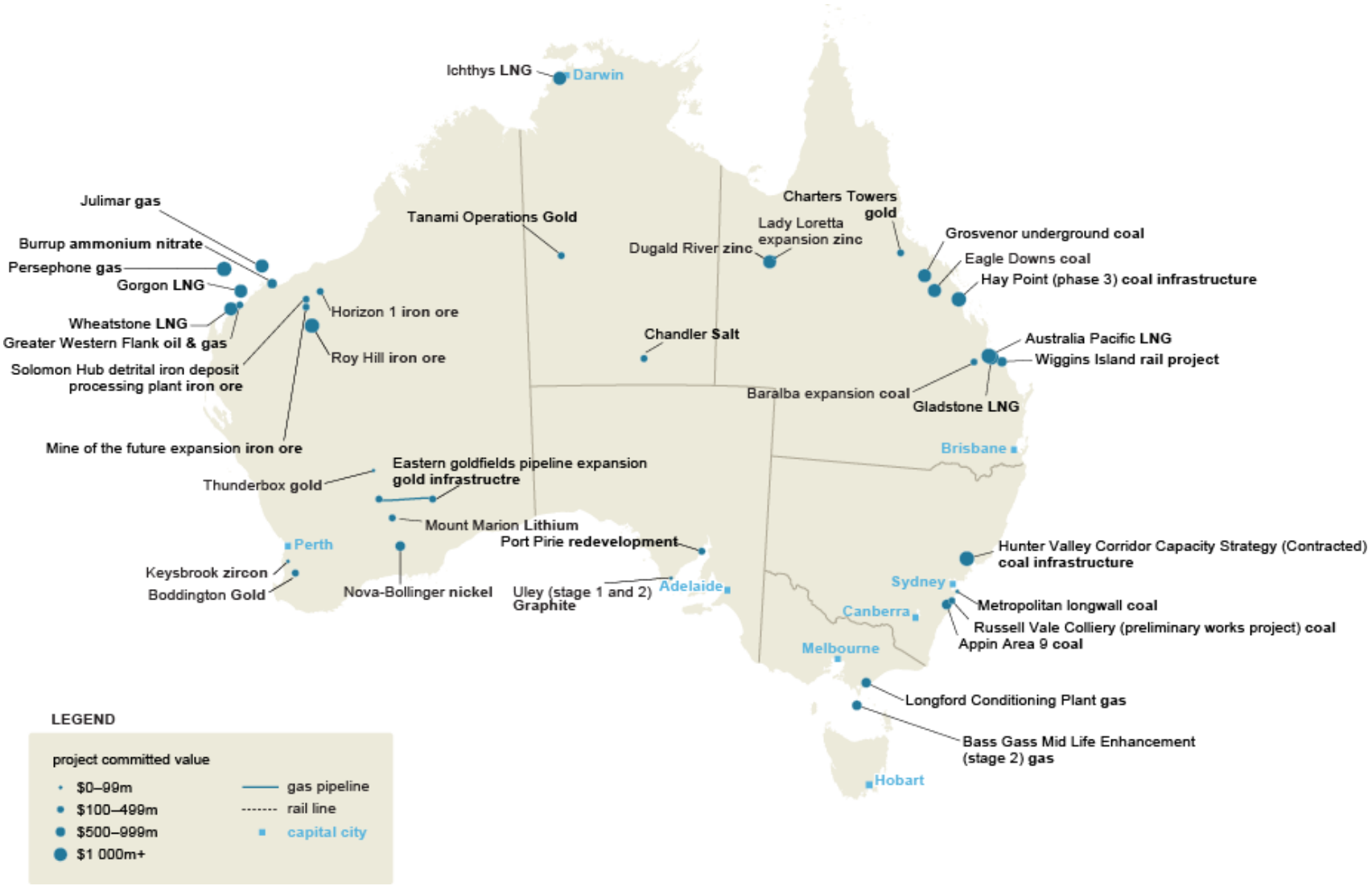
Since April 2015, the number of metals projects, including aluminium, copper, lead, zinc, silver and nickel, at the Committed Stage remained unchanged at four. These four projects have a combined value of $2.5 billion. No metals projects reached completion. There are still no projects at the Committed Stage for aluminium, bauxite, alumina or copper that are valued at over $50 million.

Since October 2014 the number of infrastructure projects at the Committed Stage has decreased by three to total four. This is the result of three projects moving to the Completed Stage. As a result, the value of infrastructure projects at the Committed Stage has decreased by 12 per cent since April to $4.9 billion. The fall in value was primarily due to the completion of the Western Australia Iron Ore - Nelson Point ship loader replacement project (worth $325 million). The Hay Point Coal Terminal (worth $3.5 billion) accounts for 73 per cent of the value of the infrastructure projects that remain at the Committed Stage, and is scheduled for completion by the end of 2015.

Table 4: Summary of projects at the Committed Stage

	NSW		Qld		WA		NT		SA		Vic		Tas		Total	
	No.	**$m**	**No.**	**$m**	**No.**	**$m**	**No.**	**$m**	**No.**	**$m**	**No.**	**$m**	**No.**	**$m**	**No.**	**$m**
Aluminium, Bauxite, Alumina															0	0
Coal	3	1,186	3	3,515											6	4,701
Copper															0	0
Gold			1	246	2	565	1	160							4	971
Infrastructure	1	326	2	4,398	1	140									4	4,864
Iron ore					3	11,416									3	11,416
Lead, Zinc, Silver			2	1,515					1	514					3	2,029
LNG, Gas, Oil			2	45,900	6	109,700	1	37,700			2	1,700			11	195,000
Nickel					1	443									1	443
Other					2	858	1	464	1	50					4	1,372
Uranium															0	0
Total	**4**	**1,512**	**10**	**55,574**	**15**	**123,122**	**2**	**38,164**	**2**	**564**	**2**	**1,700**	**0**	**0**	**35**	**220,796**

Figure 11: Locations of projects at the Committed Stage



Projects at the Completed Stage

Overview

The Completed Stage includes projects that have completed the majority of their full project scope as well as commissioning activities and can begin commercial scale production. As many projects include multiple stages and scope elements that can be independent of each other, the timing of when a project reaches the Completed Stage is difficult to assess. In the major projects list provided with this report, projects that have progressed to the Completed Stage over the past six months are recorded in the commodity table of the major project list and all projects completed within the past three years shown in a separate table.

Summary of projects at the Completed Stage

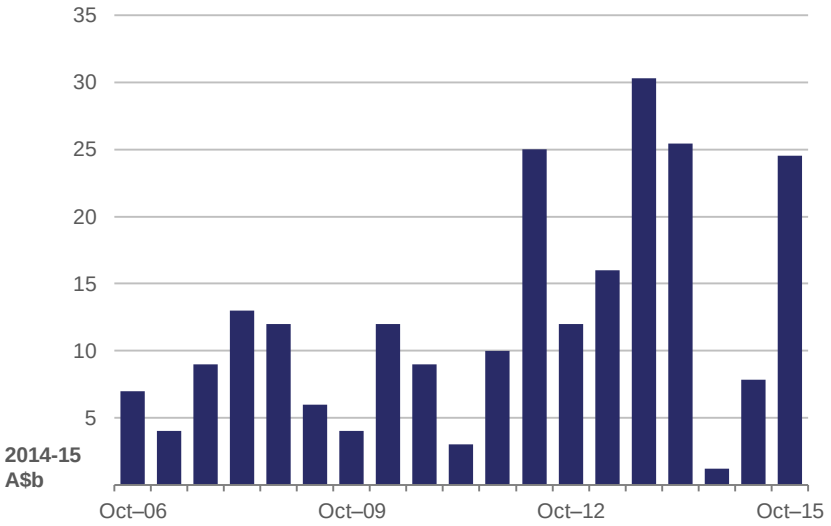
In the six months to October 2015, seven resource and energy projects with a combined value of $25 billion progressed to the Completed Stage, this is six projects less and $17 billion more than recorded in April 2015. This increase in value is due to the completion of the Queensland Curtis LNG project, worth over $23 billion.

One coal project worth $767 million progressed to the Completed Stage in the period. Maules Creek is located in New South Wales and was a new thermal and coking coal project.

Three oil and gas projects worth $24 billion were completed in the past six months. The Queensland Curtis LNG project was the largest of these projects and was worth $23 billion. There are several mega LNG projects scheduled for completion in late 2015 and into 2016 including Australia Pacific LNG, Gladstone LNG, Gorgon LNG and Wheatstone LNG, worth a combined $138 billion.

Over the past six months three infrastructure projects worth $632 million were completed. The largest of the completed projects was BHP Billiton's ship loader replacement at Nelson Point, worth $325 million.

Figure 12: Value of completed projects



One gold project—the Central Murchison redevelopment (valued at $117 million)—was completed in the six months to October 2015. The Boddington gold mine expansion (valued at $500 million) was added to the project list in this edition, and is expected to be completed in 2016.

No iron ore or metals projects, including aluminium, bauxite, alumina, copper and nickel projects reached completion in the past six months. However, the Nova-Bollinger nickel project (valued at $443 million) and three major iron ore projects (value of $11 billion) are due to be completed in late 2015 and into 2016.

Table 5: Projects at the Completed Stage

Project	Company	State	New Capacity	Capacity Unit	Resource	Cost $m
Central Murchison	Metals X	WA	200 000	oz	Gold	117
Goonyella System Expansion Project	Aurizon	QLD	11 000	ktpa	Black coal	121
Hexham Train Support Facility	Aurizon	NSW	na	na	Black coal	186
Maules Creek	Whitehaven	NSW	12	Mt	thermal and coking coal	767
Queensland Curtis LNG project	BG Group, CNOOC	QLD	8.5	Mt	LNG	23 100
WAIO - Nelson Point (ship loader replacement)	BHP Billiton	WA	na	na	Iron Ore	325
Xena Gas Field - Phase 1	Woodside	WA	na	na	Gas	370
Total						**24 986**

Table 6: Summary of projects in the investment pipeline

	Publicly announced		Feasibility Stage		Committed		Completed	
	No.	Range $m	No.	Value $m	No.	Value $m	No.	Value $m
Aluminium, Bauxite, Alumina	1	90	1	1,500	0	0	0	0
Coal	10	14,072	39	57,447	6	4,701	1	767
Copper	4	18,203	6	1,899	0	0	0	0
Gold	7	1,212	10	2,138	4	971	1	117
Infrastructure	3	3,450	12	13,630	4	4,864	3	632
Iron ore	7	7,682	11	16,826	3	11,416	0	0
Lead, Zinc, Silver	1	67	3	560	3	2,029	0	0
LNG, Gas, Oil	3	22,500	13	74,600	11	195,000	2	23,470
Nickel	4	1,838	4	3,629	1	443	0	0
Other commodities	9	1677	26	9,071	4	1,372	0	0
Uranium	4	1978	2	915	0	0	0	0
Total	**53**	**72,769**	**127**	**182,215**	**36**	**220,796**	**7**	**24,986**

Outlook for resources and energy investment

Overview

Resources and energy projects undergo complex development processes that are tailored to the requirements of the project proponent. This report utilises a simplified and generic investment pipeline model in order to assess investment trends in Australia's resources and energy sector. The model is useful for analysing future investment in the sector, identifying emerging bottlenecks and examining the speed of project development.

While the resources boom over the past decade stimulated considerable investment in Australia's resources and energy sector, not all projects that were initiated moved through to construction. Accordingly, projects in the Publicly Announced and Feasibility Stages can only be viewed as potential investment. Further analysis of the quality of the resource, construction and operating costs, the ability of the company to attract finance and return on investment is required to assess the likelihood of each of these projects in order to produce an outlook for future investment in the sector.

The resources and energy sector investment outlook is based on project level analysis of a number of factors to assess the probability that the project moves to the committed stage. This system rates the likelihood of projects progressing to the committed stage being either 'likely', 'possible' or 'unlikely' but does not provide an assessment of schedule risk or likely timing of a final investment decision. Instead, the Office of the Chief Economist has developed two scenarios, one based on 'likely' projects proceeding and another with both 'possible' and 'likely' projects. The scenarios are based on the schedules as announced by the project developers, to provide a profile for investment at the industry level. As schedule risks, including both market related and internal project risks, generally result in project delays, rather than earlier schedules, these two scenarios should be viewed as the best case outlook for resources investment. The realisation of schedule risks is likely to result in substantially lower or later investment in the industry.

The 'likely' scenario is based on projects already at the Committed Stage and adds projects that are assessed as having a higher probability of proceeding through to development. This assessment is based on a range of internal and external factors that typically have helped determine whether a project has been sanctioned in the past. Where data is available, projects are assessed based on its position on the relevant commodity cost curve and its internal rate of return. Since the assessment is probability based, there remains a degree of uncertainty over the success of projects deemed likely and progression to the Committed Stage is far from guaranteed.

The 'possible' scenario includes projects classified as Committed, projects assessed as 'likely' to proceed and projects assessed as 'possible'. The 'possible' rating is given to projects that have some positive internal and external factors that indicate it may progress to the Committed Stage. However, these projects tend to face greater challenges than a project deemed 'likely', that may limit its commercial viability.

Projects that have been assessed as 'unlikely' to proceed are not included in the forward projection of the value of committed investment. Although assessments are made at a project level, these are not provided with the Resources and Energy Major Projects report because some of the information used is treated as commercial in confidence.

Outlook for resources and energy investment

World demand for Australian resource and energy exports remains strong and for most commodities is projected to grow over the medium term. However, the downturn in commodity prices has pushed many resource and energy companies to implement cost cutting programs to remain profitable. Reducing exploration expenditure and project development has clearly been some of the main ways savings have been delivered. The focus of companies has clearly shifted from developing new projects to ensuring the commercial viability of existing assets.

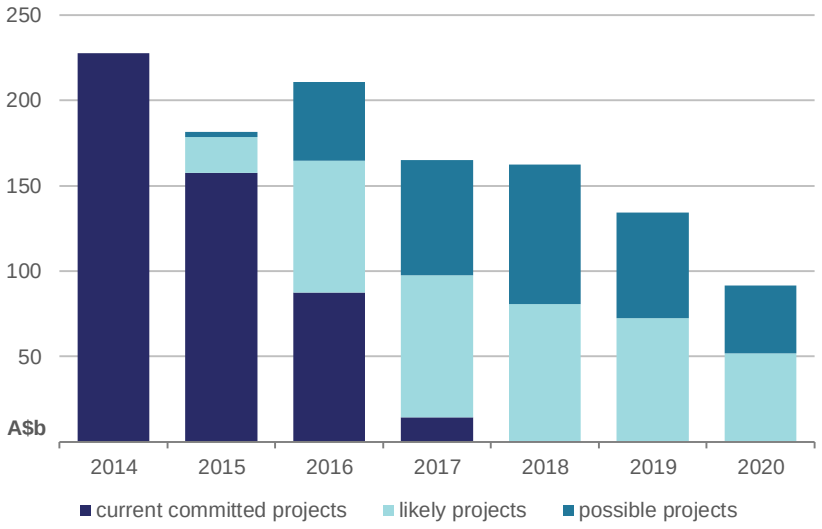
For emerging junior companies targeting the development of their first asset, the operating environment is proving particularly challenging. In an environment of tight finance and falling prices, emerging junior companies in particular have been forced to re-evaluate their project development plans in order to identify cost savings. The result is a downwards trend in the number and value of both committed and uncommitted projects in Australia over the past three years.

The outlook for resources investment in Australia remains broadly unchanged from April 2015. The value of committed projects is declining, and this will not be offset by new investments coming through the pipeline, which are being increasingly delayed due to adverse market conditions. One of the mega-LNG projects, the Queensland Curtis LNG project, has recently been completed and another, the Gladstone LNG project, has started production, but remains on the major project list as it is yet to be fully completed. There are still several mega-LNG projects still under construction which are providing support to the total value of projects on the list.

The total value of committed projects peaked in 2012, at around $268 billion, has now declined to $220 billion and is likely to fall below $200 billion by the end of 2016 as a result of the LNG projects being moved to the Completed Stage. Further, lower interest rates in Australia and a lower Australian dollar (relative to the US dollar) are unlikely to stimulate investment in the resources and energy sector as they in themselves will not be sufficient to offset the effect of lower prices. Almost all projects currently under construction are scheduled for completion before 2018 and the number of final investment decisions will need to increase to drive capital expenditure in the resources industry after this time.

Both the likely and possible scenarios contained in this outlook reflect the announced schedules of projects under development. However, the decision to proceed to construction is increasingly being delayed due to market volatility, high project costs and in some cases legal proceedings to prevent projects occurring. As such, a number of projects in both the likely and possible scenarios have had their final investment decisions adjusted to reflect the impact of these risks and their potential impact on schedule.

Figure 13: Scenarios for committed project investment



It is important to note that business investment is cyclical and while the level of investment in the resource and energy sector in Australia is declining there remains significant potential for investment in the future. Advances in technology and ongoing demand growth in highly populated emerging economies will continue to support higher consumption of commodities, such as base metals, rare earth elements, gold, silver and uranium in the future. However, Australia will need to compete with other resource-rich countries to secure investment and must ensure it remains a leading destination for attracting capital.