



Resources and Energy Major Projects

October 2014

Bureau of Resources and Energy Economics

bree.gov.au



Australian Government

Bureau of Resources
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Barber, J., Penney, K., Witteveen, B., 2014, *Resources and Energy Major Projects*, October 2014, Bureau of Resources and Energy Economics, Canberra, November 2014.

ISSN 978-1-921812-76-7 (Print)

ISSN 978-1-921812-77-4 (Online)

Vol. 4, no. 2



Australian Government

**Bureau of Resources
and Energy Economics**

Foreword

The Resources and Energy Major Projects is a biannual snapshot of the stock of investment in Australia's resources and energy sectors. In this edition of the report we are seeing a reduction in the number of projects across all categories of the investment pipeline. This is consistent with the picture we have seen since the mining investment cycle peaked in 2011-12 and continuing softness in commodity prices.

A significant level of investment is currently underway in the resources and energy sector. Currently there are 8 "mega projects", which are valued at more than \$5 billion, under construction in Australia. As these projects come into production along with the projects completed over recent years there will be a significant lift in Australia's exports of resources and energy commodities.

The global supply response in the resources and energy sector, of which Australia is a major contributor, is placing significant downward pressure on commodity prices. As a result we are seeing an increase in the number of projects being delayed or deferred. Similarly the level of exploration activity in Australia is showing continuing weakness.

It is likely that these conditions will persist over the medium term as the markets adjust to soak up additional supplies and economic conditions in key trading partners support further growth. As such we expect to see a subdued environment for investment in resources and energy projects and a stronger focus on reducing costs and enhancing productivity.

Beyond this the outlook remains positive with non-OECD emerging economies continuing to focus on economic development. This development will be underpinned by access to resources and energy commodities which are the building blocks of economic growth and enhanced living standards.



Wayne Calder
Deputy Executive Director
Bureau of Resources and Energy Economics

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Executive Summary

This release of the Resources and Energy Major Projects Report provides an update on resource and energy project developments over the period May 2014 to October 2014. It comes at a time when investment in Australia's resource and energy sector has been declining in response to a general decline in commodity prices.

The environment of lower prices has encouraged resources companies to focus on improving productivity and reducing costs of production rather than investing in additional capacity. Exploration expenditure has been a main area that companies have targeted in their cost cutting programs. As a result, total exploration expenditure, including both minerals and petroleum exploration, decreased 12 per cent to \$6.9 billion in 2013-14.

The renewed focus on reducing costs has also led project proponents to re-evaluate their plans and identify less capital intensive development options. This has been observed through revisions to the schedules and parameters of a number of projects, which has slowed the entry and progression of projects through the BREE development pipeline.

In the six months to October 2014 three projects worth \$597 million were identified as receiving a positive Final Investment Decision (FID) and progressed to the Committed Stage. This is the lowest number and value of projects moving to the Committed Stage in more than a decade. As at October 2014, there were 44 projects at the Committed Stage with a combined value of \$228 billion. LNG projects continue to drive resource and energy investment in Australia and account for around 87 per cent of the value of committed projects.

The slower rate of project progression is also evident at earlier stages of development in the BREE investment pipeline. The number of projects at the Publicly Announced Stage is now 19 less than in April 2014 and the number at the Feasibility Stage is eight lower than in the same period.

There is an emerging backlog of projects at the Feasibility Stage as a result of current market conditions causing delays to companies making a FID. Government initiatives to streamline approvals processes have increased the number of projects that have secured Government (both state and federal) environmental approval yet few projects have progressed to the Committed Stage over the past 12 months. The appetite for risk among project developers and financiers appears to be low in the current operating environment; nevertheless, Australia still has many world class resource deposits that can be developed when market conditions improve.

Investment in the Australian resources and energy sector is projected to decline in the medium term as the large LNG projects are completed. While some projects are likely to progress through the project pipeline to the Committed Stage, they are unlikely to be of a scale sufficient to offset the reduction in investment associated with the completion of the 'mega' LNG projects. Despite the subdued outlook for resource and energy investment in Australia there are still opportunities for future investment in the sector. The realisation of these opportunities will be determined by global market conditions and Australia's ability to regain cost competitiveness.

Background to the Resources and Energy Major Projects Report

The Resources and Energy Major Projects is a biannual report released by the Bureau of Resources and Energy Economics (BREE) 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 2014 to October 2014 (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.

BREE 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 BREE 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 BREE's 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, BREE first classifies a project as being at the Completed Stage when they have substantially finished their construction and commissioning activities to the point where initial commercial level production has commenced. Projects remain at the Completed Stage for a period of up to three years after construction so as to provide an ongoing record of the investment pipeline.

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

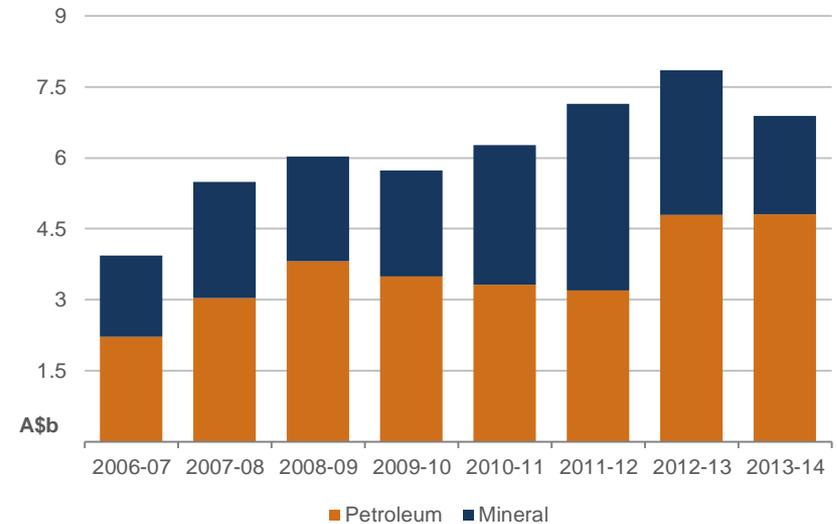
Exploration is a key stage in the mining project development cycle. It is an investment in knowledge about the location, type, quantity and quality of deposits to potentially support future development. Before making the decision to undertake exploration activities, resources and energy companies consider 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.

Recently, commodity market and general economic conditions have not supported exploration activity at the levels seen during the height of the mining investment boom. The drive to cut costs in response to lower commodity prices has resulted in many companies reducing their exploration programs, particularly at greenfield sites.

Exploration Expenditure

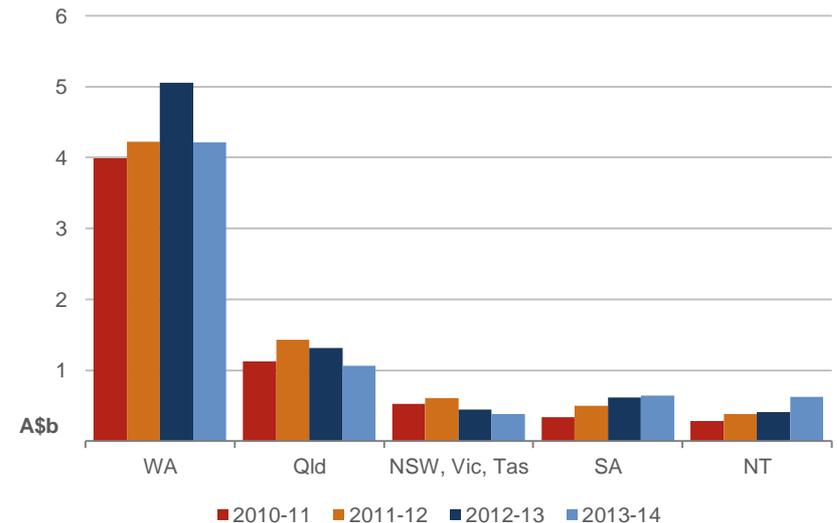
In 2013-14 lower commodity prices and cost cutting led to a decline in exploration activity and expenditure. Total exploration expenditure, including both minerals and petroleum exploration, decreased 12 per cent, relative to 2012-13, to \$6.9 billion. Minerals exploration expenditure totalled \$2.1 billion, down 32 per cent; however, petroleum exploration expenditure increased 0.4 per cent to \$4.8 billion. This increase in petroleum exploration expenditure was not uniform, with a decrease in onshore exploration offset by higher offshore exploration.

Figure 1: Australia's exploration expenditure



Source: ABS.

Figure 2: State exploration expenditure



Source: ABS.

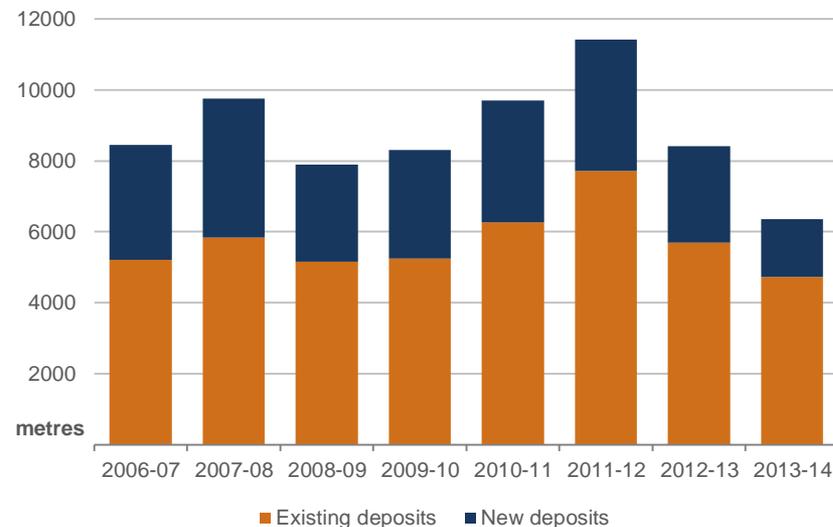
In Western Australia total exploration expenditure decreased 17 per cent, or \$840 million, to \$4.2 billion in 2013-14. Expenditure in Queensland was down 19 per cent to \$1.1 billion and the combined expenditure of New South Wales, Victoria and Tasmania decreased 15 per cent to \$382 million. These expenditure decreases more than offset higher exploration expenditure in South Australia and the Northern Territory which recorded increases of 5 per cent and 54 per cent, respectively.

The decline in minerals exploration expenditure demonstrated a commensurate decrease in exploration activity, as measured by the number of metres drilled. In 2013-14 the total metres drilled decreased 24 per cent, year-on-year, and totalled 6361 thousand metres. Metres drilled at new deposits and existing deposits decreased 40 per cent and 17 per cent, respectively. As a result of this drop in activity, exploration expenditure on new deposits decreased 33 per cent to \$682 million and expenditure on existing deposits decreased 32 per cent to \$1387 million.

Exploration expenditure decreased across all types of mineral commodity in 2013-14. Expenditure on base metals decreased 43 per cent, relative to 2012-13, to \$644 million. After peaking in 2011-12, base metals exploration expenditure has now declined by 60 per cent. Although iron ore and coal export volumes have increased substantially over the past twelve months, exploration expenditure for both commodities decreased by 34 per cent and 27 per cent, respectively, in 2013-14. Gold exploration expenditure decreased 34 per cent with other minerals expenditure decreasing 16 per cent.

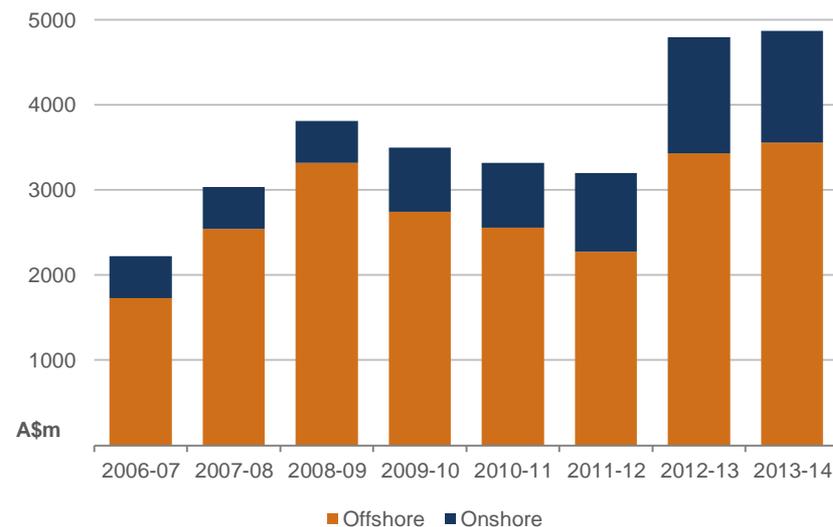
Total petroleum exploration expenditure increased 1.6 per cent in 2013-14 and totalled \$4.9 billion. Onshore exploration decreased 3.7 per cent to \$1.3 billion; however, this was more than offset by higher offshore exploration which increased 3.8 per cent and totalled \$3.6 billion. Therefore, offshore exploration accounted for more than 50 per cent of Australia's total exploration expenditure in 2013-14.

Figure 3: Mineral exploration – metres drilled



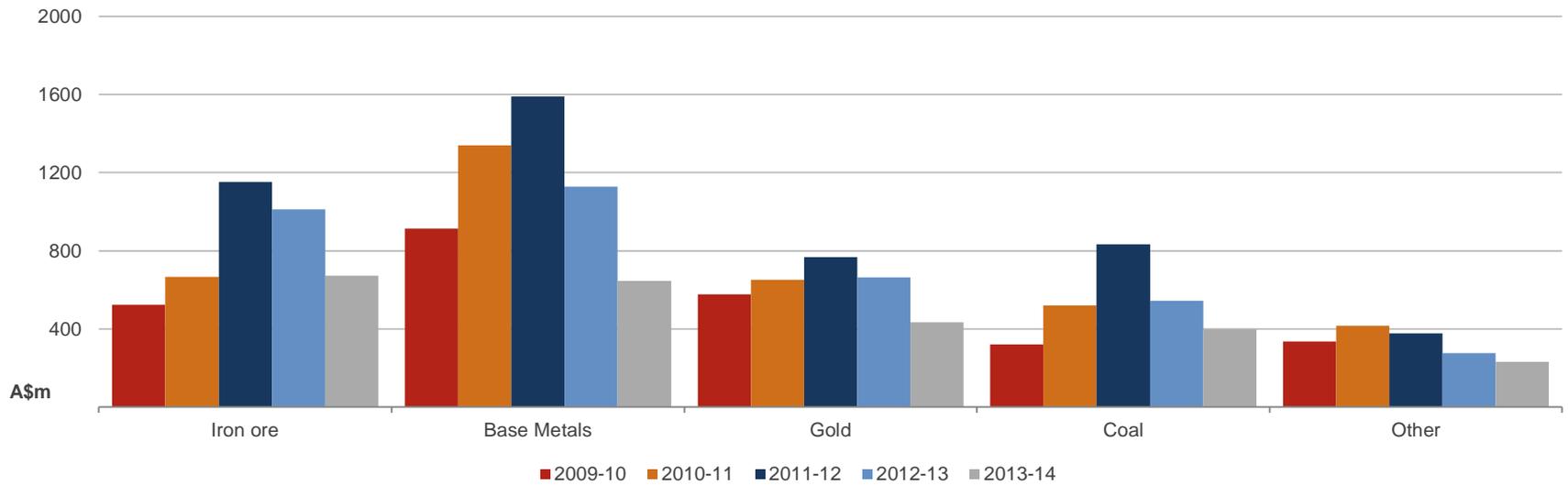
Source: ABS.

Figure 4: Petroleum exploration expenditure



Source: ABS.

Figure 5: Exploration expenditure by mineral



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 BREE using industry averages for similar construction activities. The cost bands used by BREE 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

At the end of October 2014, BREE identified 59 projects at the Publicly Announced Stage with a collective value of between \$75.2 billion and over \$94.4 billion (see Table 1). This is 19 projects less than reported in April 2014. Of these projects, 13 were removed from the major projects list after extended periods of inactivity or announcements that they are on hold, one project was added to the list, nine were advanced up the investment pipeline and two were revised back from the Feasibility Stage to reflect delays in their progress.

At the end of October there were 11 iron ore projects worth between \$15 billion and \$22.5 billion at the Publicly Announced Stage. This has decreased by two projects since April as one project has been removed from the major projects list and one project progressed to the Feasibility Stage.

There were nine coal projects at the Publicly Announced Stage with a combined value of between \$10.8 billion and \$12 billion. There are four less projects than in April 2014 with three projects removed from the major projects list and one progressed to the Feasibility Stage (Malabar Coal's Spur Hill). No new coal projects were added to the Publicly Announced Stage.

In terms of total value, LNG, oil and gas projects account for the largest share of projects at the Publicly Announced Stage. There were seven LNG, gas and oil projects at the Publicly Announced Stage with a combined value of more than \$23.5 billion. This high value is underpinned by the Browse Floating LNG, Crux LNG and Arrow projects which are all individually estimated at more than \$5 billion.

At the end of October 2014 there were six gold projects with a combined value of between \$730 million and \$1.5 billion in the Publicly Announced Stage. This is two projects less than reported in April 2014 which is the result of two projects being removed from the major projects list.

There were six metals projects, including copper, nickel, zinc, lead and aluminium at the Publicly Announced Stage at the end of October 2014. The number of projects decreased by four since April 2014, this is due to one project being removed from the major projects list and three projects progressing to the Feasibility Stage. Oz Minerals' Carrapateena, Heron Resources Kalgoorlie Nickel Project and Western Areas' New Morning/Sunrise project all progressed to the Feasibility Stage. The six metals projects at the Publicly Announced Stage have a combined value of over \$5 billion with BHP Billiton's proposed Olympic Dam expansion the main contributor to this high value.

Table 1: Publicly Announced Stage project summary

	Number of projects	Indicative cost range \$m
Aluminium, Bauxite, Alumina	2	0 – 500
Coal	9	10 769 – 12 019+
Copper	3	5 290 – 5 540+
Gold	6	730 – 1 480
Infrastructure	7	16 500 – 21 000+
Iron ore	11	15 019 – 22 519+
Lead, Zinc, Silver	0	0 – 0
LNG, Gas, Oil	7	23 500 – 25 500+
Nickel	1	0 – 250
Other commodities	7	1 376 – 1 876
Uranium	6	2 010 – 3 760
Total	59	75 194 – 94 444+

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

Over the past six months the progress of projects at the Feasibility Stage have been affected by low commodity prices. At the end of October 2014 there were 138 projects at the Feasibility Stage with a combined value of \$146.7 billion (see Table 2). The number of projects has decreased by eight since April 2014 and the total value was down \$22.2 billion. No projects previously listed at the Feasibility Stage progressed to the Committed Stage and the change in the number of projects is the net result of ten new projects added to the Feasibility Stage, one moving back to the Publicly Announced Stage and 17 being removed from the major projects list. These projects were removed after announcements they were no longer being developed or following at least 12 months of inactivity.

Table 2: Summary of projects at the Feasibility Stage

	NSW		Qld		WA		NT		SA		Vic		Tas		Other		Total	
	No.	\$m	No.	\$m	No.	\$m	No.	\$m	No.	\$m	No.	\$m	No.	\$m	No.	\$m	No.	\$m
Aluminium, Bauxite, Alumina			2	1 750													2	1 750
Coal	11	4 584	26	49 207							2	227					39	54 019
Copper	1	420	3	867	1	279			3	4 165	1	291					9	6 022
Gold	2	138	1	123	9	1 144	1	1 046									13	2 451
Infrastructure	2	846	7	7 950	3	584			2	663							14	10 043
Iron ore	1	2 900			14	19 828			3	5 050							18	27 778
Lead, Zinc, Silver	3	495			1	70											4	565
LNG, Gas, Oil	2	1 500	2	2 000	2	26 000					1	200					7	29 700
Nickel					7	5 828											7	5 828
Other	4	1 474	5	2 423	8	1 413	1	422	1	49	3	901	1	180	1	1 408	24	8 270
Uranium					1	315											1	315
Total	26	12 357	46	64 320	46	55 461	2	1 468	9	9 927	7	1 619	1	180	1	1 408	138	146 740

Projects to develop or expand coal mines continue to account for the highest number and value of projects at the Feasibility Stage with 39 coal projects worth a combined \$54 billion. This is down eight projects from April 2014 which is the net effect of one project progressing from the Publicly Announced Stage, one project moved back from the Committed Stage and ten projects, worth approximately \$8.2 billion, being removed from the list of major projects.

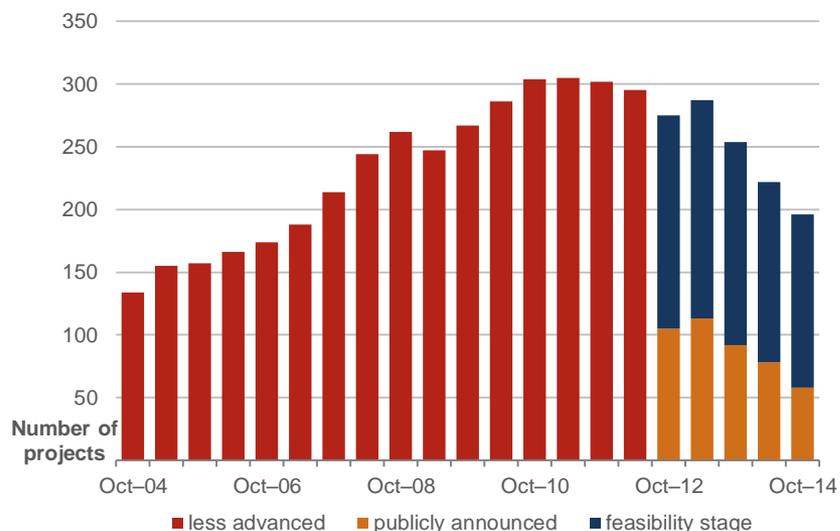
Queensland is the primary location for coal projects in the Feasibility Stage with 26 projects under development worth around \$49.2 billion. Greenfield sites in Queensland's Galilee Basin account for the majority in number and value of coal projects in Queensland. The Galilee Basin includes Adani's Carmichael Coal Project (\$16 billion), GVK-Hancock's Alpha (\$8.2 billion) and Waratah Coal's China First Coal project (\$8.8 billion). Despite recent progress announcements, the Carmichael Coal Project remains at the Feasibility Stage in this reporting period as an FID has yet to be announced. New South Wales had 11 coal projects at the Feasibility Stage worth \$4.6 billion. Coal projects located in New South Wales are mainly expansions which are generally lower in cost to develop than the greenfield projects in Queensland.

There were 18 iron ore projects at the Feasibility Stage with a combined value of \$27.8 billion. This is two projects and \$970 million less than reported in April 2014 with both projects being removed from the major projects list. Several high value iron ore projects remain under development in Australia despite the recent downturn in prices. Western Australia remains the principal location for iron ore projects under development and accounts for 14 of the 18 iron ore projects at Feasibility Stage.

There were seven LNG, gas and oil projects at the Feasibility Stage worth \$29.7 billion as at the end of October. This was one project lower than April due to the removal of the Bonaparte Floating LNG project from the major projects list.

The number of gold projects at the Feasibility Stage remained at 13 with a combined value of \$2.5 billion. No gold projects progressed to the Committed Stage and no projects were removed from the list of major projects. The Mt Todd mine expansion in the Northern

Figure 6: Number of uncommitted projects



Territory remains the highest value gold project at the Feasibility Stage and is valued at around \$1.1 billion.

The number of metals projects, including aluminium, copper, lead, zinc, silver and nickel projects, at the Feasibility Stage increased by two to 22. This is the net effect of two projects being removed from the list of major projects, three projects progressing from the Publicly Announced Stage and one project being moved back from the Committed Stage. While demand for most metals continues to grow the abundant supply that has entered international markets in the past 24 months has contributed to lower prices, reducing the incentive for further investment. The value of metals projects at the Feasibility Stage increased by 35 per cent to \$14.2 billion from April 2014. The increase was mainly driven by the Carrapateena copper project which progressed to the Feasibility Stage.

There are 24 projects at the Feasibility Stage that relate to other metals and minerals, such as rare earth elements, mineral sands and metallic minerals, with a combined value of \$8.3 billion. This is two projects and \$267 million more relative to April 2014.

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 to October 2014, three projects worth \$597 million were identified as receiving a positive FID and progressed to the

Committed Stage (see Table 3). This is the lowest number and value of projects moving to the Committed Stage in more than a decade. By comparison, in the six months from November 2013 to April 2014 eight projects worth a combined \$12.8 billion received a positive FID.

Analysis of committed investment

The number of projects at the Committed Stage decreased by four, relative to April 2014, to 44. LNG, oil and gas projects account for around 87 per cent of the value of projects at the Committed Stage (see Figure 8). Over the last six months five projects were completed, two projects revised back down the BREE development pipeline and three were added to the Committed Stage. The 'mega projects' valued at more than \$5 billion represent the highest proportion of projects at the Committed Stage (see Figure 9).

Table 3: Projects that progressed to the Committed Stage

Project	Company	State	Value (\$m)
Solomon Hub - Detrital Iron Deposit Processing Plant	Fortescue Metals Group	WA	117
Anderson Point Fifth Berth	Fortescue Metals Group	WA	300
Dampier Bunbury Gas Pipeline to Solomon Hub	Fortescue Metals Group	WA	180
Total			597

Figure 7: Number and nominal value of projects at the Committed Stage

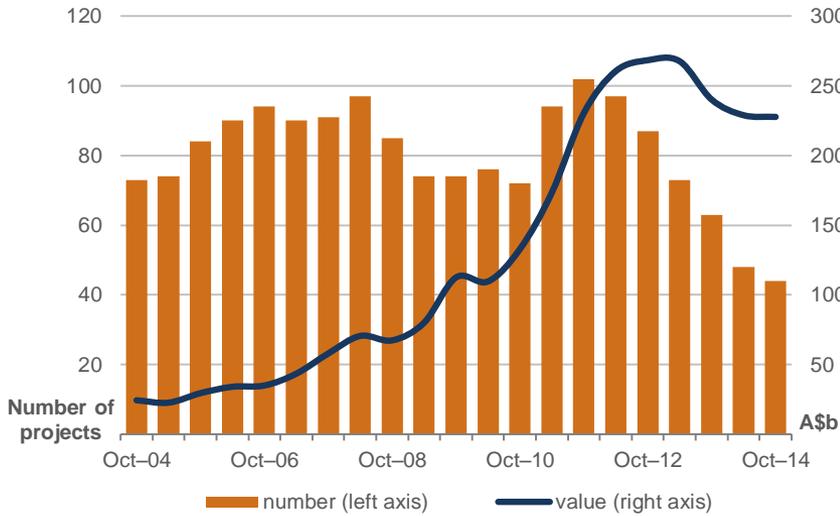


Figure 8: Value of projects at the Committed Stage by commodity

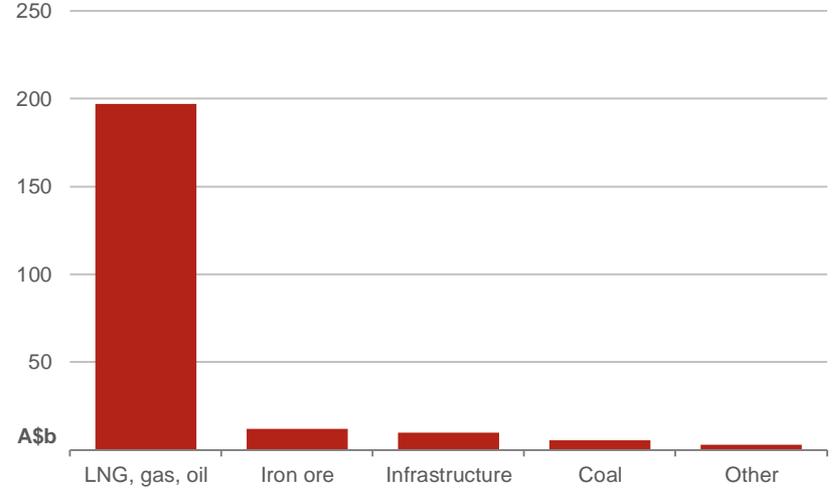
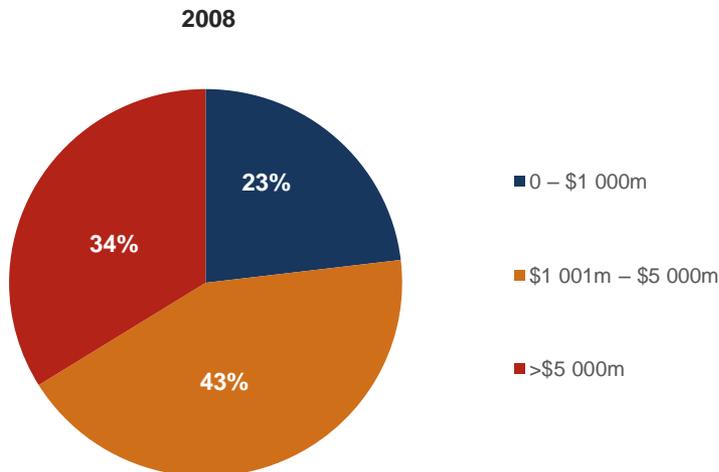


Figure 9: Share of committed investment—October 2008 vs October 2014



At the end of October 2014 there were eight mega projects at the Committed Stage, which represent 89 per cent of the value of all Committed Projects. Most of the mega projects are LNG related, with Hancock Prospecting's Roy Hill the only non-LNG project valued at over \$5 billion on the major projects list.

Summary of projects at the Committed Stage

There were 13 LNG, gas and oil projects at the Committed Stage with a combined value of \$197.1 billion, which accounts for 87 per cent of committed investment. Over the past six months the Balnaves Development Project moved out of the Committed Stage to the Completed Stage.

There were six iron ore projects worth \$12.0 billion at the Committed Stage. No projects began production in the past six months; however several projects, including Roy Hill, are scheduled for completion in 2015. Roy Hill accounts for approximately 90 per cent of the total value of iron ore projects at the Committed Stage and is the only minerals mega project.

There were nine coal projects worth a combined value of \$5.5 billion at the Committed Stage. This is one project and \$1 billion less than in April 2014 as one project was moved back to the Feasibility Stage. Five of the committed projects are in New South Wales and four are in Queensland. Most committed coal projects are expansions with only three developing new mines. The new Eagle Downs mine in Queensland is the highest value coal project at \$1.3 billion and is scheduled for completion in 2017.

There was one gold project worth \$246 million at the Committed Stage, down one from April 2014. The Hera project was completed in the last six months and progressed from the Committed Stage. Several smaller gold projects, particularly small-scale expansions at existing mines, are currently under construction but are valued below the \$50 million threshold for inclusion on the major projects list.

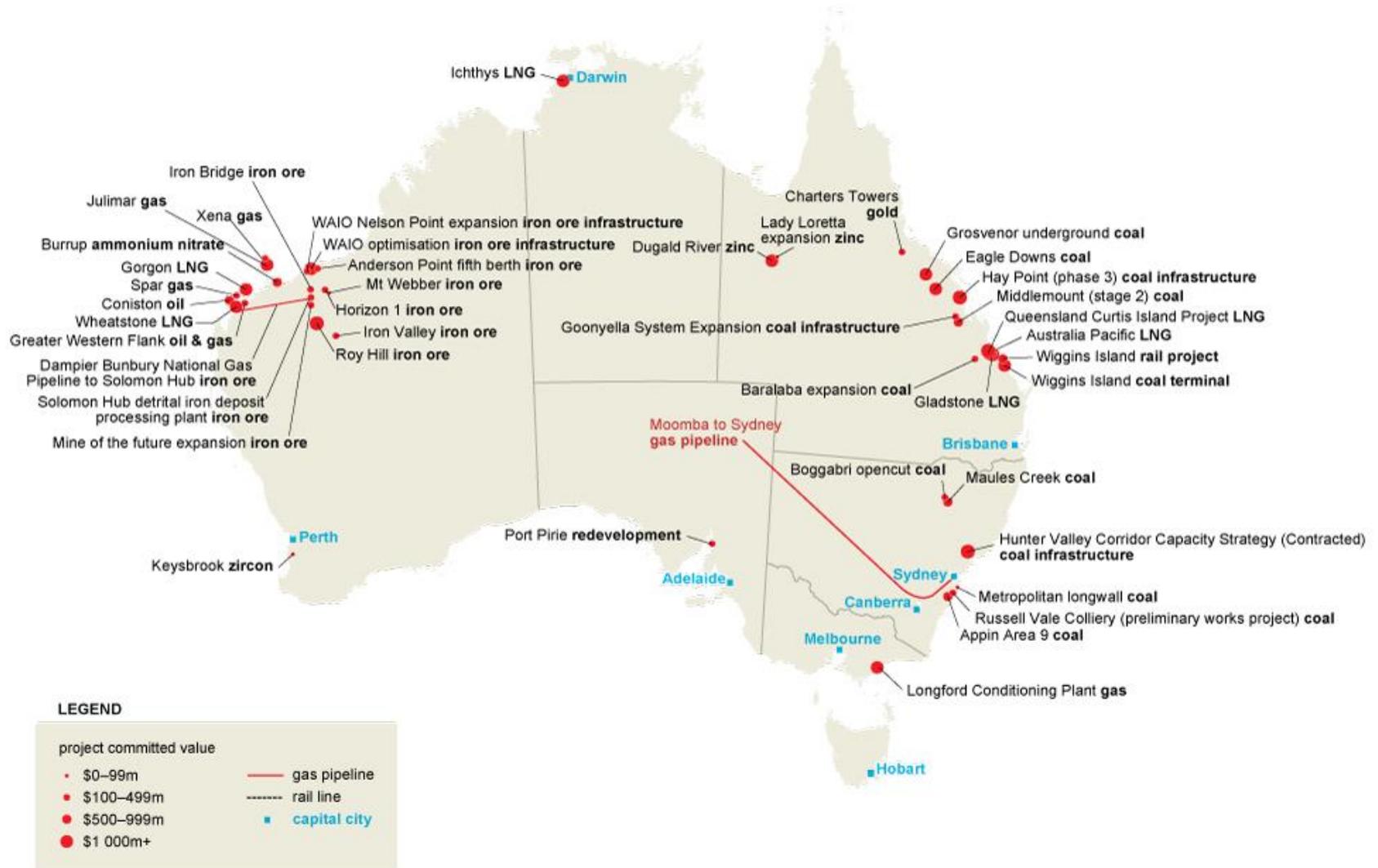
Since April 2014 the number of metals projects, including aluminium, copper, lead, zinc, silver and nickel, at the Committed Stage decreased by three. One zinc-copper project was moved back to the Feasibility Stage while the Rocklands Copper project and McArthur River Stage Three (zinc and lead) were completed. Despite the relative stability of metals prices over the past two years there are now no projects at the Committed Stage for aluminium, bauxite, alumina, copper or nickel. There were three lead, zinc and silver mines at the Committed Stage with a combined value of \$2.0 billion.

The number of infrastructure projects at the Committed Stage has increased by one and now totals ten. This is the result of two new projects that were previously not on the major projects list being added to the Committed Stage and one progressing to the Completed Stage. The two new projects are both being developed by Fortescue Metals and will develop a fifth berth at Anderson Point (Port Hedland) and a gas pipeline to their Solomon Hub facility.

Table 4: Summary of projects at the Committed Stage

	NSW		Qld		WA		NT		SA		Vic		Tas		Other		Total		
	No.	\$m	No.	\$m	No.	\$m	No.	\$m	No.	\$m	No.	\$m	No.	\$m	No.	\$m	No.	\$m	
Aluminium, Bauxite, Alumina																			
Coal	5	2 323	4	3 160														9	5 483
Copper																			
Gold			1	246														1	246
Infrastructure	2	503	4	6 588	4	2 853												10	9 944
Iron ore					6	12 045												6	12 045
Lead, Zinc, Silver			2	1 515					1	514								3	2 029
LNG, Gas, Oil			3	63 000	8	100 113	1	33 000				1	1 000					13	197 113
Nickel																			
Other					2	845												2	845
Uranium																			
Total	7	2 826	14	74 509	20	115 856	1	33 000	1	514	1	1 000						44	227 705

Figure 10: 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.

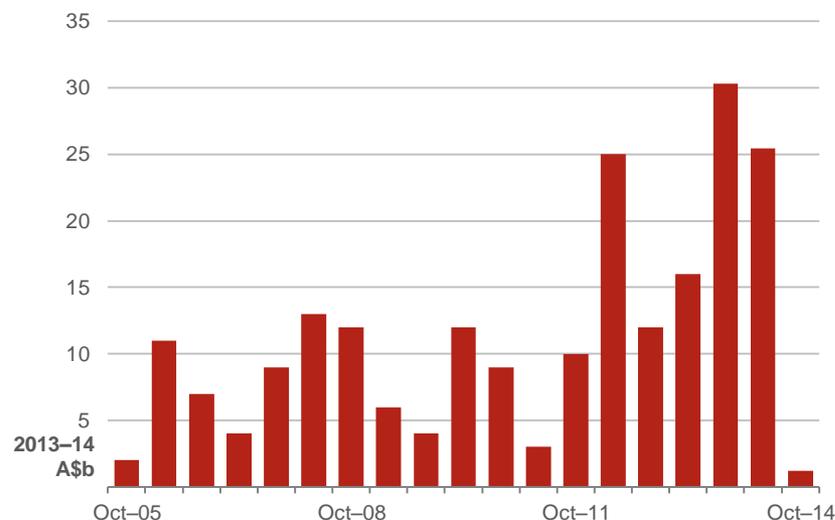
Summary of projects at the Completed Stage

In the six months to October 2014 five resources and energy projects with a combined value of \$1.2 billion progressed to the Completed Stage. This is the lowest value of completed projects over the past decade.

One oil and one infrastructure project were completed in the period. The Balnaves Development Project, an oil joint venture between Apache Energy and KUFPEC, valued at \$429 million began production during the period. Once fully operational Balnaves will produce around 30 thousand barrels of oil a day. The Townsville Port Upgrade valued at \$81 million was also completed.

Three non-ferrous minerals projects were completed during the period. This included Aurelia Metals' Hera mine which will produce over 200 000 ounces of gold and silver. Glencore's McArthur River Phase Three zinc mine was also completed and will increase zinc concentrate production by approximately 440 000 tonnes a year (bringing total annual zinc concentrate production to around 800 000

Figure 11: Value of completed projects



tonnes a year). CuDeco's Rockland Copper project was completed and will produce around 3 million tonnes of copper ore annually. Together, these three projects had a combined value of \$684 million.

No LNG, coal or iron ore projects were completed in the past six months. However several high profile projects are scheduled for completion in the next 12 months including Roy Hill, Australia Pacific LNG, Gladstone LNG and Gorgon LNG. As the 'mega' LNG projects enter the Completed Stage, the total value of resources and energy projects under construction in Australia will start to decrease rapidly.

Table 5: Projects at the Completed Stage

Project	Company	State	New Capacity	Capacity Unit	Resource	Cost \$m
Balnaves Development Project	Apache Energy / KUFPEC	WA	30	kbpd	Oil	429
Hera	Aurelia Metals	NSW	204 274, 426 860	oz	Gold, Silver	73.5
McArthur River (phase 3)	Glencore	NT	440	kt	Zinc, Lead	360
Port of Townsville Upgrade - Berth 8	Port of Townsville Limited / Glencore	QLD	n/a		Copper	81
Rocklands Copper project	CuDeco	QLD	3	Mt throughput	Copper Ore	250
Total						1 194

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	2	0 – 500	2	1 750				
Coal	9	10 769 – 12 019+	39	54 019	9	5 483		
Copper	3	5 290 - 5540+	9	6 022			1	250
Gold	6	730 – 1 480	13	2 451	1	246	1	74
Infrastructure	7	16 500 – 21 000+	14	10 043	10	9 944	1	81
Iron ore	11	15 019 – 22 519+	18	24 978	6	12 045		
Lead, Zinc, Silver			4	565	3	2 029	1	360
LNG, Gas, Oil	7	23 500 – 25 500+	7	29 700	13	197 113	1	429
Nickel	1	0 – 250	7	5 828				
Uranium	6	2 010 – 3 760	1	315				
Other commodities	7	1 376 – 1 876	24	8 270	2	845		
Total	59	75 194 – 94 444+	138	146 740	44	227 705	5	1 194

* Value of Publicly Announced projects given in cost range with projects over \$5 billion having no upper bound.

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. BREE's investment pipeline model simplifies this process 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 every project conceived was seen through to development. Accordingly, projects in the Publicly Announced and Feasibility Stages can only be viewed as potential investment. Further analysis is required to assess the likelihood of each of these projects in order to produce an outlook for future investment in the sector.

BREE's resources and energy sector investment outlook provides aggregate investment estimates for two scenarios: a 'likely' and a 'possible' scenario. The two scenarios model the rate at which projects listed in the Committed Stage move to the Completed Stage and the timing of projects assessed as possible or likely progress to the Committed Stage. BREE does not attempt to model the timing of projects; therefore the scenarios presented are based on the most recently announced project plans. Project schedules, including the timing of a final investment decisions and the start of production are highly uncertain and increasingly subject to variation. The concept of investment for the purpose of this analysis is the total value of projects under construction each year, not the expenditure for each project in each year.

The 'likely' scenario is based on projects already at the Committed Stage and adds projects that BREE assess 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 BREE makes assessments at a project level, these assessments 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

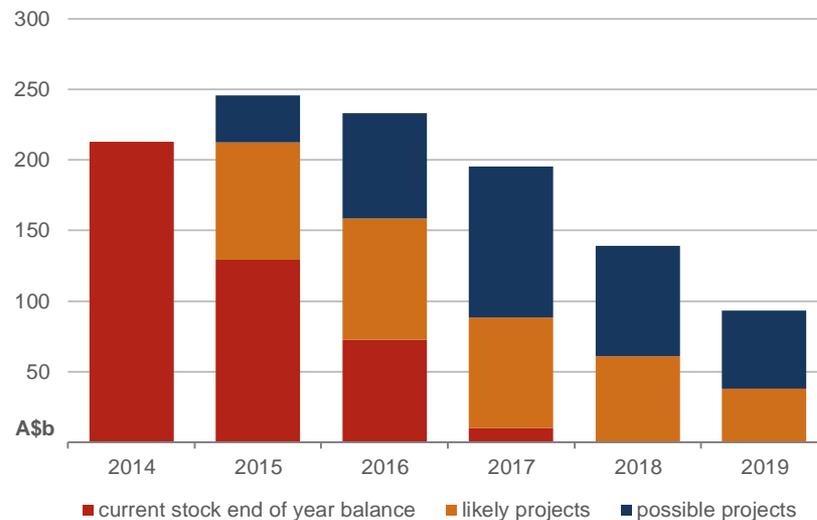
World demand for raw materials and energy is projected to grow over the medium term, particularly in emerging economies that are investing in housing, infrastructure and manufacturing to support growing populations and industrial bases. However the surge in global investment activity over the past few years has contributed to large volumes of supply entering commodity markets, putting considerable downward pressure on prices.

BREE's investment pipeline model indicates that there is an emerging bottleneck of projects at the Feasibility Stage. While the Government is implementing measures to streamline and expedite the approvals process, the current operating environment of lower prices and high costs is not conducive to project development or further investment in the sector. Reporting by Australian project developers indicate that the progression of projects to the Committed Stage is slowing as they implement cost-cutting measures and alter project plans to accommodate current operating conditions. Although developers have undertaken Bankable/Definitive Feasibility Studies that indicated favourable project economics many are now revising study parameters and price assumptions due to deteriorating market conditions and escalating construction costs. Lower interest rates in Australia are unlikely to stimulate investment in the resources and energy sector. In most business models, this will not be sufficient to offset the effect of lower prices in their decision-making.

Given these factors, the outlook for resources and energy investment is subdued over the short to medium term. The value of Australia's stock of investment in the resources and energy sector is projected to moderate as high value LNG projects currently under construction are completed. At best, the decline in value from these projects will be partially offset by the addition of projects assessed as 'likely' and 'possible' as they progress through to the Committed Stage. However, the growing incidence of project schedule delays is likely to result in a more rapid decline in the stock of mining investment.

Over the medium term there is less certainty about the scheduling and feasibility of projects, which makes it difficult to assess projects in early stages of development as 'likely'. The potential for schedule delays and decisions to reassess project parameters will be a key risk to the investment outlook, which has been based on current announced schedules. It is evident that Australian project proponents are starting to delay project schedules as they review their feasibility studies to account for current market conditions. In an environment of low prices, it is likely that project schedules will continue to be delayed in the near term. As project proponents revise their timelines and projects are delayed the profile of the stock of investment depicted in Figure 12 is expected to shift further to the right.

Figure 12: Outlook for committed project investment



Source: BREE

It is important to note that business investment is cyclical. While the stock of investment in the sector is declining, there remains the potential for further investment in the future. Australia has many world class mineral and energy deposits that can be developed when market conditions permit. The cost pressures that have affected the sector are beginning to abate in response to reduced construction activity and cost-cutting measures undertaken by companies. In addition, proponents are reassessing the plans for projects that are currently on hold, such as the scale of the project or its mining methods, with a view to reducing capital costs. These revised plans may better position the project in a climate of lower commodity prices in the future.

Looking forward, Australia will continue to compete with other resource-rich countries to secure investment to allow the development of new projects. To secure a share of this investment, Australia will need to remain a leading destination for attracting capital.

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