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Bureau of Resources and Energy Economics

Resources and Energy Major Projects

April 2013

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Foreword

The Resources and Energy Major Projects is a biannual publication that provides a list of major projects in the mineral resources and energy sectors. The data come from a wide variety of sources and provide a snapshot, at the end of April 2013, of the state of play in terms of projects at the Publicly Announced, Feasibility, Committed and Completed Stages of the investment pipeline.

In the April 2013 listing there are 113 projects at the Publicly Announced Stage with a combined planned capital expenditure spend over the life of these projects of between $121–171 billion. At the Feasibility Stage the stock of planned capital expenditure is estimated at $232 billion from a total of 174 projects. Projects at the Publicly Announced Stage and Feasibility Stage have not been committed to and are only potential investments that may occur under the appropriate conditions.

The Committed Stage of the investment pipeline includes all projects that have passed all approvals and Final Investment Decision and, in most cases, have already begun construction. At the end of April 2013 there were 73 projects with a combined capital expenditure spend over their lifetime of $268 billion. In the ten year period 2003 to 2012, around 390 resources and energy major projects progressed to the Committed Stage with a combined value of $394 billion, of which $268 billion are still under construction and not yet complete.

The Completed Stage of the investment pipeline includes projects that have completed their full project scope, commissioning activities and can begin commercial scale production. In the six months to April 2013, 21 projects progressed to the Completed Stage and had a combined value of $15.3 billion.

BREE, for the first time, has undertaken a forward projection of the stock of capital expenditures at the Committed Stage of the investment pipeline. To represent the uncertainty in this outlook, two alternative investment scenarios are provided. The scenarios are based on an assessment system that rates the probability that a project at the Publicly Announced or Feasibility stages will progress to the Committed Stage within the next five years.

Under BREE's 'Likely Scenario', the value of projects currently at the Committed Stage is scheduled to moderate after 2013 as a result of the completion of mega projects currently under construction. In 2014 the stock of committed investment is expected to decrease by $8 billion, and then by a further $63 billion in 2015. From 2017 onwards, the stock of committed investment in the mining sector is projected to revert back to levels comparable to 2007.

While BREE projects a likely decline in the stock of committed project investment, there remains a large opportunity for Australia to generate a higher level of committed investment. This opportunity will only be achieved if many of the projects which BREE currently rate as 'possible' are able to progress through to the Committed Stage over the next five years.

Quentin Grafton
Executive Director/Chief Economist
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Executive Summary

This release of the Resources and Energy Major Projects report is an update on project developments over the six months from November 2012 to April 2013. In the previous report, released in November 2012, a new model of the mining investment pipeline was introduced by BREE which placed mining and energy projects into four categories that represent the key stages of development of a major project. In this release, BREE has provided a forward looking outlook for the value of projects that progress to the Committed Stage over the next five years.

Significant opportunities still exist for investment in the Australian resources and energy sectors. Nevertheless, there are challenges in realising these opportunities. As at April 2013, the resources and energy major projects investment pipeline had $232 billion of projects at the Feasibility Stage and over $120 billion of projects at the Publicly Announced Stage that may progress further. BREE stresses that this investment is not guaranteed and that the experience of the past decade has shown that not all projects progress to the Committed Stage.

There are currently 73 projects at the Committed Stage with a combined value of $268 billion. Mega projects worth over $5 billion have been the main diver of this record high level of investment in the resources and energy sectors. While this is 14 projects less than reported in October 2012, the value of committed investment has remained constant because of cost increases to several high-value projects. BREE estimates that around 11 per cent of the value of projects at the Committed Stage can be attributed to cost increases that occurred after a final investment decision was made.

The decline in the number of projects at the Committed Stage is indicative of the emerging trend of project proponents delaying or cancelling high value resources and energy projects in Australia. In the past twelve months around $150 billion of projects have either been delayed, cancelled or have had re-assessed development plans in the past twelve months.

Based on an assessment of internal project and external market factors, BREE has developed two scenarios that project the future stocks of committed investment in resources and energy projects in Australia. In the 'Likely Scenario', which includes all existing projects at the Committed Stage and projects assessed as likely to progress to the Committed Stage in the next five years, committed investment is projected to moderate to $256 billion at the end of 2013 and then decrease to around $70 billion in 2017.

There remains a very large opportunity for Australia to generate a higher level of committed investment over and above the BREE 'Likely Scenario' projection. In the 'Possible Scenario', which includes all projects in the Likely Scenario, but also includes projects assessed as possible in terms of their progression through to the Committed Stage within the next five years, there is the potential for committed investment to plateau in 2013 and then increase to around $310 billion in 2014 before declining to around $195 in 2017. Although there is a substantial potential investment in the 'Possible Scenario', market factors, particularly commodity prices, costs of construction and productivity will play a key role in determining how much of it will be realised.

Background to the Resources and Energy Major Projects Report

The Resources and Energy Major Projects (REMP) 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 November 2012 to April 2013. 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.[1]

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. BREE gathers information on major projects from a number of sources including company websites, ASX quarterly activity reports and company media releases, and in some cases, from direct contact with company representatives.

In the previous report, released in November 2012, a new model of the mining investment pipeline was introduced by BREE which placed mining and energy projects into four categories that represent the key stages of development of a major project. These categories are:

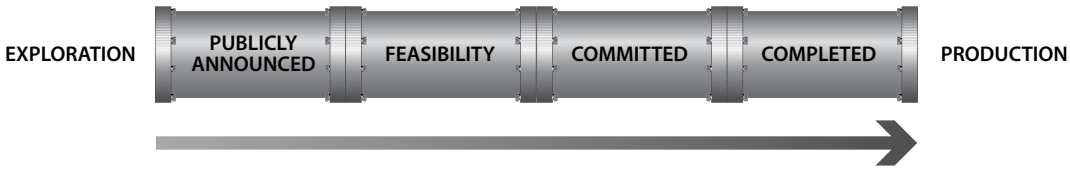
- **Publicly Announced Stage**. Projects at this stage are either at a very early stage of planning (i.e. undertaking their first pre-feasibility study), have paused in progressing their feasibility studies or have an unclear development path. As a result, not all projects will progress from the Publicly 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.
- **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.

1 A USD exchange rate of US$1.02 is assumed as a basis for this report.

- **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 Final Investment Decision 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.
- **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 Committed 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 on-going record of the investment pipeline.

Projects often take different processes in making an FID which reflects the different procedures used by project proponents and their assessments methods, information requirements and planning processes. Thus, there is no standard project development model with clearly defined stages and terminology. The BREE model of the investment pipeline does not attempt to provide a definitive process for developing mining projects, but instead provides a generalised model for assessing project development stages and the aggregate value of potential investment at each stage (see Figure 1).

Figure 1: The stages of the investment pipeline

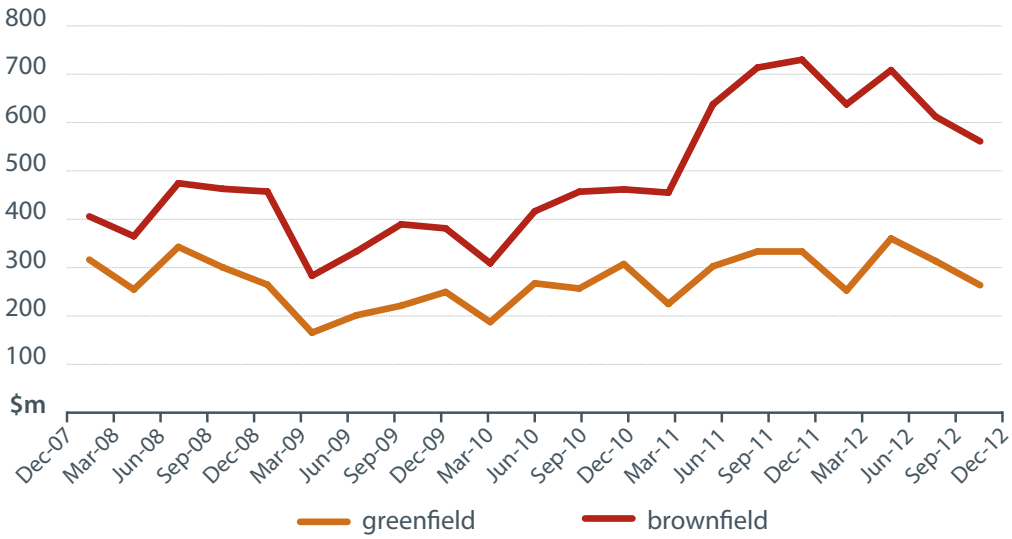


Earlier stages of developing mining and energy projects, such as identifying deposits and exploration activities, are not included in the model. While these activities remain important, they are beyond the scope of this report to include on a project by project basis. Instead, a summary and analysis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

Exploration

The total expenditure on mineral resources exploration decreased during the last two quarters of 2012 (see Figure 2). The decrease coincided with a period of increased pessimism on the outlook for many mineral commodities and sharp declines in some prices that occurred in the latter half of 2012. In the December quarter of 2012, expenditure on exploration at greenfield sites was $264 million. This represented a decrease of 16 per cent compared with the September quarter, and a 27 per cent decline compared with the June quarter. Total expenditure for 2012 was $1.2 billion, the same amount as in 2011.

Figure 2: Exploration expenditure on greenfield and brownfield sites

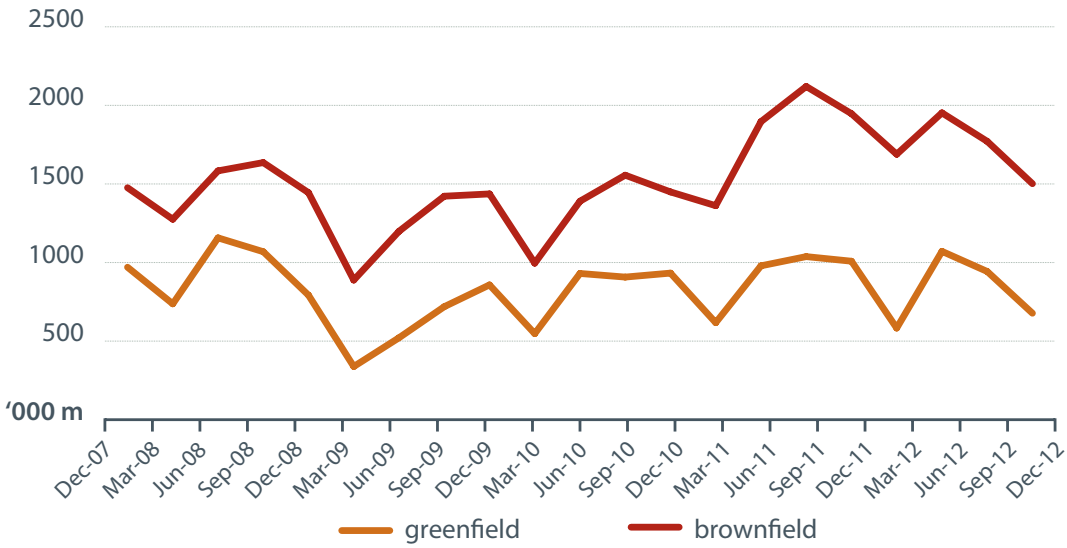


Source: ABS.

Exploration expenditure at brownfield sites was $561 million in the December quarter of 2012, down 8 per cent from the September quarter, and down 21 per cent from the June quarter 2012. Exploration expenditure totalled $2.5 billion for 2012, unchanged from the total in 2011.

Exploration metres drilled at both greenfield and brownfield sites followed the trend in exploration expenditure over the last two quarters (see Figure 3). Greenfield metres drilled in the December quarter totalled 677 000 metres, while brownfield metres drilled totalled 1 502 000 metres for the quarter.

Figure 3: Exploration - metres drilled



Source: ABS.

Projects at the Publicly Announced Stage

Overview

Projects at the Publicly Announced Stage are either undertaking their first round of feasibility studies since identifying a resource or infrastructure requirement, or have stalled in the development of their project to the point where there is no clear development path. This means that, at times, projects may revert back to the Publicly Announced Stage from the Feasibility Stage so the project proponents can consider alternative development options, address planning challenges or wait for more favourable commercial conditions. In the event this reversion occurs, the project may still go ahead under a revised plan and schedule.

In the *Resources and Energy Major Projects - October 2012* BREE provided indicative cost estimates of all projects on its major projects list. For many projects at the Publicly Announced Stage, this involved developing a parametric cost estimate based on known project information and industry cost averages for similar projects. To reflect the uncertainty in the information available, BREE present costs for projects at the Publicly Announced Stage in the following cost bands, except in cases where a cost estimate is available from the project proponent:

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

Analysis of projects at the Publicly Announced Stage

BREE has identified 113 projects at the Publicly Announced Stage with a total investment value between $121 billion and $171 billion (see Table 1). This is seven more projects at the Publicly Announced Stage compared to the October 2012 report, with an increase in value of between $29 billion and $37 billion.

Table 1: Publicly Announced Stage project summary

	Number of projects	Indicative cost range $m
Aluminium, Bauxite, Alumina	4	2 500–4 500
Coal	19	24 335–28 085+
Copper	6	7 503–9 253+
Gold	12	1 779–2 279
Infrastructure	13	18 750–31 250+
Iron ore	18	35 400–55 650+
Lead, Zinc, Silver	4	135–635
LNG, Gas, Petroleum	12	25 300–28 050+
Nickel	5	2 500–5 000
Other Commodities	15	2 170–4 170
Uranium	4	1 000–2 000
Total	**113**	**121 372–170 872+**

Iron ore projects remain the largest, by value, at the Publicly Announced Stage. There are 18 of these projects with an aggregate value of between $35 billion and $56 billion. Two iron ore projects at the Publicly Announced Stage are valued at more than $5 billion; these are the West Pilbara joint venture between Aquila Resources and AMCI ($7.4 billion) and BHP Billiton's Jinidi project. Two iron ore projects at the Publicly Announced Stage are new to the major projects list; these are Fortescue Metals Group's Nyidinghu project ($1.5 billion to $2.5 billion) and Macarthur Minerals' Moonshine Magnetite project ($2.5 billion to $5 billion).

There are nineteen coal projects at the Publicly Announced Stage with a combined value of between $24 billion and $28 billion. This is six projects and around $11.3 billion higher than reported in October 2012, primarily due to a several projects reverting back to the Publicly Announced Stage following announced planning delays by the respective project proponents. These projects include Xstrata's Wandoan mine, Rio Tinto's Mount Pleasant project and Peabody Energy's Wilkie Creek expansion. Two projects, BHP Billiton's Saraji East and the Monto coal mine, were removed from the major projects list. New entries to the list include Stanmore Coal's Belview, Nucoal Resources' Doyles Creek and Cuesta Coal's Moorlands projects. During the period, no coal projects progressed from the Publicly Announced Stage to the Feasibility Stage. MacMines Austasia's Project China Stone mine in Queensland's Galilee Basin is one of the highest value coal projects at the Publicly Announced Stage with a potential annual production of 45 Mt per annum.

The number of LNG, gas and petroleum projects at the Publicly Announced Stage decreased by one over the past six months with the total value of all projects at this stage decreasing by between $1.4 billion and $3.9 billion. Although four projects reverted back to the Publicly Announced Stage, including the Browse LNG project and Sunrise LNG project, these were offset by several projects progressing to Feasibility Stage and the removal from the list of the Pluto LNG Expansion (Trains 2 and 3) and Arrow LNG Expansion (Trains 3 and 4) projects. Coal Seam Gas projects in New South Wales such as AGL's Camden and Metgasco's Casino projects reverted back to the Publicly Announced Stage following regulatory changes that imposed a moratorium on the development of Coal Seam Gas wells in close proximity to residential areas.

Coinciding with the pauses in development to several resources and energy projects there have been announced delays to infrastructure projects in the past six months. This has resulted in the number of infrastructure projects at the Publicly Announced Stage increasing by three and the value increasing by between $5.2 billion and $11 billion. The joint venture to develop Anketell Point Port (Aquila Resources and Fortescue Metals Group) was the principal contributor to the increase. Fortescue Metal Group's Nyidinghu Rail project was also added to the major projects list for the first time with an estimated value of between $500 million and $1 billion. The Oakajee Port development in Western Australia remains the largest potential infrastructure project at the Publicly Announced Stage with an estimated value exceeding $5 billion.

The number of gold projects at the Publicly Announced Stage decreased from 19 in October 2012 to 12 in April 2013. Unlike other commodities, this decline was mainly the result of projects progressing to the Feasibility Stage and in some cases to the Committed Stage. Of the remaining projects Vista Gold's Mt Todd project is the largest with potential output of 260 000 oz per year, valued at around $650 million.

There are 19 metals projects, including copper, nickel, zinc, lead, and aluminium projects, at the Publicly Announce Stage which is three projects less than reported in October 2012. These 19 projects have a combined value of between $12 billion and $19 billion. Included in these projects is BHP Billiton's Olympic Dam expansion project which, although delayed for re-planning, remains on the major projects list.

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 Feasible 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.

Analysis of projects at the Feasibility Stage

In total, there are 174 projects at the Feasibility Stage with an estimated investment value of around $232 billion. By contrast, in October 2012 there were 171 projects worth $281 billion. The decline in value over the past six months is primarily due to delays to Woodside Petroleum's Browse and Sunrise LNG projects, as well as Aquila Resources' West Pilbara Project (see Figure 4).

Figure 4: Number of uncommitted projects

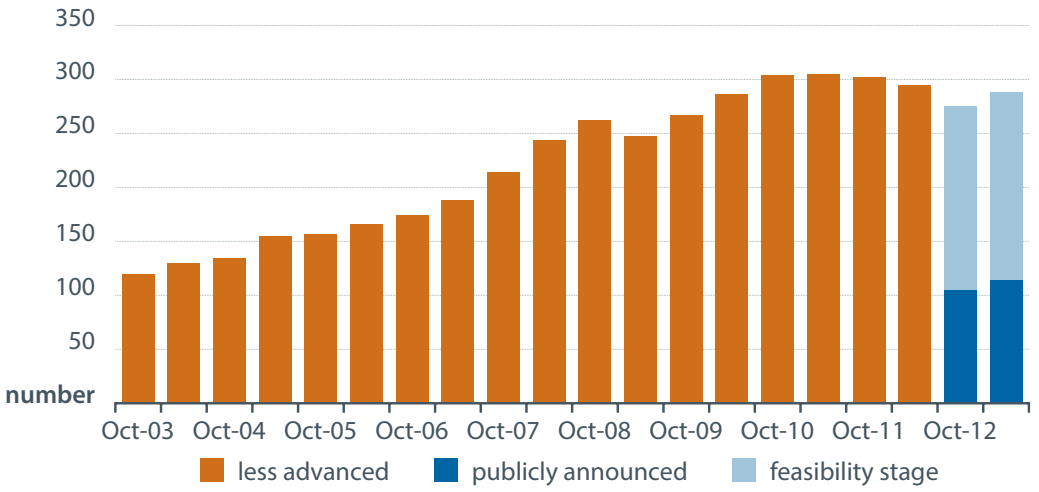


Table 2: Summary of projects at the Feasibility Stage

	NSW		Qld		WA		NT		SA		Vic		Tas		Other		Total	
	No.	Value $m	No.	Value $m	No.	Value $m	No.	Value $m	No.	Value $m	No.	Value $m	No.	Value $m	No.	Value $m	No.	Value $m
Aluminium, Bauxite, Alumina			2	1 780	1	2 000											3	3 780
Coal	17	6 604	39	49 890	1	200											57	56 695
Copper			4	1 093	1	236	1	274	2	1 300	1	185					9	3 088
Gold			2	183	9	988	1	450									12	1 621
Infrastructure	4	4 690	10	21 620	4	4 710			2	650							20	31 670
Iron ore	1	2 900	1	4 400	16	35 385	1	267	2	3 590							21	46 542
Lead, Zinc, Silver	2	417															2	417
LNG, Gas, Petroleum	2	1 500	3	25 900	2	27 000	2	4 600			1	200			1	13 000	11	72 200
Nickel			1	15	5	5 397							1	78			7	5 490
Other Commodities	3	1 752	6	2 741	8	1 273	4	2 008			3	577	3	531			27	8 882
Uranium					4	1 830	1	270									5	2 100
Total	**29**	**17 863**	**68**	**107 622**	**51**	**79 019**	**10**	**7 869**	**6**	**5 540**	**5**	**962**	**4**	**609**	**1**	**13 000**	**174**	**232 485**

Coal projects represent the largest proportion of projects, by number, at the Feasibility Stage with 57 projects worth a combined total of $57 billion. By comparison, in October 2012 there were 63 coal projects worth $76 billion. In the past six months no coal projects have progressed to the Committed Stage and the decrease is entirely attributable to projects reverting back to the Publicly Announced Stage or being removed from the major projects list.

The large coal projects located in Queensland's Galilee Basin remain the largest contributors to the value of coal projects at the Feasibility Stage. These include Adani's Carmichael Coal Project ($6.8 billion), GVK-Hancock's Alpha and Kevin's Corner coal mines ($10 billion and $4.2 billion, respectively), Waratah Coal's China First Coal Project ($8 billion) and Bandanna Energy's South Galilee Coal Project ($4.2 billion). Together, these projects account for around 59 per cent of the value of coal projects at the Feasibility Stage.

There are eleven LNG, gas and oil projects at the Feasibility Stage with a combined value of $72 billion. This value is $32 billion less than in October 2012 because the progression to the Feasibility Stage of the Santos-GDF Suez joint venture Bonaparte LNG project, Arrow Energy's Bowen Gas project, AGL's Gloucester Coal Seam Gas project and Esso- BHP Billiton's Kipper Mercury Handling Facility to the Feasibility Stage has been offset by projects moving back to the Publicly Announced Stage. Arrow's LNG Plant remains listed as an onshore LNG project; however, there is considerable uncertainty as to the future development path of this project. In April 2013 the ExxonMobil – BHP Billiton Scarborough joint venture made further progress towards FID by referring its project plans for Federal Government review. If approved, this project will be the second floating LNG (FLNG) venture in Australia after Shell's Prelude project which is currently at the Committed Stage of development.

There are 21 iron ore projects with a combined value of $47 billion. Hancock Prospecting's Roy Hill ($9.5 billion) and Rio Tinto's Koodaideri (estimated at around $7 billion) are the two largest iron ore projects at the Feasibility Stage by both value and potential output. Both are located in the Pilbara region of Western Australia and, together, have the potential to increase the region's iron ore production by a further 125 Mt per year, if they progress to the Completed Stage. There are a further 12 iron ore projects at the Feasibility Stage that have an estimated value of over $1 billion which are a mix of hematite and magnetite based projects, and mostly new mine developments rather than expansions to existing facilities.

Over the past six months both the number and value of Feasibility Stage infrastructure projects have decreased. There are now 20 infrastructure projects identified at the Feasibility Stage worth a combined total of around $32 billion. This is five fewer projects and the value is $13 billion less than October 2012. Infrastructure projects supporting the transportation of bulk commodities, such as iron ore and coal, remain the main infrastructure projects and account for around 80 per of the value of infrastructure projects at the Feasibility Stage. Adani's Abbot Point Terminal 0 (estimated around $1.4 billion) and Dudgeon Point (potentially $12 billion) projects, along with GVK's Abbot Point Terminal 3 development (around $1.8 billion) are some of the key infrastructure projects that could support the development of the Galilee Basin as a major coal-producing region if potential mining projects there proceed. In New South Wales, Port Waratah Coal Services' Kooragang Island Terminal 4 project ($5 billion) has been removed from the major projects list as it is not expected to progress to a final investment decision within the next five years.

There are 27 projects that relate to other commodities, such as phosphates, rare earth elements and mineral sands, with a combined value of $8.9 billion. These include high value projects such as Legend International Holdings' Paradise Phosphate project ($1.8 billion) and Arafura Resources' Nolans rare earths project (estimated around $1 billion).

Aluminium, alumina and bauxite projects at the Feasibility Stage remain unchanged since October 2012. Market conditions have not been supportive of further expansions to Australia's aluminium and alumina smelters and refineries in recent years. Nevertheless, new bauxite projects such as Cape Alumina's Pisolite Hills ($380 million) and Rio Tinto's South of Embley ($1.4 billion) have progressed through the investment pipeline and may be in a position to make an FID in 2013, if regulatory approvals are granted. There are also 18 base metals projects, including copper, nickel, lead, zinc and silver projects, at the Feasibility Stage with a combined value of around $9 billion. This represents an addition of three projects and an extra $1.5 billion of capital stock compared to October 2012.

The number of gold projects at the Feasibility Stage doubled from 6 to 12 between October 2012 and April 2013. These 12 gold projects have a combined value of $1.6 billion with half being valued at less than $100 million. Gold price fluctuations in April 2013 may affect gold projects progressing further through the investment pipeline in the near term.

Projects at the Committed Stage

Overview

Projects at the Committed Stage have completed their planning activities, have 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 total, nine projects received a positive FID with a combined investment value of $3.3 billion (see Table 3). While this is only one project less than the previous period, the total of additional committed investment was $9.9 billion lower as no 'mega' projects were approved over the past six months.

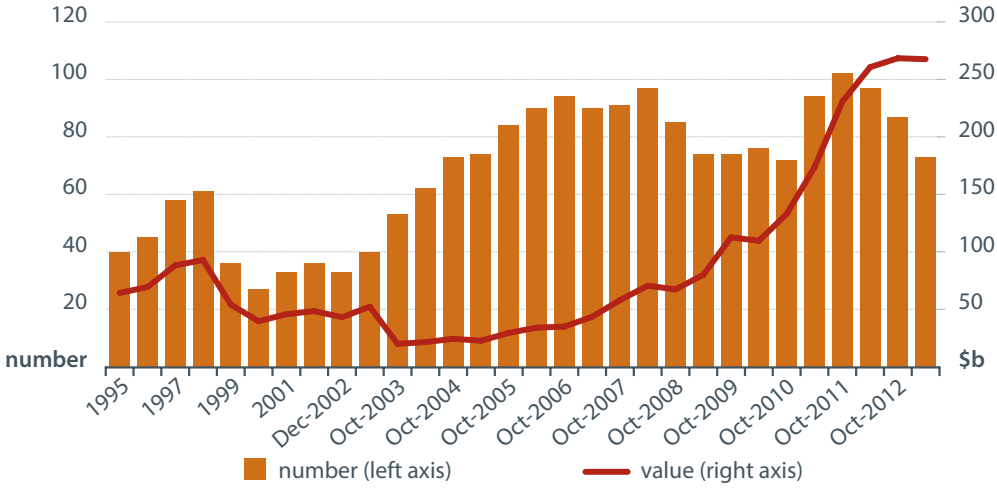
Table 3: Projects progressed to the Committed Stage since October 2012

Project	Company	State	Value ($m)
Charters Towers	Citigold	Qld	246
Dargues Reef (Majors Creek)	Unity Mining	NSW	80
Dugald River	MMG	Qld	1 456
Hera	YTC Resources	NSW	74
Lady Loretta Expansion	Xstrata	Qld	59
Longford Gas Conditioning Plant	BHP Billiton / ExxonMobil	VIC	1 000
Port of Townsville Upgrade - Berth 8	Port of Townsville Limited / Xstrata	Qld	70
Roper Bar	Western Desert Resources	NT	180
Tomingley (Wyoming) gold project	Alkane Exploration	NSW	116
Total			**3 281**

Analysis of committed investment

Both the number and value of projects progressing to the Committed Stage decreased in the six months to April 2013 (see Figure 5). The total number of projects at the Committed Stage has decreased from 87 in October 2012 to 73 in April 2013 (see Table 4). The value of these projects has remained stable at around $268 billion because of large post-FID cost increases to high value projects such as Gorgon LNG ($9 billion) and Australia Pacific LNG ($1.7 billion) over the previous six months.

Figure 5: Number and nominal value of projects at the Committed Stage



Mega projects worth more than $5 billion have been the principal driver of the growth in the value of committed investment in Australia. Mega projects currently account for around 80 per cent of the value of projects at the Committed Stage (see Figure 6).

Figure 6: Project value

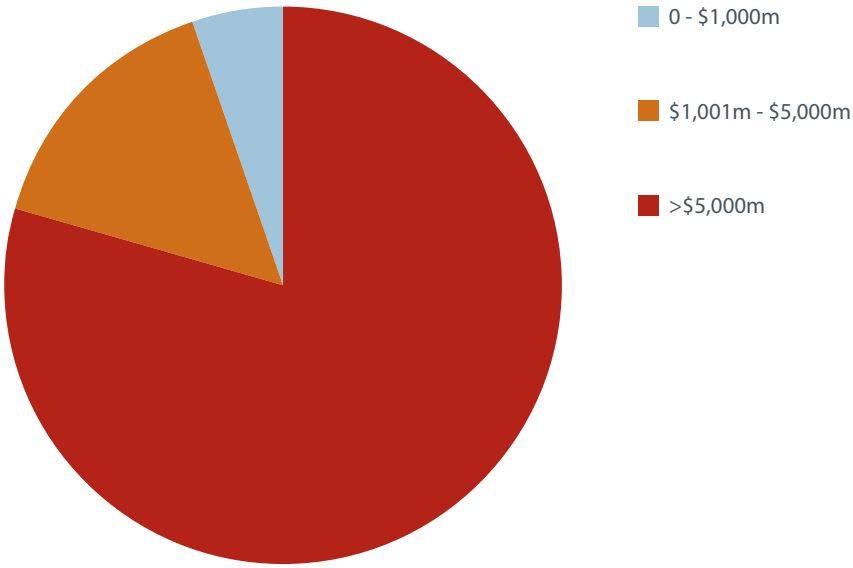


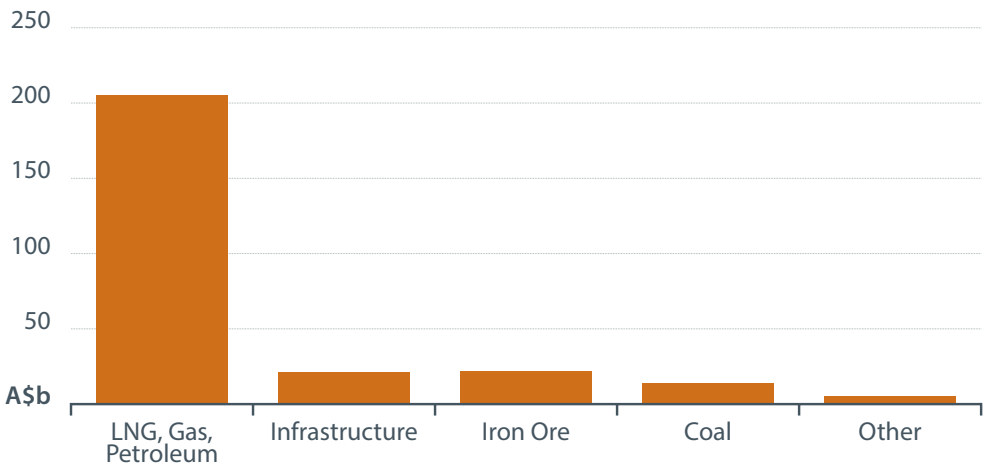
Table 4: Summary of projects at the Committed Stage

	NSW		Qld		WA		NT		SA		Vic		Tas		Other		Total	
	No.	Value $m	No.	Value $m	No.	Value $m	No.	Value $m	No.	Value $m	No.	Value $m	No.	Value $m	No.	Value $m	No.	Value $m
Aluminium, Bauxite, Alumina																		
Coal	7	4 190	9	10 004													16	14 194
Copper	1	93	1	250													2	343
Gold	3	270	1	246	2	900											6	1 416
Infrastructure	3	2 125	5	6 265	6	12 476			1	200							15	21 067
Iron ore					7	21 842	1	180									8	22 022
Lead, Zinc, Silver	1	58	2	1 515			1	360									4	1 933
LNG, Gas, Petroleum			3	62 500	11	105 132	1	33 000			2	3 600			1	680	18	204 912
Nickel																		
Other Commodities					2	1 325	1	270									3	1 595
Uranium									1	98							1	98
Total	15	6 736	21	80 780	28	141 675	4	33 810	2	298	2	3 600			1	680	73	267 579

Analysis of projects at the Committed Stage

LNG, gas and petroleum projects have the highest combined value of projects at the Committed Stage (See Figure 7). The number of LNG, gas and petroleum projects remains unchanged from October 2012 at 18, but the value of these has increased by $10.5 billion to total $205 billion, underpinned by announced cost increases at Gorgon LNG and APLNG. The BHP Billiton – ExxonMobil Longford Gas Conditioning Plant ($1 billion) was the only LNG, oil and petroleum project that progressed to the Committed Stage during the period. These cost increases were partially offset by the progression of stage 1 of the Kipper Gas Project ($1.7 billion) to the Completed Stage.

Figure 7: Projects at the Committed Stage, by commodity



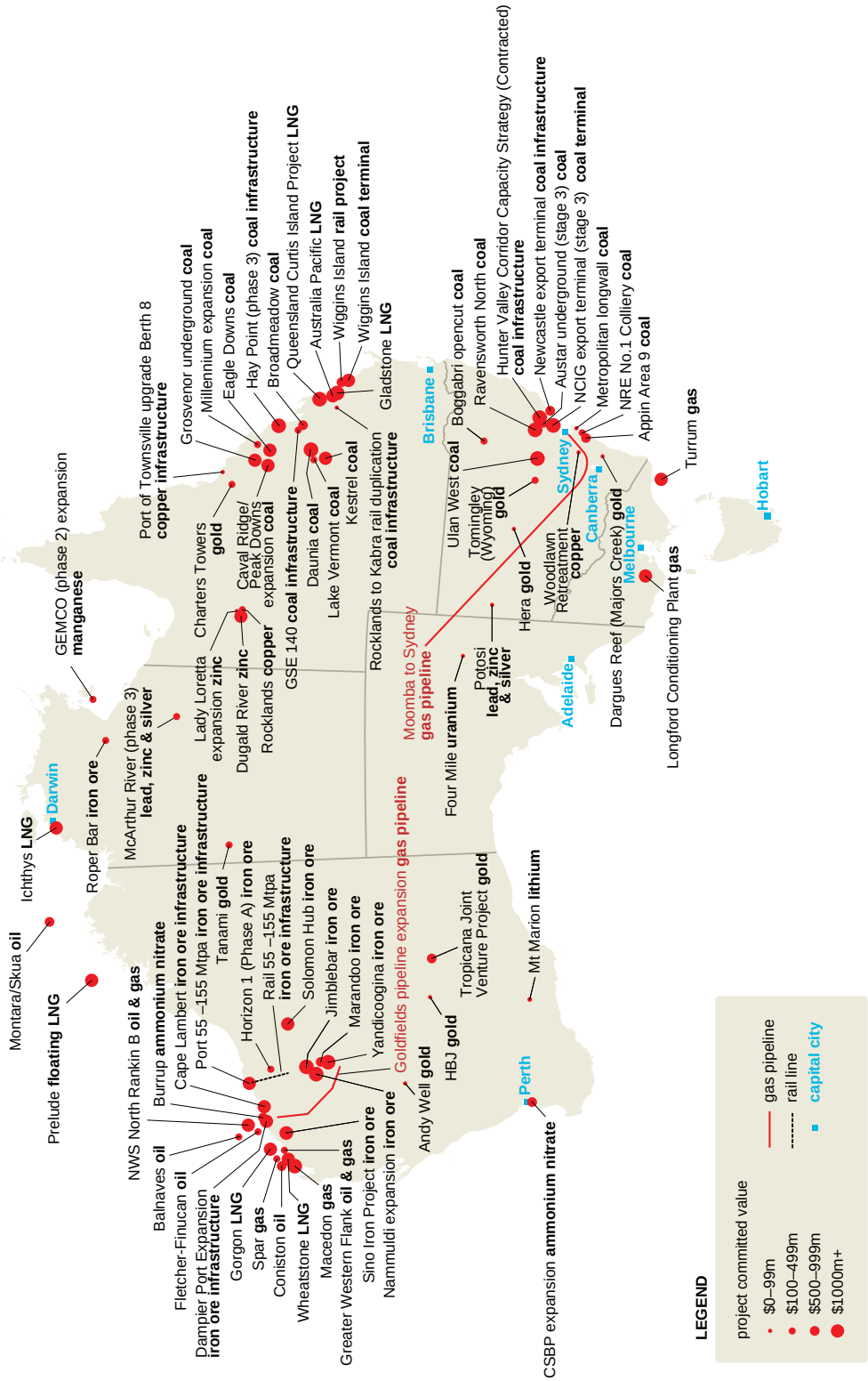
One iron ore project, Western Desert Resources' Roper Bar ($180 million) in the Northern Territory, progressed to the Committed Stage in the six months prior to April 2013. Overall, the value of iron ore projects decreased by $4.2 billion, relative to October 2012, to total $22 billion. This is because five projects progressed to the completed stage and commenced first production during the period. This decline was partially offset by an estimated $800 million cost increase to Citic Pacific's Sino Iron Project which is scheduled to commence production over the next six months.

There were no additional coal projects added to the Committed Stage in the past six months. The value of coal projects at the Committed Stage decreased by $166 million as a result of Ensham Resources' Ensham mine progressing to the completed stage. The 16 coal projects remaining at the Committed Stage have a combined value of $14.2 billion, of these, 12 projects worth around $12 billion are scheduled to be completed by the end of 2014. These include BHP Billiton's Caval Ridge ($1.9 billion) and Daunia ($1.6 billion) metallurgical coal mines in Queensland and Anglo American's Grosvenor Underground thermal coal project ($1.6 billion).

No new infrastructure projects progressed to the Committed Stage in the six months to April 2013. The value of committed infrastructure projects decreased by $3.6 billion, relative to October 2012, to total $21.1 billion as result of three projects progressing to the Committed Stage. Several large infrastructure projects remain at the Committed Stage; however, almost all of these are scheduled for completion by the end of 2014. These projects include Rio Tinto's Cape Lambert port and rail expansion ($5.2 billion) and Fortescue Metals Group's port and rail projects ($4.6 billion) that will, together, provide an additional 160 Mt of export infrastructure capacity for iron ore in 2013. The Wiggins Island Coal Export Terminal ($2.4 billion) and BHP Billiton's Hay Point Terminal 3 ($2.7 billion) are also scheduled for completion in 2014 which will provide an additional 38 Mt of coal export infrastructure capacity in Queensland.

Metals projects contributed the most to the new project listings at the Committed Stage in the past six months by both number and value. At $1.5 billion, MMG's Dugald River zinc, copper and gold mine was the largest project by value to progress to the Committed Stage and accounted for 44 per cent of the new committed project value. Of the nine projects that progressed to the Committed Stage, four were gold mining projects including Citigold's Charters Towers ($246 million), Unity Mining's Dargues Reef ($80 million), YTC Resources' Hera project ($74 million) and Alkane Exploration's Tomingley gold project ($116 million).

Figure 8: Locations of projects at the Committed Stage



Projects at the Completed Stage

Overview

The Completed Stage includes projects that have completed their full project scope, 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 project reach the Completed Stage is difficult to judge. In the major projects list provided with this report, projects that have progressed to the Completed Stage in the past 6 months are recorded in the commodity category table with all completed projects in the past 3 years shown separately.

Analysis of projects progressing to the Completed Stage

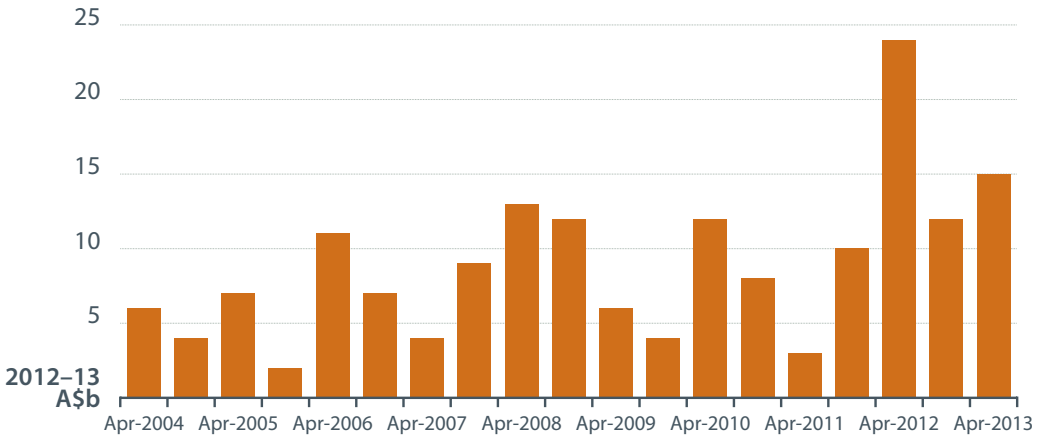
In the six months to April 2013, 21 projects progressed to the completed stage that had a combined value of $15.3 billion (see Table 5). As a result, the value of projects that have been completed is $3.4 billion, or 29 per cent, higher than the previous period. The value of completed projects in the six months to April 2013 is also the second highest recorded (see Figure 9). Whereas the highest six month period was primarily the result of the completion of single mega project, Woodside Petroleum's Pluto LNG ($15 billion), the latest value is due to a number of projects over $1 billion that have reached completion. These projects include Rio Tinto's Argyle Underground diamond mine ($2.2 billion), BHP Billiton's Inner Harbour development ($2.1 billion), Rio Tinto's Hope Downs 4 iron ore mine ($2 billion), Newcrest's Cadia East gold mine ($1.9 billion), the Kipper Gas joint venture by Esso, BHP Billiton and Santos ($1.7 billion) and Rio Tinto's Brockman 4 (stage 2) iron ore project.

Table 5: Projects at the completed stage

Project	Company	State	New Capacity	Capacity Unit	Resource	Cost $m
Ammonium nitrate emulsion plant	Incitec Pivot	WA	100	kt	Ammonium nitrate	40
Argyle underground	Rio Tinto	WA	20	Mct	Diamonds	2200
Blackwater System Power upgrade	Aurizon	Qld	9000	ktpa	Black coal	195
Cadia East	Newcrest	NSW	250000	oz	Gold	1 900
Carosue Dam (Red October)	Saracen Minerals	WA	130000	oz	Gold	40
Chichester Hub (55-95Mtpa)	Fortescue Metals Group	WA	40000	kt	Hematite	960
Cloncurry Copper project (Mount Margaret)	Xstrata	QLD	28, 17000	kt, oz	Copper, Gold	300
Ensham	Ensham Resources	QLD	1.7	Mt	Thermal coal	166
George Fisher	Xstrata	QLD	1	Mt	Ores, concentrates	310
Hamersley Iron Brockman 4 project (Stage 2)	Rio Tinto	WA	18000	kt	Hematite	1 070
Hope Downs 4	Rio Tinto / Hancock Prospecting	WA	15000	kt	Hematite	2 040
KalNorth (Lindsay's)	Kal North	WA	27000	oz	Gold	70
Kipper Gas Project (stage 1)	Esso / BHP Billiton / Santos	VIC	30	PJ pa	Gas	1 700
Kooragang Island project 145	Port Waratah Coal Services	NSW	12000	ktpa	Black coal	227
Meekatharra Gold Project	Reed Resources	WA	95000	oz	Gold	36
Mt Carlton (Silver Hill)	Evolution Mining	Qld	60000, 1.2	oz, Moz	Gold, Silver	180
Murchison	Silver Lake	WA	100000	oz	Gold	70
NCIG export terminal (stage 2)	NCIG	NSW	23000	ktpa	Black coal	900
Orebody 24	BHP Billiton	WA	n/a		Hematite	800
WAIO Inner Harbour	BHP Billiton	WA	240000	ktpa	Iron Ore	2 140
Western Turner Syncline II	Rio Tinto	WA	9000	kt	Hematite	n/a
Total						**15 344**

*Estimated due to unavailable data.

Figure 9: Value of completed projects



In total, six iron ore and related infrastructure projects with a combined value of $7 billion progressed to the Completed Stage in the six months to April 2013. In addition to those large projects above $1 billion, Fortescue Metals Group's Chichester Hub ($960 billion) and BHP Billiton's Orebody 24 projects were also completed. Together, these completed iron ore mines have added an additional 82 Mt of production capacity, although it is likely to take some time for each mine to ramp up to full production. There is the potential for a further 92 Mt of iron ore capacity to be added through 2013 if iron ore projects currently at the Committed Stage progress to the Completed Stage as scheduled.

Seven gold-producing projects were completed during the reporting period that have a combined investment value of $2.6 billion. Newcrest's Cadia East mine ($1.9 billion) has the highest value, followed by Xstrata's Mount Margaret project ($300 million) near Cloncurry in Queensland. Xstrata also progressed its George Fisher zinc and lead mine ($310 million) near Mt Isa to the Completed Stage during the period.

There were four coal and coal-related infrastructure projects with a combined value of $1.5 billion that progressed to the Completed Stage in the six months prior to April 2013. The highest value project of these was stage 2 of the Newcastle Coal Infrastructure Group's 23 Mt capacity NCIG export terminal at the Port of Newcastle ($900 million). Port Waratah Coal Services also completed their Kooragang Island project ($227 million) at Newcastle which will provide an additional 12 Mt of export infrastructure capacity. In Queensland, Aurizon's Blackwater System power upgrade ($195 million) was also completed, while Ensham Resources' Ensham mine expansion ($166 million) was the only coal mining project to progress to the Completed Stage during the period.

Figure 10: Pipeline of investment in Australia's resources and energy sector, selected projects

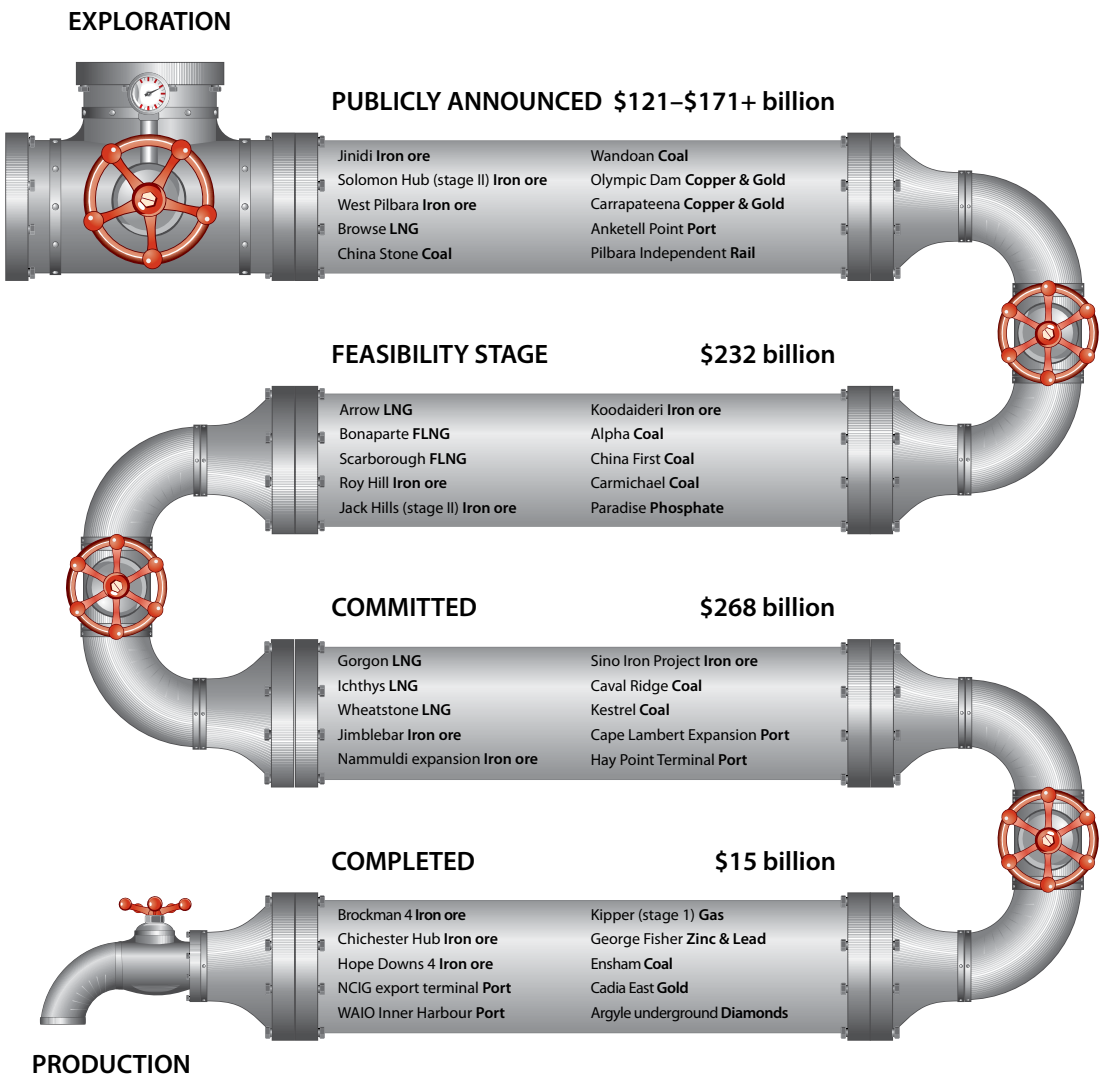


Table 6: Summary of projects in the investment pipeline, April 2013

	Publicly Announced		Feasibility Stage		Committed		Completed	
	No.	Range* $m	No.	Value $m	No.	Value $m	No.	Value $m
Aluminium, Bauxite, Alumina	4	2 500–4 500	3	3 780				
Coal	19	24 335–28 085+	57	56 695	16	14 194	1	166
Copper	6	7 503–9 253+	9	3 088	2	343	1	300
Gold	12	1 779–2 279	12	1 621	6	1 416	6	2 296
Infrastructure	13	18 750–31 250+	20	31 670	15	21 067	4	3 462
Iron ore	18	35 400–55 650+	21	46 542	8	22 022	5	4 870
Lead, Zinc, Silver	4	135–635	2	417	4	1 933	1	310
LNG, Gas, Petroleum	12	25 300–28 050+	11	72 200	18	204 912	1	1 700
Nickel	5	2 500–5 000	7	5 490				
Uranium	15	2 170–4 170	5	2 100	1	98		
Other Commodities	4	1 000–2 000	27	8 882	3	1 595	2	2 240
Total	**113**	**121 372–170 872+**	**174**	**232 485**	**73**	**267 579**	**21**	**15 344**

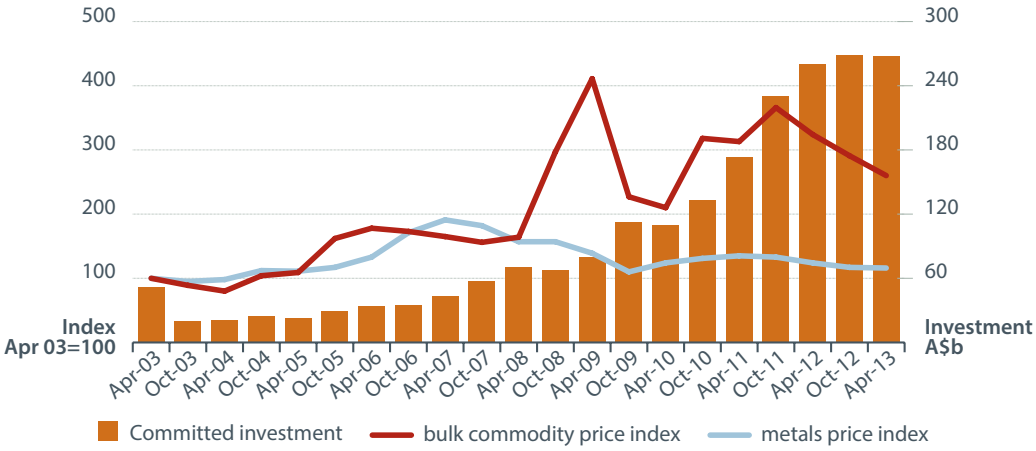
* Value of Publicly Announced projects given in cost range with projects over $5 billion having no upper bound.

Analysis of the investment pipeline

Historical analysis of committed investment

The value of committed investment in Australia's resources and energy sectors has increased 400 per cent since April 2003, growing from $52 billion in April 2003 to $268 billion in April 2013. This growth has been supported by an increase in the number of projects progressing through the investment pipeline in response to the increasing resource demands of emerging Asian economies that have contributed to higher commodity prices (see Figure 11). As noted in BREE's Resources and Energy Quarterly in March 2013 and Grafton (2012)[2], resources and energy commodity prices, overall, peaked in 2011. The subsequent moderation in prices since 2011 has changed the type of projects which are proceeding to the Feasibility and Committed stages.

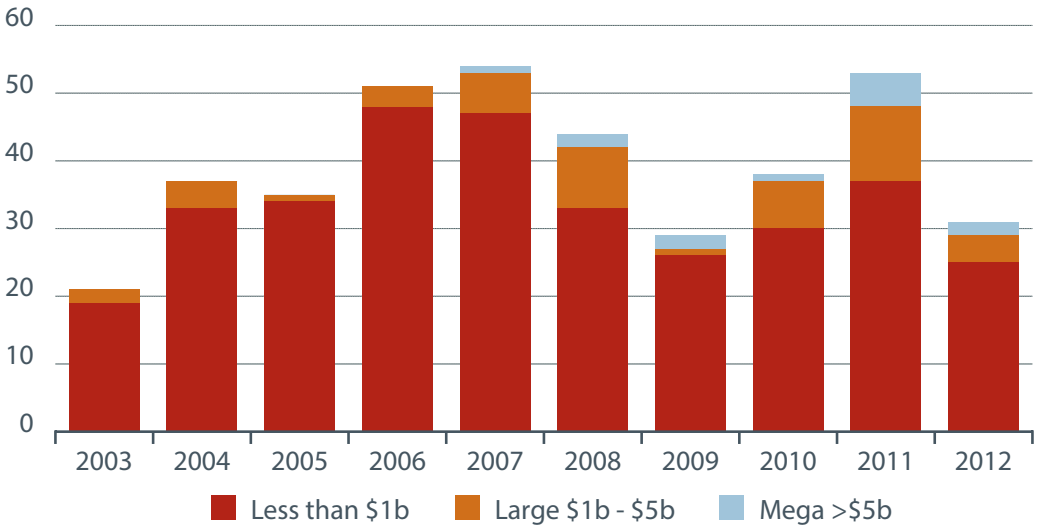
Figure 11: Commodity price index and value of committed projects



In the initial years of Australia's mining boom, the increase in resources and energy project investment was generated by a high number of projects that were valued at less than $1 billion. By contrast, the trend for project investment over the past five years has been a decline in the number of projects approved with a value of less than $1 billion and an increase in the number of projects approved that are valued at over $1 billion. The larger projects promote economies of scale in the production process and lower average costs of production (see Figure 12). These high value projects have been the principal drivers of the substantial increases in the value of projects at the Committed Stage of development, particularly LNG projects which currently account for $205 billion, or about 80 per cent of the total value of projects at the Committed Stage.

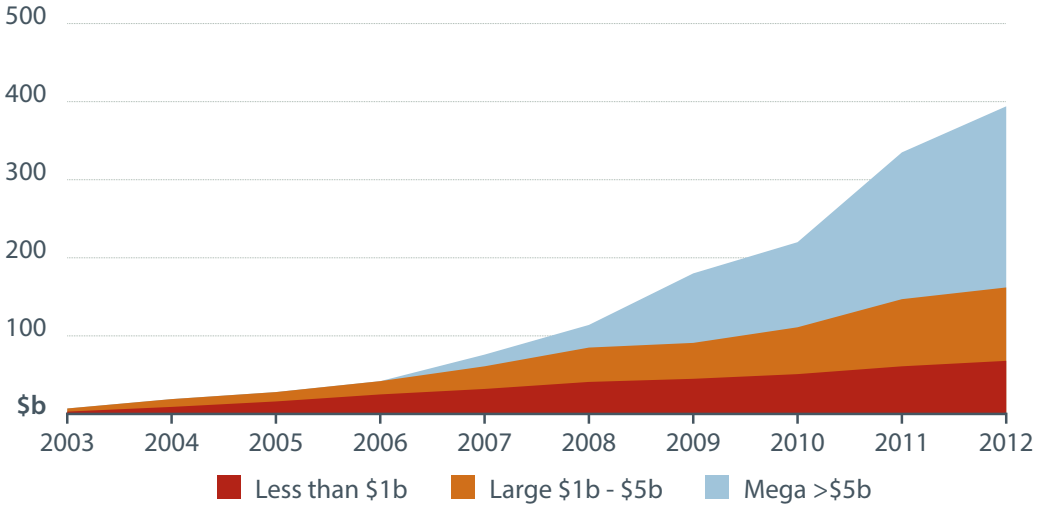
2 Speech by Professor Quentin Grafton, 17 September 2012, *Australia and the Millennium Mining Boom* , ANCRE 2012.

Figure 12: Number of projects committed to per year, 2003–2012



In the ten year period 2003 to 2012, around 390 resources and energy major projects progressed to the Committed Stage with a combined value in nominal terms of $394 billion, of which $268 billion are still under construction and not yet complete. The 13 'mega' projects approved since 2003 account for 59 per cent, or $232 billion, of this cumulative total (see Figure 13). The 48 large projects (valued at over $1 billion but less than $5 billion) approved in the same period account for 24 per cent, or $93 billion of the total, while the remaining 332 projects with values under $1 billion accounted for just 17 per cent of all project investment in the past 10 years.

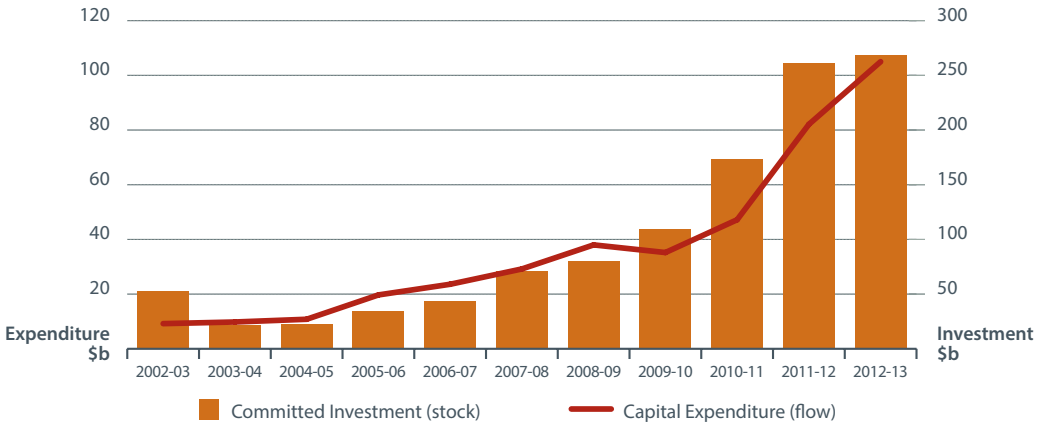
Figure 13: Cumulative value of committed projects, 2003–2012



Investment stocks and flows

The total value of committed projects at any given time represents the stock of investment while the capital expenditure per year associated with this stock is the flow of investment. The Australian Bureau of Statistics (ABS) provides an independent measure of mining industry capital expenditure per year that estimates the flow of spending associated with the stock of committed investment in Australia.[3] It should be noted that not all committed project investment is spent in Australia, and not all capital expenditure is related to committed projects. Nevertheless, as can be seen in Figure 14 there is a close relationship over the past ten years between the value of committed project investment (the stock) and ABS capital expenditure data (the flow).

Figure 14: Committed project investment and capital expenditure 2002–03 to 2012–13

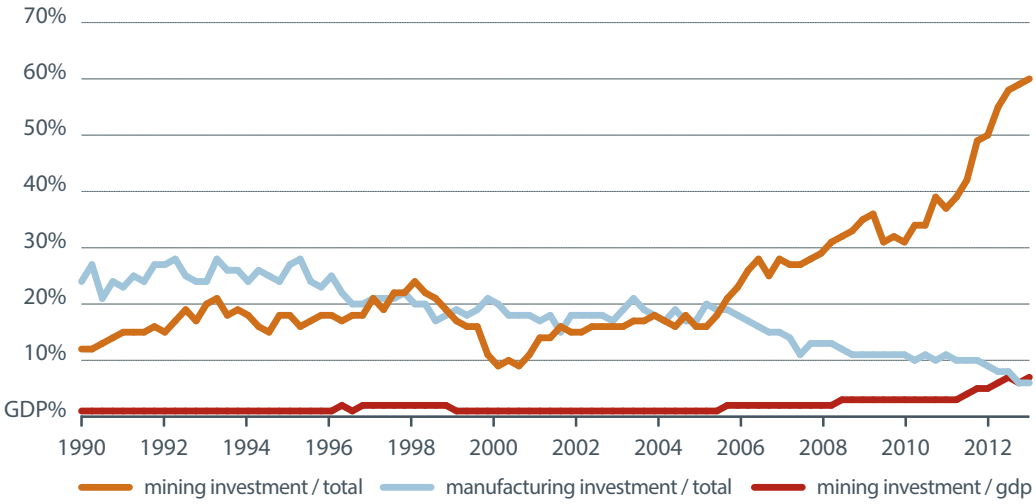


Source: ABS, BREE
Notes:
Committed project investment shown as the value in April of each financial year.
ABS estimate for 2012–13 capital expenditure shown.

As Australia has experienced record high levels of committed project investment in the past five years, it has benefited from a corresponding increase in annual capital expenditure which now accounts for around 8 per cent of GDP (see Figure 15). Several challenges are emerging that are likely to moderate the value of both the stock of committed investment and annual capital expenditure in the resources and energy sectors in the future. These include rising construction and operating costs, a moderation in commodity prices, and an increasing number of alternative resource and energy investment options in other countries.

3 'New capital expenditure refers to the acquisition of new tangible assets either on own account or under a finance lease and includes major improvements, alterations and additions. In general, this is expenditure charged to fixed tangible assets accounts excluding expenditure on second hand assets unless these are imported for the first time.' ABS Cat No. 5625, *Private New Capital Expenditure and Expected Expenditure*, 28 February 2013.

Figure 15: Mining capital expenditure as a percentage of total investment and GDP



In Australia, there has already been an observed slowing in the rate of progression of projects valued under $1 billion to the Committed Stage. This can, in part, be attributed to a decline in commodity prices from their 2011 peaks as well as increasing costs and financing challenges. The greater challenge is the emerging trend for 'mega' and large projects at the Feasibility Stage to be either cancelled or revert back to the Publicly Announced Stage. This is because these large scale projects are the principal drivers of the current record high stock levels of investment at the Committed Stage. BREE estimates that around $150 billion of projects at the Feasibility Stage have been delayed, cancelled or have had re-assessed development plans in the past twelve months (see Table 7). Furthermore, there have been a number of mining companies that have announced plans to reduce their capital expenditure programs, both in Australia and overseas. The delayed and re-assessed projects still represent an investment opportunity for Australia if market conditions were to change and become more supportive of a final investment decision.

Table 7: Feasibility Stage projects delayed or cancelled in past 12 months

Project	Company	Value ($b)
Browse LNG	Woodside	36
Outer Harbour	BHP Billiton	30
Olympic Dam Expansion	BHP Billiton	20
Sunrise LNG	Woodside	12
Abbot Point T4–9	NQBP and partners	11
West Pilbara Iron Ore	Aquila Resources	7.4
Wandoan coal mine	Xstrata	6.0
Kooragang Island Coal Terminal 4	PWCS	5.0
Anketell Point Port	Fortescue / Aquila	4.0
Cape Lambert Magnetite project	MCC Mining	3.7
Southdown Magnetite Project	Grange Resources	2.9
Yarwun Coal Terminal	Metro Coal	2.2
Mount Pleasant coal mine	Rio Tinto	2.0
Weld Range iron ore project	Sinosteel Midwest	2.0
Balaclava Island coal terminal	Xstrata	1.5
Fisherman's Landing LNG	LNG Limited	1.1
Surat Basin Rail	Aurizon / Xstrata	1.0
Wilkie Creek coal mine	Peabody Energy	1.0
Total		149

While the progression of large and 'mega' projects to the Committed Stage has slowed over the past year, the value of committed project investment has been stable. Typically, higher value projects have greater exposure to technical, schedule and cost risks. Several of the mega projects that moved to the Committed Stage after 2008 have been affected by some of these risks which have resulted in post-FID cost increases. The REMP in October 2012 reported a number of project cost increases, particularly LNG projects. In April 2013, around $29 billion, or 11 per cent, of the total value of projects at the Committed Stage is attributable to post-FID cost increases (see Table 8).

Table 8: Committed Stage project cost increases

	Cost Increase ($m)
LNG, Oil and Petroleum	20 019
Coal	1 156
Infrastructure	1 756
Iron Ore	5 488
Other	95
Total	**28 514**

LNG projects have been the principal sources of post-FID cost increases among projects at the Committed Stage. Of the six onshore projects, four have now announced cost increases. Although LNG projects are the largest contributors, by value, to the post-FID cost increases at around $20 billion they are also the largest contributors to the total value of projects at the Committed Stage with a combined value of $189 billion.

Box 1: Floating Liquefied Natural Gas

Floating Liquefied Natural Gas (FLNG) technology enables the processing of offshore gas from gas fields that would otherwise not be economically viable. FLNG technology targets remote offshore gas fields, sometimes known as 'stranded gas fields' and offers a less capital intensive and lower cost option for their development. This is because FLNG does not require long undersea pipelines to transport extracted gas to land or the development of onshore shipping terminals. These features also mean FLNG has a smaller environmental footprint than onshore development.

The FLNG extraction process is completed entirely offshore, with the plant anchored directly above the gas field. After extraction, the natural gas is processed on-board before being cooled to liquid form (shrinking it to 1/600th of the original volume) and stored until an LNG ship offloads the cargo. The potential for harsh sea and weather conditions present challenges to FLNG projects; nevertheless, there is already one FLNG project to develop an Australian offshore gas field under construction with several more potential projects under consideration. Given the recent cost increases of constructing onshore LNG projects in Australia, FLNG may play an increasingly important role in the future of the nation's oil and gas industries.

In 2007 Royal Dutch Shell (Shell) discovered the Prelude gas field located in the Browse basin, approximately 200 kilometres off the north-west coast of Western Australia. Shell gave a positive final investment decision to develop the field using the world's first floating LNG project, known as Prelude, in May 2011 with an estimated capital cost of around $12 billion. At 488m long, 74m wide and with a displacement of 600,000 tonnes, the Prelude FLNG vessel is the largest naval vessel constructed to date. Development drilling of the gas field is expected to begin in 2013 with production ramping up to 3.6 Mt of LNG from 2017.

The Browse Basin gas field off the coast of WA is another potential location for FLNG technology to be deployed. In April 2013, Woodside Petroleum (on behalf of the Browse LNG project joint venture) announced that the planned onshore LNG processing plant near James Price Point in north-west Western Australia would no longer be developed based on estimated project economics. Woodside Petroleum has entered into an agreement with Shell to investigate the use of FLNG technology as a development concept for the Browse Basin.

An ExxonMobil-BHP Billion partnership is proposing an FLNG option for the development of the Scarborough gas field located 220 kilometres north-west of Exmouth in Western Australia. Based on planning documents lodged with the federal Department of Sustainability, Environment, Water, Population and Communities, the project is targeting a production rate of over 4 Mt of LNG per year from 2020. Additional Australian offshore gas projects that may be developed using FLNG technology include the Sunrise field in the Joint Petroleum Development Area (subject to agreement between the Government of Timor-Leste and Woodside Petroleum), Bonaparte (Santos, GDF Suez), Cash Maple (PTTEP Australasia) and Crux (Shell, Nexus Energy, Osaka Gas). These projects are still in the early stages of development and require numerous approval and assessments before the proponents are able to make a final investment decision.

Framework for analysing the investment pipeline

Significant opportunities still exist for investment in the Australian resources and energy sectors. Nevertheless, there are challenges in realising these opportunities. As at April 2013, the resources and energy major projects investment pipeline had $232 billion of projects at the Feasibility Stage and between $121 billion and $171 billion at the Publicly Announced Stage that may progress further. BREE stresses that this investment is not guaranteed and that the experience of the past decade has shown that not all projects progress to the Committed Stage.

In the Resources and Energy Major Projects – October 2012, BREE implemented a new framework for analysing the pipeline of investment in Australia. In addition to these changes, BREE will also provide a forward looking outlook for the stock of investment at the Committed Stage. To represent the uncertainty in this outlook, two alternative investment scenarios are provided. The scenarios are based on an assessment system that rates the probability that a project at the Publicly Announced or Feasibility stages will progress to the Committed Stage within the next five years.

The BREE investment outlook considers both the internal and external factors that have historically determined projects' success in gaining a positive FID, and also the factors that limit the probability of success. Based on this framework, a project not yet at the Committed Stage is given one of the following three ratings in terms of whether it will progress to a final investment decision:

- **Likely**. A project assessed as likely has a number of positive internal and market factors which indicates it has a high probability of progressing to the Committed Stage within the next five years. The project's progression to the committed stage is not certain, however, because market factors can change before the final investment decision is undertaken.
- **Possible**. A project assessed as possible has a lower probability of advancing to the Committed Stage than one rated as likely. Such a project has some positive internal and market factors that suggests it may proceed to FID, but it also faces greater challenges than the 'likely' projects in the given time period.
- **Unlikely**. A project is assessed as unlikely when current market conditions and commercial assessments of the project indicate there are substantial barriers to the project and there is a low probability it will progress to the committed stage within the next five years.

BREE has modelled two scenarios based on this rating system:

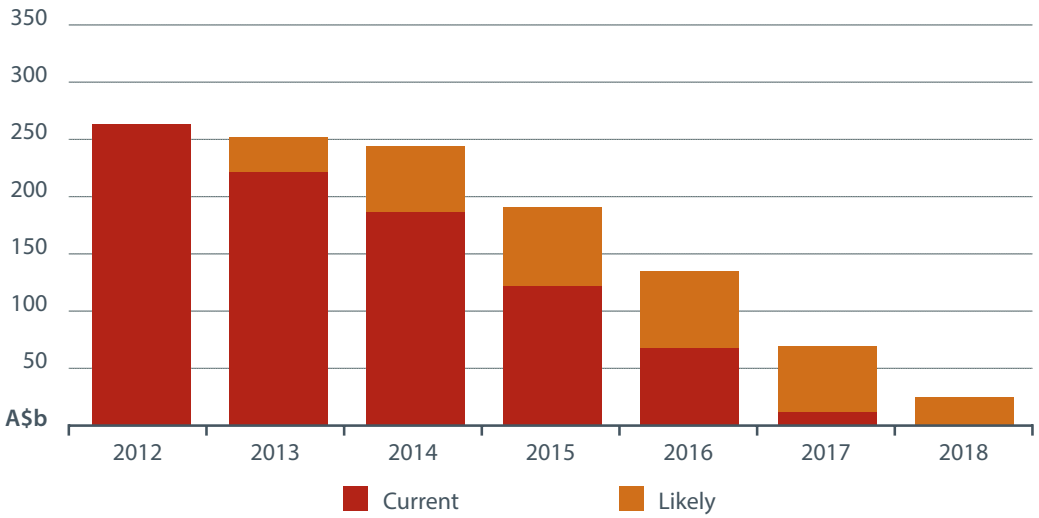
- A 'likely scenario; which includes all existing projects at the Committed Stage and the projects assessed as likely to progress to the Committed Stage in the next five years.
- A 'possible scenario'; which includes all projects in the likely scenario, but also includes projects assessed as possible in terms of their progression through to the Committed Stage within the next five years.

Projects assessed as unlikely to proceed are not included in the forward projection of the value of committed investment. The two scenarios model the rate at which projects currently at the Committed Stage are expected to move to the Completed Stage and are subsequently removed from the list, as well as the timing of projects assessed as possible or likely to progress to the Committed Stage.

Outlook for resources and energy investment

In the six months from October 2012 to April 2013, the value of projects at the Committed Stage of development decreased by $799 million. There are currently projects valued at $43 billion at the Committed Stage that are scheduled to progress to the Completed Stage by the end of 2013. The largest of these include Citic Pacific's Sino Iron project ($8.4 billion), Rio Tinto's Cape Lambert expansion ($5.2 billion) and the Woodside led NWS Rankin B joint venture ($5 billion). Potentially offsetting this expected decrease in committed investment is $31 billion of projects assessed as 'likely' to progress to the Committed Stage that have a FID scheduled in 2013. In this 'Likely Scenario', the net effect is for the value of projects at the Committed Stage to decrease by $12 billion to total around $256 billion at the end of 2013 (see Figure 16).

Figure 16: Outlook for committed project investment – 'likely' scenario

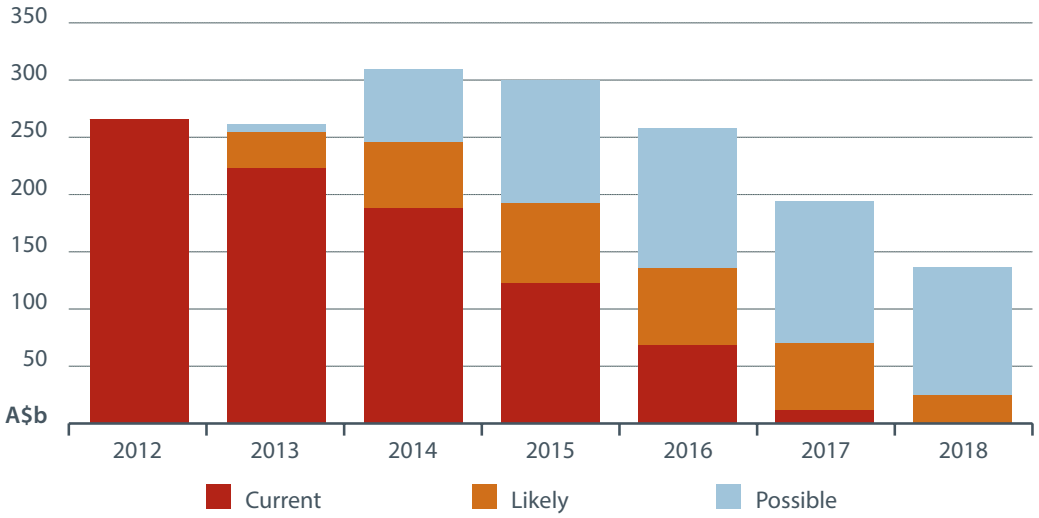


After 2013, the value of projects currently at the Committed Stage is scheduled to moderate, underpinned by the completion of mega projects currently under construction. In 2014, Queensland Curtis LNG and BHP Billiton's Jimblebar iron ore mine are schedule to start up, followed by Gorgon LNG, Gladstone LNG and the first train of APLNG in 2015.

In 2014 the stock of committed investment in the likely scenario decreases by $8 billion and then by a further $63 billion in 2015. From 2017 onwards, the stock of committed investment in the mining sector is projected to revert back to levels comparable to 2007. BREE expects that this would lead to a substantial decrease in the flow of annual capital expenditure, as measured by the ABS.

While the projection is for a likely decline in the stock of committed project investment, there remains the opportunity for Australia to generate a higher level of committed investment if it can maximise the number of projects which BREE currently rate as 'possible' that progress to the Committed Stage. BREE estimates that there are $7.5 billion of projects rated as possible that could achieve an FID in 2013. In this 'possible scenario', where all likely and possible projects proceed to the Committed Stage, the value of the stock of committed investment will remain constant in 2013 and be unchanged from 2012 (see Figure 17). Additional post-FID cost increases, however, could support a higher value of committed investment, but such cost overruns are not included in the investment outlook

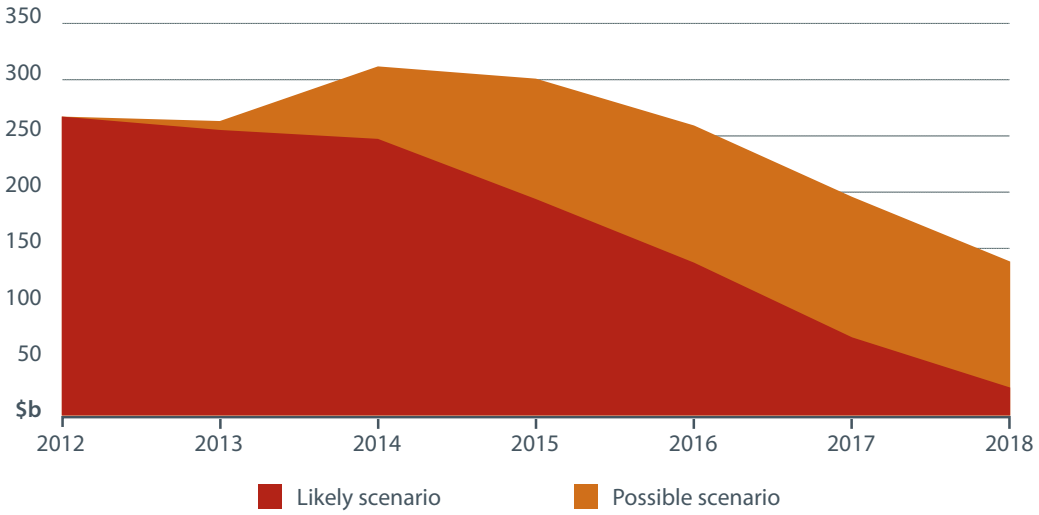
Figure 17: Outlook for committed project investment – 'possible' scenario



From 2014, the value of projects assessed as 'possible' increases substantially. If the challenges to these possible projects progressing can be resolved, there is an opportunity for committed investment in resources and energy major projects to exceed the level in April 2013. Market factors, particularly commodity prices, and especially costs of construction will play a key role in determining the future of many projects assessed as possible.

Based on BREE's analysis, in the likely scenario committed investment has peaked, and the projects that are expected to progress to the Committed Stage are insufficient to maintain the current stock of investment as of April 2013. Under this likely scenario the stock of committed investment drops over the next four years, from a peak of $268 billion in 2012 to around $25 billion in 2018. In the possible scenario, if all projects assessed as possible progress to the Committed Stage, committed investment could peak at around $310 billion in 2014 before declining to around $138 billion in 2018 (see Figure 18).

Figure 18: Likely and possible scenarios



The difference between the likely and possible scenarios represents an enormous investment opportunity for Australia. Should this opportunity be realised Australia would benefit from an additional $113 billion of investment stock at the Committed Stage in 2018.

Analysis of projects by region

Overview

Table 9 shows that the pipeline of investment in Australia's mining and energy industries, it is not evenly distributed across the jurisdictions with the bulk of the planned expenditure in Western Australia and Queensland.

Table 9: Regional investment pipeline

	Publicly Announced		Feasibility Stage		Committed		Completed	
	No.	Value A$m	No.	Value A$m	No.	Value A$m	No.	Value A$m
NSW	16	6 065–9 315	29	17 863	15	6 736	3	3 027
Qld	29	29 491–38 991+	68	107 622	21	80 780	5	1 151
WA	47	57 332–89 332+	51	79 019	28	141 675	12	9 466
NT	7	2 284–2 784	10	7 869	4	33 810		
SA	7	9 636–12 136+	6	5 540	2	298		
Vic	3	1 564–2 064	5	962	2	3 600	1	1 700
Tas	1		4	609				
Other*	3	15 000–15 250+	1	13 000	1	680		
Total	**113**	**121 372–170 872+**	**174**	**232 485**	**73**	**267 579**	**21**	**15 344**

*Offshore projects not allocated to a state.

Western Australia

Western Australia has the most projects at the Committed Stage with 28 projects valued at a total of about $142 billion. There are 12 projects less than October 2012 due to projects such as Rio Tinto's Argyle underground diamond mine ($2.2 billion), BHP Billiton's Inner Harbour expansion ($2.1 billion) and Fortescue Metal Group's Chichester Hub ($960 million) progressing to the Completed Stage. The total value of committed projects in April 2013 is broadly consistent with October 2012 due to cost increases at Gorgon LNG and the Sino Iron project offsetting the decline associated with completed projects.

Five of the eleven mega projects at the Committed Stage are located in Western Australia including the largest, Chevron's Gorgon LNG project at Barrow Island which is now valued at $53 billion following an announced post-FID cost increase in December 2012. The prospects of additional mega projects in Western Australia in 2013 diminished over the past six months following announcements by Woodside to consider an alternative investment strategy for the Browse LNG project and cancel the development of additional trains at its recently commissioned Pluto LNG facility near Karratha.

Investment in iron ore projects remains a substantial portion of the investment pipeline in Western Australia. There are already seven iron ore projects at the Committed Stage worth $21.8 billion, and there are projects at the Feasibility Stage worth a combined total $35.4 billion that are potential future investments. Many of the iron ore projects yet to receive a FID are located in regions outside of the Pilbara and include the Mid-West and Esperance-Goldfields regions.

There is $12.5 billion invested in infrastructure projects at the Committed Stage and over $4.7 billion at the Feasibility Stage in Western Australia. Continued expansion of the iron ore and gas sectors is likely to be the main driver of any additional investment in infrastructure in Western Australia.

Western Australia has a range of metals and other minerals projects in its investment pipeline. There are 21 of Australia's 36 gold projects in the investment pipeline located in Western Australia, with a value of over $2.8 billion. Although gold projects tend to be smaller in value, in aggregate they remain a valuable source of investment for the state. Similarly, uranium projects are, typically, smaller in value than large iron ore projects. Five of the nine uranium projects identified in the investment pipeline are located in Western Australia with a potential value of over $1.8 billion.

Queensland

Queensland has the second highest number of projects at the Committed Stage with 21 projects that have a total value of about $81 billion. Like Western Australia, this is primarily due to investment in mega LNG projects which account for 78 per cent, or $63 billion, of this total. Queensland still has additional LNG projects under development at the Feasibility Stage such as Shell-Petro China's Arrow LNG project, although there is speculation that this project may progress as an additional terminal at one of the three existing LNG projects being developed in Gladstone.

There are nine coal projects at the Committed Stage in Queensland. These have a total value of $10 billion and are a mix of thermal and coking coal mines. The future of investment in Queensland's coal sector is focused more on thermal coal mines with 25 of the state's 40 coal projects at the Feasibility Stage, along with 9 of the 14 coal projects at the Publicly Announced Stage, related to thermal coal. Most notable among these are the projects located in the Galilee Basin such as GVK-Hancock Coal's Alpha and Kevin's Corner mines, Adani's Carmichael Coal Project, Waratah Coal's China First Coal Project and MacMines Austasia's Project China Stone. Together, these projects have a planned production capacity of over 200 Mt per year. These projects will be reliant on continuing growth in world demand for thermal coal in electricity generation, particularly in emerging economies such as India. They are expected to be developed by overseas companies with Australian partners and should they proceed to the Committed Stage would represent a substantial foreign-direct investment.

Infrastructure investment in Queensland is primarily focused on supporting the growth in coal and gas projects. There are currently five infrastructure projects at the Committed Stage worth $6.3 billion and 13 projects at the Feasibility Stage with a combined value of $19.8 billion.

The Northern Territory

The Northern Territory has the third highest value of projects at the Committed Stage worth $33.8 billion. Much of this planned capital expenditure is due to the large value of the Ichthys LNG project which, at $33 billion, accounts for 98 per cent of the territory's committed investment in resources and energy projects. Western Desert Resources' Roper Bar iron ore project progressed to the Committed Stage during the six month period to April 2013. Valued at $18 million, the project will produce 3 Mt of hematite ore per year from late 2013.

New South Wales

There are 15 projects at the Committed Stage in New South Wales worth $6.7 billion. The coal sector is the state's main source of mining investment with 9 of the 15 committed projects either coal mine projects or infrastructure projects to support coal transportation. Together, these projects account for $6.2 billion, or 92 per cent, of the state's mining investment at the Committed Stage.

New South Wales has 29 projects at the Feasibility Stage and 16 at the Publicly Announced Stage in its investment pipeline. Coal is the main sector for this investment with 17 projects at the Feasibility Stage which have a combined value of $6.6 billion. If they proceed, these projects could provide up to 63 Mt of additional thermal coal capacity for the state.

South Australia

South Australia has only two projects at the Committed Stage with a combined value of $298 million. These are Arrium's Whyalla Port expansion ($200 million) and the Quasar Resources-Alliance Resources joint venture Four Mile uranium project. There are six projects located in South Australia at the Feasibility Stage and seven at the Publicly Announced Stage. These are primarily iron ore mining and associated infrastructure projects or copper projects.

Victoria

The major projects investment pipeline of Victoria includes only a few projects because many of the state's mining projects are below the $50 million threshold. Victoria has two projects at the Committed Stage worth $3.6 billion, these are the ExxonMobil-BHP joint venture's Turrum project ($2.6 billion) that is expected to be completed in 2013 and Longford gas conditioning plant that received a positive FID in December 2012. There are also five projects in Victoria at the Feasibility Stage, three of which are minerals sands projects.

Tasmania

Like Victoria, Tasmania has few mining projects that cost over $50 million and meet the criteria for the major projects list. At the Feasibility Stage there are four projects with a combined total value of $609 million. These are Proto Resources and Investments' Barnes Hill nickel-cobalt project, King Island Scheelite's Dolphin Tungsten Project, Venture Minerals' Mt Lindsay tin mine project and Metals X's Renison expansion (tin).