
ANZ insight

**Earth, Fire, Wind and Water:
Economic Opportunities and the
Australian Commodities Cycle**

ISSUE 1, AUGUST 2011

FOREWORD

ANZ insight is a series of client reports commissioned by ANZ. The series seeks to explore the implications of the increasingly inter-connected nature of business and economic activity in the Asia Pacific region.

It reflects the importance ANZ attaches to building common ground among business and among a diverse range of stakeholders, in order to advance economic relationships and growth in the region.

The series has been developed from ANZ's outward-looking orientation, as Australia and New Zealand's international bank. We believe this allows us to make a unique contribution with our clients to the discussion of issues related to the Australian, New Zealand and Asia Pacific economies.

'Earth, Fire, Wind and Water: Economic Opportunities and the Australian Commodities Cycle' is the first report in the *ANZ insight* series. The report was researched and completed by Port Jackson Partners in August 2011. Port Jackson Director Angus Taylor is the author.

The aim of the report is to quantify the size of the economic 'prize' open to Australia as a result of the current resources cycle which is being driven by the shift in global economic growth to Asia and to other emerging economies.

The work completed by Port Jackson Partners is high-level and does not claim to hold all the answers. The report does however provide a framework to advance a discussion with clients on the opportunities and challenges which are resulting from the commodities cycle.

This is an extended version of the report. A condensed version is also available for interested clients.

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CONTENTS

1.0 Executive Summary	5
2.0 Introduction – the nature of the opportunity and challenge	8
2.1 Supported by the boom....so far.....	8
2.2 A changing economic context provides the opportunity for a new discussion ...	12
2.3 Concerns are understandable: but we can do better.....	12
3.0 The enormous prize at stake	15
3.1 From commodity boom to sustained growth.....	16
3.2 Rapid growth in resource revenues and investment	16
3.3 Significant shifts in the mix of sector growth over time.....	20
3.4 Unprecedented investments are required.....	22
4.0 Far-reaching benefits across the economy.....	24
4.1 The range of potential benefits	24
4.2 The hidden opportunity in domestic and export services	25
4.3 Significant job creation potential across a broad range of skill sets	31
5.0 Capturing the opportunity — the challenges	35
5.1 No monopoly on high quality mineral and energy resources	35
5.2 Australia’s low cost mineral and energy positions are not unique	37
5.3 An intensely competitive landscape in agriculture	39
5.4 Seeing through the volatility	41
5.5 Managing the risk of crowding out	42
6.0 Maximising benefits through a whole-of-economy approach	43
6.1 Shifting the policy response toward new economic capacity	43
6.2 Realising the opportunity through a whole-of-economy response	46
6.3 The four factor inputs required to create capacity	47
6.4 Other enablers	51
6.5 An urgent need for broad reaching co-ordinated action.....	52
7.0 The underlying forces at work – demand.....	53
7.1 Economic convergence of the developing world – theory to reality?	53
7.2 “Earth” and “Fire”: sustained demand growth for minerals and energy	56
7.3 “Water”: Increasing wealth and the demand for soft commodities	62
7.4 The added effect of growing populations.....	64
7.5 “Air”: The implications for greenhouse gas emissions.....	64

7.6 Connections between commodity markets	66
7.7 Risks to demand exist, but should not be overstated	67
8.0 The underlying forces at work – supply and price	70
8.1 The supply side – viable, timely expansion projects are the constraint	71
8.2 Cost side pressures.....	72
8.3 The implications for pricing	73
9.0 Conclusion	74
Appendix: Modelling methodology	76

1.0 EXECUTIVE SUMMARY

Australia currently faces one of the greatest opportunities in its economic history. The shift of economic growth from the developed to the developing world is unleashing extraordinary forces in the global economy. Huge low-income populations across the developing world are demanding more basic necessities: minerals, energy, food and fibre. In particular, commodities such as iron ore, copper, coal, aluminium, gas, grain, protein and fibre are the central ingredients in the industrialisation and urbanisation of developing countries. Much of this is happening on Australia's doorstep, in China, in India and in South East Asia.

The developed countries of the world have already created a middle class of nearly one billion people – yet well over five billion in developing countries are still to reach middle class income levels. This is not the stuff of a routine commodities 'boom', but rather a more fundamental global process already well underway that will see billions more people achieve middle class living – and it has decades to run.

The direct export opportunity is unparalleled in Australian history. If Australia expands capacity rapidly enough, commodity export revenues¹ could reach \$480 billion in real terms by 2030, even with significant price and margin reductions across key sectors. Direct and support sector employment could double, with at least 750,000 jobs created, and likely many more. Investment-related employment in particular is likely to grow faster than current estimates indicate. To achieve this level of export growth, investment² of around \$1.8 trillion is required over the next 20 years. The value of commodity exports has the potential to stabilise at a level equal to more than 19% of Gross Domestic Product (GDP) over the next five years, not including supporting services. Over the next five years total commodity investment will be equal to an average of 6.4% of GDP annually.

Given the scale and longevity of the global transformation underway, this opportunity requires discussion about how to best position Australia's economy and society to capture the benefits. There has been much recent economic reform discussion about industries and regions that are not benefiting from this opportunity or that are suffering, often because of largely unrelated shocks such as the slowdown in consumer spending following the Global Financial Crisis (GFC). These are important issues, and the opportunity exists to examine the size and benefits of the upside and how Australia can make the most of it while minimising the negative impacts.

This report highlights the opportunities and shows that the benefits can accrue more broadly than is commonly understood. Well over half of the market capitalisation of Australian Securities Exchange (ASX)-listed companies is made up of businesses that either produce commodities or which provide important support services and supplies to commodity exporters. These specialist service providers cover most aspects of the commodity value chain, and many are establishing or have established global leadership positions in their niches. The domestic sales of specialist commodity service providers

¹ Total commodity export revenue (free-on-board).

² Gross investment, not net of imports.

and suppliers could grow to around \$200 billion by 2030. This cluster of export oriented service providers is positioned to extend its reach beyond Australia's natural resources endowment. At the same time, the rapid growth in resources, energy and agricultural export demand combined with rising Asian incomes creates a platform for growth in other service industries, such as education and tourism.

Embracing the opportunity can deliver broad based and sustained benefits for Australia. Higher incomes flow from higher productivity levels and additional profits for Australian investors. Increased consumer purchasing power results from higher exchange rates. There are also opportunities to deliver benefits through growth of natural resource support clusters providing inputs and services. Increased incomes should support increased consumption from domestic service sectors, extending the benefits well beyond the natural resource sectors. Finally, it will provide a platform for future non-commodity exports into Australia's new trading and investment partners.

One of the central themes of this report is that Australia faces ferocious competition globally and will need to consider active steps if it is to capture its share of growth. Competing countries are keen to capture a share of this global opportunity and many are gaining support from China and India. Australia's commodity exporters (across energy, minerals and agriculture) and their service providers need to rapidly develop new skill sets, focused on developing new resources or expanding existing ones. The nation's capital markets are also coming to terms with this new environment. They will need to see the natural resource sector as a growth sector, not a mature cash generating sector. In addition, it will be the institutional and policy frameworks adopted by resource-rich countries, and their ability to attract and motivate leading organisations and investors to seize the opportunity, that will determine the winners. High quality resources will not be enough.

There are challenges for Australia. Markets and businesses will reallocate economic capacity to the uses with the highest returns. This could lead to some crowding out of non-resource sectors of the economy, such as non-resource related manufacturing³, as economic resources move across the economy.

One option is to slow growth in commodity sectors to avoid crowding out other sectors and to minimise the risks in the event the commodity boom proves to be short lived. Businesses with fewer growth opportunities and more competitive pressures would be protected from high exchange rates and rising costs and would not be impacted by adjustments that result from the continued expansion of the commodities sector. In this scenario, which assumes Australia is facing a short-run boom rather than a global transformation, the downside is the significant opportunity cost.

Another option is to proactively build the capacity to support growth. This means adding supply side capacity (skilled labour, growth financing, technology and land for commodity production) to capture the growth, while minimising the crowding out of existing economic activity. It will then be for the private sector to align its strategies with the growth opportunity, by building and leveraging suitable growth capabilities.

³ Parts of manufacturing offering mining services or process commodities may benefit.

Relieving pressure on the economy and ensuring that there are flow on benefits will require a broad ranging discussion about what Australia needs to do and a new focus on re-assessing its options and opportunities in light of the changing global economy. This discussion has become even more important following the GFC, which had the effect of accelerating the historic shift we are seeing in global economic growth to the developing world.

Capturing as much of the opportunity as possible would provide unprecedented benefits to the Australian economy. Australia is uniquely placed to provide the poor of the world with the resources needed to lift their standard of living. If Australia gets this right, it can be the lucky country, the clever country and a good global citizen.

2.0 INTRODUCTION – THE NATURE OF THE OPPORTUNITY AND CHALLENGE

KEY THEMES:

- *In recent years, the Australian economy has benefited enormously from growth in demand for commodities, as increasing export revenues and accelerating business investment have begun to replace consumption led growth.*
- *Meanwhile, significant new challenges are emerging:*
 - *Australia can't continue to rely on commodity price rises to support growth – rapid volume growth is now critical.*
 - *Productivity gains across the economy have slowed.*
- *But questions remain:*
 - *Will the opportunity last, or is it a temporary boom?*
 - *Can Australia sit on its resources and expand production in its own time?*
 - *Will the flow of benefits have broad reach across the economy?*
 - *Will crowding out impact large parts of the economy?*
 - *Is Australia returning to a low-skilled farm, dig and deliver economy?*

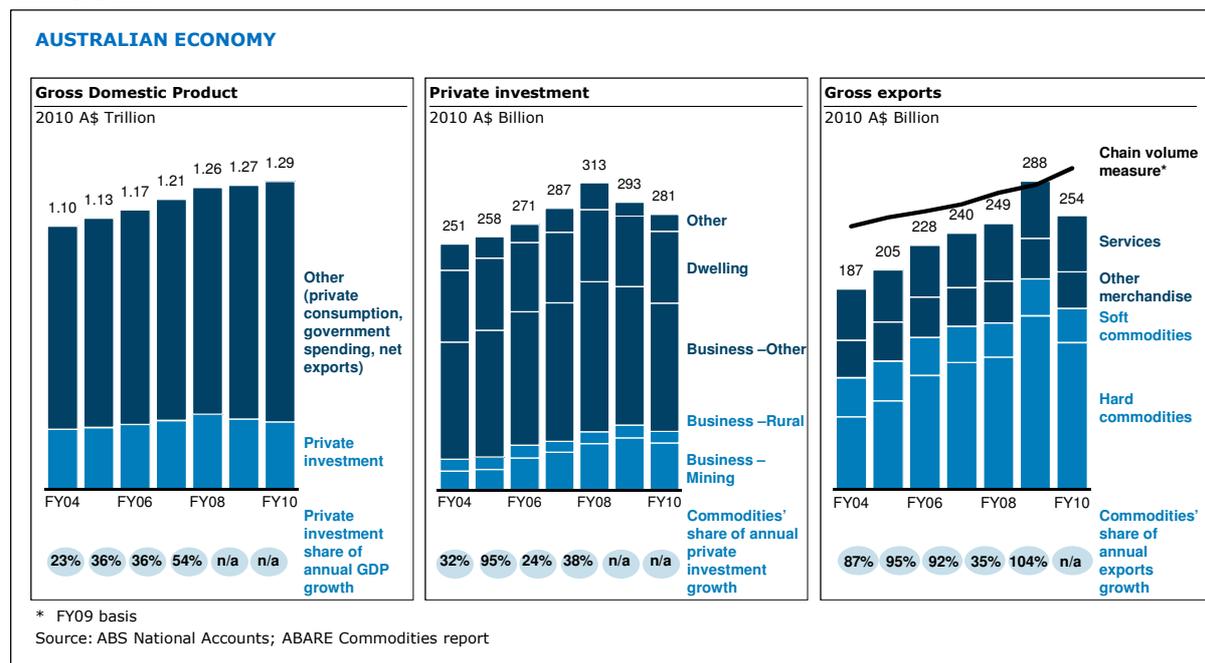
2.1 SUPPORTED BY THE BOOM...SO FAR

Australia's economic performance in recent years has been extraordinary. For example, GDP increased by an average of 5.3% per annum from 2004 to 2009 versus an average of 3.6% per annum across other OECD countries in nominal purchasing power parity terms⁴.

The Australian Government's sure-footed response to the GFC was undoubtedly supported by the strength of the economy (and therefore the budget position) in the lead up to the crisis. Much of the strength of the Australian economy until the GFC derived from private sector investment and growth of exports (Exhibit 2.1). These two factors were, in turn, driven by Australia's commodity-export industries, and the sectors that support them. While the GFC saw a pause in this process, commodity sector led growth has since returned strongly. It is now broader based than before the crisis, and it extends to agriculture and energy.

⁴ IMF World Economic Outlook 2010.

Exhibit 2.1



To put this in perspective, from financial years 2004 to 2009 the rise in gross commodity exports was equal to more than 50% of Australia's total growth in GDP, even after adjusting for the increasing exchange rate⁵. While much of the benefit of Australia's commodity-led growth flowed through to rising purchasing power for Australian consumers (via higher exchange rates), it was a critical driver of the economy through this period. Meanwhile, from financial years 2004 to 2008 growth in private investment equalled about one third of economic growth, and much of this growth in investment was driven by resource projects. Indeed, minerals and energy investment has increased around 2.5 times over the last six years, rising from 2% to 4% of GDP. Service sectors supporting Australia's commodity sectors also grew over this period, with the number of people employed estimated to have increased by around 40% since financial year 2003 (Exhibit 2.2). This increase in commodity-related exports, investment and employment contributed to Australia's reorientation of trade away from Europe and the United States (US) towards Asia from the early 2000s onwards.

This is an extraordinary gift at a time when most western economies are seeing the end of an era of debt-fuelled consumption to drive growth. As recovery by other advanced economies remains weak, Australia continues to benefit from strong growth in China and the rest of the developing world. Indeed, in recent economic data we see that Australia is in relatively good underlying health, despite sharp increases in savings, falling economic stimulus and the short term impact of natural disasters. Australia's public debt⁶ and unemployment rates⁷ remain well below other major OECD countries, terms of trade are at a 60-year high, and the currency has gone beyond parity with the American

⁵ Net exports are a contributor to GDP, not gross imports. Imports also rose over that time.

⁶ Australian Government Treasury 2010-2011 Commonwealth Budget.

⁷ IMF International Financial Statistics, 2010.

dollar⁸. In the new era of developed economy austerity, few countries can claim this kind of robustness.

Exhibit 2.2

Sector	SELECTED COMMODITY SUPPORT SERVICES—FY11—COMMODITY RELATED PROPORTION OF SECTOR ONLY*					
	Revenue \$ Billions	Industry value added \$ Billions	Profit \$ Billions	Businesses (enterprises) Number	Employees	
					FY03 Thousands	Current (FY11) FTEs***
Mining services	7.8	3.0	1.1	90	11.3	16.0
Engineering consultancy services	7.8	4.3	1.3	4,425	21.0	30.6
Heavy industry and other non-building construction	27.0	12.2	6.8	2,250	41.6	67.5
Plant hire and leasing	1.8	0.9	0.2	2,527	4.8	6.7
Explosive manufacturing	1.4	0.4	0.1	18	1.0	1.3
Machinery and equipment wholesaling**	13.5	2.9	0.9	2,791	16.7	18.8
Surveying Services	0.8	0.5	0.2	525	2.7	3.6
Port operators	1.3	0.4	0.1	8	1.0	1.1
Rail freight transport	6.9	3.1	0.7	16	20.4	29.0
Road freight transport	6.8	1.9	0.3	8,175	20.0	20.4
Shearing, cropping and other services to agriculture	5.0	1.4	0.5	20,800	22.4	28.0
Farm and construction machinery wholesaling**	5.4	-	0.7	669	0.0	8.1
Fertiliser manufacturing	2.9	0.7	0.3	9	2.4	2.4
Pesticide manufacturing	0.8	0.2	0.0	11	1.2	1.2
Scientific research	1.0	0.3	0.0	1,667	4.8	5.2
Total	90.3	32.1	13.2	43,980	171.2	239.8

+40%

* Estimated proportion of total sector attributable to commodities only (estimate based on revenue share)
 ** Mining and agricultural machinery manufacturing assumed to be included in wholesaling and therefore not included separately
 *** Full time employee-equivalent estimates based on Nov 2010 quarter actuals proportion of part-time workers in sector and relative hours for full-time and part-time workers – sectors with less than 10% of part-time workers assumed to be 100% full-time as a simplification
 Source: IBISWorld Industry Reports, 2010; ABS Labour Statistics, Nov 2010; PJP analysis

As Australia looks forward to the next several years, its position seems strong. US dollar metal and energy prices have returned to pre-GFC levels for most commodities (Exhibit 2.3). The rural commodity boom that began before the financial crisis has regained momentum, despite short-term interruptions from floods and cyclones. The pipeline of new resource sector projects is unprecedented, with massive new projects in coal, iron ore, and Liquefied Natural Gas (LNG) making up many of the more recent additions (Exhibit 2.4).

⁸ Reserve Bank of Australia, 2011, "Statement on Monetary Policy May 2011", p. 27.

Exhibit 2.3

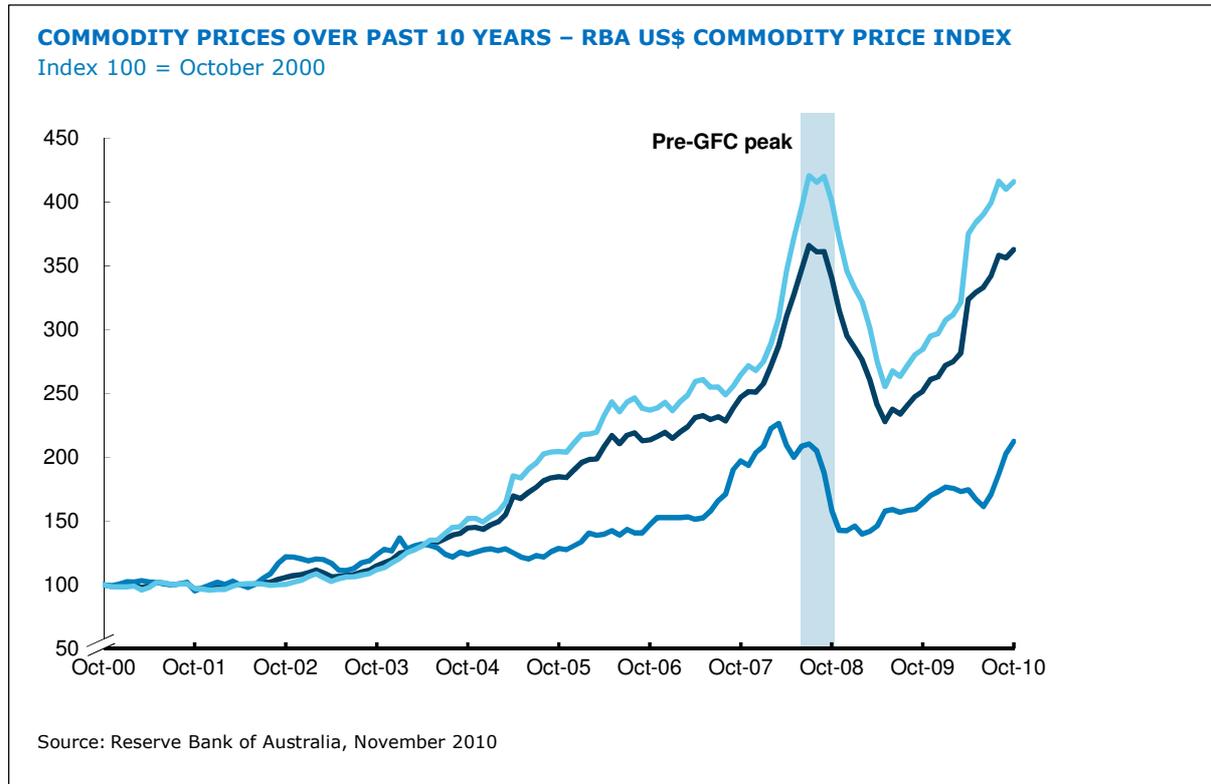


Exhibit 2.4



2.2 A CHANGING ECONOMIC CONTEXT PROVIDES THE OPPORTUNITY FOR A NEW DISCUSSION

Given the underlying health of Australia's economy, the emerging discussion of a new era of economic reform in Australia may seem odd. As commentators have now highlighted⁹, the substantial economic transformation of recent decades has begun to slow, and this is starting to present itself in the data on Australia's productivity growth¹⁰.

History suggests that significant economic reform is most often achieved if a broader economic context is recognised and embraced, and gains traction if there is a clear rationale for change. The reforms of the 1980s and 1990s were driven by a well-founded concern that Australia was losing global competitiveness. Australia recognised that its economy was too inflexible and inward looking to deal with a fast, globalising world. Commodity prices were facing continual downward pressure, growth in the developing world was sluggish, and commodity exports were a falling share of the Australian economy. During this period of reform the prevailing view was that Australia's future success depended on moving away from primary industries and towards 'new economy' service industries such as finance, technology, education and research and development (R&D)¹¹. The reforms to financial markets (e.g. floating the Australian dollar), labour markets (e.g. the Prices and Income Accord), taxation policy (e.g. the Goods and Services Tax) and industry policy (reduced tariffs) were all built on a clear understanding that the world was moving fast, and Australia was at risk of falling behind. Yet the shift in the source of global growth to the developing world means that many of the fastest growing sectors are now in basic materials, energy and commodities. Natural resource related sectors can form the cornerstone for Australia's growth and productivity gains in the coming years. This doesn't mean Australia must or should turn its back on higher value service sectors. Indeed, the natural resource opportunity is capable of generating and supporting such activity elsewhere in the economy.

2.3 CONCERNS ARE UNDERSTANDABLE: BUT WE CAN DO BETTER

The current discussion about the impact of massive new demand for Australia's resources has the opportunity to go beyond the risks and challenges to look at the steps that can be taken to seize and manage the opportunity for maximum benefit.

Some of the views that are being expressed and which are explored in this report include:

⁹ Paul Kelly, a long-term commentator on economic reform, has argued that "the historic post-1983 reform era is terminated". Ross Garnaut, one of Australia's leading economists, has said: "Economic policy since the GST [2001] has been characterised by *change*, rather than productivity enhancing reform.....Attempts at major reforms have failed comprehensively and poisoned the well for further reform for a considerable while". This has been echoed by Gary Banks, Chairman of the Productivity Commission in his Keynote Address to the Annual Forecasting Conference of the Australian Business Economists, Sydney, 8 December 2010.

¹⁰ 'Australia's Productivity Challenge', February 2011, Grattan Institute, Saul Eslake and Marcus Walsh.

¹¹ As an example, see the editorial from The Age from August 10, 2004, 'Clever Country or Fools Paradise' where the editors say 'alternatively [to becoming the clever country] Australia can rely on resource exports and become progressively uncompetitive in the global marketplace'.

1. **“All ‘booms’ must end.”**

According to this view, the benefits are fleeting and therefore do not justify the structural adjustments required to participate in the ‘boom’.

- The whole notion of a ‘boom’ is wrong. We are seeing the beginning of a persistent surge in demand growth that will offer opportunities for many years to come even as prices fluctuate and trend back towards more sustainable levels.
- Chapters 3, 7 and 8 will show that under reasonable assumptions about continuing developing world growth, the growth in demand for commodity exports will continue for decades, not years.

2. **“There is a global scarcity of high-quality resources supporting low-cost positions and Australia has an unusually large endowment of these scarce resources.”**

Based on this view, it is said that one way or another Australia will capture this opportunity, with little incremental effort or focus required.

- Chapter 5 will show that there is no shortage of resources in the world, including higher quality resources. The real scarcity is high quality projects to expand commodity production.

3. **“The benefits from commodity export growth are narrowly based.”**

According to this argument, the benefits flow to a small number of companies and employees, with few flow on benefits to others.

- Chapters 3 and 4 will show that the direct economic potential of commodity exports is often underestimated – commodity exports and related investment will soon be equal to more than 20% and 7% of GDP respectively, coming from 9.5% and 2.8% in financial year 2004.
- However, just as importantly, the flow of benefits across the Australian economy is already much deeper and broader than is commonly believed, and, with the right strategy, this could strengthen.

4. **“The risk of crowding out or the ‘resource curse’ demands caution.”**

According to this view, rapid growth in capital-intensive natural resource sectors crowds out other sectors (particularly manufacturing) and risks the creation of a two-speed economy, with disproportionate benefits accruing to capital rather than labour¹². This is obviously exacerbated if the boom is short lived. However, it deserves consideration independent of longevity.

¹² “The Fiscal and Economic Outlook”, Ken Henry, Australian Government Treasury, 16 May 2006; “The Shape of Things to Come: Long Run Forces Affecting the Australian Economy in Coming Decades”, Ken Henry, 22 October 2009.

- Australia's currency is now a ferro-dollar, driven by growth in demand for commodities (particularly steel inputs).
- By adding significant economic capacity fast enough, Australia can mitigate the worst of these impacts (Chapter 6)¹³.
- Australia has a far more open and flexible economy than in the past, so rapidly adding capacity is a much more realistic option than it once might have been.

5. "Enabling rapid growth in commodity exporters is taking Australia back to a farm, dig and deliver economy."

According to this view Australia will be buffeted by volatile markets, it will 'dumb down' its economy and face price pressures from customers.

- Chapter 3 will show that pursuing a strategy based on commodity export volume growth is different to pursuing a strategy that relies on rising prices forever.
- Chapter 8 will argue that it is reasonable to expect long term prices to stay at levels high enough to encourage volume expansions, but not higher, and this is enough to deliver an enormous opportunity.
- It is also reasonable to expect that Australia can build a knowledge economy based on an emerging cluster of commodity export service providers.

The objective of this report is to contribute to the current discussion by laying out the size and longevity of the opportunity, the nature of the challenges and the breadth of the potential benefits. It provides a framework for a discussion from the perspective of the whole economy - not just the resource sectors. It suggests that a whole-of-economy response would maximise the benefits and ensure that they are broadly distributed. This response would require alignment between governments, businesses, capital markets and the community on a broad range of key issues. With that alignment, there would be a significant prize to be won over coming decades.

¹³ Mitigation will also require freeing up capacity where possible, without undermining existing sectors. The obvious example of this is to move faster to contractionary fiscal policy.

3.0 THE ENORMOUS PRIZE AT STAKE

KEY THEMES:

- ***Australia stands to gain more than \$270 billion per annum in new commodity exports over the next two decades, despite significant price reductions.***
- ***This would result in an additional \$2.6 trillion in total commodity exports over that time period.***
- ***Around \$1.8 trillion of investment spread over 20 years is required to support this growth in commodity exports, approximately equal to half of Australia's current total capital stock.***
- ***The value of commodity exports would be equal to more than 20% of GDP annually on average over the 20 years and the investment required would be equal to almost 5% of GDP annually on average over the same period.***

The rapid and sustained surge in growth in the developing world and the associated demand for natural resource outputs plays to many of Australia's strengths. However, there is a broad range of views in the community about the scale, breadth and sustainability of the benefits. While there is widespread acceptance of positive prospects in the short term, the medium to long-term prospects are widely debated.

On the one hand, important players like the Australian Government Treasury have recently assumed continued high prices and strong demand for a sustained period of time¹⁴. At the same time, the Treasury and some in the community have questioned how widespread the benefits might be¹⁵.

On the other hand, short-seller Jim Chanos stated in April 2010 that China is on a "treadmill to hell"¹⁶, because much of its growth is dependent on construction spending, with growing imbalances (e.g. over-investment, suppression of the exchange rate) in the Chinese economy. He is said to have short-sold mining companies based on the belief that the Chinese boom was not sustainable. He is not alone. Commodity bears argue that the supply response to the boom will bring it to an untimely end, and so we should not become too enamoured with the riches it promises to bestow on us¹⁷. Port Jackson Partners' work has consistently shown that many commentators understate the potential scale and durability of the benefits, as well as the potential for the benefits to flow through to a large part of the Australian economy. As discussed in later chapters, the scale and breadth of the benefits are within Australia's control. If it chooses the right combination of policy levers, Australia can expect the impact to be far larger and with wider-spread benefits than would otherwise be the case.

¹⁴ "The strength of the Asian region is expected to continue to generate strong demand for non-rural commodities, with further price increases expected for Australia's main commodities, iron ore and coal" Economic Statements by Federal Treasury, July 2010.

¹⁵ "The Fiscal and Economic Outlook", Ken Henry, Australian Government Treasury, 16 May 2006; "The Shape of Things to Come: Long Run Forces Affecting the Australian Economy in Coming Decades", Ken Henry, 22 October 2009.

¹⁶ Shiyin Chen – Bloomberg News - April 8, 2010.

¹⁷ For example, "Why the resources boom can't last" Greg Hoffman, Sydney Morning Herald, 4 April 2011.

3.1 FROM COMMODITY BOOM TO SUSTAINED GROWTH

Australia's experience of commodity booms in recent decades is misleading when considering the current commodities cycle. In the late 1980s and the mid 1990s there were sharp increases in prices, followed by frenzied corporate activity (usually poorly timed acquisitions and recommissioning of mothballed mines and smelters or expansions of high-cost farming systems) followed by a downturn. The booms were transitory, with fairly quick reversions to reality. The underlying model was of trendline price declines of 1-2% per annum, reflecting productivity gains. This is not the picture of the resources cycle that Australia is currently experiencing.

Until now, what Australia has called a commodity boom has been driven by rising prices. As demand surged in the early 2000s slack capacity and easy de-bottlenecking provided quick new volumes (at low capital cost) in most sectors. By the mid-2000s, global commodity production was not able to meet the rapid growth in demand in key sectors, resulting in sharp price increases. For the first time in many decades major and high risk new projects were required to meet the growth in demand. Producers and capital markets declined to rush into these, particularly when the financial crisis hit.

The next phase of this story will be supply side growth based on mega projects and major new technologies, with less price upside (and downside for some commodities). In many ways it is wrong to describe this next phase as a boom. Volume growth will be the new normal, not a transitory surge in prices, soon to disappear as demand eases or supply quickly catches up. It is expected that prices will remain high enough to encourage sufficient new supply to meet continuing demand growth, but that in some sectors (particularly iron ore and coal) prices will moderate from the very high levels seen in the past.

As a result, the world will see massive, capital-intensive projects, typically with significant political, technical and commercial risk, as well as difficult new technologies and techniques, especially for agriculture. After years of relative inaction and under-investment the resource sector's growth engines have been warming up. In the Pilbara region of Western Australia (WA) there has already been strong growth, but future plans look even bolder. East coast coal growth has been constrained by infrastructure bottlenecks and difficulties in creating the frameworks necessary for growth. This now appears set to change. Massive gas projects are ramping up in WA's North West Shelf and Queensland, using new technologies which allow offshore LNG processing and the use of coal seam gas to produce LNG. Agricultural growth is back on the agenda after years of drought and low prices. In all, the scale of growth projects, conventional and unconventional, is unprecedented. Moreover, the support sectors are gearing up for continued growth, both in Australia and offshore.

3.2 RAPID GROWTH IN RESOURCE REVENUES AND INVESTMENT

There is potential for enormous increases in export volumes and revenues in the Australian commodity sectors over the next 20 years. To capture this opportunity, however, very large investments will be required.

Port Jackson Partners' assessment of this opportunity is based on five critical inputs.

1. Australia's current pipeline of projects, with each assigned a probability based on likelihood of completion to create a probability-weighted mix of projects.
2. These projects, together with the basic models of global commodity demand growth used in Port Jackson Partners' strategic consulting work, were used to develop three different cases (as well as a Do Nothing scenario where volumes remain flat) for Australia's market performance in each sector over the 20 years through to 2030. Box 3.1 introduces and describes the four scenarios.
3. Account has been taken of any reserve constraints in achieving these outcomes, although these are limited to a subset of commodities (gold and oil in particular). Exploration may, in time, break these constraints, but no assumptions have been made about future exploration success.
4. Account was also taken of sectors, primarily aluminium, where domestic cost structures are high and therefore have potential to impede growth.
5. Consensus prices and exchange rates, which typically means rapid reversion to long-term prices, which are lower than today's prices for most commodities. This is a conservative assumption, given persistent upward cost pressures and delays in supply growth around the world.

This opportunity has the potential to fuel the Australian economy for many years to come. Based on conservative assumptions, Australia could achieve a total commodity export revenue growth rate significantly faster than overall GDP for the next two decades. On reasonable estimates, total commodity exports¹⁸ could reach around \$480 billion (in real terms) by 2030 from \$210 billion in 2010 (Under a Base Case Scenario: Exhibit 3.1). This would mean that commodity exports would rise to be equal to more than 20% of GDP (excluding commodity service sector exports)¹⁹.

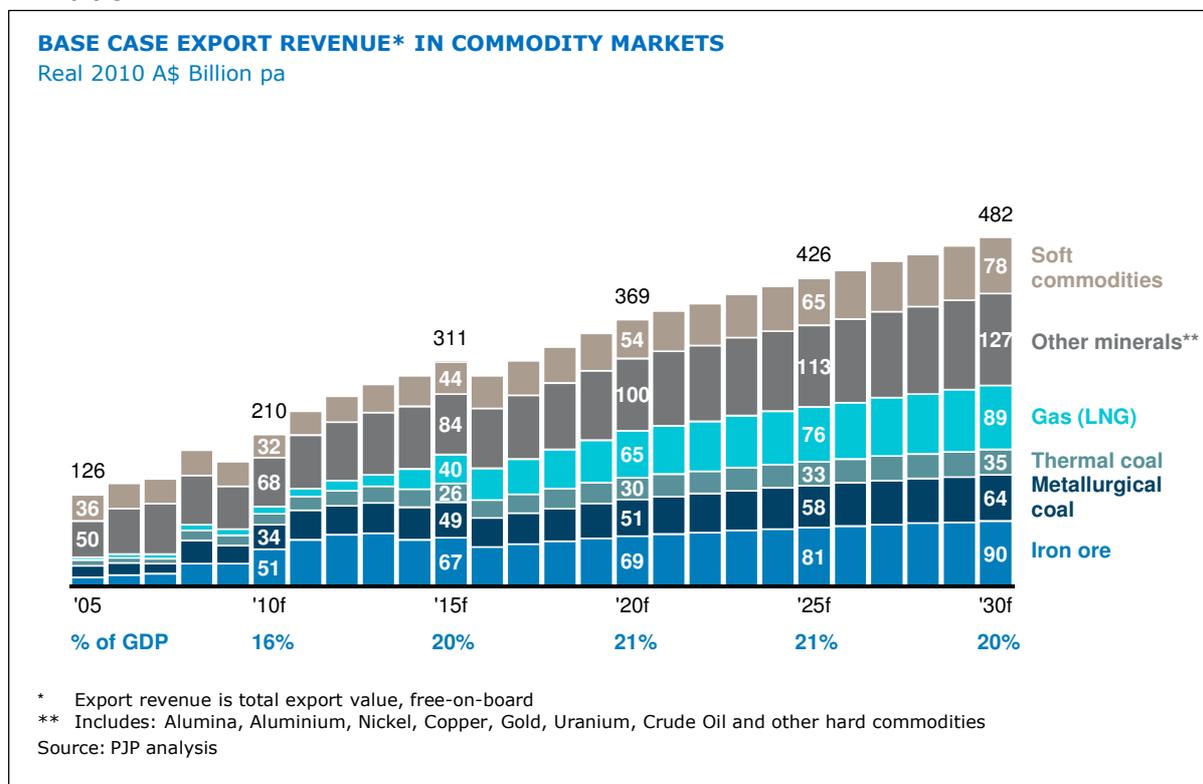
¹⁸ Total export value is modelled as total export revenues, or the value of free-on-board revenues, which include rail and port costs.

¹⁹ This is consistent with recent modelling from the IMF. The IMF recently wrote: "Over the next 10 years, the model suggests that a 50 percent increase in emerging Asia's real GDP, driven by tradeable sector productivity growth, would raise Australian GDP by about 20 percent". International Monetary Fund, "Regional Economic Outlook, Asia and Pacific, Managing the Next Phase of Growth", April 2011.

BOX 3.1: SCENARIO MODELLING: THE FOUR CASES

Case	Description	Market share assumptions	Exchange rate assumptions
Base Case	A realisable aspiration for Australia based on: <ul style="list-style-type: none"> – The forecast global growth of the commodity markets – Australia's current market share – Our current project pipeline – Australia's resource constraints 	Unchanged market shares in each commodity once the current pipeline of projects is developed, except for: <ul style="list-style-type: none"> – LNG, where it is assumed Australia's share increases from 10% in 2010 to 27% in 2030, consistent with the large LNG projects currently under development – Aluminium, where a decline in market share has been assumed, due to a lack of competitive advantage and high energy costs – Other commodities where the reserve base is limited (especially gold and oil). For these commodities future growth is curbed to recognise the falling reserve base 	Based on the Bloomberg forward curve for US\$/A\$ exchange rates
High Case	Australia achieves higher growth rates for each commodity than in the Base Case	Increase in market shares across all commodities with sufficient reserves and low cost structures	6 cents higher than the Base Case
Low Case	Australia does not reach its potential growth rates in the export commodity markets and loses share to other players	Loss of market share in each commodity while still achieving modest volume increases	6 cents lower than the Base Case
Do Nothing Case	No increase in volumes beyond capacity in place in 2010 (small volume increase over next two years as pre-built capacity comes on) A reference case only, not a likely outcome	Flat export volumes imply declining market shares in each commodity over the period	12 cents lower than the Base Case

Exhibit 3.1



However, these estimates are not forecasts, because they are highly dependent on how Australia responds to the opportunity²⁰. Indeed, Australia could do even better than this in the right circumstances because the volume growth opportunity is so large. This growth in exports can be supported by increasing investment as well as substantial value creation across a wide range of service sectors including construction and development, research and development, finance, professional services, education and others.

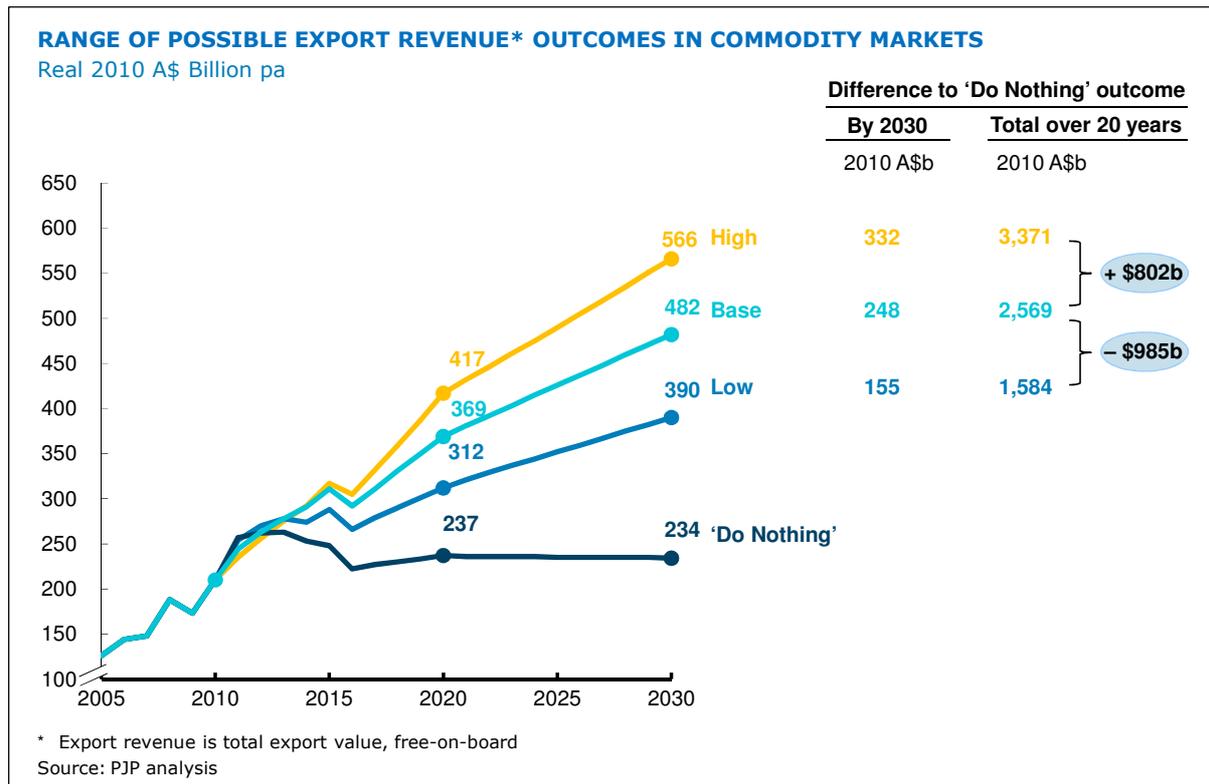
This Base Case has been compared with three other cases (see Box 3.1): the Do Nothing Case, the Low Case and the High Case.

- Under the Do Nothing Case, export revenues would be ~\$234 billion in 2030 in real 2010 dollar terms (Exhibit 3.2). The Base Case represents a cumulative increase of \$2.6 trillion in revenue over 20 years compared to the Do Nothing Case.
- In the Low Case Australia is not capitalising on the potential new projects that could go ahead. The export revenue would be \$390 billion in 2030 under this low scenario (Exhibit 3.2). This scenario would lead to cumulative export revenues of around \$1.6 trillion, which would be \$985 billion lower than under the Base Case, or worse.
- In the High Case, export revenue would be \$566 billion in 2030. Under this high scenario, cumulative export revenues could be almost \$3.4 trillion, or \$800 billion higher than the Base Case over the 20 years to 2030.

Port Jackson Partners believes that this High Case is achievable – Australia does have the potential to increase share in some commodities beyond the current project pipeline, particularly in coal, gas and iron ore, as well as some smaller sectors. However, doing so will require out-competing major players like Brazil, West Africa and India in iron ore, Indonesia, Mongolia, Columbia, Mozambique and South Africa in coal, and a whole range of current and potential players in gas (see Chapter 8).

²⁰ Long term prices are also uncertain, as we shall see. However, if prices are lower then the volume opportunity does not necessarily disappear. Indeed, it may become an imperative, to fill the gap created by lower prices.

Exhibit 3.2



3.3 SIGNIFICANT SHIFTS IN THE MIX OF SECTOR GROWTH OVER TIME

Across these cases (except the Do Nothing Case) growth is well diversified across different sectors and therefore it is robust to downturns in individual sectors. However, the composition of commodity export revenues is expected to change through time. Iron ore, metallurgical coal and Liquefied Natural Gas (LNG) will be the single largest contributors to total commodity exports in 2030 (Exhibit 3.1). It is notable, however, that LNG, thermal coal and soft commodities are modelled as having the largest *proportional* increases. LNG in particular will have a nine-fold increase in revenues in real terms, boosted by both expected price increases and a marked increase in market share. Australia has just 10% of current global export capacity but has 30% of capacity under construction and 45% of proposed capacity (Exhibit 3.3). Iron ore and metallurgical coal remain large contributors in absolute terms, but their relative contributions fall due to forecast price decreases from the current high levels (Exhibit 3.4).

This proportional shift away from steel producing inputs (iron ore and metallurgical coal) towards energy and soft commodities reflects the development path of emerging economies. Early in their development, economies use high quantities of steel and metallurgical coal to build infrastructure, while later on the focus shifts to energy and other metals for manufacturing and electricity transmission, and soft commodities. Australia will need to be aware of the changing nature of the opportunity that is open to it and position itself accordingly.

Exhibit 3.3

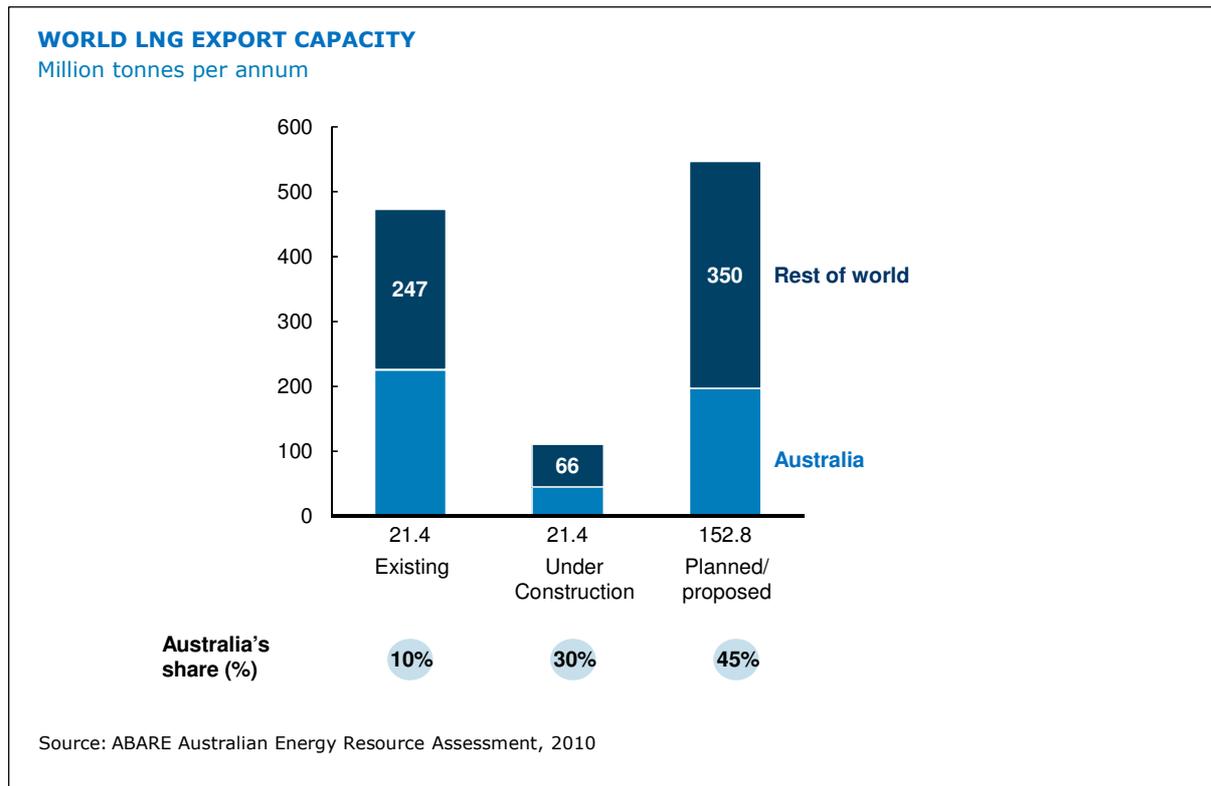
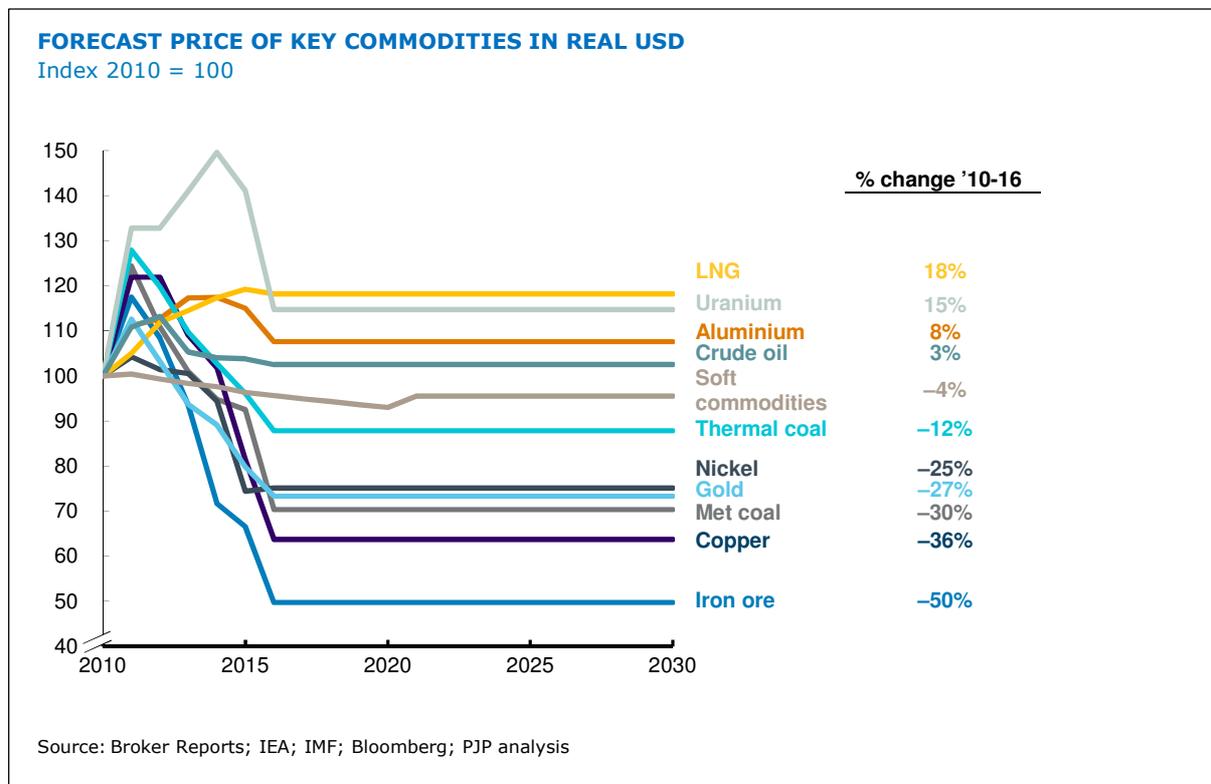


Exhibit 3.4

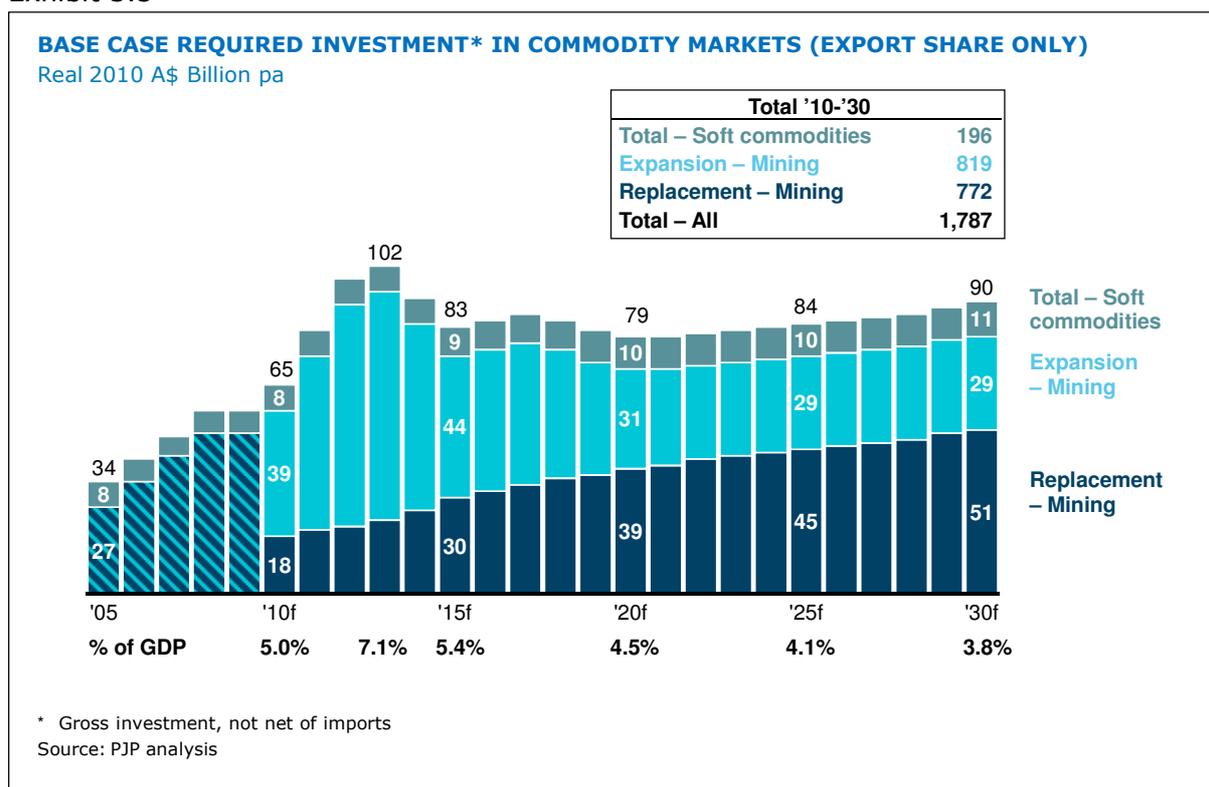


3.4 UNPRECEDENTED INVESTMENTS ARE REQUIRED

Around \$1.8 trillion in commodity related investment²¹ is required over the next 20 years to support the Base Case (Exhibit 3.5), equal to almost 50% of today's total Australian capital stock across all industries. Replacement and expansion capital for the mining industry are modelled to account for similar totals over the 20 years to 2030. Expansion investment requirements are \$820 billion over the period, while replacement capital investment is modelled at around \$770 billion. The pattern of investment is quite different, with high levels of expansion capital required in the first five to 10 years, and increasing levels of replacement capital over the period. In the Base Case, \$200 billion of investment is required to support soft commodity markets over this timeframe.

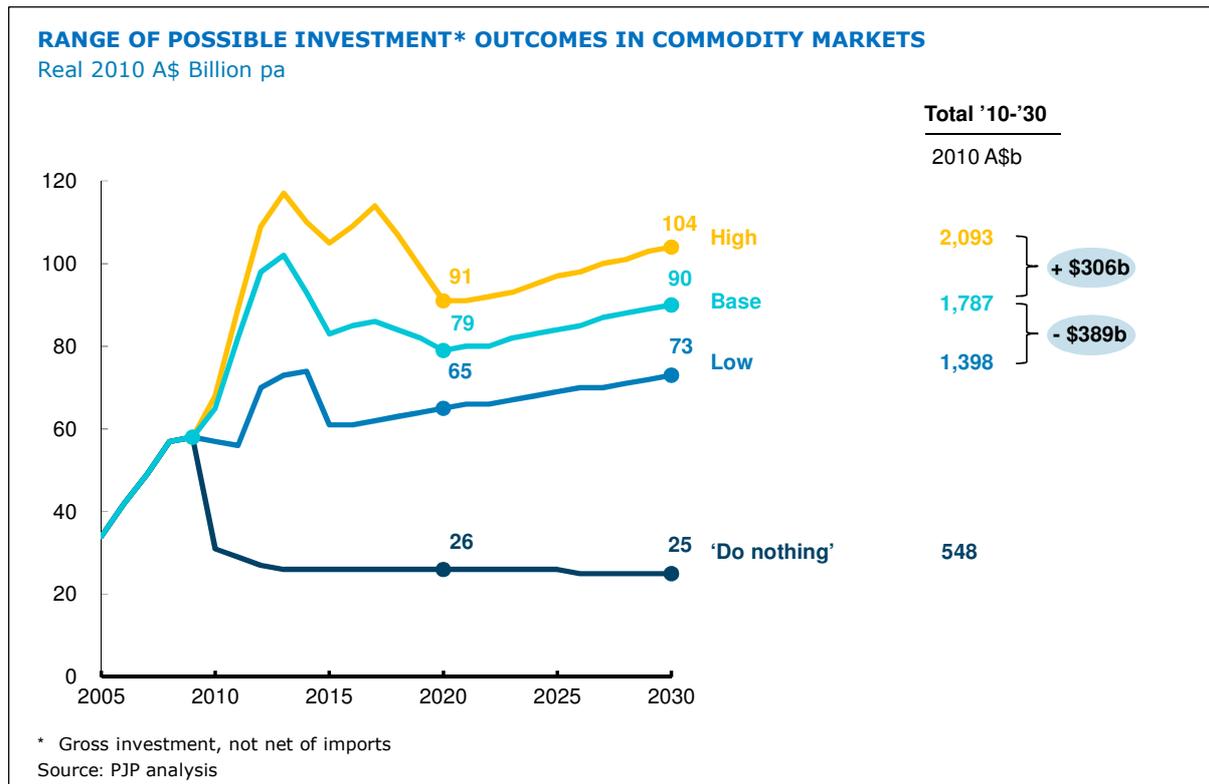
This investment is enormous by any measure, and represents a large increase compared to historical investment. Commodity related investment levels were around \$30 billion per annum prior to 2006, and gradually climbed to more than \$60 billion in 2010. In our Base Case, investment climbs to more than \$100 billion, before stabilising at around \$80 billion in 2015 (representing more than 5% of GDP). The sharpest part of the climb will be in the next three years, putting enormous pressure on the supply side of the Australian economy.

Exhibit 3.5



²¹ Gross investment, not net of imports.

Exhibit 3.6



If Australia does better than the Base Case by capturing additional market share (the High Case), then around \$305 billion of additional capital investment would be required to support this additional production, a total of around \$2.1 trillion over the 20 year period (Exhibit 3.6). If Australia is slower to capitalise on the opportunity presented (the Low Case) then \$390 billion less capital may be required.

The growth in soft commodities will be driven largely by future productivity gains, not by increases in land and water availability. While some small changes in land and water availability may occur over the modelling time period, no net change has been assumed.

It is clear that there is a very large export and investment opportunity available to Australia in commodity markets²². By contrast, if Australia does not capture this opportunity, the combination of falling prices in key commodity markets and declining investment in Australia will significantly impact Australia's economic prospects over the medium to long term.

²² Additional economic growth is coming from increased exploration expenditure, and that is not included in this analysis.

4.0 FAR-REACHING BENEFITS ACROSS THE ECONOMY

KEY THEMES:

- *The benefits of capturing the opportunity will be larger and more broadly based than just the direct impact from increased exports and investment.*
- *The sectors supporting the resource industries are large and growing, and their depth and breadth is not well understood.*
- *A significant proportion of Australian listed companies are already benefiting from exposure to the growing resource sectors.*
- *Growth in the service and supply sectors will boost jobs.*

4.1 THE RANGE OF POTENTIAL BENEFITS

It is commonplace to hear that the natural resource sectors, particularly mining, oil and gas, are not labour intensive, and that therefore the economic impact of their growth is not broad based. However, this report suggests that this is a narrow view of the benefits of capturing this opportunity.

First, the narrow view of benefits underestimates the importance of creating high productivity jobs. Workers employed by commodity exporters and their service providers have higher productivity than for the economy as a whole, partly because of the capital intensity of the investment needed.

Second, both the mining sector and the soft commodities sectors have large and fast growing support industries with firms spanning many sectors. Australia is well on the way to creating a globally competitive commodity support cluster covering a large range of skill sets. If this emerging cluster is encouraged, the potential economic benefit to Australia from future global demand for natural resources will be magnified. Section 4.3 will revisit this point in more detail.

Third, all Australians will benefit from the large increases in tax and royalty income associated with growth in these sectors, which has been significant in recent years and will continue to be significant. This report estimates that company taxes and royalties will rise by more than \$34 billion annually in the Base Case²³, with a cumulative value of around \$945 billion over the period.

Fourth, growth in commodity sectors and support industries will increase incomes, resulting in increased expenditure in other sectors, particularly in the domestic services sectors. These increases in income come from increased real wages and employment as well as increased investment incomes from growing profits. A significant proportion of the profit from these sectors, either in dividends or capital gains, is expected to flow back to Australian shareholders including superannuation funds, despite the fact that a portion of the new capital comes from offshore. A large proportion of resource

²³ Excluding any mineral resource rent tax income.

companies working in Australia are also listed in Australia and they tend to have a high weighting of Australian shareholders. This increase in incomes will, in turn, create new demand for domestic services unrelated to mining.

Finally, consumers and importers benefit from a stronger currency as it enables people to purchase more imported goods for less. This is equivalent to a pay rise for all Australians. While a stronger exchange rate, increasing costs and higher interest rates (see Chapter 6) may create short-term pressures for import-competing businesses (including retail), the Australian consumer and those businesses with significant imports will benefit from the stronger Australian dollar and the overall benefits for the Australian economy have the potential to be large.

However, the final size of the 'prize' and distribution of benefits through the economy will depend on the degree to which there is crowding out of other sectors²⁴. Even with a poor policy response, the impact of crowding out is easy to overstate. Domestic services sectors, which are now the majority of the economy, benefit from higher incomes and do not face import competition. Crowding out occurs mainly in Australia's competing export and import replacement sectors. To the extent that there are capacity constraints, interest rates will rise to restrain demand and inflation, resulting in a squeeze on domestic interest rate sensitive sectors like housing. The policy challenge is therefore to boost capacity growth through supply side measures that minimise the needed rise in rates by importing capital, accessing unemployed and underutilised resources, and encouraging productivity growth.

Computable General Equilibrium (CGE) modelling commissioned by Port Jackson Partners in the past has shown that growth in natural resource sectors crowds out other sectors less than might be expected. This is because the new jobs created are highly productive, capital tends to come from offshore (and would otherwise move to other countries, rather than other sectors in the Australian economy), support services and supplies are significant, and natural resources are otherwise 'left in the ground' – they can't be reallocated to be used elsewhere, unlike domestic capital or labour.

Even with some crowding out of other trade-exposed sectors, there is less cause for concern if the growth in the commodity and support sectors is sustained. The more sustainable the opportunity, the more it makes sense to build the economic capacity and/or reallocate economic resources to pursue the opportunity. As outlined earlier, the scale and duration of the market opportunity and the strength of Australia's resource base means that capturing a sustainable opportunity is possible.

4.2 THE HIDDEN OPPORTUNITY IN DOMESTIC AND EXPORT SERVICES

The growth of domestic and export support sectors on the back of commodity industry growth is an important and untold story in the Australian economy. Direct and indirect service providers are a critical part of the picture.

The growth of this sector is driven by both domestic resource growth and by Australian commodity producers who are expanding offshore. Given the right policy settings, the

²⁴ For example, Ed Shann, 'Leaders Have Lost Their Way on Economic Reform', Australian Financial Review, 5 January 2011, page 47.

opportunity for the service cluster may prove to be larger than the underlying commodity sector growth. But the importance of the commodity industry support sectors is not widely understood.

- Many of the support services businesses are 'buried' in larger businesses, so that organisations which appear to lack any exposure to commodity sectors may have a substantial business unit with exposure to these sectors.
- Many of the faster growing players in the services sector are still private. Most have emerged only recently from modest beginnings, and have not needed external equity capital to support their growth (at least until now), in particular because of their focus on services.

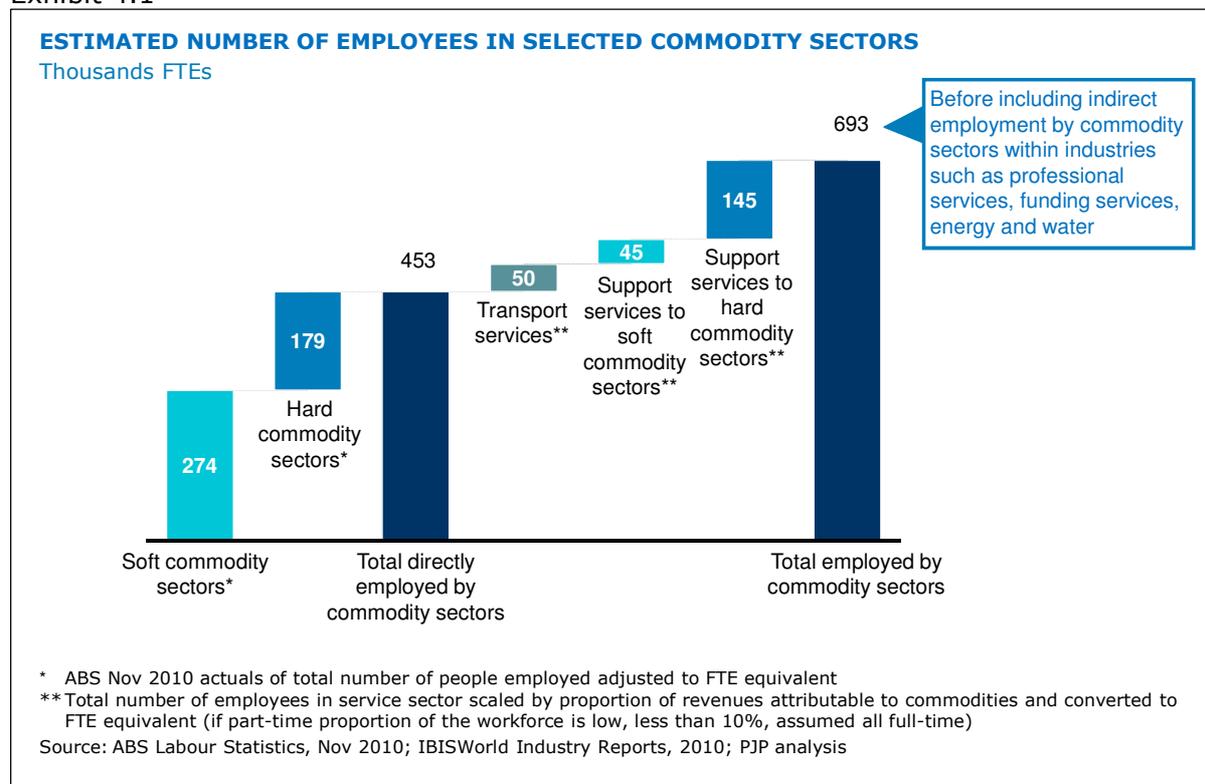
The commodity sectors directly employ around 450,000 full-time employees and the immediate supporting service and supply sectors employ another 240,000 or more, totalling around 700,000 (Exhibit 4.1). The support sectors have revenues of around \$90 billion, industry value add of \$32 billion and profit of around \$13 billion, even before we account for commodity related services in financial, energy, water and many professional services sectors (Exhibit 2.2)²⁵.

The breadth of the commodity-exposed sectors can be assessed by analysing all ASX listed companies in three groups.

1. **Focused Players** – this includes miners, oil and gas producers, agricultural producers and their focused services and supply providers (companies with a strong focus on serving these sectors).
2. **Bystanders** – this covers companies that have no direct exposure to commodity sectors, although in many cases they may have exposure to regions in which commodity driven growth is strong.
3. **Two-Speed Companies** – these companies are a mix of the two, with some business units or key customer segments with direct exposure to the commodity sectors and some without any exposure. As a result, they are often characterised by having one very fast growing part of their business and a second part of their business which is either steady or in decline.

²⁵ This analysis does not consider the employees whose work is focused on natural resource sectors, but who are employed in companies that don't characteristically focus on these sectors. For instance, a growing proportion of professional services work is focused on natural resource sectors, but these people are not included in these supporting sector numbers.

Exhibit 4.1



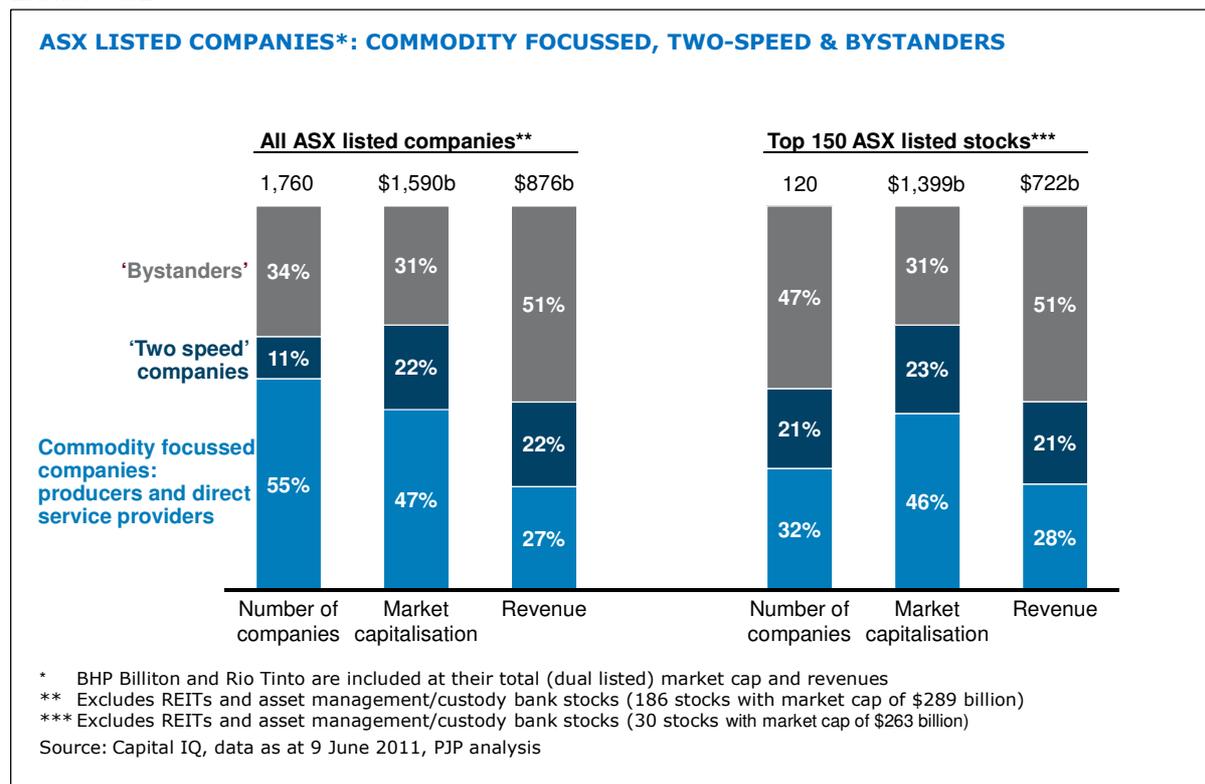
Almost 70% of the total value of the ASX is comprised of businesses with complete or partial participation in commodities or supporting services (Exhibit 4.2). This result is replicated if only the top 150 companies are considered. Commodity producers and their direct service providers (Focused Players) make up around 47% of the value of the total ASX market capitalisation (excluding Real Estate Investment Trusts and asset management stocks) and have 27% of revenue. These figures, in themselves, are astonishing and demonstrate just how far the economy has already shifted towards natural resource and soft commodity sectors. Two-Speed Companies represent another 22% of ASX market capitalisation, and have 22% of revenue. This cohort includes selected construction companies, financiers and diversified industrials and manufacturers, amongst others. This group also includes many companies not typically considered to have mining or mining services businesses. A good example is OneSteel, which is traditionally seen to be an Australian steel manufacturer and distributor, but has an important iron ore mining business as well as a fast growing mining supply business (Box 4.1).

Only 31% of the value of the ASX has no significant exposure to these industries. This includes many companies that do have some kind of regional exposure to commodity sectors, such as building material companies and property developers with businesses in fast growing regions such as WA, the Hunter Valley in New South Wales and the Bowen Basin in Queensland.

Many of the service providers are growing quickly globally as well as domestically (Exhibit 4.3). Indeed, 17 of the top 150 ASX-listed companies have very substantial

direct mining service operations, while 30 are direct participants in commodity sectors, both in Australia and offshore. The focused service company group has a combined market capitalisation of more than \$70 billion, with an increasing proportion of their revenues coming from exports. As well as the larger listed companies there is a growing list of smaller listed specialist companies. A recent report identified 62 listed small market capitalisation²⁶ stocks focused on mining services²⁷.

Exhibit 4.2



²⁶ Not in the ASX100.

²⁷ J.P. Morgan 'Small Cap Mining Services', May 2011.

Exhibit 4.3

COMMODITY SERVICES PROVIDERS – EXAMPLES				
Company	Business description	Places of operation	Revenues	Profits
			Financial years	Financial years
Leighton Holdings	<ul style="list-style-type: none"> Global contracting, services and project development company in construction, mining and other industries World's largest contract miner (33% of revenues) 	<ul style="list-style-type: none"> More than 30 countries across Australasia, Asia and Middle East 		
Orica	<ul style="list-style-type: none"> Diversified chemicals and mining manufacturing company Mining services account for 55% of revenues 	<ul style="list-style-type: none"> Around 50 countries across all six continents 		
Incitec Pivot*	<ul style="list-style-type: none"> Global chemicals company in agriculture and mining Explosives and fertilisers account for 100% of revenues (around 50/50 split) 	<ul style="list-style-type: none"> More than 20 manufacturing plants across Australasia and North America 		
Worley-Parsons*	<ul style="list-style-type: none"> Global engineering, procurement and construction management services provider to the energy, resource and complex process industries Hydrocarbons, minerals and metals account for ~80% of revenues 	<ul style="list-style-type: none"> 40 countries all across the globe 		
Campbell Brothers	<ul style="list-style-type: none"> Global diversified industrial services company Minerals and coal divisions account for a third of total revenues 	<ul style="list-style-type: none"> Operates in 44 countries across all six continents 		

* Incitec Pivot was created through merger of Incitec Fertilizers and Pivot in 2003 (results prior to FY02 not available). WorleyParsons results FY02-05 represent Worley only, prior to acquisition of Parsons in 2004 (Worley listed in 2002)
Source: Company websites; Company annual reports and investor presentations; Bloomberg

Important examples of larger mining service providers include (see also Exhibit 4.3):

- Orica (market capitalisation of \$10 billion and financial year 2010 revenue of \$5.8 billion) supplies explosives to miners across the world, growing revenues at 15% per annum and profits at 18% per annum over the last nine years, prior to the GFC.
- Incitec Pivot (market capitalisation of \$7.5 billion and financial year 2010 revenue of \$2.9 billion) supplies explosives and fertiliser products to mining and agriculture markets from more than 20 manufacturing plants across Australasia and North America, growing revenues at 28% per annum from 2002 (a year prior to merger of Incitec Fertilizers and Pivot) to 2009 and profits at around 50% per annum over the same time period.
- WorleyParsons (market capitalisation of \$6.9 billion and financial year 2010 revenue of \$5.1 billion) provides engineering, procurement and construction management services to the energy, resource and complex process industries across 40 countries globally, with profit and revenue growth of around 55% per annum from 2002 (year that Worley listed on the ASX) to 2009 (pre-GFC).
- Leighton Holdings (market capitalisation of \$9.3 billion and financial year 2010 revenue of \$14.6 billion) is the world's largest contract miner, as well as having a large project development business that extends into mining. It has grown revenues and profits at around 15% per annum over the past decade, and has contract mining operations throughout Asia and the Pacific.

- Campbell Brothers (market capitalisation of \$2.7 billion and financial year 2011 revenue of \$1.1 billion) is a diversified industrial services provider of mineral and environmental testing services operating across 44 countries around the globe, with around 50% of its revenues directly driven by the minerals industries. Over the past nine years (pre-GFC), Campbell Brothers has grown revenues at 15% per annum and profits at 26% per annum.

BOX 4.1: ONESTEEL – SERVING THE MINING SECTOR

While OneSteel is perhaps not typically considered a traditional mining services company, an increasing proportion of its business is directed towards the mining sector. It is moving its focus away from its legacy steel manufacturing business towards markets where it can provide differentiated products based on its technical expertise including to the mining sector. It is also leveraging its core capabilities in mining consumables and the strengths of its relationships with miners to expand offshore.

OneSteel created a new division known as the Mining Consumables Business in late 2010. This followed the acquisition of international mining consumables businesses Moly-Cop and AltaSteel. OneSteel has brought together its grinding media, rail and forge, and mine ropes businesses into a division focussed on the mining sector. OneSteel specifically identifies part of its strategic focus as “growing and diversifying earnings through exposure to mining and the high growth mining consumables sectors”. On a pro forma historical basis, OneSteel reports that its mining consumables business would have made \$122 million EBIT in financial year 2010 and would have had almost 2,000 employees.

Following the acquisition of Moly-Cop and AltaSteel, OneSteel is the global leader in grinding media, with 1,294 kilotonne of capacity across Australia, Chile, Peru, Mexico, US, Canada and Indonesia. The growth of the grinding media business is driven in particular by the expansion of copper and gold production.

OneSteel forecasts that 17% of revenue will be directly from mining consumables in the first half of 2011. As at May 2011, 29% of OneSteel’s year to date revenue for financial year 2011 was from the engineering/mining investment sector.

Other parts of OneSteel’s business also have exposure the mining sector. OneSteel has an iron ore business which accounts for around 12% of revenues and almost 80% of EBIT. OneSteel produces six million tonnes of hematite per annum and has reserves to continue producing at this level for around 10 years.

In addition to the high growth mining consumables business, OneSteel also manufactures products used in building mines and supporting infrastructure. These products include rail lines, piping and structural steel. Some specific examples are:

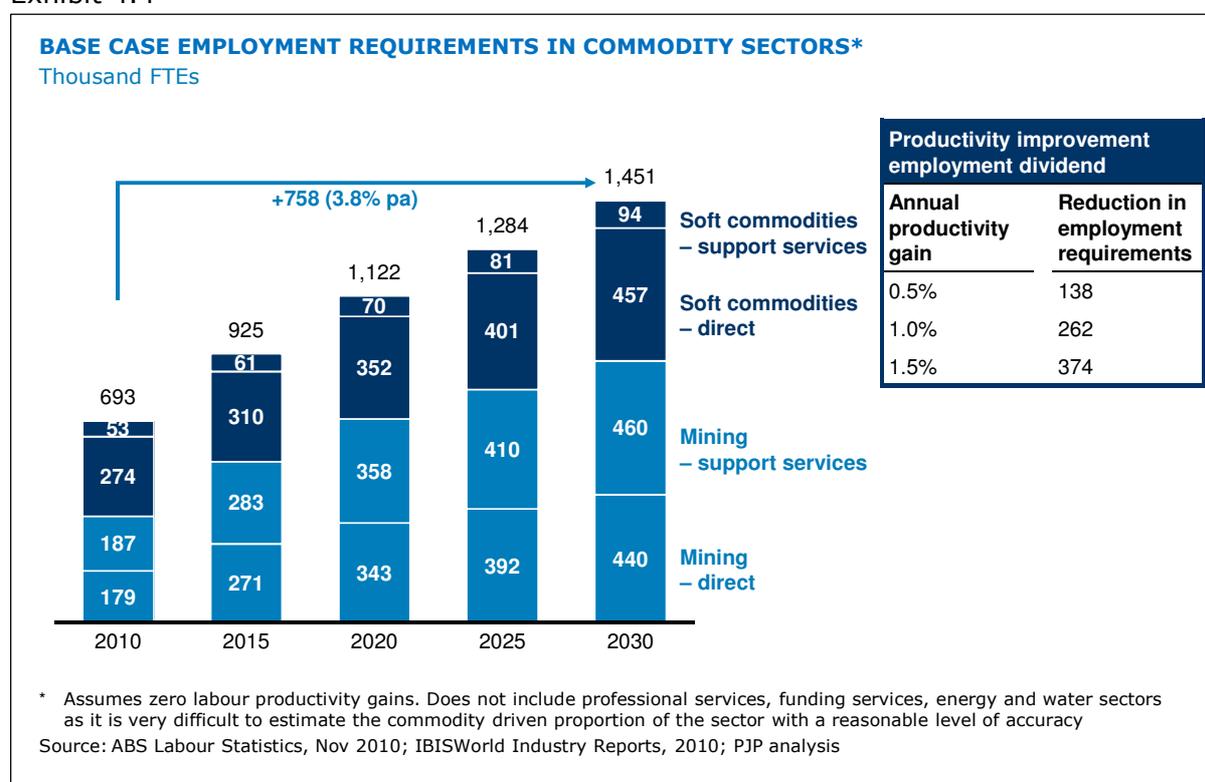
- Oil and Gas Pipe for high pressure pipeline projects. OneSteel’s Australian distribution business has introduced a casing pipe range to the coal seam gas market.
- Reinforcing steel cages used in the Kwinana Railway Extension Project in WA.
- Prefabricated pile cages for remedial piling works at the Yandi Iron Ore Mine in WA’s Pilbara region.

OneSteel also has some exposure to Australian’s soft commodity industries. Its wire business supplies rural fencing to the agriculture sector and marine mesh systems to the fishing industry.

4.3 SIGNIFICANT JOB CREATION POTENTIAL ACROSS A BROAD RANGE OF SKILL SETS

These service and supply sectors have been growing fast in recent years, and with a supportive environment they are expected to enjoy strong growth in the future. These supporting industries magnify the strength of the natural resource sectors within the Australian economy. The Australian component of their businesses will grow to around \$200 billion by 2030 in our Base Case and by much more if we include some of the activities undertaken in companies with a broader focus. Under this scenario, we estimate that the number of full-time employees directly participating in the growth of the commodity sectors could double to around 1.5 million by 2030 (Exhibit 4.4), depending on the extent of productivity gains.

Exhibit 4.4



In all likelihood, the service sectors supporting the Australian commodity export sectors will grow faster in percentage terms than the underlying commodity sectors and faster than these figures suggest. The level of employment associated with investment and new projects is not well understood, but Port Jackson Partners' research indicates the labour requirements will be higher than currently estimated. Apart from the fact that these figures understate the number of people participating in commodity sector services, it is likely there will be rapid growth in the exports of services to other producer countries.

The supporting service and supply sectors cover a broad range of activities and companies, including contract mining, engineering services, explosives and consumables manufacturing, fertiliser and pesticide manufacturing, freight transport (rail, truck and sea freight), information technology and technology R&D. Exhibit 4.5 presents a sample

of listed companies directly focused on the mining services sector, showing the breadth of skills involved.

Exhibit 4.5

SPECIALIST MINING SERVICES COMPANIES—ASX LISTED				Total annualised revenue* = \$85 billion	
Category	Annualised revenue*	Example companies	Category	Annualised revenue*	Example companies
Mining contractors	\$16.5b	<ul style="list-style-type: none"> Leighton Transfield Services Downer Macmahon 	Drillers	\$2.5b	<ul style="list-style-type: none"> Boart Longyear Ausdrill AJ Lucas Swick
Construction	\$13.7b	<ul style="list-style-type: none"> Leighton Mondelphous Watpac Clough 	Equipment Hire	\$2.1b	<ul style="list-style-type: none"> Coates Hire Emeco Boom Logistics
Consumables	\$13.2b	<ul style="list-style-type: none"> Orica Westrac Incitec Pivot Onesteel (consumables only) 	Specialist equipment	\$1.3b	<ul style="list-style-type: none"> Boart Longyear Ludowici Imdex
Consulting & process engineering	\$8.3b	<ul style="list-style-type: none"> Worley Parsons Cardno Coffey Ausenco 	Fabricators	\$1.1b	<ul style="list-style-type: none"> RCR AusGroup (SGX listed) Austin Engineering
Logistic suppliers	\$8.1b	<ul style="list-style-type: none"> QR National Toll Holdings Asciano K & S 	Testing services	\$1.1b	<ul style="list-style-type: none"> Campbell Brothers
Rail equipment & infrastructure	\$5.0b	<ul style="list-style-type: none"> Downer UGL Bracklen Engenco 	Remote Housing	\$938m	<ul style="list-style-type: none"> Decmil Fleetwood Nomad
Labour hire	\$4.3b	<ul style="list-style-type: none"> Skilled Group Programmed Group Humanis 	Mining software	\$878m	<ul style="list-style-type: none"> Data 3 Runge ISS Group
Electrical contractors	\$2.8b	<ul style="list-style-type: none"> Hastie Group Norfolk Southern Cross Electrical 	Recycling/waste management	\$476m	<ul style="list-style-type: none"> CMA Corp Tox Free Electrometals Technology
Utilities	\$2.6b	<ul style="list-style-type: none"> Duet Group APA Group Envestra 	Financial Services	\$468m	<ul style="list-style-type: none"> Wilson HTM Financial Group Bell Financial Group Euroz Austock Group
			Other	\$122m	<ul style="list-style-type: none"> Greencap Aspermont Environment Group Clean TeQ

* Based on most recently available half yearly revenue in \$A for listed companies with mining services revenue. Where possible, revenue has been allocated by category and non-mining service revenue has been deducted
Source: PJP analysis

Benefits also flow to more generic services, such as education, finance, accounting and legal services. Indeed many professional services firms have developed world class expertise and capabilities in supporting the natural resource sectors, mining in particular. Australian based law firms such as Allens Arthur Robinson and Australian subsidiaries of global law firms such as Allen & Overy Australia are experts in the complex legal requirements for developing large resource projects. The recent entry into the Australian market of global law firms Clifford Chance and Allen & Overy was, to a significant degree, predicated on wanting to get access to Australian resource expertise.

Likewise, banks, accountants and consultants have developed extensive practices supporting mining, energy and agriculture companies, and they follow those companies as they expand globally. Australia also has institutions such as the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and universities which can expand their role in supporting the natural resource industries. There is an increasing global interest in Australian expertise in these areas.

Many of these listed and private companies are extraordinary Australian success stories, built from Australia's strengths as a natural resource rich country. Economist Michael

Porter has argued for many years that clusters of internationally competitive firms can develop around dynamic, internationally competitive export focused industries (see Box 4.2). As the surge in demand for commodities continues and the emphasis shifts to competition for growth (as against watching prices go up), these companies, and others like them, will be well positioned to grow rapidly. Indeed, the composition of management teams and boards of many of the resource juniors in Africa and Asia shows that many Australians are playing leadership roles in capturing this opportunity around the world, not just in Australia.

Growth in commodity-focused domestic and export services has the potential to create longer term opportunities if targeted towards the emerging middle classes of the developing world. Already, the connections between Australia and China driven from trade and investment are creating broader opportunities in education and tourism. The emerging Asian middle class is extremely brand conscious, looking for exclusive experiences and the prestige that comes with consumption of Western goods and services. If Australia succeeds in continuing to build trade and investment relationships with these massive, fast growing economies, this broader set of opportunities is Australia's to lose.

BOX 4.2: DEVELOPING A GLOBALLY COMPETITIVE COMMODITY SERVICES CLUSTER

Michael Porter has argued that clusters of internationally competitive firms can develop around dynamic, export focused industries²⁸. Clusters are groups of interconnected firms, suppliers, related industries and institutions which can arise in particular locations. Porter suggests that there are four key factors which together can influence a country's competitiveness in a given sector. These factors are: demand conditions, factor conditions, the context for firm strategy and rivalry, and the presence of related and supporting industries.

Australia is arguably on the way to meeting the conditions for developing a world class natural resource-based cluster. First, Australia has a world class, highly demanding and sophisticated set of global customers for our natural resources. Natural resource companies, in turn, represent a world class, highly sophisticated set of customers for these service industries. Companies such as Leighton Holdings, which provide contract mining services, do so for global mining companies. The skills these service companies have developed allow them to export these services globally, knowing they are of the highest quality.

Second, Australia has a rich base of natural resources to underpin its natural resource industries. While these provide a base, on their own they do not guarantee sustained competitive advantage. Instead, factors such as a skilled workforce, infrastructure and capital create longer term competitive advantage. Australia has the skilled workforce required to manage these natural resources (although shortages exist), and increasingly has the infrastructure required to support them.

Third, Australia has the sophisticated governance systems and a strong legal system required to manage how companies are created, organised and managed, as well as the competitive legal frameworks to ensure companies must compete actively with each other. This drives innovation.

Fourth, Australia has a large and growing set of related and supporting industries. As already outlined, these service sectors cover a broad range of activities and companies.

The strength of Australian natural resource industries has meant that many of these service providers have developed successful global strategies, and are growing rapidly on the back of their global businesses. The Australian resource sector has created demand for leading edge supply firms that have successfully diversified offshore. Australian natural resource players are increasingly outsourcing specialist skills to dedicated suppliers. These organisations are following their customers offshore and are now exporting their expertise to the world. The expansion of commodity supply into more remote and difficult areas in Africa, Asia and Latin America means that there is an expanding market for successful service companies overseas.

This process of fast-growing, internationally-competitive, resource-based industries creating clusters of fast-growing suppliers and service providers is not new. Texas, in the US, built an oil and gas services industry on the back of its oil reserves. Israel has built an irrigation industry on the back of its need to drive water efficiencies. What is new is the prospect that due to improvements in communication technologies, these Australian organisations may be able to develop a global critical mass necessary to lead in their niches, far faster than the historical experience.

²⁸ "The Competitive Advantage of Nations", Michael E. Porter, The Free Press, 1990. See also "Creating Shared Value", by Michael E. Porter and Mark R. Kramer, *Harvard Business Review*, February 2011.

5.0 CAPTURING THE OPPORTUNITY – THE CHALLENGES

KEY THEMES:

- *Australia has a good starting position to capture this opportunity, based on location, natural resource endowment and skills.*
- *There are well matched and well-endowed global competitors to all of Australia's mining, energy and agricultural sectors.*
- *Australia's ability to capture share of this opportunity will depend on its continuing ability to encourage and attract investment even in the face of market volatility.*

Australia is well positioned to capitalise on the sustained growth in demand for commodities over an extended period of time.

- It is located close to the fastest growing markets, which is a big advantage for bulk commodities and building customer relationships.
- It has enough resources to supply the growth in demand for many years.
- It has a strong history of successful growth in commodity industries.

At the same time, Australia does not have a monopoly on the resources which the developing world will want, and the low-cost positions to support that demand. Competition from other countries will be ferocious. Australia must position itself thoughtfully and energetically to capture this opportunity.

5.1 NO MONOPOLY ON HIGH QUALITY MINERAL AND ENERGY RESOURCES

While Australia has a large body of natural resources relative to the size of its economy, the reserves make up only a relatively small proportion of the world's mineral and energy reserves, even in those commodities where Australia currently has significant market shares.

Australia's current production share is higher than its reserve share for bauxite, iron ore, LNG and metallurgical (coking) coal. For example, Australia currently contributes 25% of world iron ore production (Exhibit 5.1), but has 17% of known reserves²⁹ (Exhibit 5.2). By contrast, Australia is producing less than its reserve share for uranium, nickel and gold. Exhibit 5.2 shows that there are more than 50 years of world reserves of many minerals at current levels of production and even larger levels of reserves for bauxite, thermal coal and iron ore (119, 110 and 86 years respectively³⁰).

²⁹ A 'reserve' is a quantity of material considered to be economically feasible for extraction.

³⁰ It is often argued that the world is running out of oil – the 'peak oil' thesis. For oil, this may be true using conventional resource definitions, but is clearly not true if non-conventional reserves, such as shale oil and gas to liquids are included. The issue is simply one of economics – the non-conventional sources of oil are more expensive.

Exhibit 5.1

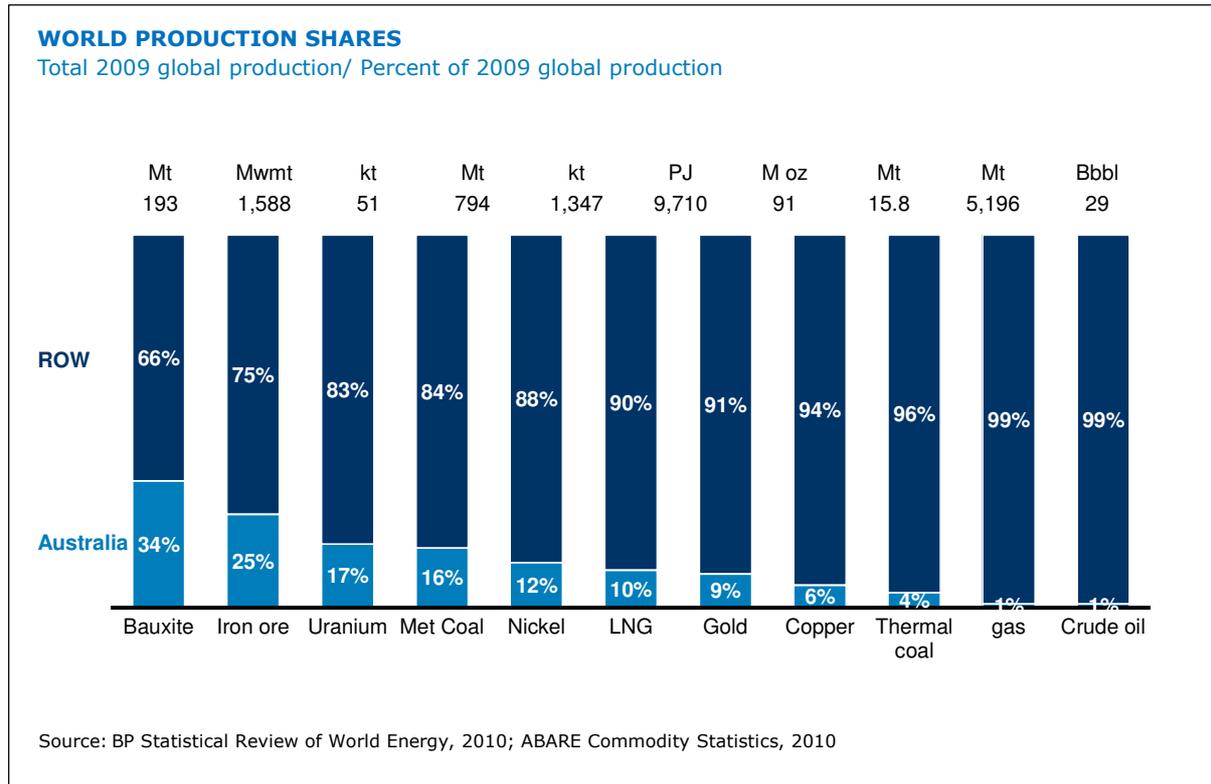
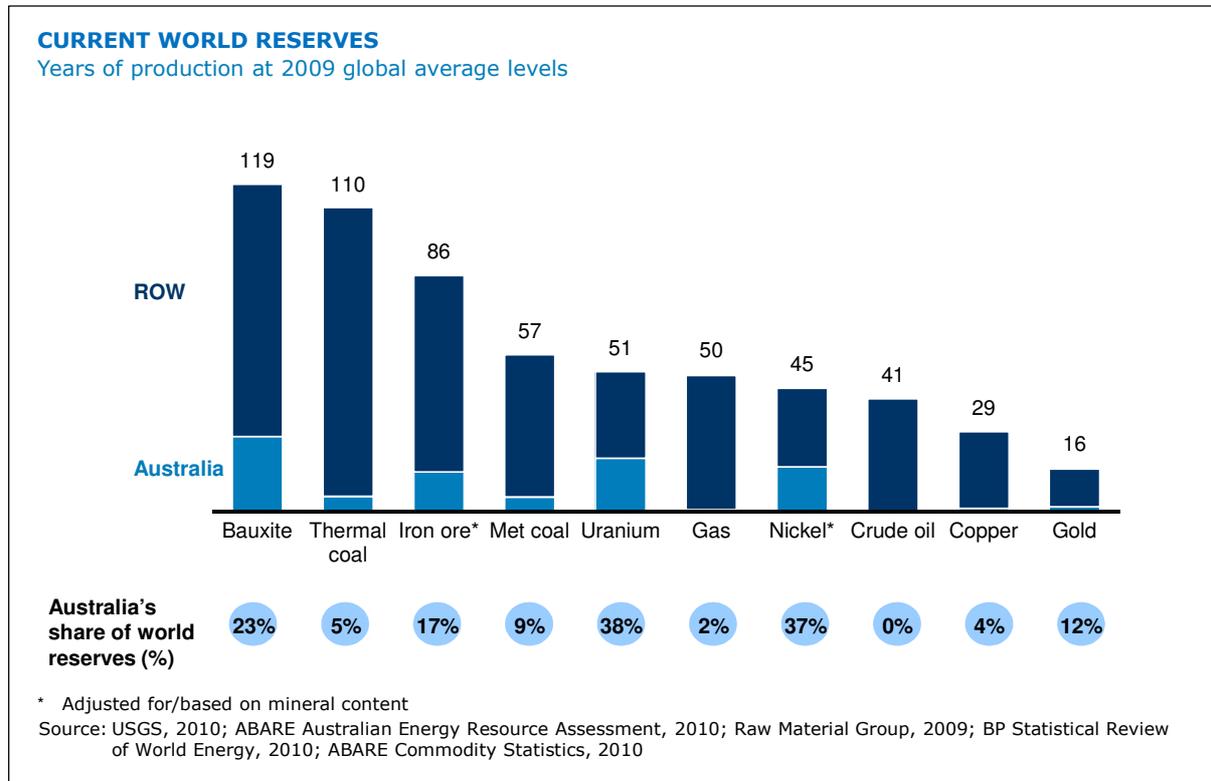


Exhibit 5.2



5.2 AUSTRALIA'S LOW COST MINERAL AND ENERGY POSITIONS ARE NOT UNIQUE

It is sometimes argued that despite the global abundance of natural resources relative to demand, much of this is low quality, whereas Australia is uniquely positioned with abundant high-quality reserves and resources³¹ adjacent to fast growing markets. While these things are advantages relative to some competitors, Australia does not have unique delivered-cost positions. Many countries have large resources and reserves of mineral and energy commodities (Exhibit 5.3), and some of these countries are major customers themselves (e.g. China for thermal coal, India for iron ore).

Iron Ore

In iron ore, Australia will compete for future opportunities with several major low-cost producers. Brazil, Guinea in West Africa, and possibly also India combined have more than enough resources to take all of the future growth. While Australia has a geographical advantage over Brazil and Guinea, these two producers have significant quality advantages. Brazil in particular is alleviating its geographic disadvantages with massive new low-cost ships and related port facilities. Indian iron ore producers have the enormous advantage of being adjacent to a large growing source of demand, with reasonable quality ore. The key issue for India is overcoming supply chains and planning issues.

Coal

In coal, Australia will compete for share with a range of other low-cost producers in Indonesia (thermal), Columbia (thermal), South Africa (thermal), Mozambique (metallurgical and thermal), Mongolia (metallurgical and thermal), India (thermal) as well as interior provinces in China (metallurgical and thermal). Australia's thermal coal is generally of reasonable quality, and it is relatively close to the relevant markets, but again, there is no cost advantage large enough to assure growth in share. Indonesia, Mongolia, the interior provinces of China and India are adjacent to much of the growth in thermal coal demand. Columbia and South Africa are further away, but have high quality resources. The metallurgical coal market is much smaller than thermal coal, and so production growth of the high quality resources in Mongolia and Mozambique has the potential to seriously impact Australian growth aspirations. Australia faces some challenges in its supply chains due to fragmented ownership of port, rail and mine facilities as well as emerging local community concern over further mine developments (particularly in the Hunter Valley of New South Wales and around Sydney).

Seaborne Liquefied Natural Gas

The seaborne LNG market is relatively new, and the competitive landscape is still unfolding. It is clear that Australia will compete hard with other producers to its north (such as Papua New Guinea), the Middle East, domestic production in major customer countries (especially non-conventional gas in China) as well as North America, which is beginning to export into Asian markets.

³¹ A 'resource' is a quantity of material where there are reasonable prospects for eventual economic extraction. A 'reserve' is the economically mineable part of a mineral resource. Reserves are therefore a subset of resources.

Aluminium and Alumina

Aluminium and alumina production in Australia is now at a clear competitive disadvantage and we have reflected this in our Base Case. China has proven its ability to develop smelting and refining capacity at a significantly lower cost than Australian capacity, and Australia has no real advantage in energy costs - the critical input into aluminium smelting and an important input in alumina refining.

Other sectors

In other sectors, Australia's position is mixed. In oil, its resources are quickly running down. In copper, it is highly reliant on expansions at Olympic Dam in South Australia. In gold, Australia's cost structures have been rising rapidly and its reserve base is dwindling. In uranium, it is reliant on politically difficult expansions (e.g. Jabiluka in the Northern Territory).

Exhibit 5.3

THE COMPETITIVE LANDSCAPE			
	Current annual global exports	Critical competitors to Australia	
		Top tier competitors	Second tier competitors
Iron ore	<ul style="list-style-type: none"> • 950 mt (2009) 	<ul style="list-style-type: none"> • Brazil (Vale) – 16 Bt reserves • Guinea (various) – 2 Bt resources* 	<ul style="list-style-type: none"> • China – 13 Bt reserves** • India – 7 Bt reserves
Coal - Thermal - Coking (metallurgical)	<ul style="list-style-type: none"> • Thermal: 725 mt (2009) • Metallurgical: 207 mt (2009) 	<ul style="list-style-type: none"> • Thermal – Indonesia (4 Bt reserves), Columbia (7 Bt reserves), South Africa (30 Bt reserves) • Metallurgical – North America (2 Bt reserves), Mozambique (~11 Bt resources), Mongolia (7+ Bt reserves) 	<ul style="list-style-type: none"> • Metallurgical – China (34 Bt reserves), Commonwealth of Independent States (8 Bt reserves), Europe (2 Bt reserves)
Gas - LNG	<ul style="list-style-type: none"> • 243 bcm (2009) 	<ul style="list-style-type: none"> • PNG (0.4 tcm reserves), Indonesia (3.2 tcm reserves), Middle East (76 tcm reserves) 	<ul style="list-style-type: none"> • China (2.5 tcm reserves)
Other minerals e.g. - Bauxite - Copper	<ul style="list-style-type: none"> • Copper: 15.8Mt (2009) • Bauxite: 193mt (2009) 	<ul style="list-style-type: none"> • Copper – Chile (>300 Mt reserves), Democratic Republic of Congo (>50Mt reserves) • Bauxite – Guinea (7.4 Bt reserves), Vietnam (2.1 Bt reserves) 	
Soft commodities e.g. - Grains - Livestock		<ul style="list-style-type: none"> • Brazil • Eastern Europe (e.g. Ukraine) • Other Central and South America 	<ul style="list-style-type: none"> • Productivity gains from traditional producers (e.g. Europe, North America) • Africa?
Service providers		<ul style="list-style-type: none"> • South Africa • North America 	<ul style="list-style-type: none"> • UK • Singapore/Hong Kong

* Guinea's iron ore is not declared as reserves
 ** Fe content adjusted
 Source: USGS, 2010, 2011; ABARE Australian Energy Resource Assessment, 2010; Raw Material Group, 2009; BP Statistical Review of World Energy 2010; ABARE Commodity Statistics, 2010; Rio Tinto Annual Report; Tavan Tolgoi Website, 2010

Beyond Australia, there is increasing recognition of the scale of the global transformation, creating new competitors.

Australia has been privileged in its ability to attract global capital for resource developments, but countries in Africa, Asia and South America are currently working

hard to improve their positioning. In the meantime, the Chinese Government is demonstrating its willingness to support new projects all around the world³². In iron ore, massive developments are planned in West Africa and Brazil. As an example, Vale's US\$11 billion Carajas Serra Sul project will create 90 million tonnes of additional capacity. In thermal coal, Indonesia and Columbia have both driven significant expansions in the past decade, and further expansions are planned³³. In coking coal, Mozambique and Canada are both growing. In copper, massive projects are planned in Mongolia, Chile, Peru and North America. Aluminium has tended to have strong supply growth for some time and this is expected to continue.

Many of these are challenging projects, but they will compete with parallel projects in Australia for a share of market growth. The result is likely to be lower prices for some commodities such as iron ore and coal (although still much higher than historical trends, in order to encourage enough new supply to meet continuing demand growth). But this will be offset by stable or higher prices for commodities which have not yet realised the full potential of the opportunity, for example LNG (see Chapter 8).

Most of Australia's strong competitors are showing their willingness to attract foreign investment and skills to encourage economic growth. Guinea, Mongolia and Mozambique have strongly encouraged a broad range of foreign interests (including Australian companies) to bring skills and financial muscle to bear on their resources. They are offering strong incentives to fast-track this investment, both positive (such as tax holidays) and negative ('use it or lose it').

The question is: can Australia win its share of new projects?

There is no inevitability about Australia attracting these large-scale projects. Missteps create delays and even cancellations which cannot be unwound. As other regions and countries start developing environments that are actively supportive of investors, timely, high quality projects will be the real source of scarcity in global markets, not the mineral resources. This means that Australia must compete on project quality and timing to take market share from these competitors.

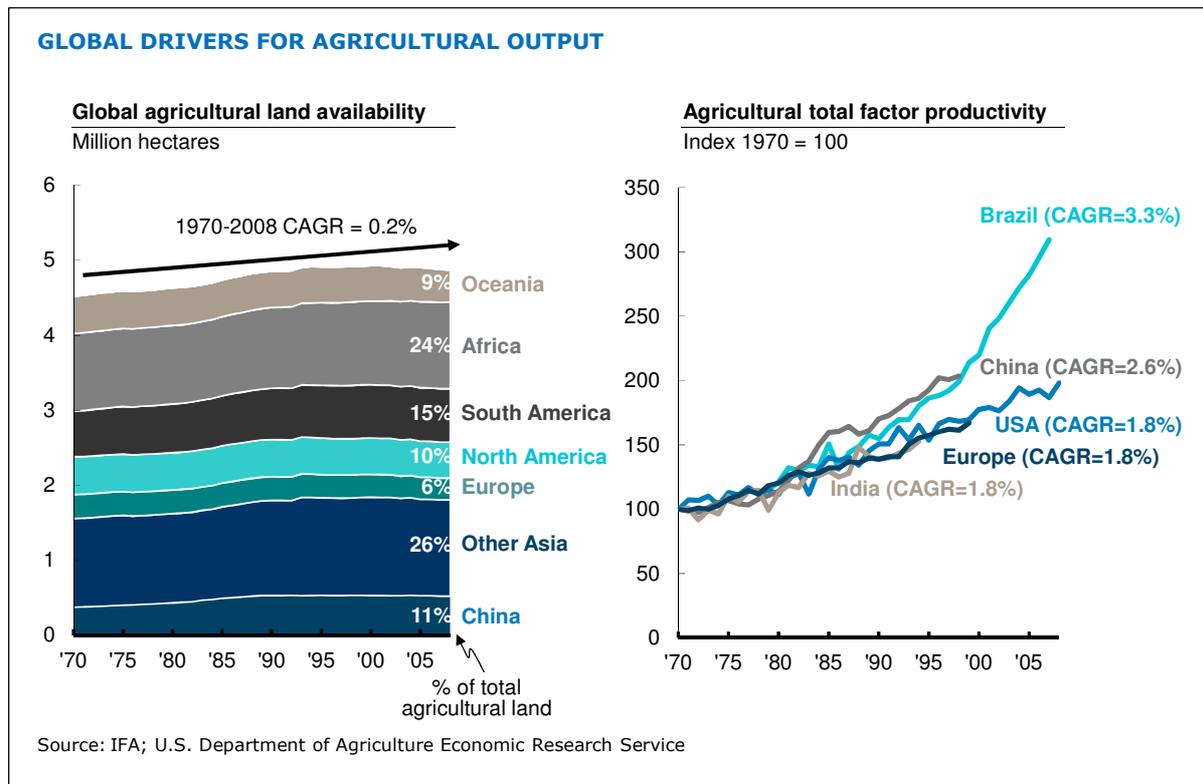
5.3 AN INTENSELY COMPETITIVE LANDSCAPE IN AGRICULTURE

Australia can also expect intense competition in the agricultural sector. Competition will be focused on the development and application of new practices and technologies, more than bringing on new land or water. The amount of land available for global agriculture has grown at just 0.2% per annum over the last 40 years (Exhibit 5.4). There are also limits on the amount of water available for agricultural use globally. Increased agricultural output has been driven by increases in agricultural productivity over that period, not by increases in land or water availability (Exhibit 5.4). Australia's agricultural productivity is relatively high, so further growth will be in competition with countries which start from a low base, with relatively easy gains. Critical competitors will include South America (particularly Brazil), Eastern Europe (e.g. the Ukraine) and parts of Africa (e.g. Sudan).

³² Scissors D., "China Global Investment Tracker: 2011", The Heritage Foundation, 10 January 2011.

³³ From 1999 to 2009, Indonesia added 179 million tonne per annum (mtpa) of production and Columbia added 39 mtpa. In that same time period, Australia added 107 mtpa.

Exhibit 5.4



Australia’s task is to continue to tap into new technologies and practices to increase its farm output. It is important to note that the developing world is able to become more productive and competitive in this area by catching up on existing best practice – the gap between the best and worst performers in agriculture is large enough to deliver enormous productivity gains for many years to come. This offers a particularly big opportunity to relatively low productivity developing countries, such as parts of South America, the Commonwealth of Independent States and Africa. Australia (and to a large degree the rest of the developed world³⁴) does not have this relatively easy path to improved productivity and competitiveness and so must focus on new technologies to maintain or improve its global position.

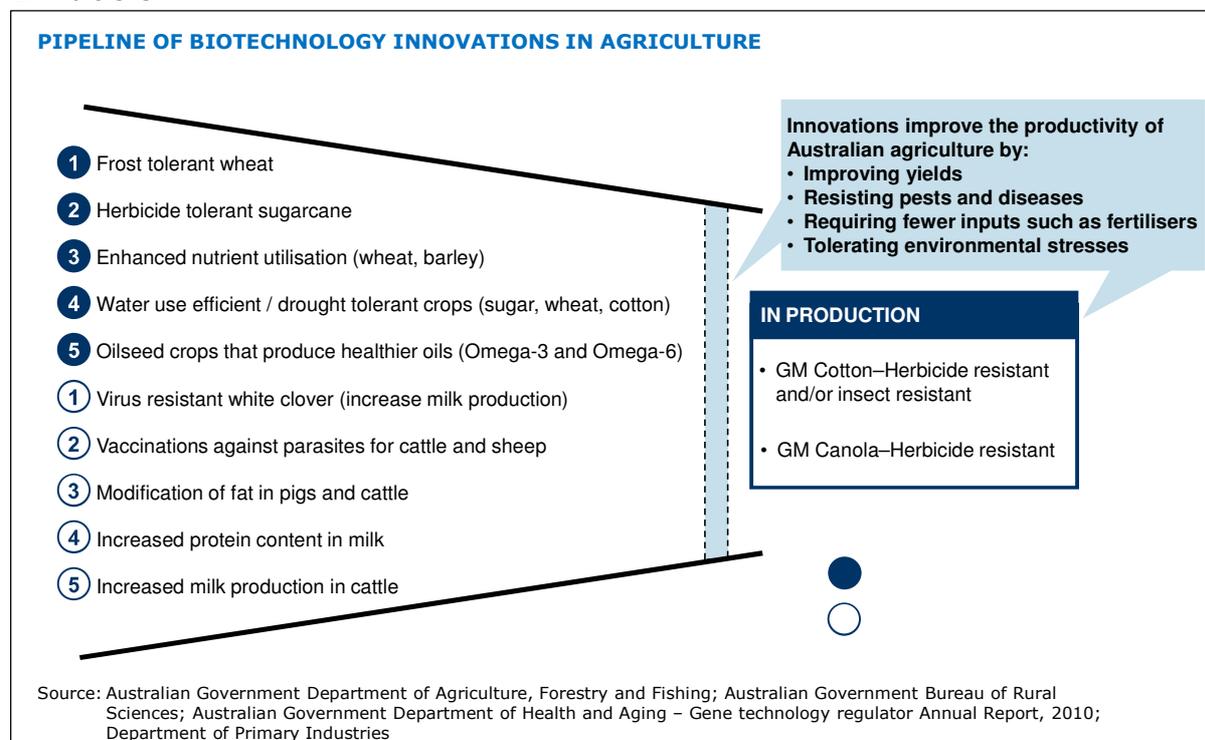
Innovations in agriculture can increase productivity, for example, by improving yields, increasing resistance to pests and diseases, reducing the need for fertilisers and other inputs and increasing tolerance for environmental stresses such as drought or frost. Historically the clover pasture revolution alongside increased application in fertiliser (‘super and sub’) resulted in massive increases in agricultural productivity. This process has largely run its course, but new technologies can provide the next wave of productivity gains. Australia has successfully brought new crops into production in the past (e.g. genetically modified cotton and canola)³⁵, and there are numerous biotechnology innovations in the pipeline (Exhibit 5.5). Australia’s ability to develop and

³⁴ The exception to this is the lost productivity from protection of agricultural sectors, particularly in the US and Europe.

³⁵ Australian Bureau of Rural Sciences, “Science for Decision Makers”, December 2009.

willingness to initiate R&D as well as adopt new technologies, given these matters are still subject to public debate, will determine its potential to compete in this area.

Exhibit 5.5



Australia may also have the advantage (along with a limited number of other regions in the world), of being able to bring some additional land and water into production. For instance, Northern Australia has abundant water available that could be used to increase Australia’s agricultural production³⁶. While this could provide a one-off increase, technology will provide continuing improvement to productivity.

There have been concerns over the effect on Australian agriculture of the Australian Government’s \$3.1 billion Murray-Darling Basin Buyback Scheme which plans to rebalance the allocation of water from irrigation toward environmental assets. While the first tranche (\$1.5 billion) of the buyback scheme is expected to have a significant effect on some regions in the Basin, the overall effects at a sector level are expected to be relatively modest³⁷. At the same time, there are clearly benefits in finding ways to meet environmental asset targets with less water, freeing up more water for agriculture.

5.4 SEEING THROUGH THE VOLATILITY

This shift to volume growth (rather than price increases) as a recognised source of opportunity will create a new dynamic. The global race to bring on new supply to meet demand growth will be intense, only tempered by the scale of the risks involved.

³⁶ Although see “Sustainable development of northern Australia”, Northern Australia Sustainable Development Task Force, February 2009, which argues that there is little potential in Northern Australia.

³⁷ “The Australian Government Environmental Water Purchase Program” ABARE, 2010.

While the transformation of the developing world will continue to drive sustained demand growth in natural resources, this demand growth may not be smooth. Most industries are working at the steep end of their supply curves, which means that small mismatches between supply and demand can have large effects on price. The chance of continual mismatches between supply and demand is high. Australia should therefore prepare for sustained volatility.

It was evident during the GFC that a number of players reacted when prices temporarily dropped and financial conditions tightened. The most successful competitors during that time period held their nerve, keeping an eye to the fundamental drivers of demand and the longer-term opportunities that they create. The volatility and uncertainty of the new environment may create discomfort for governments.

Export price volatility will need to be well managed to avoid causing uncertainty in domestic employment, activity and investment.

5.5 MANAGING THE RISK OF CROWDING OUT

Without significant new economic capacity, there is a risk that non-resource sectors of the economy, including domestic (non-resource oriented) manufacturing, are crowded out by the movement of labour and capital toward capital-intensive natural resource sectors and, in places, by a stronger Australian dollar. This risk would see the benefits of resource sector volume growth being restricted to a smaller proportion of the Australian economy than is otherwise necessary. We return to this in the next chapter.

6.0 MAXIMISING BENEFITS THROUGH A WHOLE-OF-ECONOMY APPROACH

KEY THEMES:

- *Capturing the full potential of the opportunity requires a coordinated whole-of-economy approach to address potential supply-side bottlenecks.*
- *Success will require the formation of new economic capacity.*
- *Potential challenges include:*
 - *Crowding out non-commodity export and import competing activity that would otherwise prosper – the debate over ‘winners and losers’.*
 - *Missing the full potential of the opportunity as Australian commodity producers compete with each other for scarce resources.*

Many argue that the risk of crowding out or the ‘resource curse’ demands caution. According to this view, rapid growth in capital intensive natural resources sectors crowds out other sectors (particularly manufacturing) and risks the creation of a two-speed economy with disproportionate benefits accruing to capital rather than labour³⁸. This chapter develops a framework for thinking about crowding out in the economy, arguing that a coordinated response across all governments, business and the community can minimise the impact and capture a disproportionate share of the prize for Australia.

6.1 SHIFTING THE POLICY RESPONSE TOWARD NEW ECONOMIC CAPACITY

The Australian Government Treasury has acknowledged that the impact of the commodity export opportunity is heavily dependent on policy settings³⁹. The rapid growth in economic activity to support increased commodity production and investment can be managed in a range of ways.

1. **Slow growth:** This means discouraging the pace of development of Australian commodity industries to moderate crowding out and the development of a multi-speed economy. This means deliberately ‘giving away’ some of the opportunity to minimise the restructuring required. The rationale for this is to soften the impact of the reallocation of income and resources driven by such a significant structural change⁴⁰.
2. **Reallocate and redistribute:** This option involves allowing business and markets to reallocate labour, capital, technology and land access whilst ‘compensating’ those who suffer as a result. It is essentially the default option which comes about in the absence of capacity growth.

³⁸ “The Fiscal and Economic Outlook”, Ken Henry, Australian Government Treasury, 16 May 2006; “The Shape of Things to Come: Long Run Forces Affecting the Australian Economy in Coming Decades”, Ken Henry, 22 October 2009.

³⁹ See for example Ken Henry, 14 August 2006, “Economic policies to address global pressures”, Address to Australian Industry Group Annual National Forum, Canberra.

⁴⁰ Robert Gottlieb, “Deflating our mining expectations”, *Business Spectator*, 14 June 2011.

In this option, well-functioning markets for labour, capital, technology and land access will do this work. This reallocation of factors of production is reliant on a strategic response from business to price signals for the factors of production (e.g. higher wages, capital costs and land costs). Government's only role is to make sure these markets are working properly, without distortions from Government policy or market failure⁴¹.

Under this option there is a limited supply of labour, capital and other factors of production. This means that exchange rates will rise and inflationary pressures will increase as these limits are reached. As inflation increases, the Reserve Bank of Australia is likely to increase interest rates to control inflation. This in turn can lead to industrial relations pressures and upward pressure on wages.

This option may result in the crowding out of trade exposed businesses outside of the commodity sector. Marginal opportunities and production in the commodity sectors may also suffer. As a result, this option will inevitably lead to calls for a reallocation of wealth from those benefiting from growth to those suffering. These transitional costs can be regional or sector based, and facilitated through taxes or royalties. This was part of the rationale underpinning the original Resource Super Profit Tax when it was proposed in 2010⁴².

3. Build capacity to enable growth: This option involves encouraging the pace of growth in commodities and related services whilst also proactively limiting the impact on other sectors in two ways. First, the need to reallocate resources away from non-commodity industries can be reduced by adding supply-side capacity (skilled labour, capital, land access and technology) to help capture the opportunity. Second, capacity can be added by accelerating and streamlining development processes and enacting other supportive policies (e.g. less expansive fiscal policy, tax, encouragement of foreign investment).

While no-one is seriously proposing the first option, at times journalists have detected sympathy to slowing the break-neck pace of growth in commodity export revenues. It is hard to see why anyone would actively discourage rapid growth, when it provides no shortage of new wealth to be shared across Australia.

The second option leaves a significant opportunity on the table and results in a less balanced distribution of benefits. The strength of the competitive response to the rapid demand growth in other countries means that allowing factor input costs to rise and stay high will crowd out some of the commodity opportunity itself. For example, Australia might see more marginal (but still attractive) growth opportunities disappearing offshore. It will also mean more significant crowding out of less fortunate sectors because there will be less economic capacity to simultaneously support the growth of

⁴¹ Usually this sort of encouragement is made necessary by regulatory rigidities in the first place, such as unemployment benefits for the unemployed who are not willing to move to find work.

⁴² See Dennis Shanahan, *Rudd's Reform push ends in political nightmare*, *The Australian*, 1 May 2010: "A growing resources sector will draw capital and workers to the mining states, increasing pressure on other industries and regions as they compete for employees and investment . . . Unless we recognise these challenges, Australia risks becoming a two-speed economy as the resources sector absorbs more capital and labour, while manufacturing and other industries suffer a relative decline in competitiveness."

commodity sectors while continuing to support other sectors. The transmission mechanisms for crowding out will be higher exchange rates and higher costs of labour and capital.

Port Jackson Partners' analysis indicates that while there is clearly not a pure 'either/or' choice between these options (particularly between reallocation/redistribution and building capacity), a response that is biased toward adding to the capacity of the economy (option 3) has significant advantages over the other options.

First, it provides Australia with the best chance to maximise its share of the opportunity versus international competitors. Second, it ensures that Australia captures the opportunity with the least impact on trade exposed non-commodity sectors. Given the pace of the structural shift required, some crowding out is inevitable, but it can be limited. The more Australia can increase its supply of labour, capital and technology to meet the increased demand, the less crowding out that will result. A larger working population requires enhanced infrastructure (housing, transport, utilities etc.). Increased capital requirements call for a secure political environment, open access and encouragement to offshore capital and liquid, effective capital markets. Faster rates of productivity growth and technology uptake require rapid access to new technologies, free-functioning labour markets and a broad base of suitably skilled people.

BOX 6.1: THE GREGORY THESIS AND CROWDING OUT

The debate about crowding out is not new. In 1976, Robert Gregory put forward the thesis that growth in an export oriented sector had an impact on other export oriented and import competing sectors⁴³. The essence of the argument is that some combination of input inflation (particularly labour costs and interest rates) and appreciation of the exchange rate results in reduced competitiveness for sectors competing on international markets which don't have improved pricing prospects. This is particularly true of Australia's non-resource manufacturing, tourism and tertiary education sectors.

Two points need to be made about the Gregory thesis and crowding out more generally.

First, in the original formulation Gregory was not arguing that the surge in growth of the minerals sector was 'bad', simply that it would result in significant restructuring of the economy. Deloitte has recently argued that some divergence in economic growth across regions and sectors of the Australian economy is quite normal and part of the natural process of increasing prosperity⁴⁴.

Second, Gregory's original formulation did not allow for the impact of a co-ordinated increase in the economic capacity of the country (through increased labour supply, sources of capital and total factor productivity). This is a critical point – the crowding out effect can be significantly alleviated if there is spare capacity or enough new economic capacity can be added.

Whatever our position on the Gregory thesis, it is clearly true that in the absence of significant adjustment, some of the benefits of rapid growth in commodity export revenues could be offset by losses elsewhere and there is a risk that benefits will be restricted to a smaller proportion of the economy than is necessary⁴⁵. Worse than this, the rising Australian dollar and rising input costs (including wages in key regions, such as the Pilbara in WA) threaten to derail commodity export growth itself, handing the opportunity to countries with fewer cost pressures. Appropriate responses to add economic capacity have the potential to alleviate these pressures, and these responses are obvious themes for a broad national discussion.

6.2 REALISING THE OPPORTUNITY THROUGH A WHOLE-OF-ECONOMY RESPONSE

Enabling growth is best realised by a whole-of-economy response which must be considered in two ways. First, it is important not to focus on one part of the economy at the expense of the rest. Australia has the opportunity to support the commodity-exposed sectors of its economy to capture the opportunity available. At the same time Australia can focus on those sectors of the economy not able to participate in this opportunity to mitigate the potential damage inflicted on them if the required capacity is not made

⁴³ RG Gregory, "Some Implications for the Growth in the Mineral Sector", *The Australian Journal of Agricultural Economics*, Vol 20, number 2, August 1976.

⁴⁴ Deloitte, Minerals Council of Australia – 'Clouds in the silver lining? The two speed economy and Dutch Disease', May 2010.

⁴⁵ Indeed, economist Ed Shann has pointed out that we may create a three track economy – resources (growing fast), non-traded services benefiting from higher incomes and other export and import competing sectors and services growing slowest due to competitive pressures. ('Leaders have lost their way on economic reform', *Australian Financial Review*, 5 January 2011).

available. Second, to achieve this would require a coordinated strategy across all levels of government, business and the broader community.

For instance, just increasing the supply of skilled people to deliver and operate major new projects requires coordination across many different private and public sector organisations. A whole-of economy response would require:

- Governments (State, Federal and even Local) to support the rapid growth of economic capacity - labour, finance, technology and productivity - use of land for development (mining or agricultural) and supporting policies in other areas (e.g. fiscal and monetary policy).
- Businesses that are willing to work with government to define exactly what is needed, and are able to develop the organisational capacity to deliver growth (including skills, processes, systems and so on).
- Communities aligned with the overall objective of rapid growth in commodity export capacity and all that entails (including land development, use of natural resources such as water, increasing workforce, accelerated use of new technologies).

It is overly simplistic to say that the market will, on its own, build the capacity to enable growth. In time, that may be true. However, Australia's competitors are taking a much more active approach. Countries such as Brazil, Mongolia, Guinea, Peru and others are beginning to embark on more co-ordinated whole-of-economy responses. There is increasing recognition that once a project is delayed, Australia risks losing volumes to a competitor. When geological resources are not scarce, speed determines who wins share between low cost competitors.

In order to realise the full potential of this opportunity while limiting the impact on non-resources sectors, Australia needs to create significant additional economic capacity in a short period of time. This may come from a combination of removing barriers and implementing new arrangements to build capacity. This will require the right workforce and capabilities, access to sufficient capital, easy access to the right technologies and accelerated land access. It will require a supportive political and macroeconomic environment, along with transparent and rapid approval processes and supportive environmental policies.

In some ways the reform agenda required could be seen as a new form of industry policy, which was strongly discouraged during the last period of economic reform in Australia. However, this type of industry policy does not involve subsidies, tariffs or other forms of protection, but a supportive set of economic policies that knock down barriers to growth, with an aligned response from business and communities.

6.3 THE FOUR FACTOR INPUTS REQUIRED TO CREATE CAPACITY

There are four key factors of production which contribute to an economy: labour, capital, technology and natural resources. Australia has the opportunity to create and attract new capacity in all these areas to take advantage of the opportunity while minimising any downside risk to the economy. To add capacity in each of these areas will involve overcoming concerns about the unknown and new ways of doing things including: immigration and changing work practices, foreign investment, new technology and

changes in land use within local communities. If these concerns are not overcome, Australia risks missing out on the opportunity and the associated benefits.

6.3.1 Establishing the labour force to deliver growth

Establishing a labour force with the capabilities and skills necessary to develop and operate these large new projects is a top priority. The recent rapid increase in the resource project pipeline illustrates that Australia has not needed a workforce of this scale in the past, particularly a workforce capable of executing a large number of mega projects in parallel. The establishment of such a workforce quickly can help to mitigate continued upward pressure on costs, and a potential loss of competitiveness. The question is how do we increase the size of the skilled labour force necessary to meet the opportunity? (Box 6.2)

BOX 6.2: ESTABLISHING AN APPROPRIATE LABOUR FORCE – KEY ISSUES AND PERSPECTIVES

Key issues	Some perspectives and questions
What is the size and skill-set of the additional labour force necessary to capture this opportunity?	<ul style="list-style-type: none"> At least 750,000 new jobs will be created over the full 20 years of the analysis, based on current production/labour ratios of these sectors. This estimate is likely to increase significantly as the labour requirements of new investment become clearer The composition of the workforce is a key issue, not just the size Possible sources of this workforce to consider include: immigration, retraining, increased participation rates, reduced unemployment and underemployment
How can Australia align education and training with the opportunity?	<ul style="list-style-type: none"> This is an issue for the whole higher education sector, not just for technical education How can the universities re-establish a focus in areas such as agronomy, geology, mining engineering and resource economics? How can universities and the private sector work together to educate the skilled people required?
How can increased participation rates support the opportunity?	<ul style="list-style-type: none"> What tax and welfare reforms may be required to increase participation? What changes might be needed to support an ageing workforce or one with higher female participation?
How can Australia encourage the increased mobility necessary to support the opportunity?	<ul style="list-style-type: none"> What labour market arrangements might be needed to attract skilled labour to remote projects without causing national wage pressure? How much of the remote workforce can be provided by fly-in-fly-out versus permanent relocation?
What changes are necessary to Australia's industrial relations system to ensure this opportunity is not threatened by industrial disputation or growth in real wages ahead of productivity gains?	<ul style="list-style-type: none"> During the 1970s and 1980s industrial disputes in the iron ore sector caused damage to Australia's reputation in Japan Changes may be needed to ensure Australia can capture this opportunity ahead of its competitors
What are the strategic human resources implications for Australian businesses?	<ul style="list-style-type: none"> Australian businesses may face a renewed 'war for talent' What recruiting, development and retention strategies are required? What role is there for Government in accessing people from offshore?

6.3.2 Financing growth and the foreign ownership debate

In recent times Australia has engaged in vigorous debate about the sources of capital for natural resource investment, for example the proposed deal between Rio Tinto and Chinalco, a state owned Chinese aluminium and mining company. More recently, foreign ownership of Australian farms has become an emotive issue⁴⁶. These debates are not new, for example the debate over Japanese investment in the 1970s and 1980s⁴⁷.

⁴⁶ For example, ABC News 'Selling the Farm', August 2010.

⁴⁷ For instance, the Sydney Morning Herald wrote during the 1980s: "Japan's 20 biggest companies could buy the entire State of NSW using just one year's profits" – 23 May, 1987; "...the Japanese today have become what they call Japan Incorporated" – 17 July 1983. The Australian Financial Review wrote "the local community begins to feel foreigners [Japanese] are not playing fair and square" – 7 April 1988.

The reality is that Australia does not save enough to finance growth in its natural resource industries. Australia has relied heavily on foreign investment, even at times of far slower growth. In addition, capital from developed countries is harder to come by, as the debt fuelled investment of the last decade dries up. However, alternative sources of capital (including from China and Singapore) are often closely tied to governments, with non-commercial objectives. Nonetheless, these sources of capital can be plentiful and cheap.

In agriculture, the need for new sources of capital is particularly acute. Farms have traditionally relied on family financing. However, as the sector consolidates and becomes more professional in its management practices, new sources of capital are necessary to match the best operators in the sector with large scale operations. Traditional wholly family-owned farms, with pressures from children leaving the farm and limited scale, may struggle to meet the capital requirements of the opportunity.

Government can also play a role in facilitating investment. For example, reducing expansionary fiscal policy settings would reduce constraints on providing investment capital. Changes in taxation policy can also deter investment. One prevalent question is whether Australia should create a 'sovereign wealth fund', into which some of the returns from resource sector-driven growth are invested for the benefit of future generations. This is an important issue worthy of debate and that debate should include questions such as whether such a fund should be focused on domestic investment in long-run assets that contribute to future capacity creation (e.g. infrastructure), versus having a more traditional investment focus. Box 6.3 poses key questions related to financing the opportunity and offers perspectives on each.

BOX 6.3: FINANCING THE OPPORTUNITY – KEY ISSUES AND PERSPECTIVES

Key issues	Some perspectives and questions
Where will the capital come from to support this growth?	<ul style="list-style-type: none"> • Global capital markets post-GFC are still taking shape, but new dynamics are emerging • Savings rates in the developed world have risen, but risk aversion has increased and leverage finance is out of fashion • Changing global demographics are expected to increase the costs of capital
How does Australia attract the required investment and avoid raising the cost of capital in Australia?	<ul style="list-style-type: none"> • How should Australia evaluate new sources such as foreign sovereign wealth funds? • Should Australia consider encouraging higher levels of domestic savings to support commodities growth? • How can Government use fiscal policy and tax policy to encourage savings and investment?
Should Australia revisit its Foreign Investment Review processes?	<ul style="list-style-type: none"> • Is the balance right between attracting sufficient capital and protecting the national interest? • How should Australia deal with capital closely tied to governments in customer markets?
Is there a role for an Australian 'sovereign wealth fund' to reinvest some of the fiscal returns from growth?	<ul style="list-style-type: none"> • Has the advantage of creating fiscal discipline • One key issue is whether such a fund should invest in longer run domestic assets that contribute to additional future capacity (e.g. infrastructure), versus making more traditional capital markets investments
What role can Australian banks and capital markets play in supporting this opportunity?	<ul style="list-style-type: none"> • The challenge for the banks is to finance the growth of the economy as well as the more traditional mortgage and consumer lending sectors • Does Australia have the depth of debt capital markets to support the growth of these sectors?
How might Australia increase the level of investment in agriculture?	<ul style="list-style-type: none"> • Agriculture has traditionally self-financed its growth but this model may not be sustainable • Can new financing models such as equity partnerships and leasing emerge fast enough to support growth?

6.3.3 Accelerating productivity: technology, innovation and R&D

Australia's rate of growth of total factor productivity has slowed in recent years, and natural resource sectors are no exception⁴⁸. In fact, multifactor productivity has declined since 2003-04 after a rapid surge during the 1990s, which has partially offset productivity improvements arising from 'capital deepening' (i.e. increases in the capital to labour ratio)⁴⁹. Today, Australia faces an increasing need to re-establish the productivity gains of the 1990s. In minerals and energy, despite relatively high quality resources, Australia faces ongoing grade declines in some regions. Combined with significant workforce requirements, productivity is critical to realising the full potential of the growth opportunity.

In the case of agriculture, most volume increases have always come from productivity gains, driven by new practices and emerging technologies. It is difficult to add substantial new land and water to our agricultural resource base, so growth in agriculture is critically dependent on producing more from the same base of land and water. In agriculture, there has been a global shift away from investment in productivity-enhancing R&D, and this has created challenges for reactivating rapid growth in the sector. There are also concerns about some new technologies which have the potential to increase productivity. It will be necessary to resolve these concerns if we wish to improve the output of the land and water we have available. Box 6.4 presents key issues about enabling growth and offers some perspectives to stimulate discussion about how to address them.

BOX 6.4: ENABLING GROWTH WITH TECHNOLOGY, INNOVATION AND R&D – ISSUES AND PERSPECTIVES

Key issues	Some perspectives and questions
<p>What has driven the slowdown of total factor productivity in Australia's natural resource industries and how can this be addressed?</p>	<ul style="list-style-type: none"> • Some required breakthroughs could simply involve integrating existing technologies e.g. Rio Tinto's remote operations centre in Perth, which serves the Pilbara from over 1,500km away • Possible improvements include: <ul style="list-style-type: none"> – Can Australia counter falling ore grades with better mining technologies such as automated vehicles or autonomous drills? – Could Australia address falling rates of productivity growth in agriculture with emerging biotechnology breakthroughs or better use of remote sensing and GPS technologies?
<p>How might Australia re-establish its pre-eminent position in natural resource R&D, particularly for agriculture?</p>	<ul style="list-style-type: none"> • Historically Australia led the world in R&D for commodity industries, particularly in agriculture • Could the CSIRO establish a new 'flagship' program, coordinating new investment in research in agriculture and mining productivity?
<p>How does Australia build new R&D partnerships with consumer countries (e.g. India and China?)</p>	<ul style="list-style-type: none"> • Customer countries are increasingly interested in investing in R&D to improve access to resources • China and India are good candidates to work with Australia
<p>How can Australia best facilitate the development of globally competitive service clusters in energy, mining and agriculture, supporting productivity gains in these sectors?</p>	<ul style="list-style-type: none"> • Developing a globally competitive natural resource cluster should deliver accelerated productivity gains for commodity exporters. High levels of productivity are in fact central to the success of a cluster

⁴⁸ 'Australia's Productivity Performance', Saul Eslake, Seminar Presentation to Australian Treasury, September 2010.

⁴⁹ 'Sustaining Growth in Living Standards in the Asian Century', Dr Martin Parkinson, Gala Address to the Melbourne Institute Economic and Social Outlook Conference, June 2011.

6.3.4 Accelerated planning approvals and land and water access

Central to capturing growth in commodity exports is the need to accelerate planning approvals as well as land and water access for mining and farming. Planning approvals are a difficult issue, and will always be subject to differing responses from local communities and other interest groups.

Creating as much certainty as early as possible in the process is critical to encouraging future investment. In many ways certainty is far more important than giving complete freedom to deal with land as miners and farmers see fit. This can be achieved by establishing clear guidelines in each region as to which areas are acceptable for development and which areas are not. These clear guidelines can also provide certainty and address fears for local communities concerned about changes in land use.

To achieve this certainty, Government planning departments will need to continue increasing their skill sets and resourcing to deal with the increased number of applications. Part of the answer here may lie with the private sector working with communities and planning departments to bring the approval process forward as far as possible. This may be best done by seeking approval for a portfolio or series of projects rather than individual projects independent of each other. Planners will need clearer, simpler pre-set guidelines as to what will be acceptable, and what will not.

6.4 OTHER ENABLERS

In a number of other areas, a coordinated response is required. Taxation policy can do more to encourage investment, whilst ensuring that Australia does benefit from this opportunity. Foreign policy and trade policy need to be aligned with our trade and investment partners. Trade policy can also continue to help open up new markets for our agricultural products. Environmental policies will need to balance achieving environmental objectives with encouraging investment. Water policy will need to be set such that it does not inhibit productivity gains. Box 6.5 outlines some of these key issues.

BOX 6.5: MACROECONOMIC AND OTHER REGULATORY SETTINGS – KEY ISSUES AND PERSPECTIVES

Key issues	Some perspectives and questions
What fiscal settings are necessary to minimise crowding out and cushion the inevitable volatility?	<ul style="list-style-type: none"> • Should Government spending be scaled back as private sector investment increases? • How can fiscal policy be used to cushion against the volatility expected as exposure to commodities increases? • What is the best way to manage volatile government income?
How do Australia align competition and trade policy with its interests?	<ul style="list-style-type: none"> • How can Australia best approach competition policy relating to export infrastructure, and mergers and acquisitions? What changes may be needed if it is viewed through the lens of the export opportunity? • How can trade policy be used to open up as many opportunities as possible for Australia, particularly for agriculture?
How does Australia manage the inflationary pressure that may surface as it has during mining booms of the past?	<ul style="list-style-type: none"> • How should monetary policy be set to encourage building new economic capacity while containing inflationary pressure?
What infrastructure is necessary to support this larger workforce and increased bulk exports?	<ul style="list-style-type: none"> • What regulatory settings may need to be changed to expand export infrastructure quickly? • How can Australia create the required social infrastructure (schools, hospitals, housing) and local economic infrastructure (local roads, water, electricity, local transports) to support the expected growth?
How does Australia provide water for key environmental assets while minimising the impact on agricultural production?	<ul style="list-style-type: none"> • The value of water has risen as agricultural commodity prices have increased • What innovations could minimise the amount of water required to meet legitimate environmental targets?
How does Australia meet its international carbon reduction obligations while minimising the impact on its natural resource export opportunities?	<ul style="list-style-type: none"> • Australia is unusual in being a major commodity exporter with a heavy reliance on coal fired electricity • How can Australia reduce its carbon emissions without penalising Australian commodity exporters versus their competitors?
What are the foreign policy implications of increasingly aligning Australia's trade and investment relationships with the developing world, particularly China?	<ul style="list-style-type: none"> • How does Australia resolve any emerging tensions?

6.5 AN URGENT NEED FOR BROAD REACHING COORDINATED ACTION

Many of the questions outlined in this chapter are not new, and work is being done to resolve at least some of them. However, the debate so far has not recognised the scale and nature of the opportunity that makes consideration of these issues critical. Success will require initiatives to support the formation of new economic capacity, business strategies to build that capacity and use it for growth, and community alignment with the increased development required to support a fast growing economy. If Australia fails to achieve a coordinated response across all these areas it can expect to leave an enormous opportunity on the table.

7.0 THE UNDERLYING FORCES AT WORK - DEMAND

KEY THEMES:

- *Demand growth for most natural resources is strongest as countries move from US\$2,000-10,000 per capita. China is at this critical income level and India is moving towards it.*
- *Demand for agricultural land and water rises with increasing income levels, as diets shift to more resource-intensive foods and calorie consumption increases.*
- *Emissions intensity of economic growth is higher in the developing world than in the developed world, but this is unlikely to slow growth in commodity demand.*
- *Risks to commodity demand growth exist, particularly in the short term, but are most likely to drive volatility, rather than a change in the trend.*

At the heart of the opportunity for Australia is a sustained surge in demand for raw materials, driven by the aspirations of the developing world. Conventional economic theory has always predicted various versions of economic convergence – poorer countries catching up to the income levels of wealthier countries. In many parts of the world, this is now happening. As it does, the world is witnessing a surge in demand for the basic materials (minerals, energy, and food) necessary to house and feed a growing global middle class. While this process is not entirely preordained, and there are risks, the momentum is very strong.

7.1 ECONOMIC CONVERGENCE OF THE DEVELOPING WORLD – THEORY TO REALITY?

Since 2000, the nature of global economic growth has been turned upside down (Exhibit 7.1). Until then, global growth was primarily driven by the developed world with about two thirds of growth coming from the developed world, and one third from the developing world. Between 2000 and 2010, this pattern was turned on its head. In the five years to 2010, almost three quarters of global growth came from the developing world. Long-term forecasters typically believe that this trend will be sustained (see Exhibit 7.2).

Exhibit 7.1

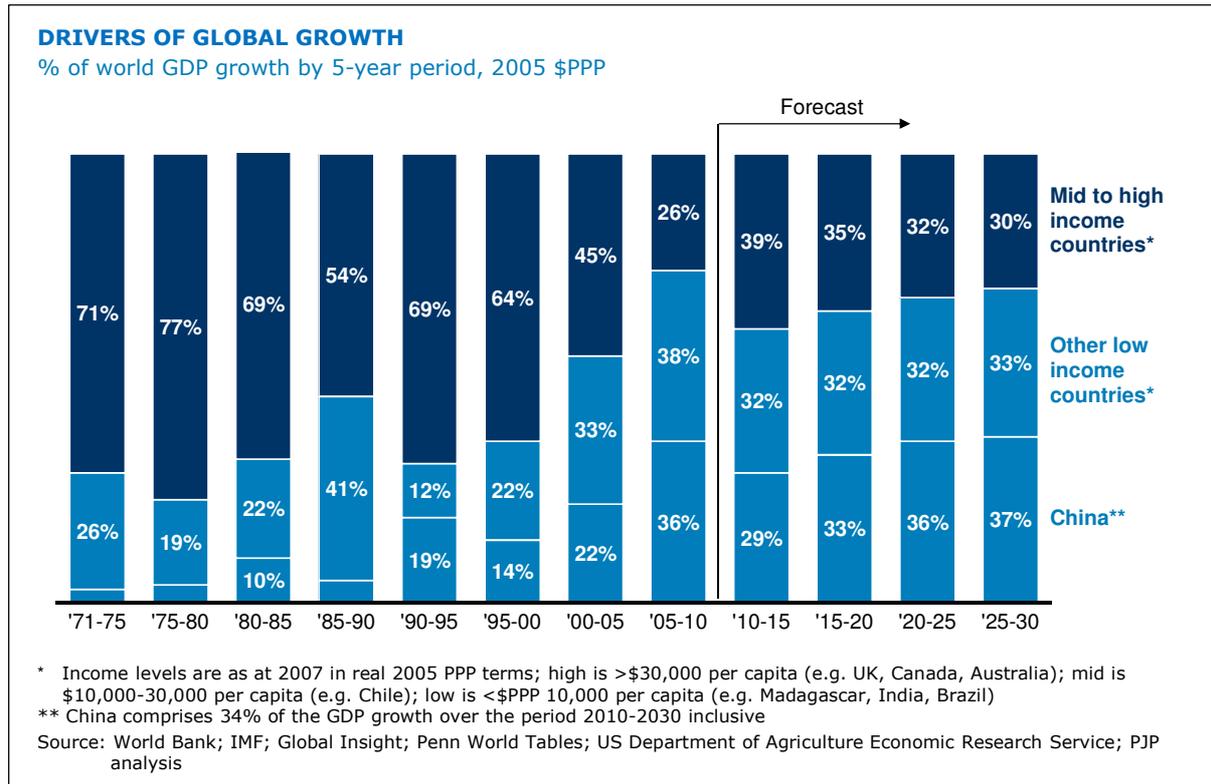
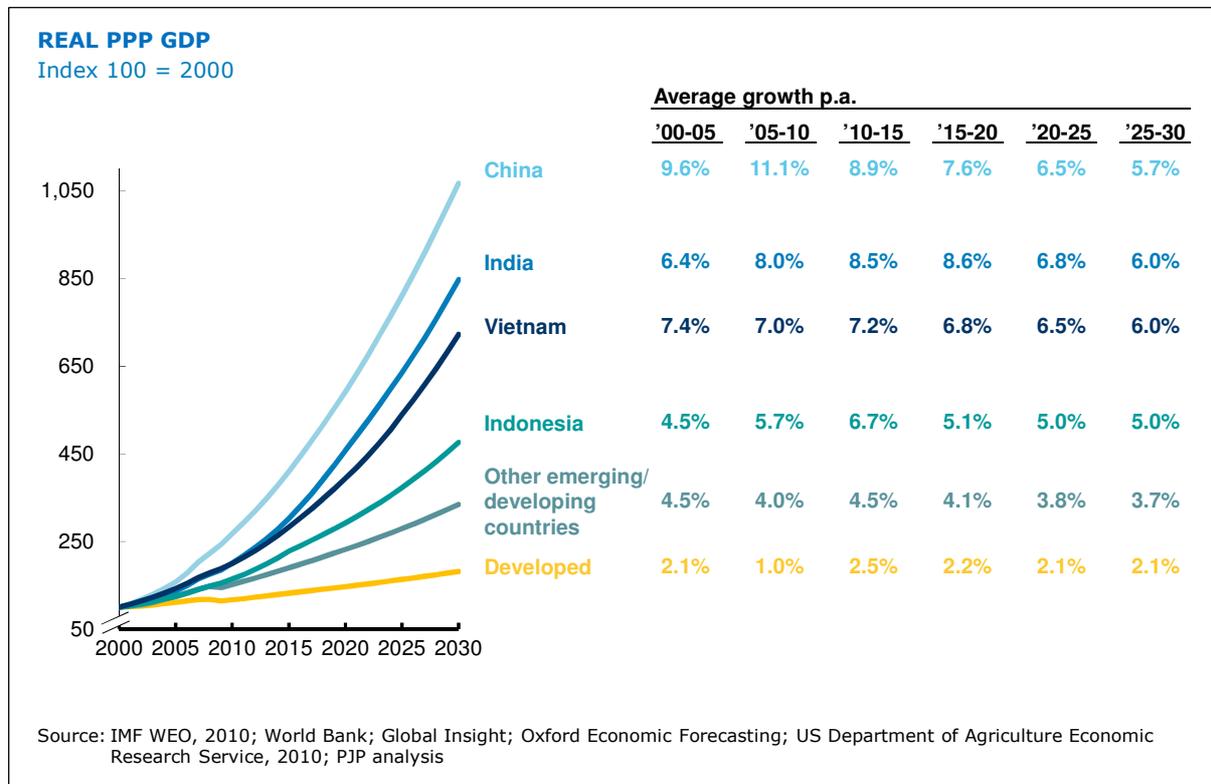


Exhibit 7.2



Perhaps the most surprising aspect of this convergence is how long it took to occur. Most elementary models of economic growth conclude that the GDP per capita of countries with lower capital stocks and wages should, all other things being equal, trend towards higher wealth countries (with adjustments due to the idiosyncrasies of each country). This means that the developing world countries should experience higher economic growth rates than the developed world countries during the catch-up phase. This process involves investment, transfer of technology, education and training, and all the institutional settings that make these things possible. Historically, however, this relationship did not generally hold true. The exception was across relatively homogenous countries or regions (e.g. across OECD countries or across the US)⁵⁰. However since 2000, the theory seems to have started to play out.

Why is this happening now? China is an important part of the story. Between 2005 and 2010 China was responsible for more than a third of global growth, and its average annual real growth rate was around 11% in purchasing power parity terms. But the growth extends well beyond China. India, South East Asia, South America, parts of Eastern Europe and even parts of Africa have experienced growth rates well above OECD levels. For example, average annual real growth rates in purchasing power parity terms for India, Vietnam and Indonesia were 8.0%, 7.0% and 5.7% respectively compared to 1.0% for developed countries over this timeframe. Over time, the expectation is that China will play a less important role, and other emerging economies, such as India, will become more important.

Convergence is now also happening within countries and closely related regions. This will provide a further stimulus to growth prospects. This sort of growth has enormous inertia. For instance, we can expect to see gradual convergence across the provinces of China, as the Government supports growth of the inland provinces to catch up with the wealthier coastal provinces.

Whatever the causes of convergence are (see Box 7.1) there is a strong enough consensus that it will continue, even if the process is not smooth. For the purposes of this work, Port Jackson Partners has accepted this proposition as a starting point, at least for key countries and regions including China, India, South East Asia and Brazil⁵¹. Port Jackson Partners' estimates of future economic growth rely on a range of credible sources outlined in Exhibit 7.2. While these assumed growth rates for large developing world countries are strong, the estimates are still relatively conservative compared to recent history. Central to these forecasts is a progressive slowdown in the rate of Chinese and Indian growth, with Indian growth never reaching the giddy heights of double digit Chinese growth. By comparison, the developed world, is forecast to grow at relatively low rates of around 2% per year.

⁵⁰ Barro and Sala-i-Martin, *Economic Growth*, 2004, pages 45-47.

⁵¹ For the purposes of the analysis in this paper we have used economic growth forecasts from third parties. These models are built from theories of "conditional convergence".

BOX 7.1: POSSIBLE CAUSES OF ACCELERATING ECONOMIC CONVERGENCE

Given that the evidence for convergence⁵² is strengthening, it is reasonable to speculate about root causes. These include:

- Increased understanding amongst developing world leaders of the drivers of economic growth, particularly the required institutional settings (e.g. property rights), the role of infrastructure and education, the importance of investment and the role of technology and productivity.
- A broader set of successful templates for economic development, from Japan, South Korea, South East Asia, the US and Europe, including recognition that import substitution policies and excessive focus on redistribution did not work.
- Increasing pressure to deliver increased prosperity through liberalising their economies: poverty has fallen 'out of fashion'. This, in turn, is probably driven by increased understanding of wealth disparities in the developing world through the use of information technology (particularly through the mobilisation of dissatisfied populations).
- Widespread acceptance of the importance of establishing a market economy to deliver increased prosperity.
- Lower trade barriers around the world, along with better transport and communication links, have allowed export oriented growth strategies to flourish.
- Increased access to the knowledge, skills and technology of the developed world through the information and communications revolution.

7.2 "EARTH" AND "FIRE": SUSTAINED DEMAND GROWTH FOR MINERALS AND ENERGY

Demand for minerals and energy is primarily driven by two processes: urbanisation and industrialisation. Demand growth for most of the large natural resource sectors is strongest as countries move from around US\$2,000-3,000 per capita up to US\$10,000-15,000.

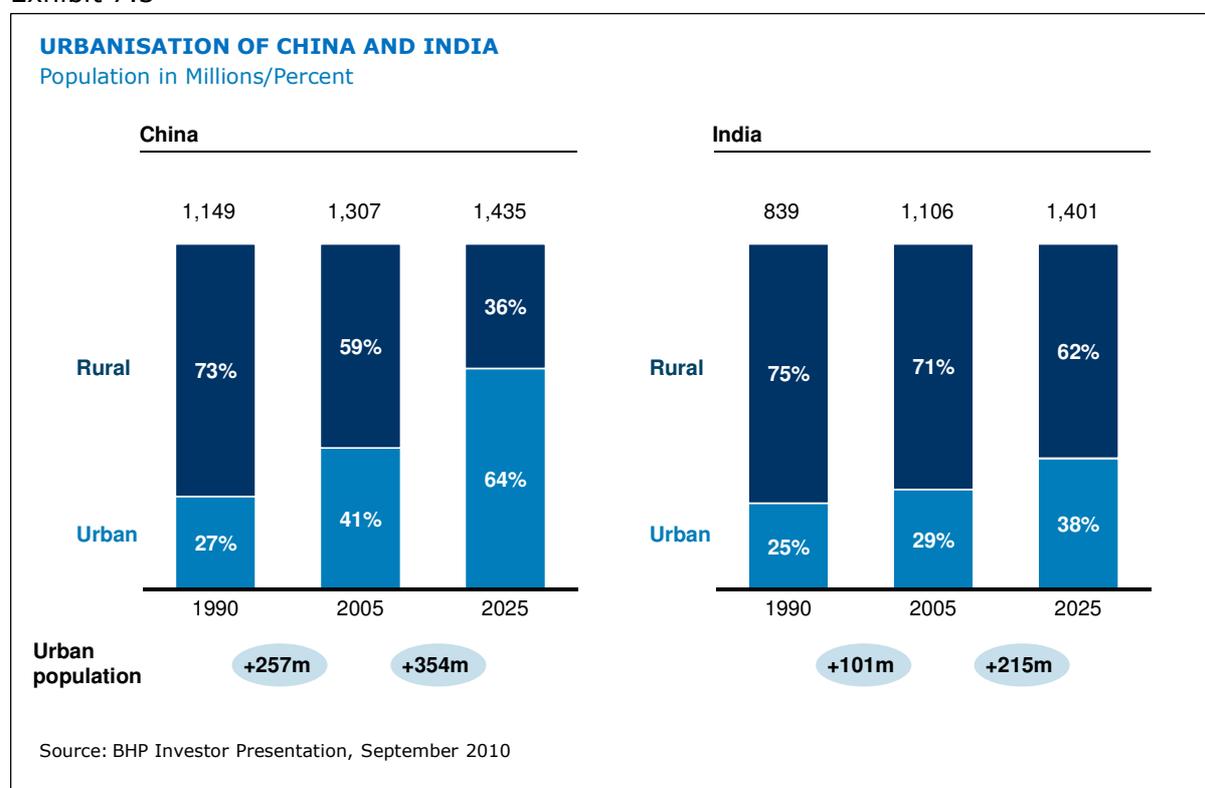
Urbanisation. Large portions of the population typically move from rural areas to the cities as a result of agricultural productivity gains. This drives rapid growth of essential urban infrastructure such as housing, roads, rail, water, electricity and heating. Exhibit 7.3 shows that urbanisation has been growing in China and India. This is expected to continue. In China this represents around 15-20 million people per year moving to urban areas, whereas in India it is closer to 10 million. Across the world, expectations are that close to 70 million people will be added to the urban population every year from 2010 to

⁵² In reality, this process is likely to be what economists call "conditional convergence" - that is, convergence conditioned by the particular circumstances of individual countries (e.g. propensity to save).

2050 (more than three times the population of Australia)⁵³, or 2.8 billion people in total. This process is enormously resource intensive, because the infrastructure required uses copious amounts of steel (e.g. buildings, transport infrastructure) and copper (e.g. electricity grids), and involves heavy use of energy.

Industrialisation. Along with urbanisation, economic development is inevitably linked to some level of industrialisation. Historically, economies have progressively moved from primary (agrarian) to secondary (industrial) to tertiary (services). While around one billion people now live in tertiary economies (roughly the OECD countries), the vast majority of the world’s population (another five to six billion) are living in less mature economies which are progressively making the transition to industrial economies. This is leading to industrialisation and urbanisation on a scale the world has not seen before. The process of industrialisation is likewise extremely mineral and energy intensive.

Exhibit 7.3



The combined effects of urbanisation and industrialisation on mineral and energy demand are demonstrated in Exhibits 7.4 to 7.6. Exhibit 7.4 shows the relationship between the typical growth in demand for steel and economic growth, at different levels of GDP per person. While every economy is a little different in practice, at the crucial income levels between US\$2,000 and US\$10,000 per capita, growth of demand for steel is roughly twice the growth rate of the country (peaking at around 2.3 times). This means that if a country grows at 10% (as China has) demand for steel grows at 20% per annum. This accounts for the phenomenal growth in demand for iron ore in China over

⁵³ Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, *World Urbanization Prospects: The 2009 Revision*.

recent years. The world can expect to see similarly high demand growth rates in India in the not too distant future.

The relationship between economic growth and the growth rate of demand for commodities does not apply for developed countries. The growth rate of demand for commodities over the long term is almost independent of economic growth for developed countries with incomes greater than US\$ 20,000 per capita (depending on the commodity). This means that slower trend-line economic growth for the developed world will only have a limited effect on global demand growth for these commodities. In some developed countries, however, the need to replace depleted infrastructure stocks may also result in increases in demand above the trend-line level.

The relationship between economic growth and demand growth differs by commodity (Exhibit 7.5). Steel (and therefore iron ore and metallurgical coal) is more important in the earlier stages of development, whereas electricity, copper and nickel are increasingly important in the next stage of development. Aluminium becomes more important in the latter stages of development (e.g. as car numbers increase). This could have important implications for the relative mix of Australian resource projects and exports over time.

Energy warrants special mention. Demand for energy appears to follow a slightly different path to that of other commodities. In particular, in the early stages of development, the energy intensity of economic growth⁵⁴ can drop, as use of inefficient biomass (typically wood) is replaced by much more efficient sources of energy, such as coal, and inefficient energy practices are eliminated. On top of this, the path of energy consumption differs greatly by country. China, for instance, has had very high levels of energy consumption per dollar of GDP, but this is now coming into line with other countries (Exhibit 7.6). However, it is very clear that energy consumption of developing countries per unit of output is considerably higher than of the developed world. The result of this is that global growth skewed towards the developing world is much more energy intensive than growth in the developed world.

⁵⁴ This is defined as energy expenditure divided by the real size of the economy.

Exhibit 7.4

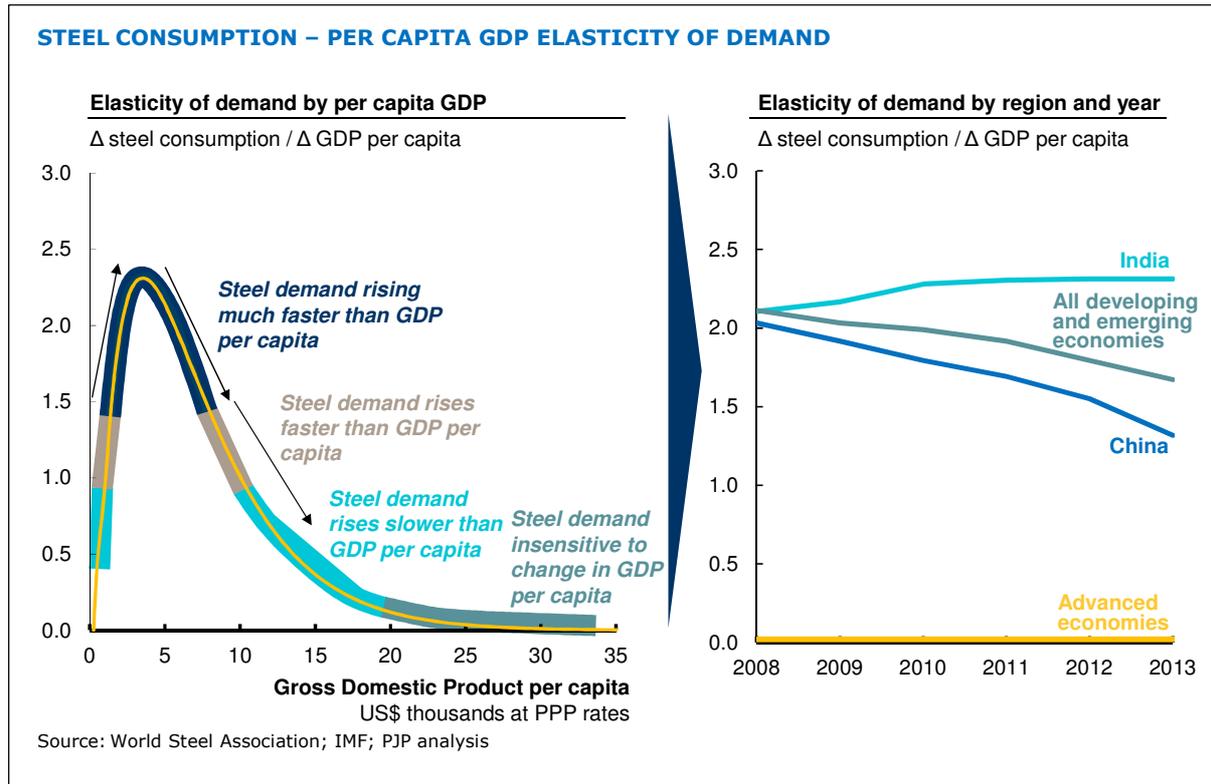


Exhibit 7.5

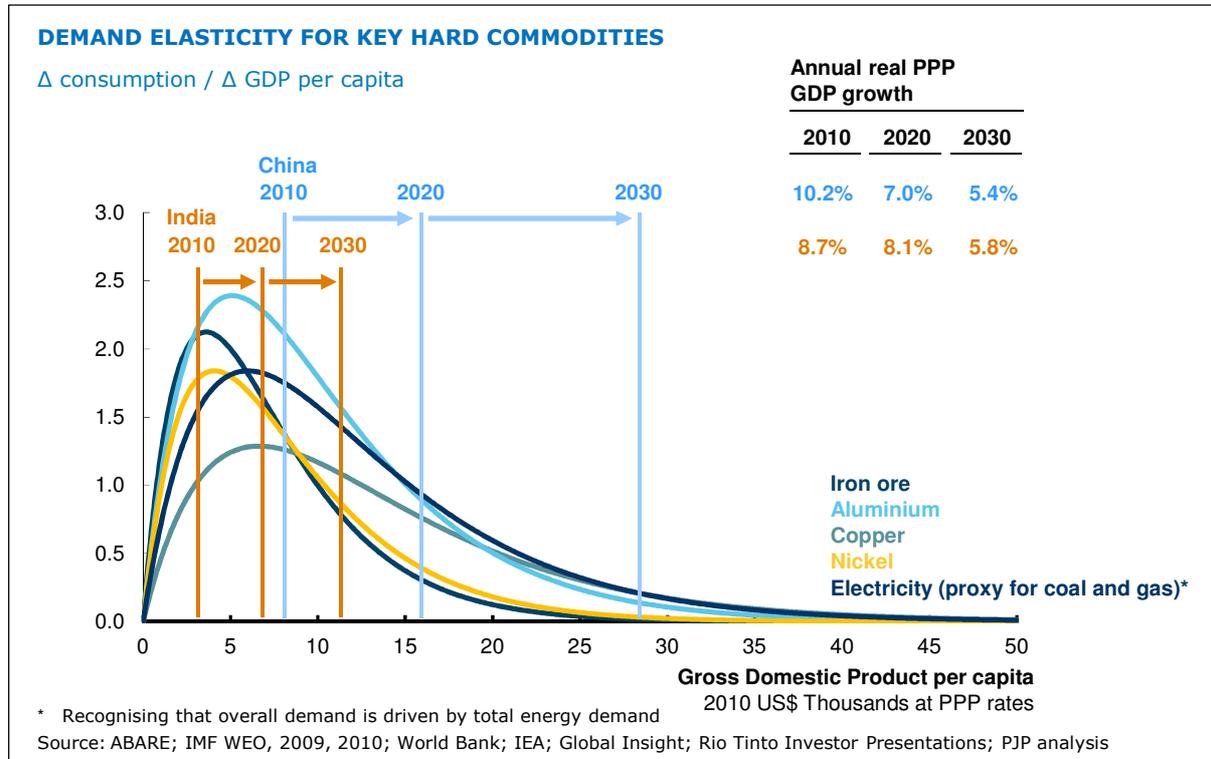
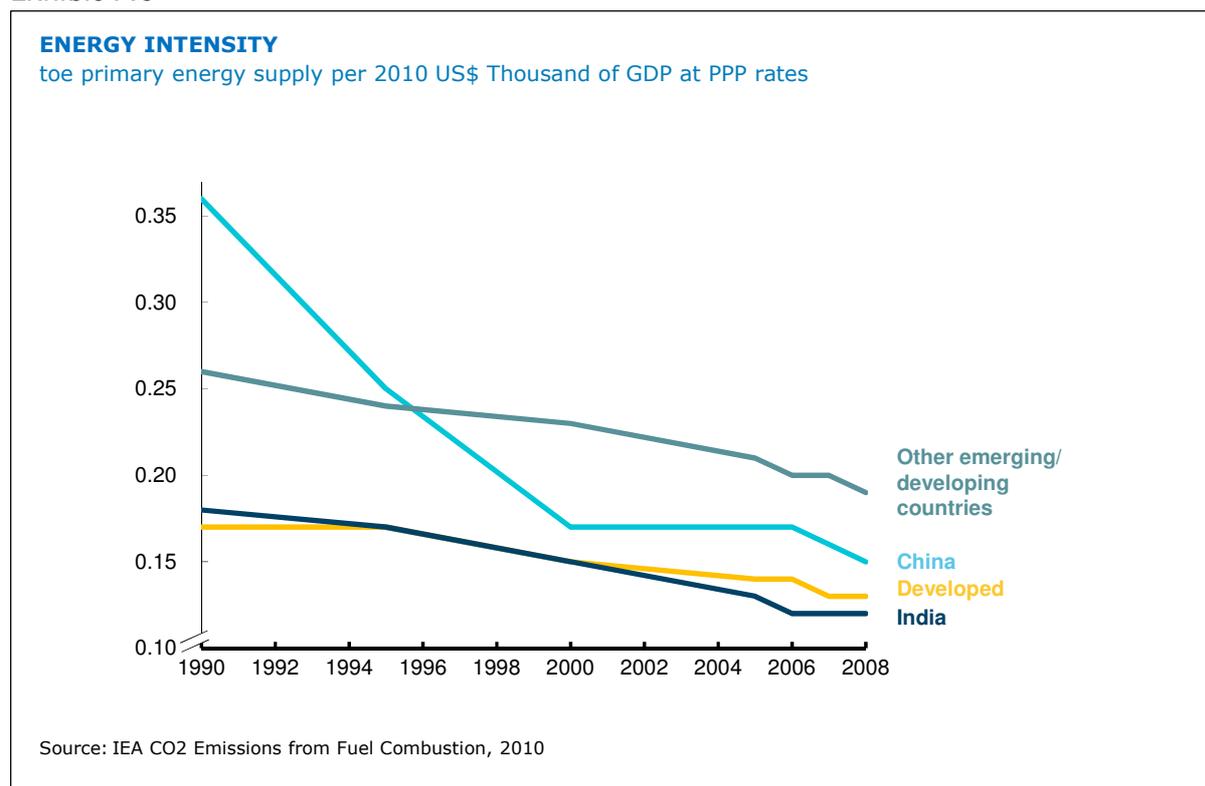


Exhibit 7.6



China is currently passing through the most critical part of its economic development from a mineral and energy perspective. India is at a somewhat earlier stage of its development, and will become increasingly prominent in the next decade. While China lacks many of the domestic resources to supply its growth path, the picture is somewhat different for India (particularly in relation to iron ore), and this will be an important issue for Australian producers. Australia will inevitably have to compete with some level of domestic production in India, but the difficulties of establishing infrastructure and developing resources in India provide significant opportunities for Australia.

The results of this process for China can be seen in Exhibits 7.7 and 7.8. Massive growth in Chinese cities has occurred and is expected to continue. Forecasters expect China to have more than 200 cities with a population in excess of one million by 2025. This contrasts with 35 such cities in Europe. Around 50,000 skyscrapers could be built, equivalent to 10 New York-sized cities. Some 170 mass transit systems will be required, and five billion square metres of road will need to be paved.

The world has not yet experienced anything like this, and it shows in the commodity demand data. China now accounts for two thirds of the demand for met coal, more than 50% of the demand for iron ore, with its demand for other key commodities approaching 50% (Exhibit 7.8). Moreover, China accounts for the majority of growth in many of these commodities. This is simply what happens when more than a billion people follow the demand path outlined in Exhibit 7.5. While China's growth in demand will slow in the coming decades (due to falling economic growth rates and falling resource intensity), India and other fast-growing developing countries will fill the gap.

As long as the process of urbanisation and industrialisation continues for the five billion people outside of the most developed countries, this strong demand growth seems irrepressible.

Exhibit 7.7

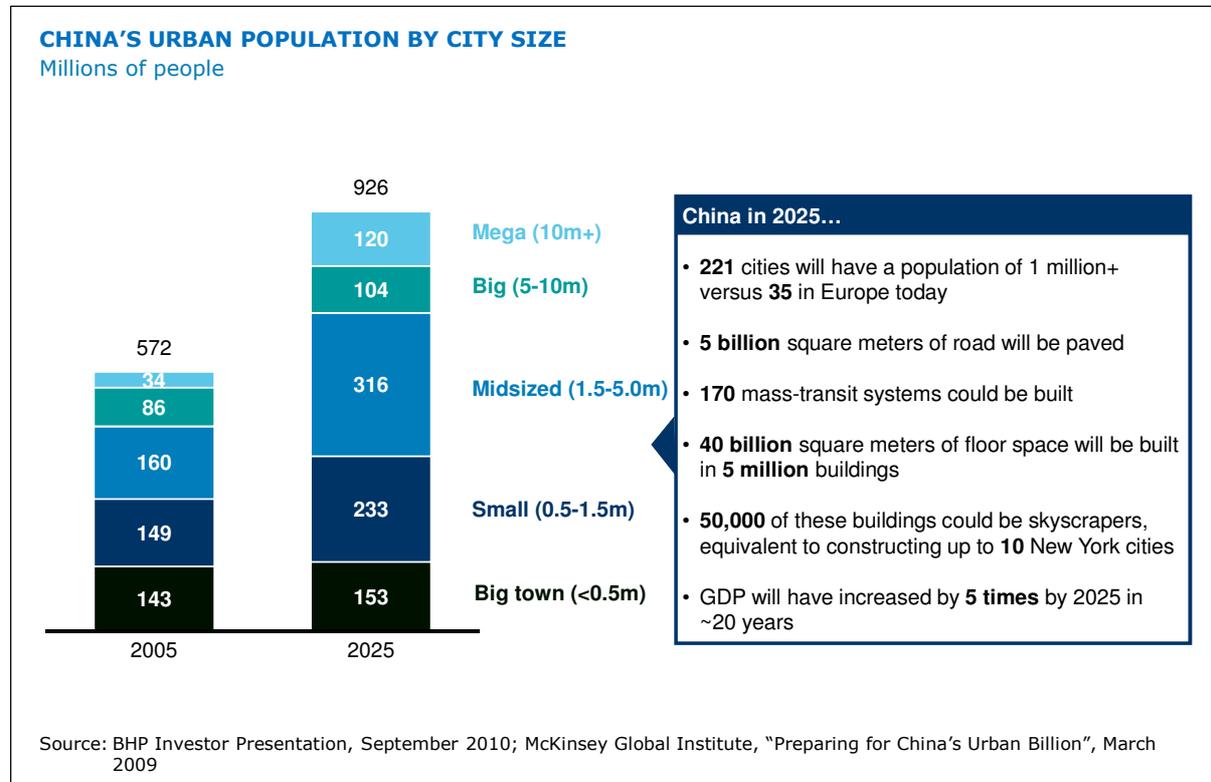
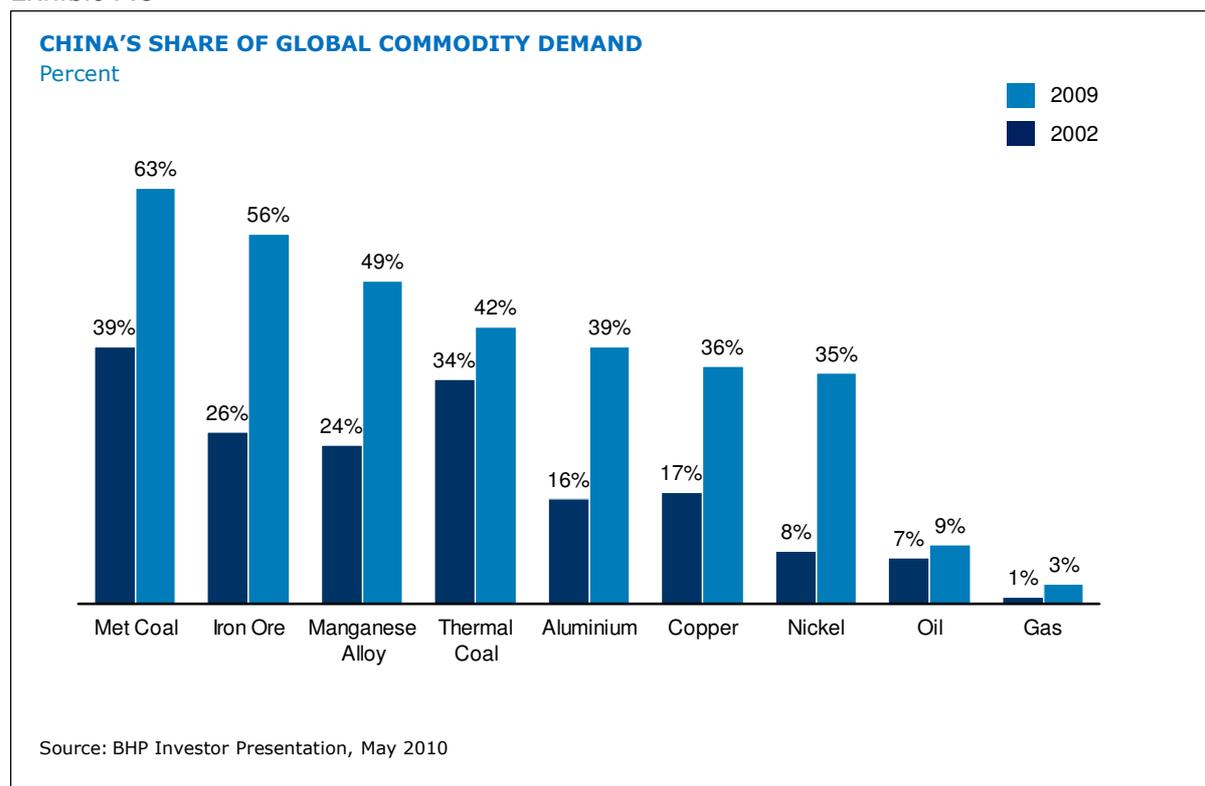


Exhibit 7.8



7.3 "WATER": INCREASING WEALTH AND THE DEMAND FOR SOFT COMMODITIES

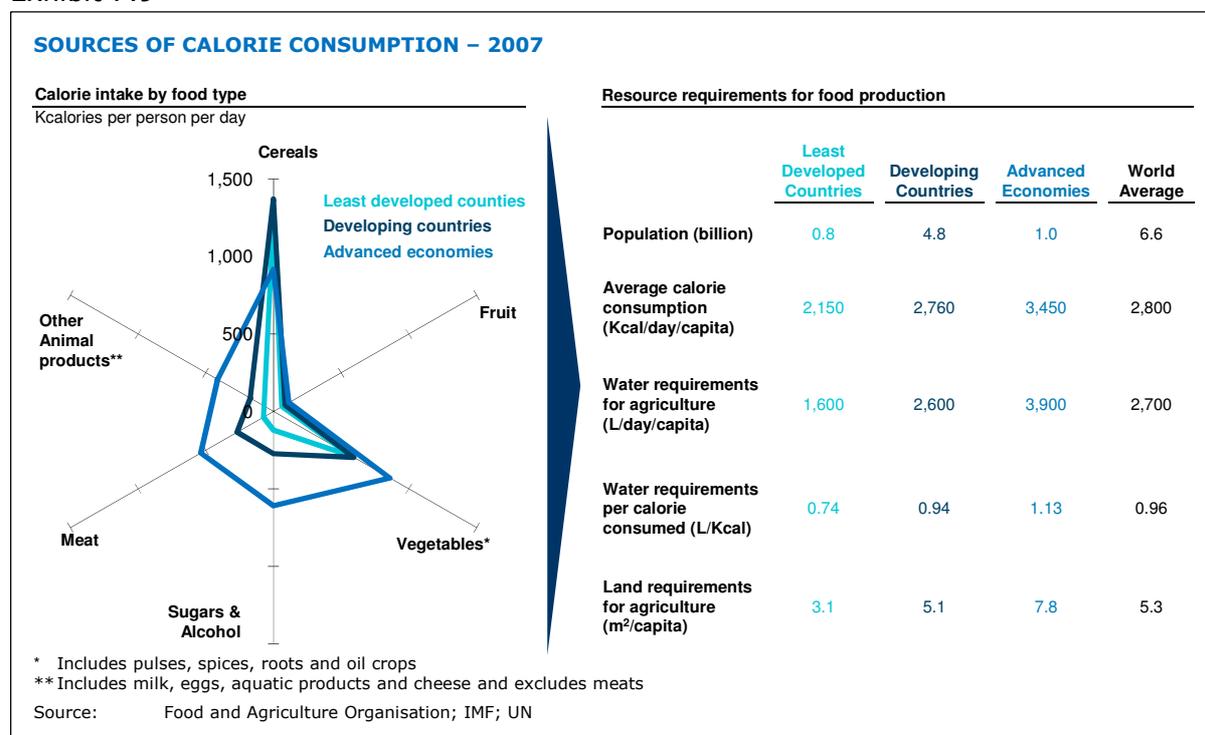
The process of economic development also has important implications for soft commodities such as agricultural food and fibre outputs. These commodities are primarily the product of land and more importantly, water. Agriculture is easily the most important user of water around the world, so that food trade flows largely move from regions with water surpluses to regions with water scarcity⁵⁵. Food exports and imports can almost be thought of as a de-facto trade in water, balancing surpluses and shortfalls region by region.

As income levels increase, total calorie consumption increases (Exhibit 7.9). Whereas average daily kilocalorie consumption in the least developed countries is 2,150 per capita, in developing countries it is around 2,800 and in advanced countries it is around 3,500. Just as important, the nature of those calories changes dramatically. Lower income country diets are focused on cereals, which are typically the least resource intensive foods (that is, they require less land and water per calorie). However, higher income country diets are more focused on fruit and vegetables, sugars, meat, dairy and other animal products such as eggs. Much of this is about a shift in diet from carbohydrates to protein (Exhibit 7.9). These foods are far more water and land intensive per calorie. The net effect of this is that advanced economies use around 2.5

⁵⁵ These food trade flows are often referred to as virtual water trade. Somewhat ironically given recent dialogue in Australia, Australia in fact has a significant water surplus, driven by its small population relative to its large land mass. Australia's population would need to grow a great deal before it became an effective importer of water.

times the water (and land) per person per day relative to the least developed countries, with developing countries somewhere in between.

Exhibit 7.9



The shortage of water for food production, combined with increasing demand for more resource intensive foods, shows up in unexpected ways. For instance, in recent years increasing demand for meat in China, with limited potential to access additional agricultural water, has meant that China has had to import large quantities of feed-grain. This has opened up a massive trade in soybeans from Brazil to China. This trade grew from almost nothing to around 20 million tonnes per annum between the late 1990s and today⁵⁶.

There is also an important link between urbanisation, industrialisation and the demand for water and land. While the majority of land and water in most countries is used for agriculture, the process of urbanisation and industrialisation places additional pressures on agricultural water (and, to a lesser extent, land). In particular, developed country households use far more water than developing country households because of flushing toilets, showers and use of washing machines. In addition, industrial sectors make heavy use of water (sometimes by polluting water supplies), putting additional pressure on demand. In China and India, household consumption of water has an expected growth rate of around 6% per annum from 2000 to 2016, while industrial demand for water is expected grow around 9% growth per annum⁵⁷.

⁵⁶ China's Soybean and Products Production and Consumption for 2009-10, Chinese Soybeans Import Country-wise for 2008-09, US Department of Agriculture.

⁵⁷ "Water footprint of Nations: World Bank, OECD and FAO agricultural Outlook" 2007-16.

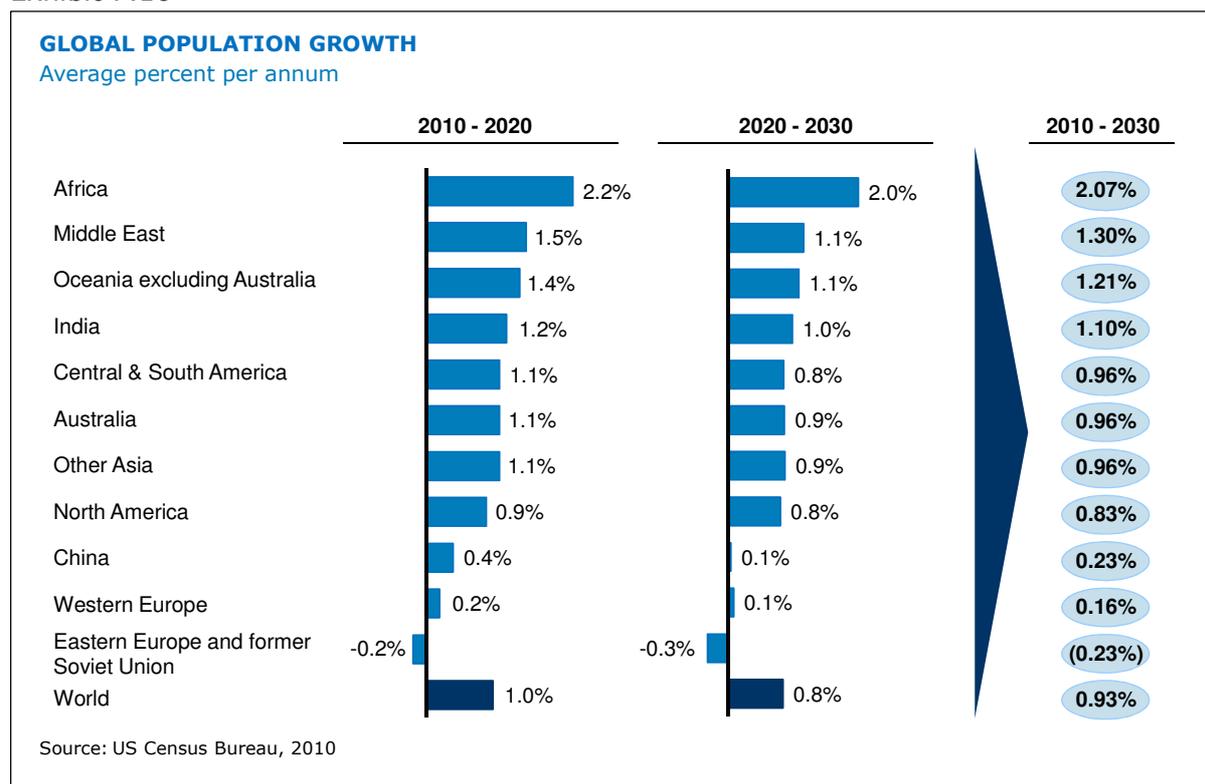
As income levels rise, demand for water increases through the increasing demand for soft commodities. This increasing demand for soft commodities presents an opportunity for Australia to expand its agricultural sector.

7.4 THE ADDED EFFECT OF GROWING POPULATIONS

In this discussion of the effect of urbanisation, industrialisation and increasing affluence, it would be easy to forget the role of population growth. While Western Europe, Japan, the former Soviet Union and China all have relatively stagnant populations, populations in the US and the developing world (outside Eastern Europe and China) are expected to grow at near 1% or more (Exhibit 7.10). Africa is the standout, with expected population growth of more than 2%, but Indian, South East Asian and Central/ South American populations are still growing quickly (although slowing over time).

This is adding further pressure to commodity demand and will become increasingly important as these large regions of the world become more affluent. The net effect of this growth is an increase in the global population of around 1% per annum over the next 20 years. Adding population is only part of the impact: a growing population in increasingly affluent parts of the world has a much greater effect.

Exhibit 7.10

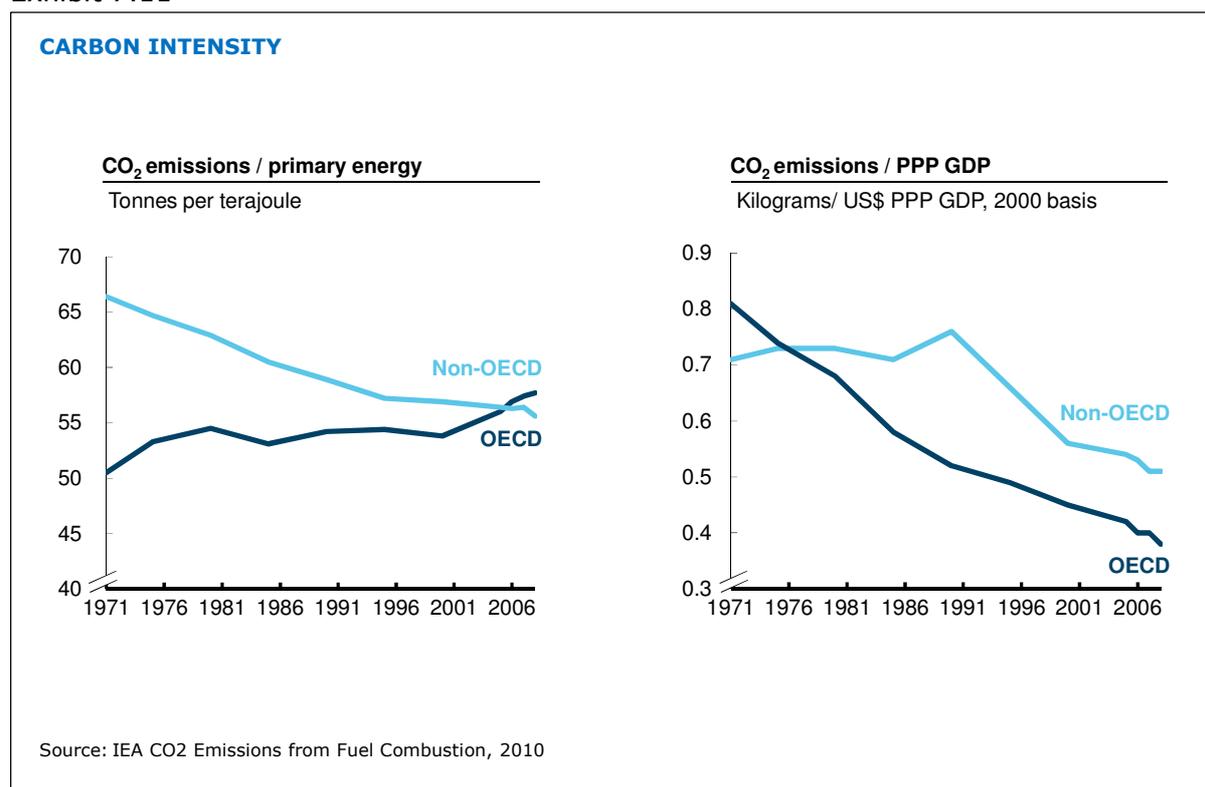


7.5 "AIR": THE IMPLICATIONS FOR GREENHOUSE GAS EMISSIONS

Urbanisation, economic development and industrialisation also have profound implications for carbon emissions. This was recognised in Australia's Garnaut review of

Climate Change⁵⁸, which noted that the emissions intensity (carbon emissions per dollar of GDP) of economic growth is much higher in the developing world than in the developed world (Exhibit 7.11). While there was some reprieve to this trend during the 1990s because of one-off improvements in Chinese energy efficiency, the trend resumed in the 2000s. As we have come to understand that the source of global growth is switching to the developing world, (Exhibit 7.1) a dilemma has arisen. While on the one hand developing world growth has enormous flow on benefits for those populations, it is inevitably carbon emission intensive and has accelerated the pace at which the world is moving to higher atmospheric concentrations⁵⁹.

Exhibit 7.11



Unsurprisingly, this issue was central to the difficulties faced at the Copenhagen Climate Conference in 2009: the developing world, and particularly China, has been reluctant to adopt binding total emission reduction targets which risk curbing their economic development. China and India made voluntary, non-binding commitments to reduce the emissions intensity (emissions per unit of GDP) of their economies by 2020. Other developing countries including Brazil and Indonesia made voluntary commitments to reduce emissions compared to 'business-as-usual' by 2020. By contrast, developed countries made binding commitments to absolute reductions in emissions compared to a base year⁶⁰.

Are these environmental pressures likely to result in a significant reduction in demand for commodities? The economic aspirations of countries like China, India and others on a

⁵⁸ "The Garnaut Climate Change Review", Ross Garnaut, 2008, Cambridge University Press, pages 56-57.

⁵⁹ "The Garnaut Climate Change Review", Ross Garnaut, 2008, Cambridge University Press, page 64.

⁶⁰ Some of these commitments, including Australia's were on a conditional basis.

development path are such that this is unlikely in the timeframe of the analysis in this document. Low cost sources of energy were critical to the economic development of the OECD countries, and the developing world is not in a hurry to substantially increase the cost of its energy⁶¹. It is true that, over time, this issue will result in some change in the mix of demand for commodities. In time, gas and (perhaps) uranium may substitute for coal, because gas is substantially less carbon intensive. From an Australian perspective, however, this is not a great long-term concern, because Australia has large gas and uranium resources. Australia has the added advantage of providing energy sources that are lower in greenhouse gas emissions than domestically-sourced fuels in China (particularly for coal).

Given enough time, non-fossil fuels may substitute for fossil fuels. However, because of the costs involved, this is likely to be a drawn-out process, particularly in the developing world where economic growth will be more sensitive to energy costs. Moreover, some mitigation initiatives may actually increase the demand for commodities. For instance, the rapid growth in ethanol in the US (which is arguably more about energy security than carbon emission reduction) has resulted in increasing demand for agricultural outputs.

It is true that the developed world is far more likely to curb or modify its consumption of natural resources to reduce carbon emissions well ahead of the developing world. However, the developed world is far less important to commodity demand prospects than the developing world.

In theory, Australia's aspirations to reduce its carbon emissions could affect its ability to capture the commodity opportunity. Whether this happens will depend on the path Australia takes to curb its carbon emissions. If Australia focuses on reducing the emissions of its export sectors, it may well affect its share of exports to other countries, particularly in some sectors (e.g. aluminium, coal, gas). If export sectors are exempt or the impact is limited until agreements are in place with our major commodity competitors, the outcome may be different. This is ultimately a policy choice, as was discussed in Section 6.1 above.

7.6 CONNECTIONS BETWEEN COMMODITY MARKETS

A number of commentators have made the important point that the combined effect of increasing demand for natural resource industries is greater than the effect on sectors independent of each other⁶². Commodity markets are becoming increasingly connected via demand substitution. It is possible to arbitrage shifting commodity prices. The most important industry in this regard is energy. As energy prices go up, there are flow-on benefits not just to fuel suppliers, but also to low-cost mineral and agricultural resources:

⁶¹ Nor, as it happens, is the developed world – recent increases in electricity prices are becoming a critical political issue in Australia, and other parts of the developed world.

⁶² "The Revenge of the Old 'Political' Economy", Goldman Sachs, 2008.

- Higher oil prices result in substitution to ethanol for transport fuels, raising the price of agricultural products. Goldman Sachs has described this as “BTU, bushel and barrel convergence”⁶³.
- Higher energy prices result in higher production costs of minerals and therefore higher prices, as marginal mineral producers tend to have energy intensive business systems.
- Higher oil prices result in reduced substitution away from metals to plastics.
- Over the long term, higher oil prices should lead to higher gas prices.
- Increasing demand for water is having an impact on energy costs, as new energy technologies such as shale oil extraction make heavy use of water.

7.7 RISKS TO DEMAND EXIST, BUT SHOULD NOT BE OVERSTATED

The hazards of attempting to forecast the future are well known. In particular, major structural shifts are notoriously difficult to predict. For example, many market analysts did not foresee the scale of the growth of China or the implications for commodities. However, once a structural shift becomes clear, the real challenge is to understand its likely pathway, and any risks to that pathway. While there are risks to the momentum of developing world growth and commodity demand, the dynamics of this growth are increasingly well understood⁶⁴.

Despite recognising the strength of a structural shift it is still important to consider potential risks to the process. ‘Black swans’⁶⁵ always lurk on the horizon, even if they are hard to see (see box 7.2). However, most of these risks are likely to be short term in nature, and will drive volatility rather than undermining the trends outlined in this chapter.

⁶³ “The Revenge of the Old ‘Political’ Economy”, Goldman Sachs, 2008, page 19.

⁶⁴ Port Jackson Partners in particular was early at recognising and forecasting the nature of that growth and the commodity demand arising from it. In past published work, Port Jackson Partners has consistently taken the view that the economic growth of the developing world will have a profound effect on commodity markets. For example, “Economic Evaluation of the Impact of Lost Iron Ore Production and Share” Report by Port Jackson Partners to the National Competition Council, 2008.

⁶⁵ A ‘black swan’ event is described by Nassim Nicholas Taleb in his 2007 book ‘The Black Swan’ as having the following three attributes: it is an outlier, it carries an extreme impact, in spite of its outlier status, human nature makes us concoct explanations for its occurrence after the fact, making it explainable and predictable.

BOX 7.2: POTENTIAL RISKS TO STRUCTURAL TRENDS

- **Leadership risks in China:** China remains critical to the commodity demand story in the short term and is managing a number of challenges.
Response: While China is continuing to manage the challenges facing it carefully, the risk is also mitigated in two ways. First, India and other developing countries will become increasingly important for commodity demand over time. Second, China has a long term commitment to economic development and the continual shift of the population out of poverty. The importance of this objective to the Chinese Government should not be understated. As Hoffman and Enright point out “Many analysts believe that sustained economic growth has been perhaps the most important feature that has served to maintain the legitimacy of the Chinese Communist Party rule for the bulk of the populace”⁶⁶.
- **Political and economic breakdown:** A broader breakdown in the economic and political systems that are supporting the growth of the developing world is always a possibility. While growth of world trade and global investment flows almost became an assumption in the lead up to the GFC, the increased fragility of the global system is now more apparent.
Response: The interconnection between the developing world and the developed world, particularly China and the US, is deeper than at any time in history. The cost of a breakdown also increases as the connections increase. Most major countries have an interest in maintaining the economic and political institutions that support their prosperity.
- **Environmental costs constrain growth:** The current and potential environmental costs of economic growth are well known, and have been touted as a potential constraint on growth since the 1970s and before⁶⁷.
Response: As outlined in Section 7.5, the prevailing attitude in developing world countries is that this is primarily the responsibility of the developed world, and it should not curb growth in the developing world. The major question is whether Australia wants to expand capacity in emissions intensive sectors to meet that demand.
- **Demand constrained by rising prices:** As commodity prices rise, demand could be constrained by some combination of conservation, substitution, innovation or even economic stagnation. Some amount of this is possible, particularly for an individual commodity (as against all commodities – see Section 6.6).
Response: Fast growth in demand is consistent with lower prices for the highest priced commodities. Indeed, this report assumes a significant reduction in prices for many commodities. If Australia is successful in taking its share (or more) of the growth in demand, many of the adverse effects of lower prices on revenue will be mitigated.
- **A rapid restructuring of the Chinese economy:** It is clear that there are some significant imbalances in the Chinese economy. The exchange rate is suppressed versus the US dollar. Investment and savings rates are high and consumption is low as a proportion of economic activity. These imbalances are likely to be addressed over time, and, consistent with our assumptions, the resource intensity of growth will fall. Because of the focus of the Chinese leadership on managing this restructuring process, a sudden short-term reduction is always possible, and may lead to the fall in many commodity

⁶⁶ Robert Broadfoot and Michael Enright, *China into the future: making sense of the world's most dynamic economy*, page 270, Wiley, 2008.

⁶⁷ See *The Limits to growth: A report for the Club of Rome's Project on the Predicament of Mankind*, Donella H. Meadows, Jorgen Randers, Dennis L. Meadows, and William W. Behrens (1974).

prices anticipated in this work and consensus views in the market place.

Response: Commodity demand is likely to continue growing strongly, despite a slowdown in China. None of this detracts from expected growth in other countries.

8.0 THE UNDERLYING FORCES AT WORK – SUPPLY AND PRICE

KEY THEMES:

- *Viable projects are the constraint to supply, not natural resource availability; placing a premium on companies and countries that can support the development of these projects.*
- *Rapid demand growth combined with limited potential for easy volume increases has driven strong upward pressure on capital and operating costs and therefore longer term prices.*
- *Prices for some commodities (especially iron ore and coal) are expected to converge from their current very high levels towards 'incentive prices', while still remaining high enough to encourage additional production.*
- *Prices are likely to be volatile in the short to medium term, requiring promoters and investors of these large high risk projects (including governments) to keep their nerve.*

Sharp and sustained growth in demand for commodities, driven by the developing world, is the critical dynamic driving many of the conclusions of this report. However, an important part of the story is the supply-side response to growing demand. In particular, it might be thought that supply will catch up with demand – the classic economic 'hog cycle' – and prices will be driven back to the level of the 1990s.

Mineral, energy and agricultural supply can increase comfortably at relatively modest levels of demand growth, without facing serious constraints and without requiring high prices. This was seen during the 1990s, and it lulled many into a false sense that we had moved to a new era of plenty. However, once demand growth crosses the 2-3% threshold, the supply response is much more challenging. In the minerals and energy sector, this demands major new projects, and in agriculture this typically requires adoption of major new technologies and practices (or the opening up of vast new tracts of land, which is unlikely).

In most sectors, investing in this new capacity involves enormous financial, technical and political risk – investment that had slowed dramatically in the decades preceding the current surge in growth. To be viable, the new capacity requires higher long-term prices, at least in comparison to prices witnessed in the 1990s and early 2000s. This is despite an expectation that some commodity prices (especially iron ore and coking coal) will trend down a long way from current levels, as new projects and technology come through the pipeline.

Prices are likely to be volatile and there is still considerable uncertainty about where they might move to over the medium term, given uncertainty about the extent and speed of the supply response. Organisations and countries may become good enough at bringing on massive new projects to put a cap on prices. All the same, if Australia is able to bring on required projects and technologies in a timely manner, it will participate in much of the revenue upside from this opportunity. In addition, its resource base and proximity to

markets is such that most of these projects should be viable even in lower long-term price scenarios.

8.1 THE SUPPLY SIDE – VIABLE, TIMELY EXPANSION PROJECTS ARE THE CONSTRAINT

During the 1970s the Club of Rome argued that the earth's supply of natural resources was finite and depleting rapidly, and this would ultimately result in stagnation of economic growth. The basic thesis was soon proven to be wrong, as commodity prices fell to historically low levels in the 1980s and 1990s.

In hindsight, the authors paid insufficient attention to the economics of natural resources. There is no physical shortage of critical natural resources such as gas, iron ore, copper and even oil and water⁶⁸ (Exhibit 5.2). The real issue is attracting the investment, technologies and skills to execute the required projects, and the evolving economic costs of extracting and processing resources. Even in agriculture, where the supply of agricultural land has not grown substantially, technology investments and related productivity programs can always lift volumes, at a cost.

If this is true, why have many commodity prices risen so quickly and so far since 2003, well above the pure economic cost of developing new projects?⁶⁹ The simple answer is that the projects and programs necessary to match supply with demand have not come on fast enough, and there have been upward pressures on producers' costs (see section 8.2). When demand for commodities was growing at 1-2% per year, as it was for many commodities prior to the last decade, de-bottlenecking and productivity improvements in existing mines, processing facilities and farming operations were enough to match supply with demand. To the extent that demand grew a little faster than 1-2% per year, more aggressive productivity improvements and the occasional low risk 'brownfield'⁷⁰ or technology project was enough to meet the surge in demand⁷¹.

However, as demand surged to rates typically much faster than 2% per year in the past decade massive new investments were required. The risks inherent in these projects are enormous and are not just restricted to the marketplace. Political risk, technical risk, geological risks and climatic risk (particularly in the case of agriculture) all create barriers to bringing on new volumes. To some extent this flows through into longer development timeframes – developers and investors can always attempt to reduce risks by taking more time to plan the projects. This failure to invest was exacerbated by many years of under-investment in these industries, which were seen to be mature and low growth.

⁶⁸ While water is not included on Exhibit 5.2, additional freshwater can always be found at some economic cost, with desalination the default (but expensive) technology.

⁶⁹ One notable exception to this is aluminium, but this is because the industry is dominated by processing, not mining, so the nature of the risks is quite different. Upstream aluminium may be able to break away from the downward price pressure faced by the industry, particularly if the pricing regime is restructured away from LME linked prices.

⁷⁰ A brownfield project is one that is adjacent to and builds from a pre-existing operating asset.

⁷¹ To some extent, the aluminium sector has been an exception to this rule, because most of the cost of producing aluminium requires some form of processing, and this can be done some distance from the mine. The risks involved in establishing large processing facilities are quite different from those associated with leveraging a natural resource, and oversupply is more likely. As a result, aluminium supply has been able to keep up with rapid demand growth for some time.

The GFC made this situation worse. Most major projects were put on hold and volume growth suffered. Only now are the growth plans of resources industries getting back to pre-financial crisis levels. At the same time, it is not clear that many of the mega-projects planned around the world will keep to their intended timetables. The financial, political and technical risks are enormous and so continued delays are likely, particularly if there are further aftershocks from the GFC.

8.2 COST SIDE PRESSURES

Rapid demand growth combined with limited potential for easy volume increases has driven strong upward pressure on capital and operating costs. In many cases, the more marginal projects which inevitably drive pricing outcomes⁷² are facing greater upward pressure than less marginal projects. For instance, more marginal assets typically require more energy to extract the ore or produce the food and fibre. As energy costs go up, this has a disproportionate impact on the marginal asset cost structure, and therefore price.

BOX 8.1: COST SIDE PRESSURES

What is behind the upward pressure on costs, which is supporting higher prices?

- Sharp increases in labour costs in regions with large project pipelines, impacting both capital and operating costs. This is exacerbated by a lack of social infrastructure (housing, hospitals, schools etc.) to support burgeoning workforces.
- Increasing exchange rates in producer countries, such as Australia and Brazil, as resource-driven expansions compete with others sectors for economic capacity.
- Increasing exchange rates and costs in China, where Australian exports compete with domestic production for iron ore, coal, aluminium, agriculture and potentially also gas (as non-conventional gas gains momentum in China).
- Increasing prices of basic inputs, such as energy and consumables (e.g. explosives and fertiliser), often driven by the surging demand for the underlying commodity.
- Falling natural resource productivity, as the rapid rate of extraction reduces mineral grades (particularly for copper, gold and Chinese coal) and degradation of land and water impacts agriculture.
- Increasing shipping costs (which are driving up delivered commodity costs), although there are signs that the pressure may ease with increasing supply of bulk carriers in the relatively near future.
- Increasing administrative and environmental compliance costs.
- Rising tax rates, particularly mineral royalties and profit taxes.

Over time, the absence of policy interventions (or in the presence of the wrong interventions), this is likely to create real challenges for many producer countries. These countries will be faced with a less competitive cost structure at exactly the time when

⁷² This is because marginal projects are on the end of the supply curve, which determine pricing outcomes.

the growth opportunity is strongest. Fortunately for Australia, in most of its commodities it is in the middle or lower section of the commodity cost curve, meaning that it benefits from this dynamic and its assets are shielded from sharp drops in prices⁷³. However, poor policy settings could affect this position.

8.3 THE IMPLICATIONS FOR PRICING

Clearly, increasing operating and capital cost pressures have been putting significant upward pressure on prices. Whereas in the past there was no need for markets and prices to encourage large volumes of high cost new production, the situation has now changed. That is, prices will need to be high enough to encourage additional production (incentive prices), at least for sufficiently long periods of time to create confidence in the commercial merits of these investments, given the enormous risks involved.

Analysts typically expect prices to converge back to incentive prices, as can be seen from Exhibit 3.4. Port Jackson Partners accepts this assumption for the purposes of its analysis, although there is obviously a lot of uncertainty about where long term prices might settle (if, indeed, they ever really settle). Port Jackson Partners believes that there is a strong possibility that delays in bringing on the massive new projects necessary to deliver growth could lead to medium-term pricing well above incentive price levels, and therefore above the consensus, creating an extraordinary opportunity for countries able to bring these projects online sooner. Moreover, prices are likely to be volatile in the interim, given that global demand is at the steep end of most supply curves⁷⁴. For most commodities, this means reductions in prices compared to current levels, with the exception of LNG and aluminium.

In general, the implications of the analysis in this report are not particularly sensitive to the exact path of commodity prices. If prices are lower, then the baseline against which the value of volume growth has been measured is slightly lower. If prices are higher, volume growth is worth a little more to Australia. Either way, volume growth is far more important in the long term. Volume growth can add significantly to GDP, taxes and employment versus a no-growth environment. The critical question is: can Australia continue to provide the policy platform for its projects in order to compete effectively with offshore alternatives?

⁷³ Although note that for some commodities resource grades are falling, and there is a real risk of being pushed to the higher end of the cost curve if this is not addressed through further exploration and technology enhancement, and by containing cost increases driven by rising labour costs and exchange rates.

⁷⁴ Most natural resource supply curves are relatively flat for the lowest cost two to three quartiles of capacity, and then steep for the highest cost quartile. Because demand has been outstripping supply, demand is now at the high of the supply curve, which is steep. This means that small fluctuations in supply and demand can result in large fluctuations in price.

9.0 CONCLUSION

KEY THEMES:

- *The current opportunity for Australia is under-estimated.*
- *Natural resources and associate support can sustain other 'new economy' growth sectors.*
- *Unprecedented capacity expansion will require a whole-of-economy approach involving governments, business, capital markets and communities.*
- *Australia is beginning the policy debates necessary to maximise its ability to capture the opportunity and minimise any negative effects.*
- *Focusing on the size of prize is the framework needed to build common ground.*

Many of the past economic reform agendas in Australia, particularly in the 1980s and 1990s, were driven by recognition that failure to address the nation's lack of openness and competitiveness would result in Australia being left behind.

What makes today's situation different is that, with the exception of sectors and regions suffering from a stronger currency, there is not the same negative driver for change. Only aspiration can motivate Australia to fully engage in this discussion and to address the issues outlined in this report. The good news is that the prize is so big, and the potential benefits so widespread, that Australia has every reason to embrace the opportunities. Capturing as much of the opportunity as possible would provide unprecedented benefits to the Australian economy.

This report puts forward two cautionary notes. First, capturing Australia's share of this opportunity cannot be taken for granted as a result of the ferocious competition emerging from other resource-rich nations around the world. Second, there is potential for some sectors of the Australian economy to be hurt along the way. However, it is clear that measures that boost the capacity of the whole economy would maximise the opportunity for Australia, broaden the benefits across the economy and mitigate many of the negative impacts.

Market prices are signalling one of the great needs of our time – to provide the relatively poor of the world with the raw materials to move beyond subsistence and poverty. Unlike past episodes of growth, this will be long-lasting, dependent on technology and high-end skill sets and has the potential to deliver decades of economic prosperity.

It may be timely to return to some of the successful reform processes of the past. Gary Banks, Chairman of Australia's Productivity Commission, has pointed out that: "the major reforms that defined the [1980s and 1990s] followed considerable research and public testing of the pros and cons of different possible reform measures. This generally occurred through review processes that made effective use of discussion papers, draft reports or 'green papers'. In most cases, sufficient time was allotted to the consultation processes to enable proposals to be properly explained, digested and responded to, and to inform a wider public debate. This was central to the industry assistance and national

competition policy reform processes, as well as to the major reforms to financial regulation and taxation.”⁷⁵

In addition to the unprecedented benefits to the Australian economy, Australia has an important role to play in supplying the developing world with the resources needed to lift its population out of poverty. The opportunity for Australia in doing this is enormous and the potential benefits widespread. This does however require an invigorated discussion in Australia to position itself thoughtfully and energetically to capture as much of the opportunity as possible. If Australia gets this right, it can be the lucky country, the clever country and a good global citizen all at the same time.

⁷⁵ Gary Banks, 'Successful reform: past lessons, future challenges', Keynote address to the Annual Forecasting Conference of the Australian Business Economists, 8 December 2010.

APPENDIX: MODELLING METHODOLOGY

The modelling underpinning this report quantifies the potential size of the 'prize' for Australia arising from the opportunities presented by export markets over the next 20 years to 2030. This appendix outlines the modelling approach and the data sources used in quantifying the value of this opportunity.

There are three aspects to the modelling:

1. Quantifying total export revenues (free-on-board) for Australia if it captures the opportunity presented by commodity demand growth.
2. Quantifying the investment required to support these exports.
3. Estimating the employment impacts.

A1. EXPORT REVENUES AND REQUIRED SUPPORTING INVESTMENTS

This report is underpinned by a set of three export-volume scenarios which represent a range of realistic future outcomes for Australia.

- The Base Case represents a realisable aspiration for Australia based on the forecast global growth of the commodity markets, the current market share of its exports within these markets, the current pipeline of projects and Australia's resource constraints⁷⁶.
- The High Case assumes that Australia captures some additional upside over the Base Case growth rates for each commodity.
- The Low Case assumes that Australia does not reach its potential growth rates in the export commodity markets and therefore loses share to other global players.
- An additional Do Nothing Case was also created where Australia's commodity export volumes remain flat over the next 20 years. This case is meant to provide a reference only. It is not presented as a likely future outcome.

A1.1. Hard commodities

Export revenues

Export revenue forecasts for each hard commodity are made up of price forecasts (converted to Australian dollars), total global demand forecasts and estimates of Australia's market share. For each of these components the modelling is based on reliable and generally publicly-available sources:

- **Commodity prices:** future prices for each commodity are based on analyst consensus pricing in US\$. These price forecasts do not vary by scenario.

⁷⁶ The base case scenario for soft commodities is developed slightly differently as discussed in Section 1.2 of this Appendix.

- **Exchange rate:** the Bloomberg forward curve for US\$/A\$ exchange rate converts analyst pricing to Australian dollars for the Base Case. As commodity exports play a significant role in determining the A\$/US\$ exchange rate, the Base Case exchange rate assumption was adjusted between the scenarios. The High Case has exchange rate six cents higher than the Base Case, the Low Case is six cents lower than the Base Case and the Do Nothing Case is six cents lower again.
- **Global demand forecasts:** were developed for each commodity using the demand elasticities described in detail in section 7.2 of this document (Exhibit 7.5) and the estimated future global growth rates based on the multiple public sources detailed in Exhibit 7.2. These global demand forecasts do not vary by scenario.
- **Australian market shares:** were developed for each commodity taking into account current export volumes, current pipeline of projects and resource constraints. Australian market shares vary by scenario, driving the export revenues for each scenario.

Required supporting investment⁷⁷

To estimate the replacement and expansion capital expenditures required to support the level and growth of commodity exports under each scenario typical industry capital expenditure to revenue ratios and replacement periods were used based on Port Jackson Partners' previous work in the resources sector (Exhibit A1). For simplicity, it was assumed that there is a three-year average build timeframe across all industries.

Exhibit A1

TYPICAL INDUSTRY CAPITAL RATIOS AND REPLACEMENT PERIODS		
	Typical capital to revenue ratios*	Average capital replacement period
	times	years
Iron ore	4.2	30
Metallurgical coal	1.7	31
Thermal coal	2.5	23
Liquefied natural gas	4.1	20
Gold	1.9	25
Crude oil	1.6	10
Aluminium	3.0	34
Copper	2.7	29
Nickel	2.5	25
Uranium	2.5	25
Other mineral commodities	4.2	30

* At long-term prices
Source: PJP analysis

⁷⁷ Modelled as gross investment, not net of imports.

A1.1.1. Ferrous raw materials

Global demand for steel, and therefore iron ore and metallurgical coal, will be driven predominantly by China over the short-to-medium term and increasingly by India over the longer term outlook. Over the short term (to 2015), we have aligned the export volumes with the current project pipelines within the commodities. The significant pipeline in iron ore implies that even under the Base Case Australia's exports increase market share from 23.4% to 28.0% of total global consumption between 2010 and 2015.

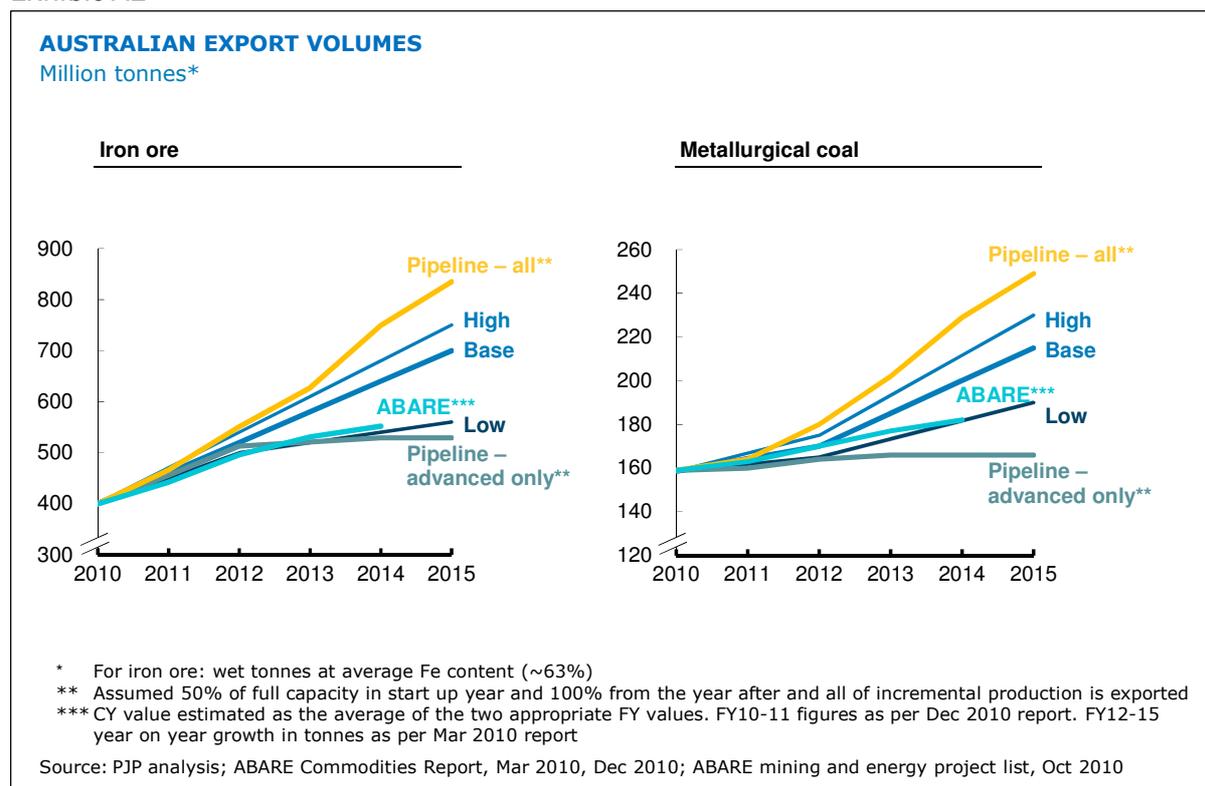
For metallurgical coal, however, the outlook over the next five years indicates a loss of market share (from 18.8% to 17.5% of global consumption) as there are few projects in the pipeline⁷⁸. The High and Low Cases represent a range of plausible outcomes around the Base Case, still aligned to the project pipeline over the short term (Exhibit A2).

Over the medium term (2015 to 2020) it has been assumed that Australia will maintain market share under the Base Case, gain market share at a rate of 3% per annum under the High Case (i.e. if the market share in 2015 is 10.0% then the market share in 2016 would be 10.3%) and lose market share at 3% per annum under the Low Case. Over the long-term, 2020 to 2030, it has been assumed that Australia maintains share under all cases.

The current measured and identified reserves of iron ore are sufficient to supply the export volumes for all scenarios over the 20 year timeframe. For metallurgical coal, however, some reserve renewal will be required to supply the export volumes in the High Case over the last few years of the outlook period. Port Jackson Partners believes this to be reasonable as the current level of reserves does not account for resources that have not yet been proven.

⁷⁸ We do not explicitly account for the impact of the recent floods in Queensland in the valuation as the net impact on metallurgical coal export revenues is likely to be small and a one-off occurrence in 2011. The impact of the loss in volumes will be mitigated through the negotiation of higher prices for the remaining quarters in 2011 (ABARE "The impact of recent flood events on commodities", Jan 2011).

Exhibit A2



A1.1.2. Base metals and other non-energy minerals

The report uses a similar modelling approach in deriving global demand and Australian market shares for base metals and other non-energy minerals to that for ferrous materials. In the Base Case scenario it has been assumed that Australian exports maintain share of global demand over the next 10 years, while in the High Case Australia gains share at 3% per annum and in the Low Case it loses share at 3% per annum. Over the long term, 2020 to 2030, it has been assumed that Australia maintains share in all cases. The export volumes over the short term align to current project pipelines for each commodity. Current identified and measured reserves are sufficient to supply these volumes over the outlook period (with the exception of gold).

For aluminium and gold, the report takes a more conservative approach to developing Australia's market share and global demand assumptions. Aluminium global demand growth is expected to be high over the outlook period, around 9% per annum from 2010 to 2020 and 4% per annum from 2020 to 2030, driven by the industrialisation of China and India. However, it is hard to see Australia having a competitive advantage in aluminium and alumina smelting as these are very energy intensive processes. The report has therefore assumed a substantial deterioration in Australian export market share of total global demand in aluminium (and alumina) across all scenarios⁷⁹. It is possible that Australia may be able to capture some of the growth of this market in the

⁷⁹ Short term market share decline (2010-15) of 6% per annum under the base case, 8% per annum under the low case and 5% per annum under the high case. Further decline in share at 1.5% per annum under the base case, 3% per annum under the low case and 0% under the high case over the medium term (2015-20). Share assumed to remain flat post 2020 under all cases.

future by growing our bauxite exports. In the valuation, the report has maintained a conservative approach and has not included any of this potential additional upside.

In the case of gold, the drivers of global demand are more complicated than for other hard commodities as gold is treated as a currency. Over the past 10 years global demand for gold has remaining fairly flat, fluctuating around an average of 4.1 thousand tonnes per annum. For the purposes of this valuation, it has been assumed that global demand will remain steady at this average level over the outlook period. In addition, it has been assumed that Australian exports maintain share of the global market under all scenarios. As Australia has limited gold resources, the report has conservatively assumed no share gains in the high scenario. Although some reserve renewal can be expected based on historical trends, it has been assumed this will be sufficient only to maintain share over the outlook period. On the other hand, as there is no reason to expect export volumes to decline, it has also been assumed that Australian exports maintain rather than lose share under the low outcome scenario.

A1.1.3. Energy minerals

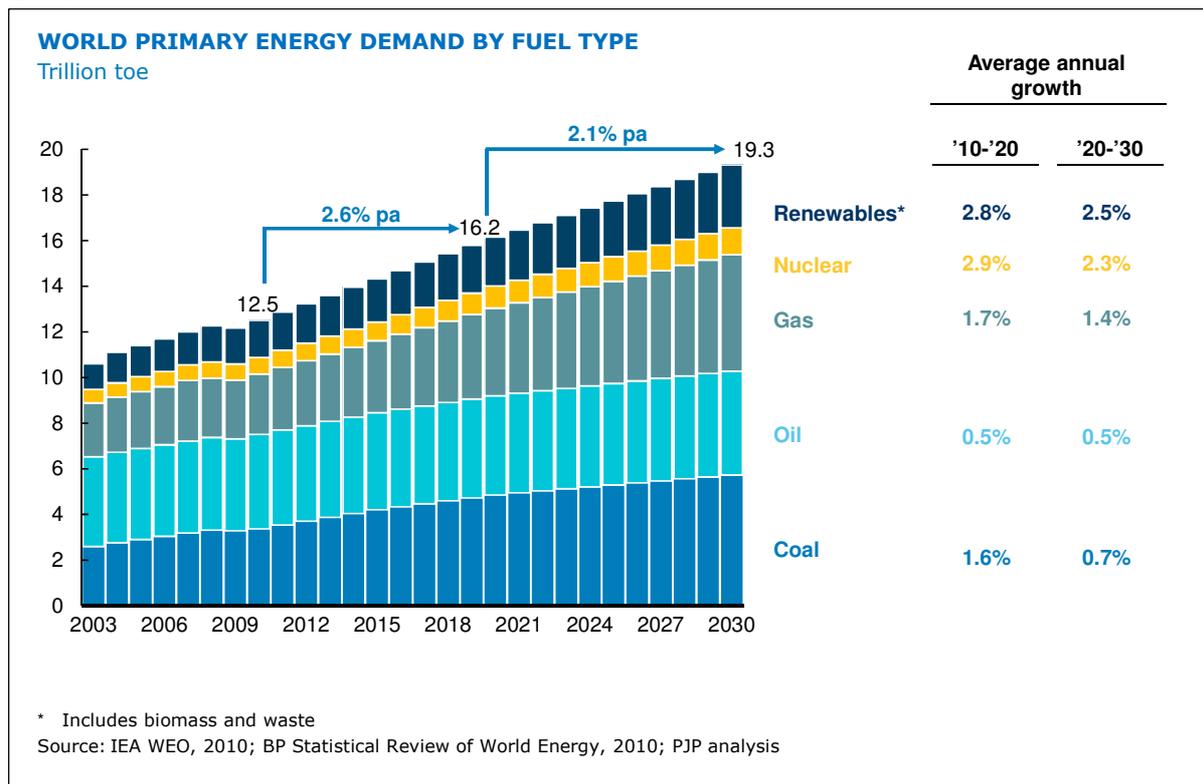
To estimate global demand for energy minerals we used some of the IEA world primary demand forecasts in their latest (2010) World Energy Outlook, rather than estimating demand using a bottom-up approach. Our view is loosely based on the IEA's energy demand forecasts under the 'New Policies' scenario⁸⁰, but does differ in some fundamentals. Port Jackson Partners believes that demand growth for energy minerals will be higher than estimated by the IEA due to:

- Higher long-term global economic growth rates, around 3.5% per annum in real PPP terms (still conservative) versus IEA's 2.9% per annum.
- A forecast reduction in energy intensity that is lower than that expected by the IEA. We expect this smaller reduction in energy intensity because global growth will be driven by the developing world, and in the developing world growth will remain more emissions intensive for some time yet.

Port Jackson Partners also believes that thermal coal and gas will be more significant within the overall energy mix over the outlook period than the IEA forecasts. Exhibit A3 illustrates Port Jackson Partners' view of energy demand over the outlook period.

⁸⁰ Scenario reflects the broad policy commitments and plans such as reductions in greenhouse gases. The commitments are assumed to be implemented in a 'cautious manner' to reflect their non-binding character and uncertainty of how are to be put into effect.

Exhibit A3



To estimate Australian export volumes for thermal coal and uranium the report has used the same approach as above for the hard non-energy minerals. Over the short term, the analysis in the report has aligned the export volumes with the current project pipeline. There are many thermal coal projects in the pipeline and so even under the base case Australia’s exports are forecast to increase market share from 2.5% to 3.3% of total global consumption from 2010 to 2015. The High and Low Cases represent a range of plausible outcomes around the Base Case, aligned to the project pipeline over the short term. Over the medium term (2015 to 2020) it has been assumed that Australia will maintain market share under the Base Case, gain market share at a rate of 3% per annum under the High Case and lose market share at 3% per annum for thermal coal and 1.5% per annum for uranium under the Low Case⁸¹. Over the long term, 2020 to 2030, it has been assumed that Australia maintains share under all cases.

World LNG demand growth is expected to remain strong over the outlook period, driven by the growth in global demand for gas and LNG’s increasing share of primary gas demand (Exhibit A4). As discussed in section 5.1, Australia has a large proportion of the current global pipeline of LNG projects with massive projects such as Curtis in Queensland and Gorgon, off the north-west coast of WA. The report therefore models Australia increasing its export share under all scenarios. Volumes are expected to increase sharply from around 2014 once many of the large projects start producing. Australian exports are expected to increase in share of total global demand from the current 10.2% to 27.3% over the next 10 years under the Base Case scenario. Under

⁸¹ A slower annual deterioration rate was assumed for uranium to be consistent with the short-medium term trend based on the current project pipeline.

the High Case Australian exports increase to 32.7% and under a Low Case to 21.8% of total global demand by 2020. From 2020 to 2030 it has been assumed that Australia maintains share under all cases. Very few analysts estimate an explicit LNG price so this report has estimated the implied Free on Board (FOB) LNG price based on the consensus US (Henry-Hub) gas import price as shown in Exhibit A5.

For crude oil this report has conservatively assumed that export volumes will remain flat over the outlook period across all scenarios. This is equivalent to maintaining a constant market share for Australian exports in the global market as the forecast growth of demand for oil over the outlook period is almost zero. In a similar way to gold, Port Jackson Partners sees no reason to expect export volumes to decline as current reserves are more than sufficient to maintain volumes over the outlook period. This report therefore has not assumed any market share loss in the Low Case.

Exhibit A4

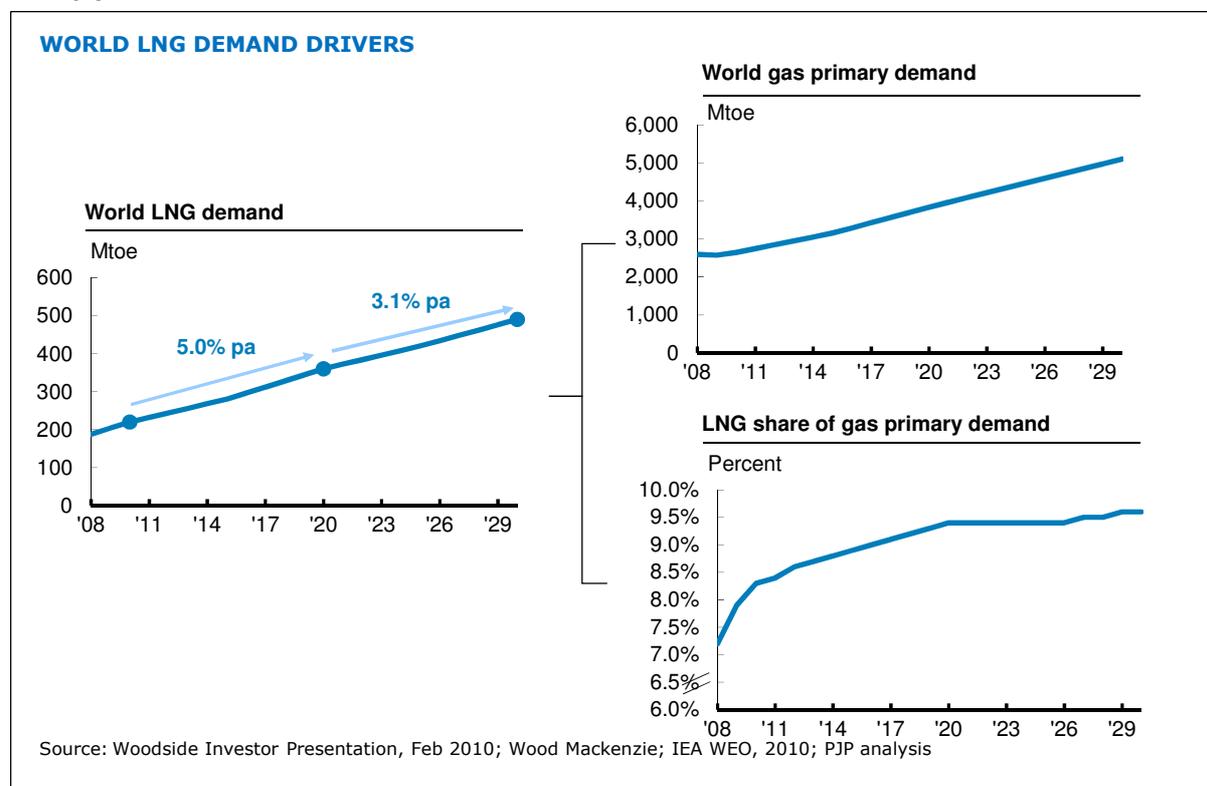
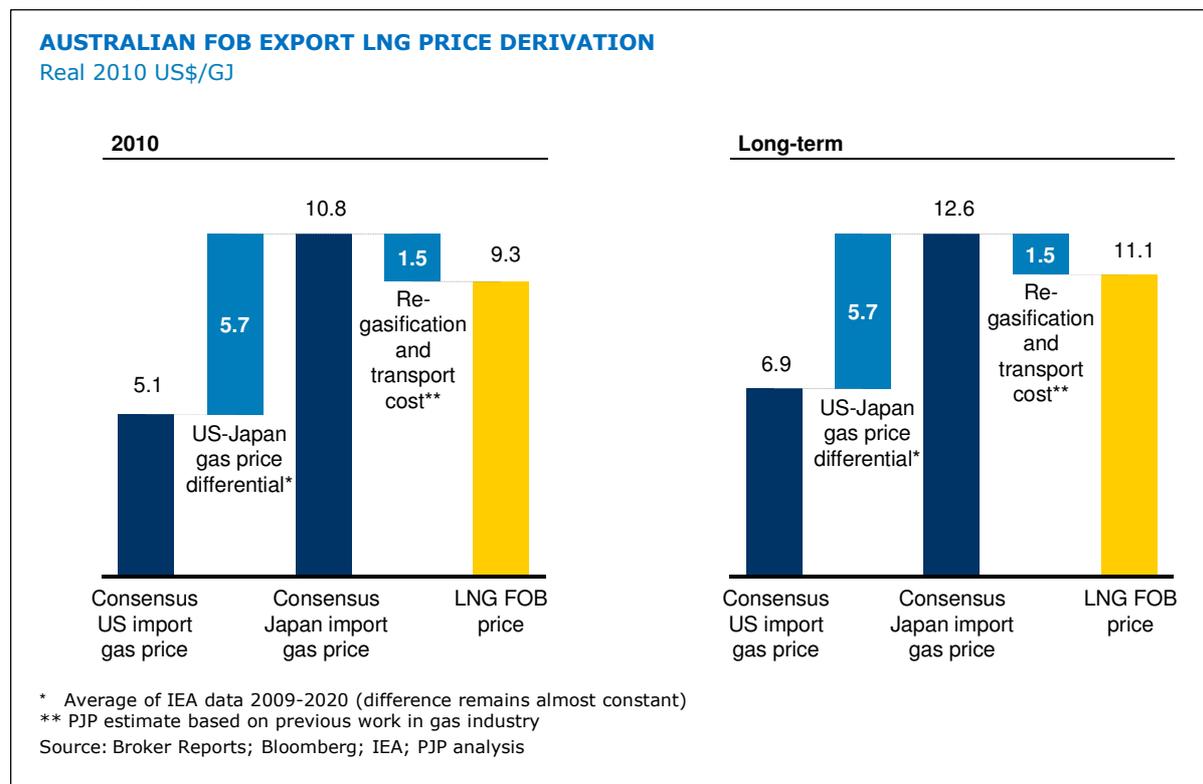


Exhibit A5



A1.2. Soft commodities

This report has used a slightly different approach to estimating export revenues and the required supporting investment for soft commodities compared to the approach outlined above for minerals.

Export revenues

The report has modelled future export revenues driven by forecast prices and Australian production volumes available for export.

Forecast prices: the report has used the agricultural commodities price index forecast developed by the World Bank, converted to Australian dollar terms. As livestock and crops price movements have been very similar historically, it has been assumed this trend continues in the future. The price forecasts do not vary by scenario, but exchange rate forecasts vary as outlined above for hard commodities.

Australian production volumes for export: Global demand for soft commodities will continue to grow driven by increasing wealth and the change in diet to protein rich foods, as discussed in detail in section 7.3. In modelling Australia's soft commodity export volumes, however, the key determinant is productivity improvements. This is a different approach to that used for hard commodities where the report estimated Australia's market share of global demand. Exports represent the difference between production and domestic consumption, and for the purposes of the valuation we have assumed that domestic consumption grows at population growth rates in Australia.

Australia's production capacity of agricultural commodities is driven by the supply of land and water, and by productivity improvements.

Supply of land and water: There is the potential for Australia to be able to bring some additional land and water into production in Northern Australia. It is also possible that the supply of land and water may be reduced through degradation, and the enactment Murray-Darling Basin Buyback Scheme (which plans to rebalance the allocation of water from irrigation toward environmental assets). On balance, it has been assumed that the supply of land and water remains constant over the next 20 years.

Productivity improvements: Productivity improvements can be achieved within a given soft commodity or through switching between soft commodities. Port Jackson Partners has based its Base Case productivity growth estimates on long-term historical trends, adjusted for droughts (no droughts assumed over the outlook period) and potentially higher investment in R&D, which has been falling in recent years. The Low and High Case outcomes provide a range of plausible productivity growth rates while the Do Nothing Case provides a reference case where there are no productivity gains (Exhibit A6).

Required supporting investment

In modelling this report, Port Jackson Partners has only considered the capital expenditure required to support soft commodity exports, rather than that required for total production. It has therefore scaled total investment by the proportion of total production which is exported.

Under the Base Case scenario, it has been assumed that investment in agricultural commodities continues to grow at the average historical growth rate of 1.6% per annum (cumulative average between financial years 2003 and 2009). Under the Low Case, it has been assumed that investment remains at current levels (i.e. 0% growth per annum) over the outlook period, while in the High Case, growth in investment is slightly higher than the base case at 2.0% per annum. In the Do Nothing reference case investment is reduced to replacement capital expenditure only, which is approximated using historical depreciation costs.

Exhibit A6

PRODUCTIVITY GROWTH ASSUMPTIONS FOR AGRICULTURAL COMMODITIES			
Scenario	Productivity growth 2010-30		Comments*
	Crops	Livestock	
	Percent per annum		
Low	1.75%	0.75%	<ul style="list-style-type: none"> • Livestock estimate equivalent to FY04-FY10 cumulative average agricultural productivity growth • Crops estimate 1% above livestock (based on historical experience)
Base	3.40%	2.40%	<ul style="list-style-type: none"> • Livestock estimate equivalent to 1% above long-term, 30-year, cumulative average of agricultural productivity growth. The 1% lift represents adjustment for droughts and a potential for higher R&D spend going forward • Crops estimate 1% above livestock (based on historical experience)
High	4.60%	3.60%	<ul style="list-style-type: none"> • Livestock estimate equivalent to FY94-FY10 cumulative average agricultural productivity growth • Crops estimate 1% above livestock (based on historical experience)
Do Nothing	0.00%	0.00%	<ul style="list-style-type: none"> • No productivity growth assumed in this reference scenario

* Average historical growth rates exclude drought years

Source: ABARE Commodity report, 2010, ABS, PJP analysis

A2. Employment impact

Under the Base Case it has been estimated that around one million new full-time employees will be required in commodities and commodities support service sectors over the next 20 years. This estimate is based on three factors:

1. It has been estimated that an additional 758,000 full-time employees will be required in mining, agriculture and a selection of support services over the next 20 years above today's level of employment (Exhibit 4.4). To estimate this number, it has been assumed that employment in commodities and commodities support service sectors will grow in line with commodities production revenue (adjusted to long-term prices). The report has not assumed any labour productivity improvement over the outlook period.
2. The number of new employees required in these sectors will be higher than this figure as some of the 690,000 employees currently in these sectors will leave over the next 20 years, either leaving the workforce all together or moving to other industries.
3. The 758,000 estimate does not account for a number of significant commodity support services in sectors such as energy, water and many professional services (e.g. legal and finance).

ABOUT PORT JACKSON PARTNERS

Port Jackson Partners is a consulting firm providing advice to CEOs, boards and senior managers to help set corporate direction, define business strategies and develop their organisations. The firm was founded in 1991 by two former Directors of McKinsey & Company and has grown over the past two decades into one of Australia's most respected strategy consulting firms.

Port Jackson Partners is distinctive in five important ways:

- It delivers insight through idea-intensive problem solving. It is sharply focussed on solving clients' most important strategic problems.
- Its work has real impact. It targets critical issues, and provides distinctive solutions that address clients' unique circumstances. It helps clients make the right choices to create successful, strong, growing businesses.
- Its senior, high calibre teams bring real experience. Its Partners are deeply and directly involved in leading day-to-day problem solving.
- It works hard to build long-lasting relationships based on consistent high performance. It is expert in working in complement to clients' own expertise and resources.
- Its approach allows it to match consulting efforts with changing clients' needs over time.

ANGUS TAYLOR

Angus Taylor has been a Director of Port Jackson Partners since 2002. Angus has extensive experience working with senior executives, boards and their organisations to shape and implement their strategic agenda. He works across a range of sectors, including resources, industrials, service companies, agriculture and the public sector. Much of his work in recent years has focused on helping to facilitate growth strategies through a combination of transactions, organic growth and organisational redesign. As a result he has worked on a number of the highest profile Australian corporate transactions and projects in recent years.

In the course of his work, he has helped his clients deal with many of the most pressing issues they face, including how to respond to the rapid growth of the developing world, how to think about emerging regulation, and how to respond to fast evolving markets for capital, products and talent.

Outside of his consulting work, Angus has active interests in a number of companies in agriculture and professional services, and he sits on the Council of St Andrew's College at the University of Sydney. He regularly teaches executive education courses in strategy and strategy implementation for a range of Universities, including UNSW and Duke University.

Angus has a MPhil in Economics (Rhodes Scholar), Oxford University and has degrees in Economics and Law, Sydney University (University Medal in Economics). Prior to joining Port Jackson Partners he was a Partner at McKinsey and Company.

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